Korean tonogenesis, /s/, and the Contrastivist Hypothesis

MOT

March 9-11, 2012

Yoonjung Kang

“We don’t want people to think that there is some sort of cult going on around here.”

B. Elan Dresher

ca. 2005, at an MOT dry run meeting

Phonology-Phonetics interface

- Contrastivist Hypothesis (Hall 2007, Dresher 2009): Phonological rules/generalizations refer only to the features that are contrastive in the language
  - Limited Access to phonetics: No more features than necessary to distinguish all contrasting segments of the language.

  Cf. Alternative views on phonology-phonetics interface: Phonology may refer directly to phonetic details of speech sound ("phonetically grounded OT", "Articulatory Phonology", "Exemplar Model of phonology")

Redundant contrast

	i	o
[coronal]	+	-
[labial]	-	+
[high]	+	-

- Only one of the features is expected to be "active" phonologically.
- The other features are "enhancement" features (Steven and Keyser 2006, Hall 2011).

Korean obstruents

	Aspirated (heavily aspirated)	**Lenis (slightly aspirated)**	**Fortis (unaspirated)**
Plosives	/p^h t^h k^h c^h/	/p t k c/	/p' t' k' c'/
Fricatives	/s/		/s'/

- Three-way contrast in stops and affricates

  /tal/ 'moon' /t^hal/ 'mask' /t'al/ 'daughter'

- Two-way contrast in fricatives

  /si/ 'poem' /s'i/ 'seed'

Phonetic duality of /s/

Acoustic cue	/s/ patterns with aspirated or lenis category
VOT (s)	Unclear (long-ish VOT)
f_0 (Hz)	Aspirated (raised f_0)
H1-H2 (dB)	Compatible with both (high H1-H2)
Fricative duration (s)	Lenis (significantly shorter duration than fortis)
COG (Hz)	Lenis (significantly lower COG than fortis)

Kang et al. (2008)

Post-obstruent tensing

- Lenis → fortis/[-son]__

  /hak-**p**i/ → [hak**p’**i] ‘tuition’

  /hak-**p**^{h}a/ → [hak**p**^{h}a] ‘school (of thought)’

  *[hak**p’**a]

  /hak-**s**ɨp/ → [hak**s’**ɨp] ‘study’

Initial tensification

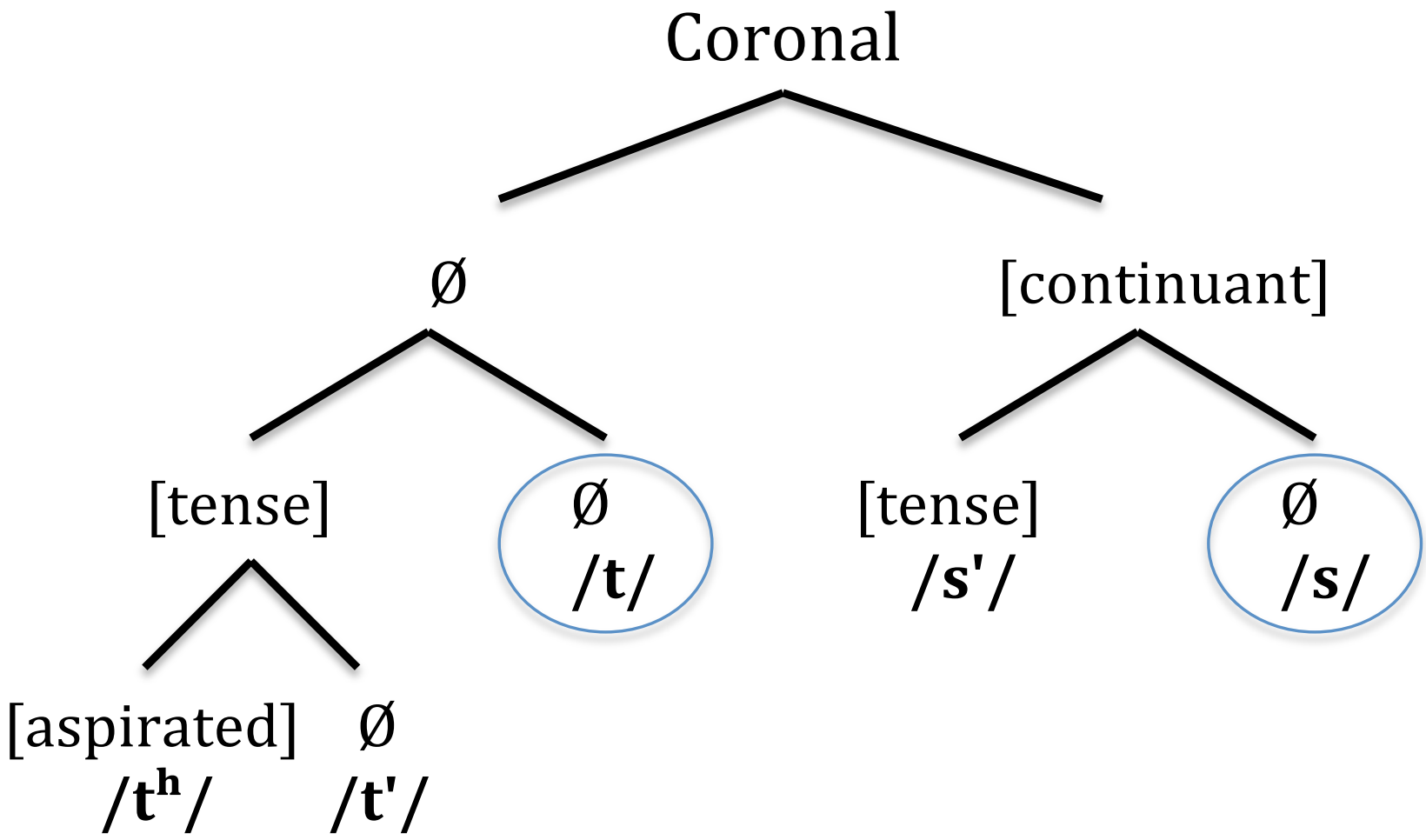
- Word-initial lenis > lenis ~ fortis

/**k**upta/ ~ /**k’**upta/		‘to grill’
/**p**ok’ta/ ~ /**p’**ok’ta/		‘to stirfry’
/**t**ak’ta/ ~ /**t’**ak’ta/		‘to clean’
/**c**okak/ ~ /**c’**okak/		‘piece’
cf. 16C	/kac^{h}i/ > /**k’**ac^{h}i/	‘magpie’
	/pulwhi/ > /**p’**uli/	‘root’
/**s**onaki/ ~ /**s’**onaki/		‘rain shower’
/**s**eta/ ~ /**s’**eta/		‘strong’

Sound symbolism

- Lenis: gentler, quieter,…
- Fortis/Aspirated: more intense
  - panc’ak ~ p’anc’ak ‘glittering’
  - piŋpiŋ ~ p’iŋp’iŋ ~ pʰiŋpʰiŋ ‘round and round’
  - saksak ~ s’aks’ak
  - sɛŋkɨs ~ s’ɛŋkɨs

Feature hierarchy



Aspiration

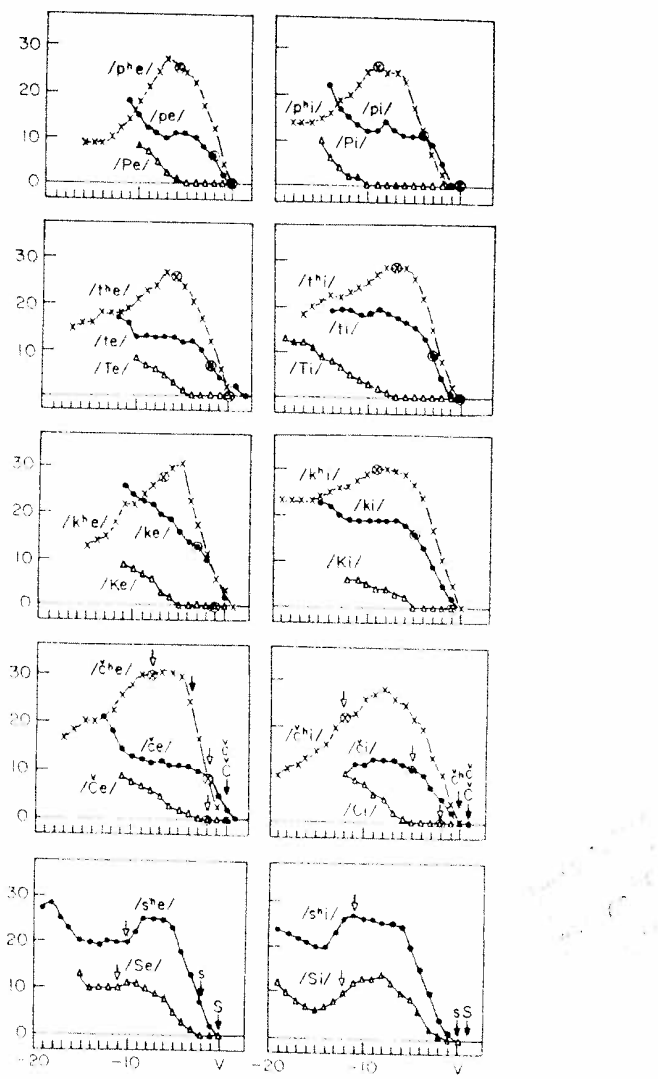
- /h/ + lenis, lenis + /h/ → aspirated

  /coh-ta/ [co**t͡ʰ**a] ‘is good’

  /kɬp-hata/ [kɬ**p͡ʰ**ata] ‘is urgent’

/s/ is [aspirated]?

- Kagaya (1974), Iverson (1983), Avery & Idsardi (2001)
  - Not subject to intersonorant voicing (but see Cho et al. 2002)
  - Wide glottal opening (but see H. Kim et al. 2008)
- Facts are disputed but it is fair to say that /s/ is more aspirated-like than regular lenis obstruents.



Temporal changes of glottal width for representative utterance samples of each type of the consonants in /CV/.

/s/ as aspirated: not unexpected

- Stevens and Keyser (2001): “In the case of fricatives, however, air must continue to flow through the supraglottal constriction, and consequently the default configuration for the glottis is somewhat spread.”
- Kingston (2011): “Voiceless fricatives are produced with a wide-open glottis (Lo̤fqvist & Yoshioka, 1980; Yoshioka, Lo̤fqvist, & Hirose, 1981), so they phonetically resemble the segments specified for these features, and that phonetic resemblance could be enough for them to pattern with the segments specified for [voice] or [spread glottis] in these sound changes.”

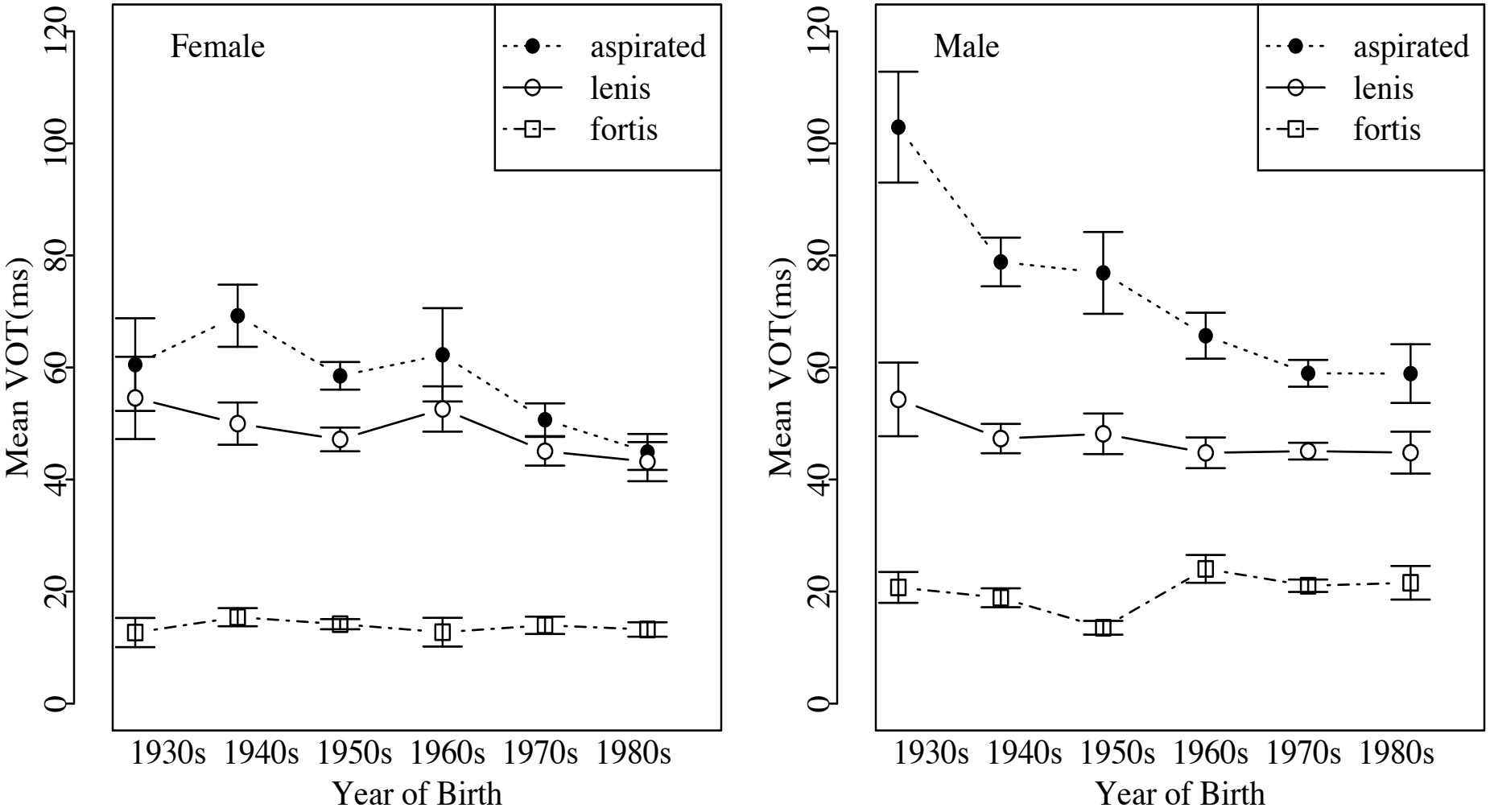
/s/ as aspirated: not unexpected

- Vaux (1998): Voiceless fricatives pattern with aspirated stops phonologically in Armenian, Greek, Pali, Sanskrit, Spanish, and Thai.

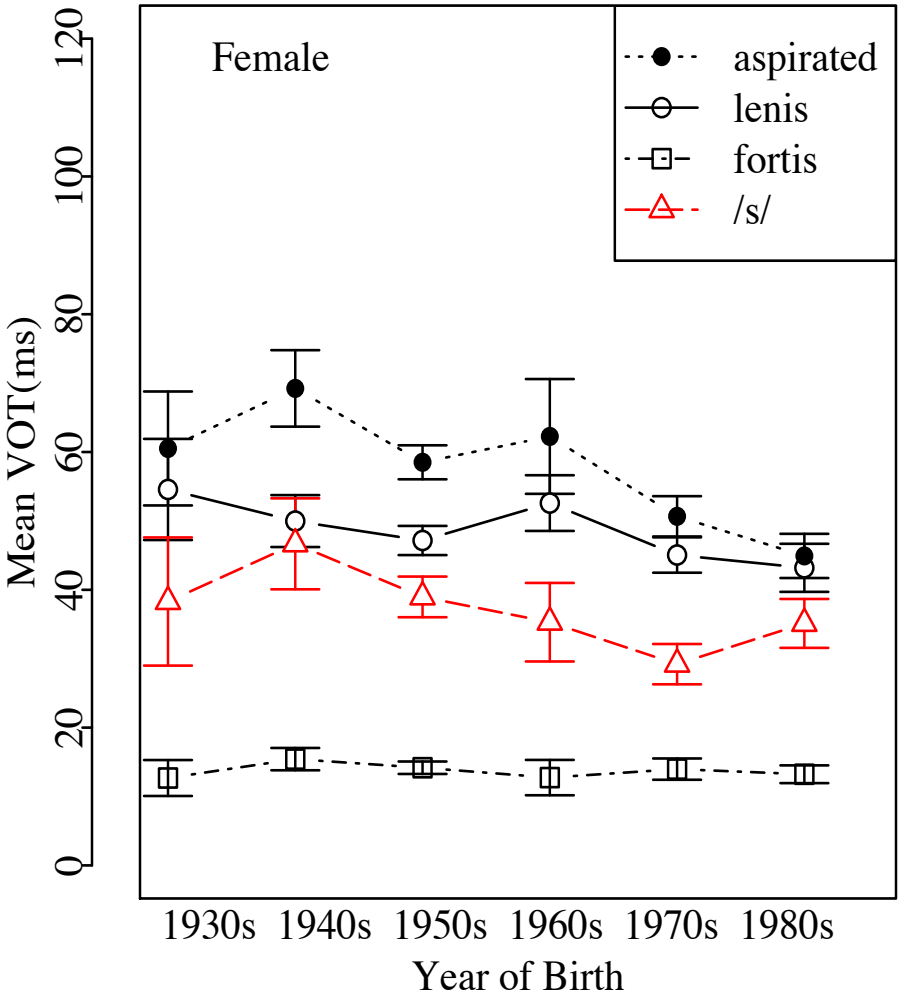
VOT merger in Seoul Korean

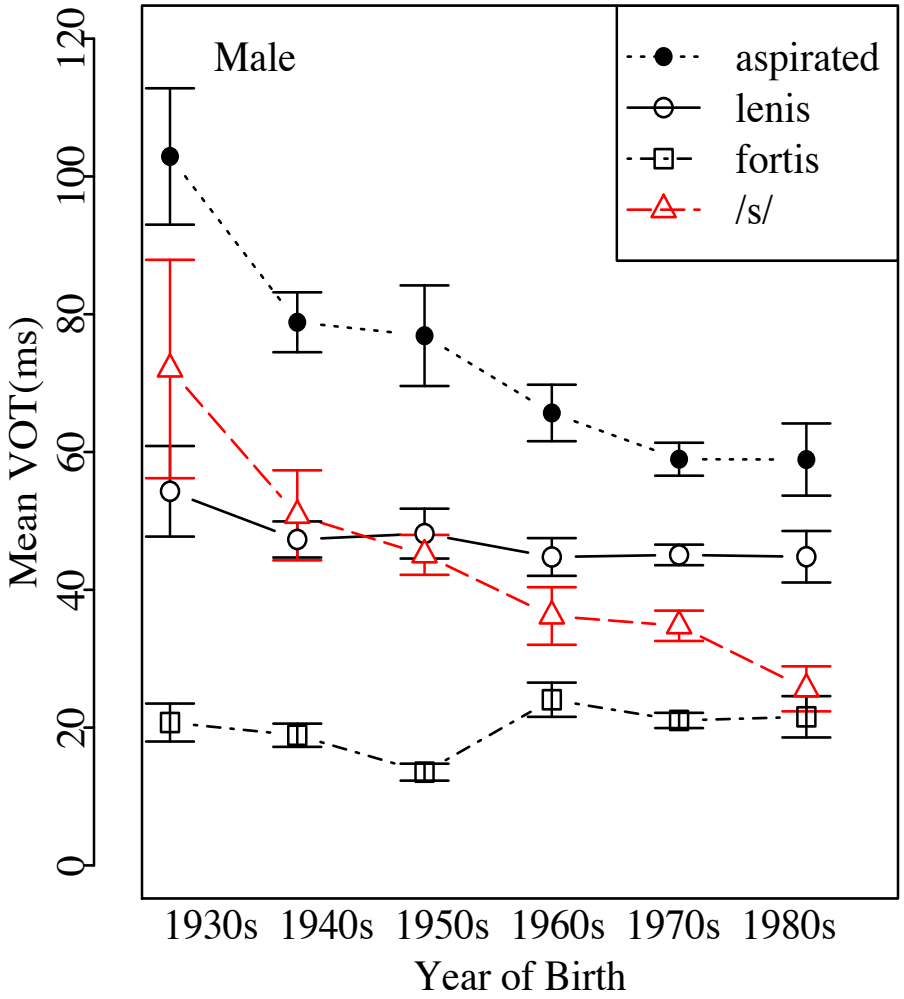
- VOT of aspirated stops are shortening to merge with that of lenis stops in younger speakers' speech (Silva 2006, Wright 2007, Kang and Guion 2008, Kang, et al. 2012) more in females than males (Oh 2011).
- VOT of /s/?
- NIKL (The National Institute of Korean Language) corpus (more about this later today)
  - Sentence-initial stops (9 from each of 117 speakers)

Stop VOT in NIKL



VOT of /s/ in NIKL





Rise of “tone” in Seoul Korean

- Accentual phrase boundary tones (Jun 1993, 1996)
  - LH: Default pattern

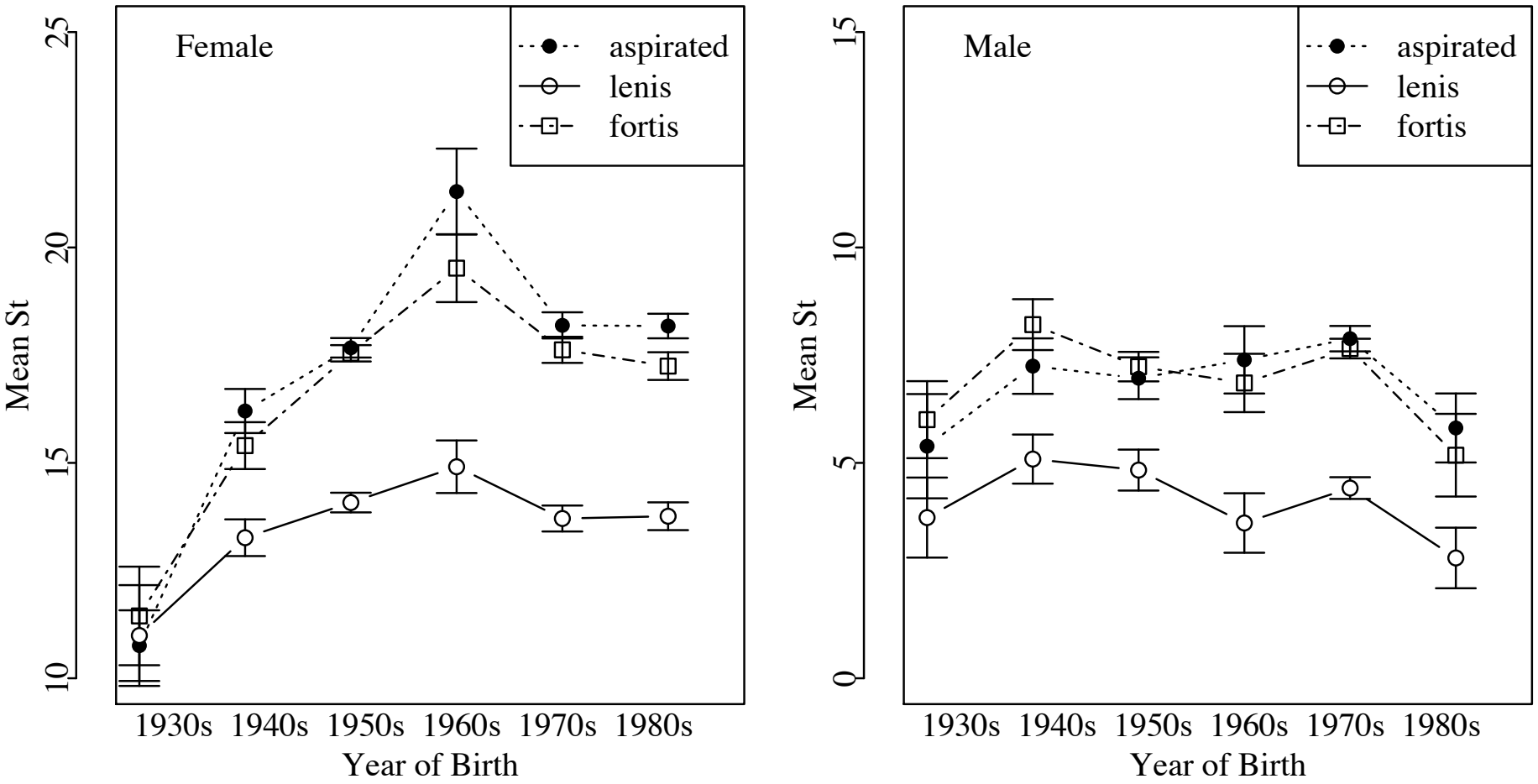
    L H L H

    $[\sigma\ \sigma\ \ldots\ldots\ \sigma\ \sigma]_{AP}$
  - HH: Initial C is fortis or aspirated.

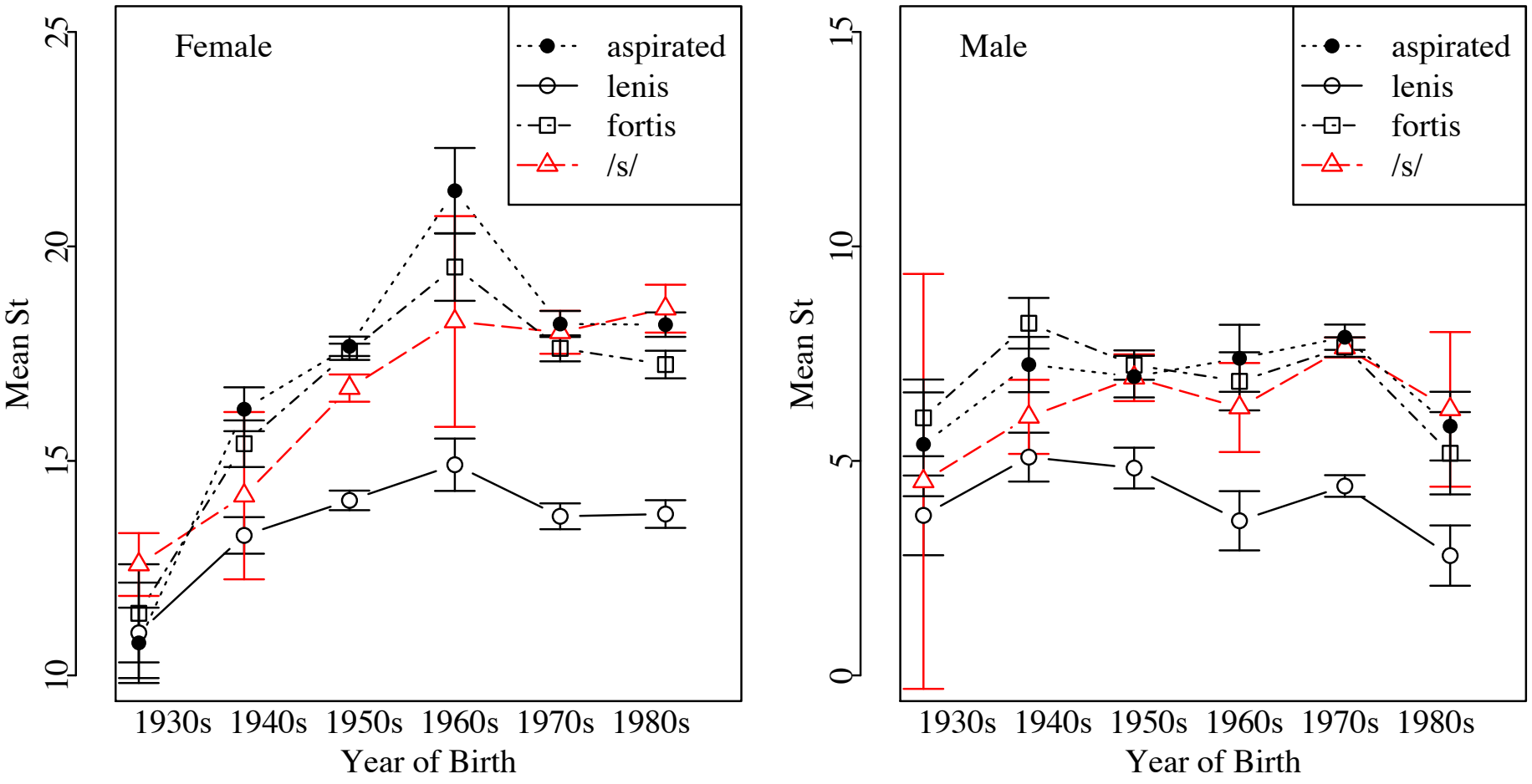
    H H L H

    $[\sigma\ \sigma\ \ldots\ldots\ \sigma\ \sigma]_{AP}$
  - /s/ (and /s’/): HH

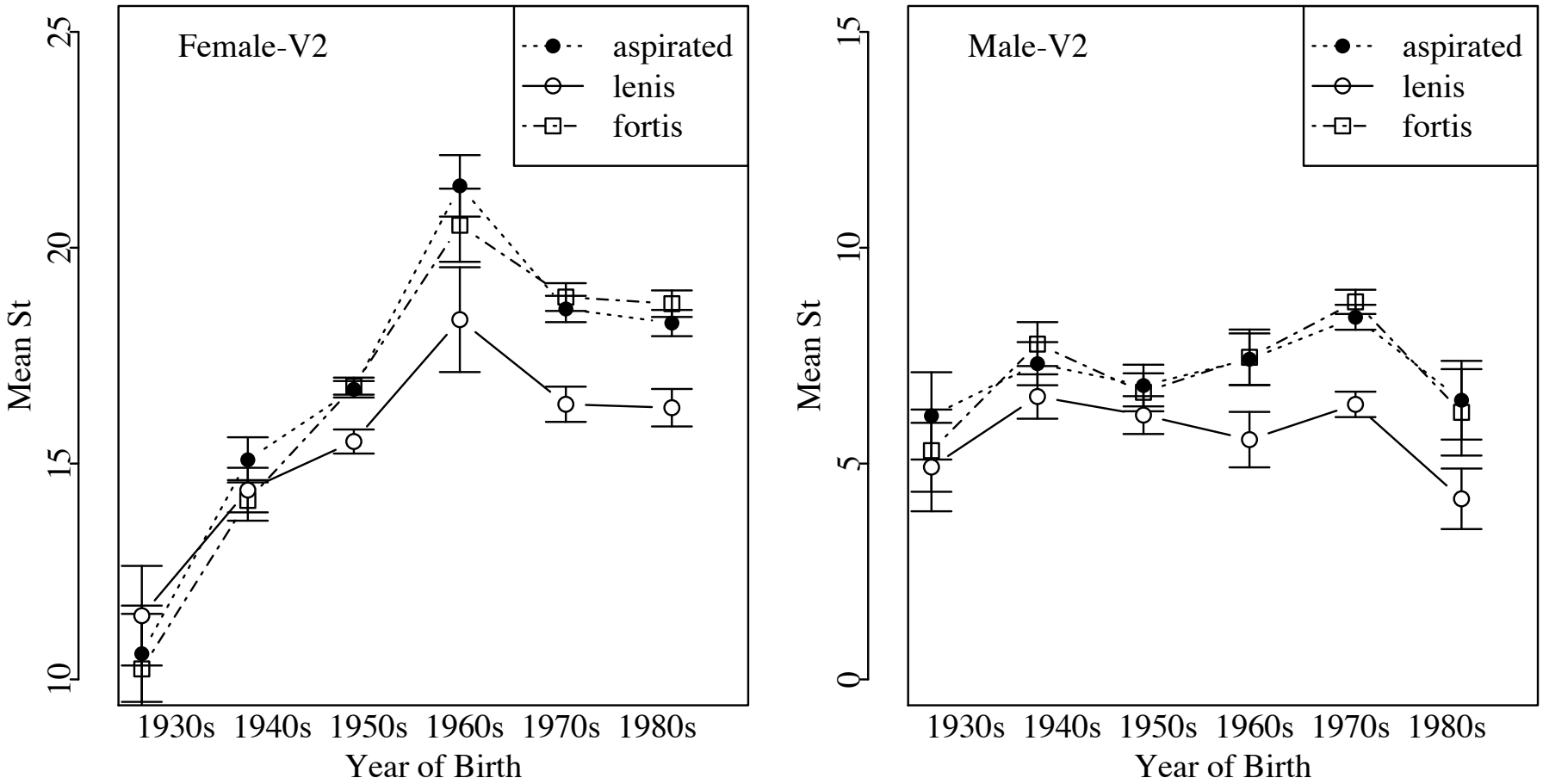
F0 in NIKL


Female
aspirated
lenis
fortis
Mean St
10
15
20
25
1930s
1940s
1950s
1960s
1970s
1980s
Year of Birth
Male
aspirated
lenis
fortis
Mean St
0
5
10
15
1930s
1940s
1950s
1960s
1970s
1980s
Year of Birth

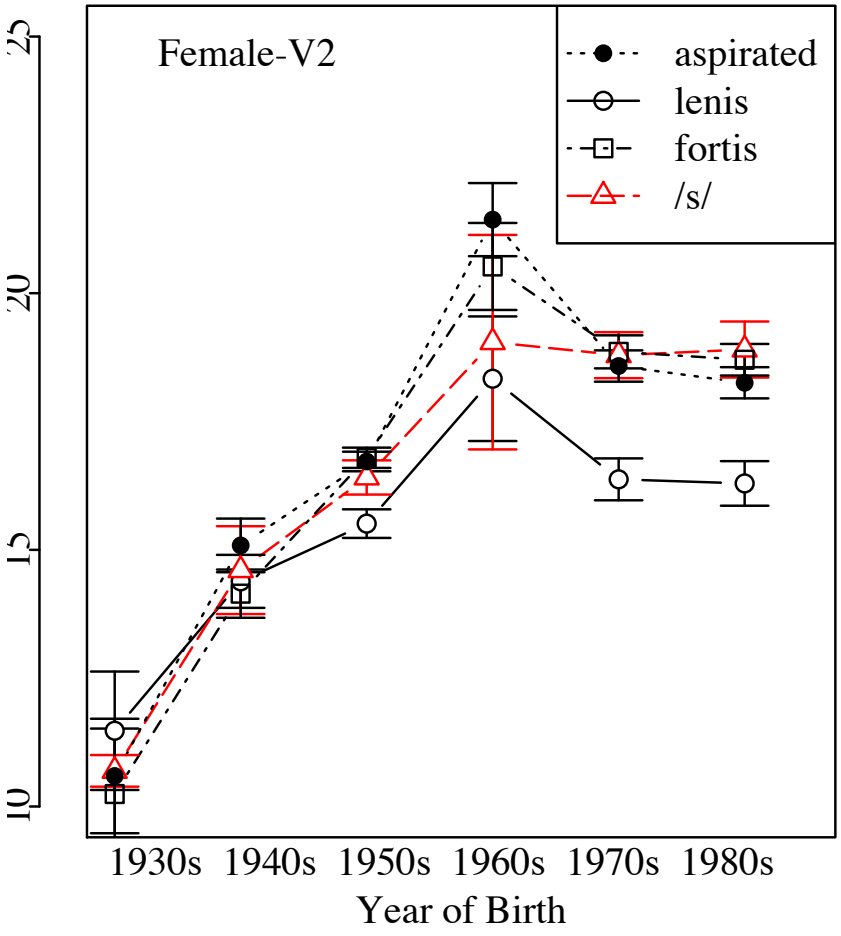
F0 of /s/ in NIKL

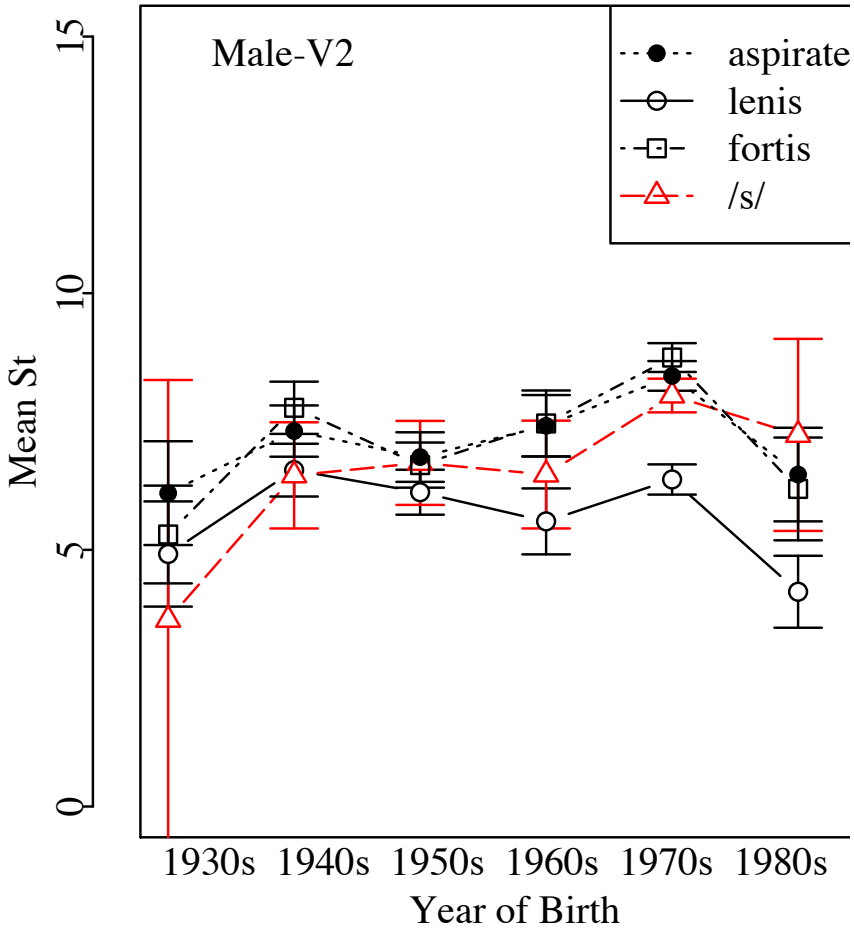


F0 on V2 in NIKL



F0 of /s/ on V2 in NIKL





“Phonologized”

- “Unlike in English and French, the phrase initial H tone in Korean is … ***phonologized*** [emphasis YJK].” (Jun 1996)
- /s/ acts like [aspirated].

Too many natural classes to account for

	t^h	t	t'	s	s'
[cont]				+	+
POT		+		+	
F0	+		+	+	+
ASP	+			+	

“Stand-in” features?

- length & quality in vowels → [tense]
  (cf. Rohany Rahbar 2011, Persian)
- [i] as [-round] triggering assibilation in Finnish
- This works for cases where you have a feature system that gives you the natural classes you want but the content of features is not quite right.
- But, in the current case, we are having trouble getting the natural classes that we want.

Post-lexical phonology

- VOT lowering and F0 raising are conditioned by Accentual Phrase boundaries.
- Accentual Phrases are available only in post-lexical phonology.
- It seems reasonable to assume that the Contrastivist Hypothesis does not apply to post-lexical phonology, where structure preservation is not upheld.

Life-cycle of phonology (Kiparsky,nd)

"Sound change can be assumed to originate through synchronic variation in the production, perception, and acquisition of language, from where it is internalized by language learners as part of their phonological system. […] These phonetic implementation rules may in turn become reinterpreted as phonological rules, either postlexical or lexical,[…] at which point the appropriate structural conditions on them are imposed by the principles governing that module. In the phonologized stages of their life-cycle, rules tend to rise in the hierarchy of levels, with level 1 as their final resting-place."

Prediction of the Contrastivist hypothesis

- A new phonological rule may be blocked from moving into the lexical level if there are other processes that use up the contrastive feature specifications.
- Alternatively, the new rule may be adopted at the expense of others.
  - A child learns F0 rule first and then may "ignore" the others as their feature specification does not allow the possibility.

Stay tuned!