Nonnative speech perception and production

The short term stay I have spent at the Phonetics Laboratory of Sophia University in Tokyo (present head of the laboratory: Prof. Shinohara Shigeko) was intended to establish collaborations between my French colleagues (in particular, my present laboratory: Laboratoire de Phonétique et Phonologie) with the members of Prof. Shinohara's laboratory and, if possible, with other Japanese research teams doing research in the broad field of phonetics, phonology, and psycholinguistics. In particular, a research topic common to our two laboratories is the Japanese perception of the /r/-/l/ contrasts of different languages, for example of English (e.g., *right* vs. *light*) or of French (e.g., *roi* 'king' vs. *loi* 'law'). My own research, a comprehensive review of which is currently submitted to *Journal of Laboratory Phonology*,[1] suggests there is a change in progress in the way Japanese listeners perceive the critical sound /r/ involved in the French contrast. Prof. Shigeko Shinohara and Dr. Ooigawa, a post-doc researcher at her laboratory, are interested in this issue as well as in other issues on nonnative speech perception. Concerning the /r/-/l/ sound contrast, recent research as well as informal observation both suggest that being able to perceive this contrast does not warrant correct production, and correct identification of lexical minimal pairs (Ota, Hartsuiker, & Haywood, 2009).[2] A research project on these representational issues (production vs. perception phonology vs. lexicon) in France and in Japan is planned for the short term. A further theme of research in the domain of nonnative speech perception as well as theoretical phonology (with possible application to second language learning) concerns the perception and production of nonnative *combinations of sounds*. One doctoral student of Prof. Shinohara, Yuriko Matsumoto, is following up my research on the /tl/ and /dl/ clusters, which are illegal word-initially in many languages. Japanese is no exception, with the additional restriction on sound combinations that branching onsets (i.e., clusters) are altogether banned in Japanese. Her preliminary work seems to show that naïve Japanese listeners tend to hear the /t/ in /tl/ as a /p/-like sound, contrary to French or English listeners who clearly hear a /k/-like sound. This puzzling finding will be part of the collaboration we have established between our two laboratories. Finally, yet another theme of research involving phonology and psycholinguistics –the label Laboratory Phonology has often been used in this context– revolves around geminate consonants. Preliminary discussions for collaborative research on this topic were already underway before my stay at the Phonetics Laboratory of Sophia University between my colleague Rachid Ridouane (LPP) and Prof. Shigeko Shinohara (Sophia). This collaboration enterprise has now been extended to Profs. Haruo Kubozono (NINJAL), and Shigeto Kawahara (Keio University), whom I discussed with during my stay in Tokyo. Prof. Kawahara supervises the post-doctoral research of Jason Shaw, previous student and now colleague of my close colleague Catherine Best (MARCS Institute, Australia). A research network is thus emerging between all these people and our French LPP laboratory. So far, it produced a publication on the cross-linguistic *perception* of consonant geminates.[3] But in the future, we have planned to focus primarily on the production aspects of

---

[1] Hallé, P., Best, C., Chang, Y-C., & Nigo, M. (submitted). Japanese listeners' perception of French versus English /r/-/l/ contrasts. *Journal of Laboratory Phonology*.
[2] Ota, M., Hartsuiker, R., & Haywood, S. (2009). The KEY to the ROCK: Near-homophony in nonnative visual word recognition. *Cognition*, *111*, 263-269.
[3] Hallé, P., Ridouane, R., & Best, C. (final revision). Differential difficulties in perception of Tashlhiyt Berber consonant quantity contrasts by native Tashlhiyt listeners versus Berber-naïve French listeners. *Frontiers in Psychology: Language Sciences*.

consonant geminates with the help of Electromagnetic articulography (EMA), among other possible experimentation devices. Our first challenge will be to track the articulation of word-initial voiceless stop geminates, which have *no* acoustic manifestation.

These planned EMA investigations lead me to the second important aspect of the search for Japanese collaborations I have conducted during my stay. With Prof. Takayuki Arai, head of the Speech Communication Laboratory at Sophia University, we decided on future collaboration in investigating the articulation of consonant clusters by either native or nonnative speakers of languages that allow such clusters in various within-word positions (e.g., French, English, Georgian, Hebrew, etc.). Native speakers of Japanese (naïve or second language learners) are ideal nonnative speakers since Japanese largely disallows consonant clusters. Our French laboratory (LPP) already has collaborations with other French and German laboratories on this topic, and we will extend this research network to Prof. Arai's laboratory. We agreed to work within the framework of Articulatory Phonology (see the foundational papers of Articulatory Phonology by C. Browman and L. Goldstein published in *Phonology*, 1988, and *Phonetica*, 1992). Other than consonant cluster production, Prof. Arai and I have a keen interest in Fujisaki's command-response model of speech fundamental frequency (F0), especially because EMG data on laryngeal muscles give physiological plausibility to Fujisaki's command-response model, which therefore fits very well in the Articulatory Phonology framework. One project on this topic would be using a version of Fujisaki's command-response model to model the production of Shanghai Chinese tones. Shanghai Chinese tones are indeed challenging due to the left-to-right tonal spreading imposed by the tone sandhi rules common to most Wu dialects of Chinese. Shanghai tone production also has other specificities, among which voice quality (breathy vs. modal phonation), and depressor consonant effects. Prof. Arai and I wish to compare these perhaps language-specific features across various languages, including Japanese. A post-doc project on this topic has been submitted to JSPS, with Prof. Arai as the supervisor of my previous PhD student Jiayin Gao, a very brilliant student. The project submitted in the fall of 2015 was unfortunately not retained but we strongly hope that an improved version of this fellowship application will eventually be successful. This would of course greatly strengthen the efficiency of the collaboration between Prof. Arai's and our French laboratories.

Finally, other than my efforts to establish collaborations with Japanese colleagues (which I find rather successful), I gave three 2-hours conferences at Sophia University:

26 November: *Phonological priming effects in naming versus phoneme monitoring tasks with picture stimuli as targets*. Organizer: Prof. Shinohara (Sophia University Research Week).

30 November: *Some old and new data on speech production planning (phoneme monitoring as an alternative, complementary paradigm to picture naming)*. Organizer: Prof. Arai.

10 December: *Prothetic /e/ heard in #sC by Spanish listeners: A case study of "phonotactic repair."* Organizer: Prof. Shinohara.

Photograph taken on December 10 after Conference. Prof. Arai appears standing fifth from left and I'm standing on his right.