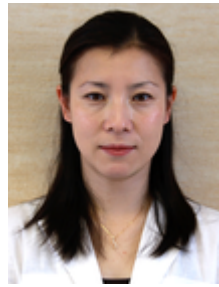# Center for Language Research

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The Center for Language Research (CLR), in the School of Computer Science and Engineering, was established the same year as the University of Aizu (1993) to contribute to the development of professionals in computer science, computer

engineering, and related fields. CLR professors carry out research and teaching of successful language use in academic and workplace contexts – in particular, the use of English for academic and professional purposes. Our research focuses on language theory, use, pedagogy, and acquisition as well as on supporting educational technologies. Grounded in this research, we provide innovative English language training to University of Aizu students primarily at the undergraduate, but also at the graduate level. All students at the university, both undergraduate and graduate, are computer science majors, but they must write and present their theses in English, so CLR professors teach students the skills that are necessary for writing a research paper and presenting it in English.

At the undergraduate level, along with 1st- and 2nd-year core courses in the 4 skills (reading, writing, speaking, and listening), the CLR provides a variety of interesting elective courses for 3rd- and 4th-year students; current offerings include Design of Human Languages, Pronunciation: Comparing English & Japanese Sound Systems, Analysis of English Sentence Structure, Language and Linguistics, Music and Language, English Grammar for Test Preparation, Computer Assisted Ethnomusicology, Advanced English Grammar, Reading Fluency, Writing & Design for E-learning, Presentation Skills, Writing in the Workplace, Language in Manga, Japanese Pop Culture through English, Writing and Design with Lego, Digital Storytelling for Engineering Narratives, Experimental Methods and Statistics for Linguistics, Pronunciation: Acoustic Analysis Using Software, and English through Communicative Media.

At the graduate level, courses currently offered include Computer-Assisted Language Learning, Technical Writing in Software Engineering, Information Technology Society & Values, Multinational Business Communication, and Speech Articulation & Acoustics.

CLR faculty members are also extremely active in research, as is attested by our high success rate in obtaining national, prefectural, and internal research grants. For details, please see individual professors' websites linked to the University of Aizu homepage. We welcome inquiries from researchers in Japan and overseas regarding opportunities to collaborate with us. Our homepage can be found at http://www.u-aizu.ac.jp/labs/clr/

Refereed academic journal

[kimusik-402-073-01:2015] Kim Rockell. Musical looping of lexical chunks: An exploratory study. *JALT CALL Journal*, 11(3):235–253, 2015.

> This paper reports on the experimental use of a recently developed musical looping app with a class of Japanese university students of English during 2014. Working in groups using shared hand-held devices, students created compositions based on lexical chunks or formulaic sequences selected freely from a fixed text. A scored example of one such group composition is included in the paper. During research, the author acted as instructor and a participant and observer role afforded an intimate view of the educational process. Self-assessment questionnaires prior to and post working with Loopy indicate that students experienced increased confidence in their ability to produce spoken English over a three-month period. The affordances and constraints of using the musical app to learn English are examined and a significant increase in speech rate when reading from a fixed text is also noted.
> Keywords: Formulaic sequences, lexical chunks, call, music, looping applications

[wilson-402-073-01:2015] E. Kaneko, Y. Heo, G.K. Iverson, and I. Wilson. Quasi-neutralization in the acquisition of English coronal fricatives by native speakers of Japanese. *Journal of Second Language Pronunciation*, 1(1):65–85, 2015.

> Second language learners show various forms of mispronunciation, or modification, of target pronunciation, most perhaps due to direct native language transfer, but others, summarized here, to deflected contrast, hypercorrection and covert contrast. The present paper reports on a novel form of adaptation that we term 'quasi-neutralization,' in which acoustic characteristics of competing target phonemes are found within the same interlanguage segment (e.g., think pronounced as "thsink"). The three English voiceless coronal fricatives /s/, /sh/, /th/ were elicited from Japanese learners of English via two techniques: a wordlist reading task that encouraged participants to focus on their pronunciation, and a sentence construction task that diverted their attention from pronunciation. Among different types of modification, quasi-neutralization was observed predominantly when participants were conscious of their pronunciation, which could reflect their linguistic insecurity as learners. This research thus illuminates another of the strategies that learners employ in the acquisition of L2 pronunciation.

[yasuta-402-073-01:2015] Takako Yasuta. Introducing role language analysis to English writing. *Papers from the international workshop on role language and character language in 2015*, pages 186–198, February 2016.

This paper introduces how role language analysis using Japanese Manga can help undergraduate students to improve their writing skills in English.

[youngheo-402-073-01:2015] Gregory K. Iverson Emiko Kaneko, Younghyon Heo and Ian Wilson. Quasi-neutralization in the Japanese Acquisition of English Coronal Fricatives. *Journal of Second Language Pronunciation*, 1:65–85, 2015.

Second language learners show various forms of mispronunciation, or modification, of target pronunciation, most perhaps due to direct native language transfer, but others, summarized here, to deflected contrast, hypercorrection and covert contrast. The present paper reports on a novel form of adaptation that we term quasi-neutralization, in which acoustic characteristics of competing target phonemes are found within the same interlanguage segment. The three English voiceless coronal fricatives were elicited from Japanese learners of English via two techniques: a wordlist reading task that encouraged participants to focus on their pronunciation, and a sentence construction task that diverted their attention from pronunciation. Among different types of modification, quasi-neutralization was observed predominantly when participants were conscious of their pronunciation, which could reflect their linguistic insecurity as learners. This research thus illuminates another of the strategies that learners employ in the acquisition of L2 pronunciation

[youngheo-402-073-02:2015] Younghyon Heo and Hyowon Song. Influence of Short-term Native-Like Parsing Practice on Reading Comprehension. *Foreign Language Studies*, pages 33–55, 2015.

Along the line of research on the relationship between parsing and English reading proficiency (Johnson and Moore, 1997; Kim, 2007, 2010; Schreiber, 1980), this study investigates whether short-term native-like parsing practice instantly leads to EFL learners' better understanding of L2 reading passages.

Refereed proceedings of an academic conference

[jperkins-402-073-01:2015] Julian Villegas Ian Wilson, Jeremy Perkins and Ayaka Orihara. Reaction Time to Unnatural and Natural Pronunciation by

Native and Non-Native Speakers of Japanese. In *Proceedings of the 2015 Autumn Meeting of the Acoustical Society of Japan*, pages pp. 339–342, 2015.

[jperkins-402-073-02:2015] Seunghun Lee Carlos Fasola, Hector Painequeo and Jeremy Perkins. Acoustic Properties of the Dental vs. Alveolar Contrast in Mapudungun. In The Scottish Consortium for ICPhS 2015, editor, *Proceedings of the 18th International Congress of Phonetic Sciences*. the University of Glasgow, 2015.

ISBN 978-0-85261-941-4. Retrieved from http://www.icphs2015.info/pdfs/Papers/ICPHS0506.pdf

[jperkins-402-073-03:2015] Ian Wilson Julian Villegas and Jeremy Perkins. Effect of Task on the Intensity of Speech in Noisy Conditions. In *Proceedings of the 2015 Autumn Meeting of the Acoustical Society of Japan*, pages pp. 369–372, 2015.

[wilson-402-073-02:2015] S. Moriya, Y. Yaguchi, and I. Wilson. Normalization and matching routine for comparison of native speaker and non-native speaker tongue trajectories. In *Proceedings of the 16th International Symposium on Advanced Intelligent Systems*, pages 1423–1435, 2015.

The main purpose of this research is to specify articulation difference between native and non-native speakers by digitizing tongue motions and analyzing the difference between utterances. Differences in tongue motion directly influence speaker's pronunciation, therefore it may be possible to improve non-native speaker's efficiency of pronunciation practice with the relevant feedback and visualization. It is necessary for comparison of native and non-native speakers' tongue motions to that end, however, normalization is absolutely necessary to remove the influence of anything except tongue motion before comparison, because every person has a unique shape and size. In this paper, we use coronal cross section of the tongue taken by ultrasound scanner to carry out the following: first record the ultrasound of speaker's tongue motion using the corpus "The Boy Who Cried Wolf." Then, sample tongue motion by using a histogram of oriented gradients and Karhunen-Loeve expansion. Next, apply eight prepared normalizations to tongue motions. Finally, compare each tongue motion per frame via dynamic time warping and correlation coefficient. The experimental result allowed us to compare with speaker's tongue motions in sentences which were recorded in different environments or by different speakers and to point out non-native speaker's speaking errors.

[wilson-402-073-03:2015] D. Erickson, J. Kim, S. Kawahara, I. Wilson, C. Menezes, A. Suemitsu, and J. Moore. Bridging articulation and perception: The C/D model and contrastive emphasis. In *Proceedings of the 18th International Congress of Phonetic Sciences (ICPhS XVIII)*, 2015.

This paper compares prominence that listeners perceive with actual articulatory prominence. We calculated phrasal boundaries from articulatory patterns using an algorithm of the C/D model, and compared those calculated boundaries with perceived boundaries. The jaw displacements, measures of prominence, were measured using EMA; articulatory boundaries were derived from a C/D model algorithm. The data is a set of English sentences that vary in the placement of contrastive emphasis. Perception data were obtained from listeners who were asked to evaluate syllable prominence and syllable boundaries for these sentences. The results indicate that perception of syllable prominence shows strong correlations with articulatory prominence, showing that jaw displacement can be a strong perceptual cue for syllable prominence. Further, perception of syllable prominence is also correlated with algorithmically-calculated articulatory syllable boundaries. These results encourage us to explore the relation between articulation and perception of language prosody in terms of the C/D model framework.

[youngheo-402-073-03:2015] Gregory K. Iverson Emiko Kaneko, Younghyon Heo and Ian Wilson. Quasi-neutralization in the Acquisition of English Coronal Fricatives by Native Speakers of Japanese. In *EPIP4 4th International Conference on English Pronunciation: Issues and Practices*, pages 65–66, 2015.

Second language learners show various deviations from target pronunciation, most perhaps due to direct native language transfer, but others to 'deflected contrast' (Eckman et al., 2003), 'hypercorrection' (Eckman et al., 2013) and 'covert contrast' (Berti, 2010; Eckman et al., 2014; Scobbie et al., 2000). The purpose of the present study is to report on a novel form of adaptation that we term 'quasi-neutralization', in which acoustic characteristics of competing target phonemes are found within the same interlanguage segment.

Unrefeered proceedings of an academic conference

[wilson-402-073-04:2015] I. Wilson, J. Perkins, J. Villegas, and A. Orihara. Reaction time to unnatural and natural pronunciation by native and

non-native speakers of Japanese. In *Proceedings of the 2015 Autumn Meeting of the Acoustical Society of Japan*, pages 339–342, 2015.

Reaction times (RTs) have been shown to be faster when listening to stimuli that have a natural phonological process (e.g., Japanese high-vowel devoicing) at the expense of acoustic information, rather than stimuli with unnatural phonology (non-devoiced high vowels in a context where they should be devoiced) -Ogasawara and Warner, 2009, Language and Cognitive Processes. However, those results were for native listeners listening to native speakers. In the case of non-native speakers, it is unclear how pronunciation errors (both phonetic and phonological) produced in the same natural/unnatural contexts would influence RTs. We tested 30 listeners, using 3 speakers (1 native and 2 non-native of high and low proficiencies) with both natural and unnatural tokens. A linear mixed effects analysis showed that overall, RTs were faster for natural versus unnatural stimuli, but this was not true for the non-native speaker subset of data. In the native speaker data subset, RTs were faster for low-high pitch-accented words. In the non-native speaker data subset, there was a 2-way interaction between naturalness and pitch accent errors: tokens that were both unnatural (i.e., non-devoiced high vowels) and produced with incorrect pitch accent had significantly slower RTs.

[wilson-402-073-05:2015] J. Villegas, I. Wilson, and J. Perkins. Effect of task on the intensity of speech in noisy conditions. In *Proceedings of the 2015 Autumn Meeting of the Acoustical Society of Japan*, pages 369–372, 2015.

We investigated the differences in speech intensity of Japanese speakers subjected to alternating periods of silence and Gaussian noise while engaged in four different tasks: two requiring communication effort (free dialog, and playing a game with a partner) and two requiring none (free soliloquy, and text reading). Two of the tasks were goal oriented (game, and reading) while the others were not. Regardless of noise presence, higher levels of intensity were observed on communicative tasks. During quiet periods, significant level differences were observed for non-communicative tasks, with goal-oriented tasks yielding higher levels. In noise-to-silence transitions, speakers decreased their intensity to their average speech level faster than they increased it in the opposite transitions. In either case, such intervals were longer than typical reflex times. The effects of goal and communication effort in the transitions were complex: smaller in the noise-to-silence transitions, with text reading having the least variation, and dialog the greatest. Highest levels in quiet

and noisy conditions were observed in tasks requiring communication efforts, regardless of goal orientation. In the transitions, speakers were faster to lower their speech level than in raising it when exiting and entering a noisy period, respectively.

[wilson-402-073-06:2015] D. Erickson, J. Villegas, I. Wilson, and Y. Iguro. Spanish articulatory rhythm. In *Proceedings of the 2015 Autumn Meeting of the Acoustical Society of Japan*, pages 319–322, 2015.

This paper addresses Spanish articulatory rhythm. Preliminary work with Spanish suggests that the initial syllable of a phrase has the strongest phrasal stress while the last one, the weakest. We recorded in audio and video utterances in Spanish, English, and Japanese, from three paid Salvadorian female siblings with different language background. Traces of markers in their faces were used for analyzing their jaw movement patterns. The obtained results, especially the results of the most English proficient participant, suggest that immersion in a second language may produce changes to the rhythmic patterns observed in the native language of the speaker. These differences in second language immersion seem to be reflected in jaw displacement of the different languages studied, and this is especially evident in the fact that there was not a pattern that was common to even any two of the speakers in their native Salvadorian Spanish.

[youngheo-402-073-04:2015] Kaneko E. Heo Y. Vazhenin A. Brine, J. and G Bateson. Language learning beyond Japanese university classrooms: video interviewing for study abroad. In *Critical CALL: Proceedings of the 2015 EUROCALL Conference*, pages 1–6, 2015.

In 2014, the University of Aizu was accepted for participation in Japan's national TOP Global University (TGU) initiative. In this paper, we describe our use of video interviewing to prepare Japanese students for our Global Experience Gateway study abroad TGU project. Our university specializes in computer science education at undergraduate and graduate levels. Our students are preparing for careers or further research in either software or hardware specializations, and it is expected that English will be required increasingly in computer-related research and business. Within Japanese education, there is a view that the youth are reluctant to speak English (King, 2013), and our students use English infrequently. We have created a study abroad programme, which is intended to motivate students to study more in their regular English language classes to improve language skills and attain higher TOEIC scores. However, improved course grades and test scores do not

prepare students with interpersonal communication skills required to function in an Englishspeaking context. Recent literature on language learning outside of the classroom (Nunan and Richards, 2014) supports our use of video interviewing to prepare students for study abroad. We are teaching Japanese students to conduct and videorecord interviews with non-Japanese speakers in preparation for the conversational demands of study abroad. Practice with video equipment, interviewing techniques, simple camera work and editing helps our students to interact with our international students and teachers. In this paper we outline the curriculum design, equipment selection, instruction, student project work, and assessment in this course.

Research grants from scientific research funds and public organizations

[jperkins-402-073-04:2015] Jeremy Perkins. Kakenhi Grant-in-Aid for Young Scientists: An Acoustic Typology of Creaky Voice, 2015.

[wilson-402-073-07:2015] I. Wilson. JSPS Grant-in-Aid for Scientific Research (Acad. Research Subsidies) KAKENHI 25370444 - Co-Investigator (Kenkyu-Buntansha), 2013–2016.

[wilson-402-073-08:2015] I. Wilson. University of Aizu Competitive Research Funding, 2015–2016.

Academic society activities

[wilson-402-073-09:2015] I. Wilson, 2016.

Reviewer, Journal of Phonetics – ISSN: 0095-4470.

[wilson-402-073-10:2015] I. Wilson, 2015.

Reviewer, Phonetica (journal) – ISSN: 0031-8388.

[wilson-402-073-11:2015] I. Wilson, Y. Iguro, and J. Villegas, March 2016.

Refereed Presentation, Smoothing-spline ANOVA comparison of Japanese and English tongue rest positions of bilinguals. At the 1st International Symposium on Applied Phonetics (ISAPh 2016), Nagoya, Japan.

[wilson-402-073-12:2015] I. Wilson, Y. Iguro, and J. Villegas, December 2015.

> Unrefereed Presentation, Articulatory settings of Japanese-English bilinguals. At Ultrafest VII, Hong Kong.

[wilson-402-073-13:2015] J. Villegas, I. Wilson, Y. Iguro, and D. Erickson, December 2015.

> Unrefereed Presentation, Effect of a fixed ultrasound probe on jaw movement during speech. At Ultrafest VII, Hong Kong.

Advisor for undergraduate research and graduate research

[wilson-402-073-14:2015] Sunao Kanada. MSc Thesis: Electromagnetic articulometry study of the articulation of English /r/ sound by native and non-native speakers, Graduate School of Computer Science and Engineering, March 2016.

> Thesis Advisor: I. Wilson, Referees: Profs. J. Villegas and Y. Yaguchi

[wilson-402-073-15:2015] Yuki Iguro. Graduation Thesis: Articulatory settings of Japanese and English spoken by bilingual Japanese, School of Computer Science and Engineering, March 2016.

> Thesis Advisor: I. Wilson, Referee: Prof. J. Villegas

[wilson-402-073-16:2015] Tomoki Shishido. Graduation Thesis: Correlation between pitch perception ability and English stress perception ability, School of Computer Science and Engineering, March 2016.

> Thesis Advisor: I. Wilson, Referee: Prof. J. Villegas

[wilson-402-073-17:2015] Yukari Sekiguchi. Graduation Thesis: The effect of speech speed and word frequency on native listeners' comprehension of L2 speakers, School of Computer Science and Engineering, March 2016.

> Thesis Advisor: I. Wilson, Referee: Prof. J. Villegas

Contributions related to regional education

[wilson-402-073-18:2015] Taught "The World of Speech Research: Focus on Acoustics" – 4 lectures for Aizu Senior High School students, October 2015

[yasuta-402-073-02:2015] Workshop: Presentation skills in English, Super science high school project at Aizu Gakuho high school, September 26

[yasuta-402-073-03:2015] Public lecture: Living in the global society, Fukushima kids globalization project at Nishine junior high school in Fukushima city, October 24

[yasuta-402-073-04:2015] Public lecture: Tips to be a good English speaker, Aizu Gakuho Junior High School, March 2016

[yasuta-402-073-05:2015] Public lecture: Tips to be a good English speaker, Aizu Gakuho Junior High School, March 2016

Did you participate in students recruitment, support the alumni, and/or contact with student's parent? (Yes or No) If yes, please describe what you did.

[wilson-402-073-19:2015] Gave a lecture at "Yumenavi Live" Tokyo on using cutting-edge technology for improving English pronunciation, July 2015.

[wilson-402-073-20:2015] Gave a lecture at "Yumenavi Live" Sendai on using cutting-edge technology for improving English pronunciation, October 2015.

Did you participate in Public Lectures, and/or Open Campus? (Yes or No) If yes, please describe what you did.

[wilson-402-073-21:2015] Participated in Open Labs in 2015.

[yasuta-402-073-06:2015] U of Aizu TRY series, Let's compare Japanese and Korean!, October 30

[yasuta-402-073-07:2015] U of Aizu TRY series, Discussion forum: Men's language vs. women's language', October 31

[yasuta-402-073-08:2015] U of Aizu TRY series, Discussion forum: Men's language vs. women's language', October 31