Integrating lexical and post-lexical suprasegmental information in native and non-native Japanese

In the phonological encoding process, segmental, lexical, metrical, syntactic and intentional information are integrated in order to construct prosodic constituents (Levelt 1989). On the basis of a phonetic plan produced in this process, a speaker must coordinate several suprasegmental cues synchronously at the articulatory level. Based on previous evidence of interference from one's native language (L1) in the speech processing of a second language (L2) (e.g. Gut 2003), it is assumed that the phonological encoding process in a L2 is a complex task, even more so, when L1 and L2 have typologically different prosodic systems like German and Japanese (Japanese with lexical H*+L pitch accents, realized mostly by changing only *f*0; German with post-lexical pitch accents of different types, realized by changing *f*0, intensity and duration).

We investigated how Japanese native speakers (JN) and German learners of Japanese (JNN) modify words with and without lexical pitch accent to signal post-lexical information. In our task, participants (15 JN and 15 JNN, the latter rated with respect to their proficiency in Japanese) had to repeatedly (3 times) seek a person's attention in two situations, saying either a pitch-accented word (*Sumimasen* 'Excuse me' – with a lexical pitch accent on the penultimate mora) or a word without pitch accent (*Konnichiwa* 'Hello'). This 2x2x3 design allows us to test how the strengthening of one aspect influences the coordination of suprasegmental cues *ceteris paribus*. Productions were analyzed both in terms of duration, energy (spectral tilt) and *f*0. Results were as follows:

1a) JN´ realizations of intonational contours were constant across repetitions (possibly due to the lexical function of *f*0 in Japanese). Even the intonation-phrase (IP) boundary tones were produced consistently across repetitions (as L%) in both types of utterances, though they could have been theoretically realized as a question rise tone, LH%.

1b) JNN, on the other hand, modified the intonational form from one production to the next, changing both pitch accent types (e.g., H*, L*) and IP boundary tones (H%, L%), with greater variation in the utterance without lexical pitch accent. There were significant correlations between L2 proficiency test scores and the use of nuclear tunes ($p<0.05$), which we regard as developmental stages of the L2 learning.

2a) JN conveyed the increased emphasis due to repeated attention-seeking by a higher pitch maxima in the word without lexical pitch accent ($p_{Repetition}<0.003$) and by a greater pitch range of the pitch fall in the word with lexical pitch accent ($p_{Repetition}<0.0001$).

2b) Both JN and JNN marked repetitions by longer utterance duration ($p_{Repetition}<0.01$). While JN lengthened all morae uniformly, JNN only lengthened the last mora with a nucleus ($p_{Repetition}<0.001$, $p_{Langage}<0.01$, $p_{Interaction}<0.001$). The first three morae were shortened and "n" in Konnichiwa was elided, resulting in deviant phonotactic forms.

2c) JNN produced the pitch-accented mora with more energy than JN ($p<0.0001$), resulting in stress rather than accent.

JN and JNN conveyed increased emphasis in different ways and the words with and without pitch accent were differently emphasized in both groups. Our results show problems not only in producing the phonological form of Japanese accentual phrases but also in integrating the suprasegmental cues in L2 Japanese (as 2b and 2c provide quantitative evidence for the perceptible foreign-accents). The relationship among the different suprasegmental cues as well as implications for perception will be discussed.

References:

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