Phonological development in the midst of phonological change

通時的音韻変化の渦中での音韻発達

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Plan for this talk

**Goal**: to explore some questions about the relationship between phonological development (音韻発達) and diachronic phonological change (通時的音韻變化)

- Review (some of) what’s known about 音韻発達
- Review (some of) what’s known about 音韻變化
- Outline the questions that we will ask about the relationship between them.
- Present two case studies that use a subset of data from the paidologos project to explore these questions

**To begin**: introduce the paidologos project: a cross-linguistic study of phonological development
What is the paidologos project?

- Ongoing comparison of phonological development across languages, begun in 2003 with data collected for Cantonese, English, Greek, and Japanese. Later: Korean, Mandarin & Min Nan Chinese, French, Drehu
- Productions elicited of analogous sounds in analogous word positions across languages, using same task and same recording equipment.
- Large number of children (100+) for each target language, covering same age range (2 through 5 years).
- Transcribed using comparable transcription protocol.
- Recordings of initial four languages available at http://childes.psy.cmu.edu/data/PhonBank/
The paidologos elicitation task

- Target consonants in word-initial position in familiar words.
- Word productions elicited in a picture-prompted repetition task.
- Child hears and repeats female voice ...

target: [doa] ドア
The paidologos elicitation task

• Child hears and repeats female voice saying target word in ...

• Rewarded by duck walking up ladder.

target: [to:fu] 豆腐
The paidologos transcription protocol

Two-stage transcription protocol for: (1) correct or not and (2) ...
The paidologos transcription protocol

If at stage (1) judged not correct, then (2) perceived substitution
Includes the progressive mastery of even the most difficult sounds of the ambient language.

Often evident in stereotypical early mispronunciations:

Palatalization (and assimilation) of stops and fricatives

- [kjimono] 着物 /kj/ pronounced as [tɕ]
- [semi] セミ /s/ pronounced as [ɕ]

Devoicing or nasalization of voiced stops

- [doa] ドア /d/ pronounced as [t]
- [gasu] ガス /ɡ/ pronounced as [k]
- [donguri] どんぐり /d/ pronounced as [n]
Why are [d] and [g] difficult for children?

The successful production of a stop involves release of air pressure that builds up in oral cavity after ....

momentary seal at nasopharynx to block air passage through nose coupled with momentary seal in oral cavity to block air passage through mouth.

Figure 1 in Vorperian, Kent, Lindstrom, Kalina, Genry, & Landell (2005): mid-sagittal MRI of 7-month old female.
Why do children substitute \([t]\) and \([k]\)?

Voicing happens when air flow pushes vocal folds apart. Requires air pressure in oral cavity < pressure below glottis

Voiceless stop variants \([t, k]\) happen if air pressure in oral cavity builds up to impede air flow across the glottis.
Why do children substitute [n] and [ŋ]?

Voicing requires air pressure below glottis > oral cavity

nasal variants [n, ŋ] if nasopharynx partially opened to prevent air pressure build-up in oral cavity so that air can continue to force air through the glottis
Progressive mastery of Japanese [d] and [g]

Productions of /d, g/ as [t, k, n, η] decrease with age (months)
At 2 and 3 years of age, children who speak French as a first language also substitute [t, k] or [n, ñ] for /d, g/ (Allen, 1985).

At 3 years of age, children who speak Thai as a first language, produce adult-like /t/ (and /tʰ/), but substitute something more like [t] for /d/ (Gandour, Petty, Dardarananda, Dechongkit, & Mukngoen, 1986).

Children who speak Min Nan Chinese (“Taiwanese”) produce adult-like /k/ in their first words, but do not produce adult-like /kʰ/ until after 2 years, and substitute something like [k] for /ŋɡ/ until after 3 years of age (Pan, 1993).
Continuous measures possible

• When the phonetic parameters involved are well understood, phonological development can also be measured quantitatively.

• Paradigm example: Phonetic parameter of voice onset time (VOT) provides a quantitative measure of:
  • “degree of voicing” for target /d, g/ in languages such as French, Thai, and Min Nan Chinese, ...
  • “extent of aspiration” for target /tʰ, kʰ/ in languages such as Cantonese, Thai, Min Nan Chinese, English, and Korean.

• Phonological development evident then in progressively more adult-like values for VOT that augments evidence from transcription.
Voice onset time as a measure of voicing

Duration of interval between burst & voice onset (Lisker & Abramson 1964)
VOT and acquisition of voicing contrasts

Category with short lag VOT first, because it requires the least precise articulation (Kewley-Port & Preston 1974).

- Short lag achieved by glottis opening at any time during the oral occlusion: easy to produce!

<table>
<thead>
<tr>
<th>Language</th>
<th>Lead</th>
<th>Short lag</th>
<th>Long lag</th>
</tr>
</thead>
<tbody>
<tr>
<td>English (Macken &amp; Barton 1980a)</td>
<td>voiced</td>
<td>voiced</td>
<td>voiceless</td>
</tr>
<tr>
<td>French (Allen 1985)</td>
<td>voiced</td>
<td>voiceless</td>
<td></td>
</tr>
<tr>
<td>Cantonese (Clumeck et al 1981)</td>
<td></td>
<td>unaspirated</td>
<td>aspirated</td>
</tr>
<tr>
<td>Thai (Gandour et al 1986)</td>
<td>voiced</td>
<td>unaspirated</td>
<td>aspirated</td>
</tr>
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</table>
VOT and acquisition of voicing contrast

- English seemed to be an exception, until VOT explained transcribed [d, g] for /t, k/ substitutions in (Kewley-Port & Preston 1974, Macken & Barton 1980).

![Graphs showing VOT (ms)](image)

Cantonese-speaking adults

English-speaking adults

VOT (ms) [Figs. 2.3 & 4.2, Kong 2009].
Phonological development, summarized

• Includes the progressive mastery of even the most difficult sounds of the ambient language.

• Often evident in stereotypical early mispronunciations, particularly of more difficult sounds such as:
  • Fricatives and affricates, particularly the dentals.
  • Voiced stops, fricatives and affricates.

• Development evident in the way in which early mispronunciations give way to more adult-like correct pronunciations as the child matures.

  Can view phonological development as phonological change early in the lifetime of an individual speaker.
phonological change

• Defined as change in pronunciation norms over the history of a speech community.
• Evident in differences in pronunciation of target sounds for members of a speech community where ...
  • recordings are available at two or more different times ("real time" studies)
  • speakers of many different ages can be recorded ("apparent time" studies)
• Evidence best when two types of study can be combined, as in the following changes in Tokyo:
  • Kato (1983), Hibiya (1986), et al., on [ŋ] ~ [ŋ]
  • Takada (2011) on [b, d, g] ~ [p, t, k]
Study of Nezu speakers showed that the proportion of [g] productions for medial /g/ was smaller for older speakers.
有声破裂音の半有声音化 (Takada, 2012)

Ueno’s recordings   VOT (ms)   Takada’s recordings
Neogrammarian distinction between ...

- **(Regular) sound change** -- diachronic change in pronunciation norms for a target sound that is:
  - transmitted in all word forms containing the target sound in the relevant phonetic context
  - associated with continuous differentiation across age groups in the speech community

- **Borrowing** -- diachronic change in pronunciation norms for a target sound that is:
  - attributed to the influence of exposure to another speech community
  - associated with a potentially abrupt differentiation between speakers with and without that exposure
Labov’s (2007) description

language internal change
• regular “transmission”
• “generated by the process of INCREMENTATION, in which successive cohorts and generations of children advance the change beyond the level of their caretakers and role models, ...”
• “... and in the same direction over many generations.”

importation of elements from other systems
• potentially irregular “diffusion”
• can show discontinuity, because it typically happens when adults come into contact with speakers from the other systems.
Three speakers who were outliers in the relationship of proportion of [g] productions to age were the ones with most exposure to the Yamanote variety.
What sound patterns do children learn? 
To which patterns are they exposed? 
If the change is gradual, there are many possibilities ...
  • mostly forms that are closer to the older earlier variants
  • forms that are closer to the newer “changed” variants
  • a variety of forms along a subset of the range
  • a variety of forms along the entire range
What are the possibilities if the change is abrupt?
☞ Is children’s phonological development affected by the type of diachronic change that is going on?
Two case studies

Study 1: Seoul Korean lax stops

• Changing from mildly aspirated stops (with intermediate VOT) to breathy voiced stops with accompanying low tone

• Example of continuous internal sound change by transmission.

Study 2: Dongbei sibilant fricatives

• Two-way contrast between apical vs. laminal palatal replaced by standard Mandarin three-way contrast.

• More recent emergence of “feminine accent” variant of alveolo-palatal.

• Example of imported lexical contrasts and social marker.
Case study 1: Korean stop phonation types

Three-way contrast among three phonation types:

- **Tense stops**
  will be written here as [p’, t’, k’], as in: [t’al.gi] (meaning: いちご)

- **Lax stops**
  will be written here as [p, t, k], as in: [ta.ram.d3wi] (meaning: リス)

- **Aspirated stops**
  will be written here as [pʰ, tʰ, kʰ], as in: [tʰa.d3o] (meaning: ダチョウリス)
[tha.d3o] ダチョウ
Three acoustic measures

VOT (measure of aspiration / voicing)

**F₀** (measure of tone)

H₁-H₂ (measure of voice quality)

VOT (sec.)

burst

voice onset

F₀ = 1/interval

20ms

first harmonic (H₁)

H₁-H₂ (dB)

second harmonic (H₂)
Korean stop phonation types 50 years ago

Word-initial phonetic parameter values:
• tense stops with short VOT values (6 to 18 ms)
• lax stops with intermediate VOT values (~2 to 60 ms), described as “mildly aspirated” in KSL textbooks
• aspirated stops with long VOT values (~100 to 115 ms) [Kim, 1965; Weitzman & Han, 1965, 1967; Hardcastle, 1973; Kagaya, 1974]
• lax stops also differentiated by low Fo [Kagaya, 1974]

Word-medial phonetics (where no Fo difference):
• tense stops had long closure whereas lax stops had short and often voiced closures
Korean stop phonation types today

[Fig. 1 from Silva, 2006]
VOT contrast in production

[Fig. 2 from Silva, 2006]
From Figs. 1 and 2 in Kang & Guion, 2008:

- **Fo (Hz)**
  - Older speakers: $p^h$, $p'$, $p$
  - Younger speakers: $p^h$, $p$

- **VOT (ms)**
  - Older speakers: $p^h$, $p$
  - Younger speakers: $p^h$, $p'$

[conv, citn, clear]
Adult productions in the paidologos data

[Fig. 2 in Kong, Beckman, & Edwards, 2011]
Child productions in the paidologos data

[Fig. 3 (top) in Kong, Beckman, & Edwards, 2011]
Child productions in the paidologos data

[Fig. 3 (bottom) in Kong, Beckman, & Edwards, 2011]
Study to determine perceptual weights

Seoul speakers listen to CV extracted from words and identify target by clicking on jamo for one of the three consonants:

They then rate the goodness of the production by clicking somewhere on a line from “bad” to “good” exemplar of the identified target:
Perception results analyzed

- Mixed effects logistic regression models to estimate log-likelihood that production was identified as ...
  1. tense (as opposed to lax or aspirated)
  2. lax (as opposed to aspirated)
   as a function of standardized acoustics measures.
- Separate models for stimuli from productions by:
  1. adult women (who are leading the sound change)
  2. adult men
  3. children
  so that we can use normalized ranges that are appropriate for the talker type.
Perception of adult lax (versus aspirated)

Probability of "lax" judgment

- VOT (ms)
- Fo (Hz)

[Fig. 8 in Kong et al., 2011]
Perception of child lax (versus aspirated)

[Fig. 8 in Kong et al., 2011]
Summary, case study 1

• Change in pronunciation of Seoul Korean lax stops is a continuous (internal) change by transmission.
• Adult Seoul speakers of all ages have participated in the change production, with women leading the change, although ...
• Perceptual weights by older adults slower to change.
• Productions by children are not at leading edge, but instead are more like productions by adult men.
• Perceptual weights by adult listeners show evidence of listening with production differences in mind.
• Perception of children’s productions supports evidence from production that young children are conservative.
Case study 2: Mandarin sibilants

- The PRC standard language has a 3-way contrast among:
  1. dental [s]
  2. alveolo-palatal [ɕ], similar to Japanese sibilant [!] 
  3. post-alveolar (“retroflex”) [ʂ], similar to English sibilant [!]
How can we measure fricative development?

- Both English and Japanese have a contrast between alveolar / dental [s] and postalveolar / alveolopalatal [ʃ].
- English [s] mastered earlier than [ʃ] and [s] substitutes for [ʃ] (Smit et al. 1991) -- i.e., a “fronting” stereotype.

  - shoe
  - safe

- Japanese [ʃ] mastered earlier than [s] and [ʃ] substitutes for [s] (Nakanishi et al., 1972) -- i.e., a “backing” stereotype.

  - shukurimu ‘cream puff’
  - semi ‘cicada’
Articulation of Japanese [s] and [ʃ]

- Whereas English [s] is alveolar and often apical, Japanese [s] is lamino-dental [panel (a) in figure].
- Whereas English [ʃ] is a rounded apical postalveolar, Japanese [ʃ] is a lip-spread alveolopalatal [panel(b)].

Figure 2 (Japanese sibilants) from Toda and Honda (2003).
Acoustic measures for sibilant contrasts

spectral moments
• Choose a representative window during the fricative’s turbulent part.
• Calculate a spectrum and treat it as a pdf, by ...
• Calculating moments, such as the mean (or centroid) frequency formant transitions
• Measure $F_2$ at voice onset
Acoustic measures of sibilants

- Short front cavity of [s] in both languages: higher centroid value for [s] relative to value in [ʃ]
- Small back cavity in Japanese [ʃ]: high F2 frequency value at voice onset in following vowel.
- Phonological development examined by looking at phonetic measures:
  - undifferentiated values in the youngest children that reflects stereotypical substitution patterns
  - progressively more adult-like values in older children
Measures applied to children’s productions

Japanese- versus English-speaking

<table>
<thead>
<tr>
<th>Measures</th>
<th>Description</th>
<th>Target: M1 (Hz)</th>
<th>Target: M2 (Hz)</th>
<th>Target: M3 (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>centroid</td>
<td>in Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F2 onset</td>
<td>in Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>st. dev.</td>
<td>in Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 6.3 from Li (2008).
Lexical contrast
• Based on Beijing contrast among [ɕ], [s], [ʂ]

Social variation
• Beijing vernacular “feminine accent”: [ʂɨ] or [ʂ] variant of (ɕ), reported in Middle School girls as early as the 1920s & 1930s by Jinxı Li, Y. R. Chao [Cao, 1986; Hu, 1991].
Articulation of Mandarin [s], [ɕ], [ç]

(a) dental [s] laminal, with shortest front cavity 
(b) palato-alveolar [ç] has long constriction and hence both a large front cavity and a short back cavity (similar to Japanese [ʃ] in 尻尾 and シャンプー) 
(c) post-alveolar [ɕ] has large front cavity (similar to English [ʃ] in ship and shampoo)

Figure 3 in Toda and Honda (2003).
Acoustic measures for sibilant contrasts

spectral moments
• Choose a representative window during the fricative’s turbulent part.
• Calculate a spectrum and treat it as a pdf, by ...
• Calculating moments, such as the mean (or centroid) frequency formant transitions
• Measure $F_2$ at voice onset
Acoustic measures of sibilants

• Short front cavity of [s] in Mandarin: higher centroid value for dental [s] relative to values in both the palatoalveolar [ɕ] (as in similar Japanese [ʃ]) and the “retroflex” [ʂ] (as in similar English [ʃ]).

• Small back cavity in [ɕ] (as in Japanese [ʃ]): high F2 frequency value at voice onset in following vowel as compared to both [s] and [ʂ].

• Phonological development again examined by looking at phonetic measures:
  • undifferentiated values in the youngest children that reflects stereotypical substitution patterns
  • progressively more adult-like values in older children
Lexical contrast
• Historically, Dongbei system was a 2-way contrast between [ɕ] and a variable (s).

Social variation
• Value of (s) reflected closeness to Korean vs Manchu or Mongolian.
Songyuan City within Dongbei context
Songyuan City sibilants

- After 1950s, PTH 3-way system emerges, with influx of Han from south and universal education.

- More recently, (ɕ) “feminine accent” diffusion via younger educated women, who go to university in Beijing [Li, 2005].
As predicted, ...

• higher F2 onset in alveolopalatal [ç]

• higher centroid value in dental [s]
Songyuan children’s lexical contrast

- As in Beijing (e.g., Hua, 2001), substitution of [ɕ] for [s].
- Youngest SY children have very [ɕ]- or [ʂ]-like centroid values, and F2 onset values that are closest to those in [ɕ].
Figure 6.3: Comparison of categorical split for children of the three languages in the three acoustic dimensions as a function of age. Regression lines were fit on the acoustic values for each target fricatives over all the productions of each child against child age in different acoustic dimensions. Above and below each regression line, the 95% confidence intervals for the regressions were also drawn. Black lines and symbols represent /s/ in all three languages, grey lines and symbols are for /ʃ/ in English and /s/ in Mandarin, and silver lines and symbols are for /ɕ/ in Japanese and Mandarin.
Songyuan City sibilants, “feminine accent”

more [s]-like centroid in women’s [ç]

men
fronted variant

female adults

centroid (Hz)

mean centroid (Hz)

women

men

[Li, Kong, Edwards, & Beckman 2008]
Songyuan girls, “feminine accent”

- As soon as the children have mastered the lexical contrast at 4 years of age ...
- The girls show a higher, more [s]-like centroid value in their production of [ʂ] relative to value for the boys in the same age group.
BACKGROUND

1. Phonological categories and socio-indexical categories
   - Speech sounds encode not only lexical information but also social identity such as gender, age, geographic origin, ethnicity, formality and so on (Kramarac, 1982; Labov 1990, 2001; Purnell, Isard & Baugh, 1999; Clopper & Pison, 2004).
   - Gender-marked phonetic variants of phonological categories:
     - Fricative and vowel production (shown by studies reviewed by Munson and Babel, 2007).
     - Stop productions (Swartz, 1992): shorter VOTs in males’ stops in American English.
   - Acquisition of lexical information and gender-marked variant
     - Whiteside (2001, 2004): girls’ (5;8, 13;2) longer VOTs in /d/ than in /t/.

2. Gender-marked phonetic variant in Mandarin and Japanese
   - Voiceless sibilant fricatives in Songyuan Mandarin Chinese
     - Three-way contrast in Mandarin fricatives: dental/uvular /s/ vs. alveolar palatal /ʃ/ vs. retroflex /ɻ/.
     - Feminine accent: fronted or dentalised /ʃ/ vs. alveolar palatal /ʃ/.
   - Stops in Tokyo Japanese
     - Two-way contrast in stop voicing: voiced versus voiceless stop (Homma, 1980; Shizuma, 1989).
     - Recently noted that VOT of the voiceless stop category varies systematically with the speaker’s age and gender (Takada, 2004).

QUESTIONS

1. What are the relevant acoustic measures to describe the phonetic variants associated with these social-indexical categories?
2. How does the acquisition of variants that reflect adult social-group membership interact with acquisition of lexical phonetic knowledge in the first language acquisition?
   - When and how do children manifest these socially specific variants in adult-like manner in the course of phonological development?
   - What kinds of linguistic constraints would affect the mastery of knowledge associated with speech sounds in the first language acquisition?

DATA & ACOUSTIC MEASURES

1. Subjects
   - Recruited and recorded in Songyuan, China, and Tokyo, Japan.
   - Adults (18–30): 10 females and 10 males for each language.
   - Children (2;0–6;0): 10 children per age group, with sex balanced in each language.

2. Materials (from the pedalogos project http://www.ling.ohio-state.edu/~edwards)
   - Word Repetition task.
   - Stop- and fricative-initial followed by vowel /a/, /i/, /e/, /o/ in words familiar to children were elicited.
     - Mandarin fricatives: /ʃ/ in /san/ “three” and /ɻ/ in /sən/ “west”.
     - Japanese stops: /d/ in /daiko/ “radish” and /ɻ/ in /takor/ “octopus”.

3. Acoustic measures
   - Mandarin fricatives
     - Centroid frequency: 1st moment in moment analysis; mean frequency over the fricative spectrum; negatively correlated with the length of the front cavity. Centroid measure is calculated over a 40ms window centered at the middle of the frication of the target fricatives.
     - Onset F2 frequency for fricatives: the 2nd formant frequency of the vowel following the fricatives taken at the onset of the vowel.

   - Japanese stops
     - VOT (Voice Onset Time: Lisker & Abramson 1964): An interval between the articulatory explosion and voicing onset.
     - H1-H2: The amplitude difference between the first harmonic and the second harmonic measured at the following vocalic onset, breathiness measure, correlating with larger open quotient for voiced source (Holmberg et al 1998, 1995; Hanson, 1997; 1999).

RESULTS:

A. Voiceless sibilant fricatives in Mandarin
   • Adults
     - No clear gender-related difference in children’s use of lag / lead VOT variants of voiced stops: phoneme*gender [F(1, 10)= 0.0034, p<0.05] in Syos’ productions.
     - Both boys and girls tend to produce voiced stops with short lag VOT values, and very few pre-voiced tokens were found even in the ddeist boys.

B. Stops in Japanese
   • Adults
     - Gender difference was found in the use of VOT for the two phoneme categories: ANOVA shows phoneme by gender interaction [F(1, 18)= 4.7672, p<0.02].
     - Lag VOT voiced stops were used by most of females.

DISCUSSION

• Adult productions showed that ... 
  - In Mandarin, female variants of alveolarpalatal fricative can be acoustically characterized as having a higher centroid frequency.
  - In Japanese, female variants of voiced stops can acoustically characterized by having short lag VOT values whereas male variants have lead values for VOT.
  - The emergence of gender-marking variation might be constrained by the same maturational factors that govern the mastery of the lexical phonological contrast.
  - Those Mandarin 4 or 5 year olds who exhibited extrametricality in their fricative productions all showed good proficiency in fricative production for all three lexically contrasting categories.
  - By contrast, the Japanese children as a group might not have been able to show evidence of acquiring sociolinguistic markers associated with voiced stops, because the male-marking variant (voicing lead) is a difficult sound that is not mastered until age 6 cross-linguistically (Allen, 1985; Macken & Barton, 1980).
  - Alternatively, the lag VOT variants of Japanese voiced stops in boys’ speech could also be interpreted as a reflection of sound change in progress, where the voiceless-voicing contrast is becoming a lax-tense distinction. Recordings of older Japanese-speaking children’s productions may help distinguish between these two interpretations.

ACKNOWLEDGEMENT

This work was supported by NIDCD grant 02932 to Jan Edwards. We thank the children who participated in the task, the parents who gave their consent, and the principals and teachers at the schools at which the data were collected.
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  - Three-way contrast in Mandarin fricatives: dental/alveolar /s/ vs. alveolarpalatal /ʃ/ vs. retroflex /ɻ/.
  - Feminine accent: fronted or dentalised /ʃ/ in sound, in college-aged women, first found in the Beijing dialect (Cao 1986,1987; Wu 1991).
- Stops in Tokyo Japanese
  - Two-way contrast in stop voicing: voiced versus voiceless stop (Homma, 1980; Shimizu, 1989).
  - Recently noted that VOT of the voiced stop category varies systematically with the speaker’s age and gender (Takada, 2004).

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B. Stops in Japanese
- Adults
  - No clear gender-related difference in children’s use of lag/lead VOTs for voiced stops: phoneme*gender [F(1,10)=0.0034, p=0.955] in Syns’ productions.
  - Both boys and girls tend to produce voiced stops with short lag VOT values, and very few pre-voiced tokens were found even in the oldest boys.

DISCUSSION
- Adult productions showed that ...
  - In Mandarin, female variants of alveolarpalatal fricative can be acoustically characterized as having a higher centroid frequency.
  - In Japanese, female variants of voiced stops can acoustically characterized by having short lag VOT values whereas male variants have lead values for VOT.
- The emergence of gender-marking variation might be constrained by the same maturational factors that govern the mastery of the lexically phonological contrast.
  - Those Mandarin 4 or 5 year olds who exhibited extremely dentalized forms in their productions all showed good proficiency in frication production for all three lexically contrasting categories.
  - By contrast, the Japanese children as a group might not have been able to show evidence of acquiring sociolinguistic markers associated with voiced stops, because the male-marking variant (voicing lead) is a difficult sound that is not mastered until age 6 cross-linguistically (Allan, 1985; Macken & Barton, 1980).
  - Alternatively, the lag VOT variants of Japanese voiced stops in boys’ speech could also be interpreted as a reflection of sound change in progress, where the voiceless-voiced contrast is becoming a lax-tense distinction. Recordings of older Japanese-speaking children’s productions may help distinguish between these two interpretations.

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Summarizing (interpreting) results

- The Songyuan children are learning the 3-way lexical contrast with the same pattern as Beijing children.
- The young girls seem to leading the “imported” change in the social valuation of the (ɕ) variable.
- Is this evidence of an abrupt shift in values that are transmitted in the aftermath of borrowing?
- By contrast, the Seoul child speakers are relatively conservative in the sound change that is affecting the stop phonation type system.
- Is this evidence of a slower timeline (later learning of the social valuation) in the more continuous process of “incrementation” in regular sound change?
Caveats (other interpretations)

1. Is this an artifact of differences in age of socialization?
   • The children in the Songyuan sample were all recorded at school. Women work until their mid-60s and their children are placed in government-funded nursery schools by age two.
   • By contrast, children in Seoul tend to be placed in (private) nursery schools at a later age, and to spend less time each day at school. Although many mothers work, grandmothers often tend the children when they are not in school.

2. Is this an artifact of comparing apples (sibilant place) to oranges (stop phonation type)?
Work in the planning ...

• Analyze child-directed speech recordings, so that we can assess these variables in input to young children. **Compare** new phonation type pattern in Tokyo /d, ! /

• If this change in progress is indeed a borrowing from Tohoku dialects, we have the control condition for interpreting the Seoul sound change.

**Compare** “feminine” (s) and “masculine” (ʃ) in English.

• Use gender ratings to examine social valuation.

• Look for evidence of history of this sibilant variation.

• If this change in progress is a change from below, we have the control condition for interpreting the “feminine accent” in Sonyuan girls.
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- and you for your kind attention

Ευχαριστώ πολύ
감사합니다
ありがとうございます

Thank you
Appendix: List of wave files

slides 4
  04doaWprompt.wav

slides 5 & 6
  05toofuWprompt.wav
  06toofu.wav

slide 7 & 8
  08.3doa.wav

slide 8
  08.1kimono.wav
  08.2semi.wav
  08.3doa.wav
  08.4gasu.wav
  08.5donguri.wav

slide 15
  15.1domata.wav
  15.2tixos.wav
  15.3deer.wav
  15.4tickle.wav

slides 28 to 30
  28ttalgi.wav
  29taramdZi.wav
  30thadZo.wav

slide 45
  45.1shoe.wav
  45.2safe.wav
  45.3shuukuriimu.wav

slides 47 & 52
  47same.wav