TOWARD A METHOD TO UNCOVER L1 JAPANESE SOCIOPHONETIC TRANSFER TO L2 ENGLISH

Noriko Yamane *[1] and Karen L.C. Carter †[2]
[1]Hiroshima University, Graduate School of Integrated Arts and Sciences, Higashi-Hiroshima, Japan.
[2]Arizona State University, Tempe, Arizona, USA.

1 Introduction

Understanding the acoustic socio-phonetic reality of intelligibility in spoken English is of theoretical importance to linguistic and applied linguistic research and in demand as English is a common lingua franca across the globe. To understand the factors that improve intelligibility of L2 English necessitates an interdisciplinary approach that combines phonetics, second language acquisition to uncover socio-cultural meaning on what constitutes intelligibility for L2 English speech from the perception of the native English speaker (NES) as the listener. We propose mixed methods research to study the prosodic feature of voice pitch and its role in intelligibility in L2 English speech. In this paper, we discuss how voice pitch is perceived in terms of intelligibility in L1 to L2 English phonetic transfer.

In L2 speech evaluation research, intelligibility is generally understood as "actual understanding of a word or utterance" [1]. Intelligibility then is the speaker's ability to convince the listener of the speaker's meaning of the words, intention of the sentences conveyed, and emotion behind the utterance, which should be expressed in appropriate content and form. At the form level intelligibility can be associated with various phonetic and non-verbal features such as prosody, rhythm, tone and pitch of speech. However, a language-specific prosody could negatively transfer to L2 speech and affect L2 intelligibility [1]. There is no research testing how these aspects can affect the intelligibility of L2 English.

Previous studies have investigated intelligibility in relation to pronunciation errors [2] at the segmental level, foreign accent [3], paralinguistic features contributing to the intelligibility of non-native English speakers [4], voice pitch, quality, politeness and gender specific to Japanese [5] and prosodic cues that transfer between L1 and L2 [6]. Despite the number of crosslinguistic transfer studies in intelligibility, studies in how voice pitch is perceived in terms of intelligibility and socio-cultural meaning has not been done. The research questions are two folds:

- How is the pitch range and intensity of spoken English of EFL learners related to the levels of L2 proficiency?
- How does the pitch/intensity manifestation affect the intelligibility of L2 English from the view of the native English speaker (NES)?

* yamanen@hiroshima-u.ac.jp
† karen.carter@asu.edu

2 Method

Sixteen EFL learners at the average age of 19 in a Japanese university were asked to deliver a one minute speech about themselves, both in English and Japanese. Avideocamera was mounted in a CALL classroom, and a microphone was pinned on the neck of the speaker's shirt. They were told to talk to the camera.

As a first approximation, we made a prediction about the relation between the efficiency of English and the use of pitch and the intensity; Advanced EFL learners, compared to beginners, should show (i) more dynamic pitch range, and (ii) larger intensity, which should contribute to the intelligibility. Another prediction is that advanced learners may switch the tone of voice between two different linguistic settings.

We chose 6 female students only. One speaker was an 'advanced' (C1 level in CEFR, 751-900) learner of English, four were at 'upper intermediate' (B2 level in CEFR, 526-750), and one was at 'pre-intermediate level' (A2 level in CEFR, 300-400) according to the categorization of embassyenglish.com. Self-reported TOEIC scores were used as a measure of objective English skills of individuals. Students were later asked to pick one most important (meaningful) sentence in their own English speech. Pitch and intensity of the targeted English sentence and the Japanese equivalent were measured in Praat [7] for each person. In pitch setting, semitones were set re 1Hz, for interspeaker comparison. For the quantification of the pitch range, we used the output of the maximum pitch minus minimum pitch.

Four NESs of American English in the western part of the United States volunteered to view videotapes to comment on voice pitch and L2 English intelligibility. They were all naive about Japanese language. Each NES volunteer is identified by gender (F=female/M=male), age and nationality (A=American) as F19A, M28A, F57A and M62A. The first volunteer was a college student, and the rest of them were college graduates currently in professional occupations.

3 Results

Results indicate that our predictions were right in general. The trendline of both graphs (Fig. 1) show that TOEIC scores on one hand and the size of the pitch range or intensity on the other hand are positively correlated. First, for the pitch of English sentences in question, the average pitch of the individuals of this group was 85.1 Hz, the min

was 77.3 Hz, and the max was 91.1 Hz. Thus, the difference between them (=pitch range) was 13.8 Hz. Among them, the biggest pitch range was marked 18 Hz by an upper intermediate speaker, and the lowest pitch range was marked 6.2 Hz by a pre-intermediate speaker who was on the lower end of x-axis. Second, the intensity of English speech of the sentences in question was averaged among the six females at 50.6 dB. Among them, the largest intensity was marked 54.6 dB by an advanced speaker who was on the higher end of the x-axis. The smallest intensity was marked 44.3 dB by an upper intermediate speaker.

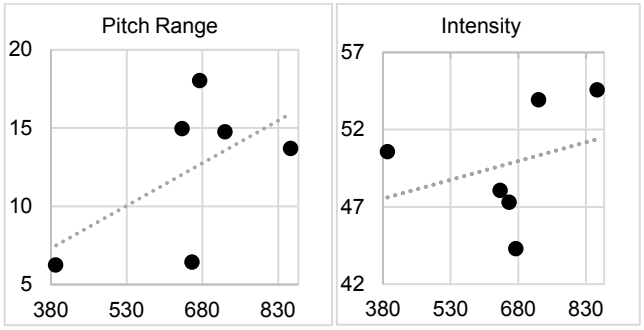

Figure 1: TOEIC score (points; x-axis) and pitch range (Hz; y-axis) on the left, and intensity average (dB; y-axis)

Another finding was the difference in pitch height between the two speech settings. The y-axis below shows the pitch value (Hz) calculated by pitch used in Japanese speech minus pitch used in English speech. The average of this value of all individuals is 0.3 Hz, which suggests Japanese speech is 0.3 Hz higher than English speech in general.

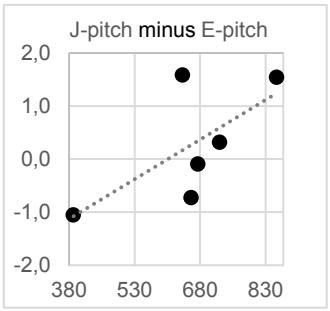

Figure 2: TOEIC score (points; x-axis) and the difference in pitch (Hz; y-axis) between English speech and Japanese speech

It is worth noting that an advanced learner (higher end of x-axis) lowers pitch in English relative to Japanese, while a pre-intermediate learner (lower end of x-axis) raised pitch in English relative to Japanese. The upper intermediate group was split into two groups; Two speakers lowered pitch in English and the other two raised pitch in English.

4 Discussion

Previous research shows that women tend to use high soft pitched voice as a societal expectation to project a feminine image [5] (p.14) and as a manifestation of politeness [5] (p.127). Americans however view softness of pitch differently. Soft pitched voice particularly in American women is generally seen as an undesirable trait of timidity and therefore lacking in authority (Key and Kramer study as cited in [5]).

These findings are compatible with how American viewers' commented on Japanese EFL speech. M28A interpreted the high soft pitched voice of a Japanese woman's English speech: *"Very timid English speaking"* In another comment M28A wrote that he wished for a louder voice, saying *"[she] was very quiet and it would be easier [to hear] if she speaks up."*

A key factor in intelligibility is not only to hear the speaker but to be able to hear the speaker clearly. F19A stated that intelligibility was lost because of indistinct sounds, saying *"The English speech sounded mumbled by the students on the right because of how softly they spoke."* F19A speaks to the notion that soft speech is not valued or stigmatized in American culture, as listeners must strain to make out distinct pronunciation sounds and thus soft tone is seen as undesirable. F19A added that soft speech was also monotoned. F19A's commented it is not so much that the speech was unintelligible, but there appeared to be a lack of interest in the speech.

5 Conclusion

Results show i) we are on a right track in examining whether levels of L2 English are correlated with the expansion of pitch range, augmentation of intensity, and lowering of pitch in L2 English in relative to L1 Japanese, and ii) there is a difference in socio-cultural meaning as far as voice pitch and intensity are concerned from the view of the American listeners. Further research will investigate additional paralinguistic factors that influence intelligibility of L2 English with augmented data.

Acknowledgments

The authors acknowledge the facilities and the technical assistance of the Information Media Center at Hiroshima University.

References

[1] Derwing, T. M., & Munro, M. J. (1997). Accent, intelligibility, and comprehensibility. *Studies in second language acquisition*, *19*(1), 1-16.

[2] Saito, K. (2011). Identifying problematic segmental features to acquire comprehensible pronunciation in EFL settings: The case of Japanese learners of English. *RELC Journal*, *42*(3), 363-378.

[3] Munro, M. J., & Derwing, T. M. (1995). Foreign accent, comprehensibility, and intelligibility in the speech of second language learners. *Language learning*, *45*(1), 73-97.

[4] Murphy, J.M. (2013). Intelligible, comprehensible non-native models in ESL/EFL pronunciation teaching. *System 42, 258-269*.

[5] Yuasa, I.P. (2009). Culture and gender of voice pitch: A sociophonetic comparison of the Japanese and Americans. http://ebookcentral.proquest.com.ezproxy1.lib.asu.edu

[6] Rasier, L., & Hiligsmann, P., (2007). Prosodic transfer from L1 to L2. theoretical and methodological issues. *Nouveaux cahiers de linguistique française 28 (2007), 41-66*.

[7] Boersma, P., & Weenik, D. (2014). Praat: Doing phonetics by computer (Version 5.3. 85) Computer program].