

# Learning Sounds of Asian Languages

イマ、アジアノ言語ガ オモシロイ

**Katherine Demuth** (Macquarie Univ.)

**Leher Singh** (National Univ. of Singapore)

**Henny Yeung** (Simon Fraser Univ.)

**Chutamane Onsuwan** (Thammasat Univ.)

**Youngon Choi** (Chung-Ang Univ.)

**Mutsumi Imai** (Keio Univ.)

**Hyun Kyung Hwang** (Univ. of Tsukuba)

**Reiko Mazuka** (RIKEN CBS)

**6th Jul. 2019**  
**10:00~17:00**

**21 KOMCEE EAST-K011**  
**Komaba Campus**  
**The University of Tokyo**

more info.



# 国際シンポジウム「イマ、アジアノ言語ガ オモシロイ :

## Learning Sounds of Asian Languages」

共催: ・科学研究費補助金基盤研究 (S)

「乳児音声発達の起源に迫る : アジアの言語から見た発達メカニズムの解明」(16H06319)

・科学研究費補助金新学術領域研究 (研究領域提案型)

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・国立国語研究所機関拠点型基幹研究プロジェクト

「多様な言語資源に基づく総合的日本語研究の開拓」: 対照言語学の観点から見た日本語の音声と文法

Time Table	
10:00-10:20	Opening Remark-Why Asian languages now? (Dr.Mazuka)
10:20-11:00	Learning unusual sound contrasts with diachronic changes: The case for Korean. (Dr. Choi)
11:00-11:40	The Acquisition of lexical tones in infancy and early childhood. (Dr. Singh)
11:40-13:00	Lunch Time
13:00-13:40	The sound symbolism bootstrapping hypothesis: How children bootstrap themselves from multi-sensory mapping to language- specific linguistic systems. (Dr. Imai)
13:40-14:20	Babytalk is not always WEIRD: Distinct acoustic characteristics of infant- versus adult-directed speech in Lenakel (Austronesian) and English (Indo-European). (Dr. Yeung)
14:20-15:00	Acoustic characteristics of motherese and early perceptual development: A case study of Japanese stops. (Dr. Hwang)
15:00-15:20	Coffee Break
15:20-16:00	Phonetic modifications of Thai stops' Voice-Onset-Time, vowel duration, and lexical tones in Infant-Directed Speech.(Dr.Onsuwan)
16:00-16:40	Learning the tones of Mandarin: Acoustic evidence from children with cochlear implants. (Dr. Demuth)
16:40-17:00	General Discussion



会場準備の都合上、なるべくEメール  
での事前登録をお願いいたします!

件名: 「7/6シンポジウム参加登録」

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21 KOMCEE EAST K011

Admission : Free

# Learning unusual sound contrasts with diachronic changes: The case for Korean.

**Youngon Choi**

Chung-Ang University, South Korea

Compared to other languages, phonetic categories utilized in Korean are relatively unusual: (1) stops and affricates contrast in three ways as fortis, lenis, and aspirated and they are all voiceless. Fricative contrast is also all voiceless unlike other languages although they do not contrast in three ways. (2) two of the three categories, lenis and aspirated, have undergone a tonogenetic sound change in the past few decades such that voice onset time is no longer the primary cue for distinction and instead, fundamental frequency has become the primary cue for their distinction. Using visual habituation paradigm, we have been investigating 4-12-month-old Korean infants' development of the ability to discriminate these sound categories, including three-way bilabial stop and affricate contrasts and two-way fricative contrast and the relevant acoustic properties of the maternal input to these infants. The emerging patterns from these studies show that learning of these unusual contrasts take longer to develop and that this delay may be related to the acoustic parameters associated with these sound categories as well as to the diachronic change occurring in the input. The acoustic properties of the input provided for infants appear to play an important role in shaping the speech perception capacity.

# **The acquisition of lexical tones in infancy and early childhood.**

**Leher Singh**

National University of Singapore, Singapore

For the most part, research on how infants and children master their native sound system has focused on Indo-European languages. This has resulted in a skew towards researching the properties of these languages, which are typically consonant and vowel systems. Lexical tones are highly frequent phonological properties of other languages, such as Mandarin Chinese, which are widely spoken around the world. I will present research from my laboratory investigating the acquisition of tonal systems, drawing from infant speech perception, word learning, familiar word recognition, and recognition of words amidst context-cued variation. Results from each of these areas point to a developmental trajectory for tone acquisition that is largely asynchronous with trajectories established for English and other widely studied languages.

# **The sound symbolism bootstrapping hypothesis: How children bootstrap themselves from multi-sensory mapping to language-specific linguistic systems.**

**Mutsumi Imai**

Keio University, Japan

Sound symbolism is a non-arbitrary relation between speech sounds and meanings. Recently, sound symbolism has attracted researchers' attention as it seems to be connected to various important issues central to human cognition and language, including cross-modal mappings, synesthesia, language development and evolution. In this talk, I propose the sound symbolism bootstrapping hypothesis, which claims that (1) pre-verbal infants are sensitive to sound symbolism, with a biologically endowed ability to map and integrate multi-modal input; (2) sound symbolism helps infants to gain the referential insight for speech sounds; (3) sound symbolism helps infants and toddlers associate speech sounds and their referents and to establish a lexical representation; and (4) sound symbolism helps toddlers learn words by helping them to focus on referents embedded in a complex scene. I present evidence for each of these claims through a series of behavioural and neurological studies with infants, toddlers and adults. I then discuss how children de-ground from direct iconicity and immerse into conventional language, which is a system of abstract symbols and does not contain apparently sensible sound symbolism.

# **Babytalk is not always WEIRD: Distinct acoustic characteristics of infant-versus adult-directed speech in Lenakel (Austronesian) and English (Indo-European).**

[Elise McClay, Senay Cebioglu, Tanya Broesch, & Henny Yeung]

**Henny Yeung**

Simon Fraser University, Canada

Many acoustic aspects of infant-directed speech (IDS) are thought to be distinct from adult-directed speech (ADS). For example, IDS vowels have been reported to be slower overall, breathier, higher in terms of pitch and pitch variability, more spectrally variable (both within- and between-tokens), and hyper-articulated (among other differences). A limitation of that work is that IDS research has traditionally been limited to WEIRD contexts (Western, Educated, Industrialized, Rich, and Democratic). Research on Asian languages has also been largely limited to WEIRD populations, even while sampling from historically understudied (non-Indo-European) language families. Here we report a comparative IDS-ADS study of English (spoken in the Vancouver, Canada metropolitan area) and Lenakel (an Oceanic dialect chain primarily spoken on the island of Tanna in Vanuatu), which samples from WEIRD and non-WEIRD populations, respectively. An analysis of vowels from controlled phonetic contexts suggests that most IDS-ADS differences that occur in English do not occur in Lenakel. Only pitch-related differences were observed across WEIRD and non-WEIRD contexts (i.e., pitch was higher and more variable in the IDS of both languages). This raises fundamental questions about which characteristics of IDS are universal, and which may be language-/culture-specific.

# **Acoustic characteristics of motherese and early perceptual development: A case study of Japanese stops.**

[Hyun Kyung Hwang, Mieko Takada, Reiko Mazuka]

**Hyun Kyung Hwang**

University of Tsukuba, Japan

Infants must acquire the ability to discriminate contrastive sounds in a language. If the input for infants involves ongoing sound changes, one of the challenges infants encounter can be varying cues across generations. Interestingly, a change-in-progress of laryngeal contrasts is reported in Japanese voiced stops—the lack of pre-voicing among younger speakers. It raises an interesting question whether this change is reflected in maternal input, or mothers still exhibit pre-voicing prevalently when they talk to their infants to enhance the laryngeal contrast. What are the implications of the changes if infants' speech development is closely linked to sound changes in the maternal input?

To explore the acoustic characteristics of infant-directed speech (IDS), this study explored two different types of speech data: lab speech & spontaneous speech. The results of acoustic analyses revealed that mothers spread the innovation in initial stops rather than facilitating the perceptual development of infants. Also, the quite adjacent distribution of two stop categories suggests difficulties in discriminating the voicing contrast. Thus, Japanese-learning infants aged 5 and 9 months old were tested using the visual habituation method. The results of the behavioral study confirm that the development of Japanese voicing perception is acquired relatively late, highlighting the weak discriminability of stop contrast due to the ongoing sound change in maternal input.

# Phonetic modifications of Thai stops' voice-onset-time, vowel duration, and lexical tones in infant-directed speech.

**Chutamane Onsuwan**

Thammasat University, Thailand

A large body of research has shown that some phonetic features are significantly modified in infant-directed speech (IDS) comparing with adult-directed speech. However, differences in terms of types (i.e., duration, formant frequency) and degrees (i.e., neutral, hypo, and hyper articulated speech) have been noted across studies of various languages. This talk presents acoustic results which show that segmental (stop and vowel) and supra-segmental (lexical tone) units in IDS are not necessarily modified equally within the same language (Thai). Speech materials were taken from interactions between mother and her child and with an experimenter using labeled toys. There were 14 Thai mother-child dyads across two groups of infants (4-6 and 8-10 months olds) in Experiment 1, where mean F0, pitch range, time-normalized F0 contours (mid, low, falling, high, and rising), and duration of vocalic portions were extracted from 700 tokens. In Experiment 2, there were 15 mother-child dyads across three groups (4-6, 8-10, and 11-13 months olds). Durational measures were taken from nearly 430 tokens for stops (/b/, /p/, and /ph/) and the following vowel. Overall findings showed that, unlike supra-segmental and vocalic aspects of IDS which were associated with relatively significant degrees of hyper-articulation, the VOT aspect failed to show this pattern.

## **Learning the tones of Mandarin: Acoustic evidence from children with cochlear implants.**

[Tang, P., Xu Rattanasone, N., Yuen, I., Gao, L., & Demuth, K. (in press). The acquisition of Mandarin tonal processes by children with cochlear implants. *Journal of Speech, Language and Hearing Research*.]

**Katherine Demuth**

Macquarie University, Australia

Recent research has shown that, by the age of 3, Mandarin-speaking children have acquired adult-like acoustic representations for the 4 tonal contrasts (Tang et al., 2019). But tones are known to be a challenge for deaf children who are fitted with cochlear implants (CIs), since these devices are not good at transmitting pitch. This study investigated the acoustic realization of Mandarin-speaking children fitted with CIs. The findings reveal that those implanted before the age of two can approach tonal acoustic values similar to those of their normal hearing peers, but that this is especially true for those with longer CI experience. However, even if they can produce lexical tones, the comprehension of tones presents a challenge. This suggests that early implantation, and longer CI experience may be needed for these learners to be able to use tonal information during language processing.