



Lexical Stress Assignment to Base, Inflected and Derived Words in English by Japanese and Seoul Korean Learners of English

Mariko Sugahara

Doshisha University

msugahar@mail.doshisha.ac.jp

Abstract

We investigated whether or not the acquisition of English lexical stress in base, inflected and derived words by Japanese learners of English (JLE) and Seoul Korean learners of English (SKLE) was affected by their native prosodic systems. JLE and SKLE were presented with written English words, either base forms (e.g., *educate*, *parent*) or inflected/derived forms with a suffix (e.g., *educating*, *parental*), and were asked to write down a stress mark where they considered primarily stressed. For the base words, although both of the language groups most frequently preferred the correct word-initial stress (e.g., *éducate*, *párent*), the JLE performed better than the SKLE in some cases. For the suffixed words, the JLE preferred stress shifted near to morpheme boundaries (e.g., *educáting*, *paréntal*) more often than the SKLE regardless of whether the suffixes were ‘stress-neutral’ (e.g., *-ing*) or ‘stress-shifting’ (e.g., *-al*). Whereas Seoul Korean lacks lexical stress/accent, Japanese is a lexical accent language, which we consider the reason for the JLE’s better performance in the simple word tasks. Furthermore, the Japanese accent tends to fall near morpheme boundaries, which is likely to be the reason for the JLE’s strong bias to stress-shift in English suffixed words.

Index Terms: acquisition of English lexical stress, L1 transfer of prosodic systems, Japanese learners of English, Seoul Korean learners of English, stress patterns of base and suffixed words in English

1. Introduction

Knowledge of language-specific prosodic systems has been shown to affect the acquisition of English stress patterns ([1] and [2] on Polish and Hungarian learners of English; [3] on Spanish learners of English; [4] on Korean learners of English; and [5] on Mandarin learners of English). They looked at how their native languages’ prosodic systems affected those learners’ production or perception of English stress, taking into consideration the syllable structure ([1], [2], [3], [4], [5]), the lexical classes ([3], [4], [5]), and the phonological similarity between nonce words used in their experiments and existing words ([3], [4]). Few studies, however, have considered the factor of morphological organization of words: how differences in native languages’ prosodic systems affect stress assignment to English words that have different morphological organizations such as base words and suffixed words. The main interest of this study, then, is to investigate whether Japanese learners of English (JLE) and Seoul Korean learners of English (SKLE) show different patterns in assigning stress to base words (e.g., *educate*, *parent*) and to suffixed words (e.g., *educating*, *parental*), and see whether their native prosodic systems have any effect on their

performance. The organization of this paper is the following. In Section 2, the prosodic systems of English, Japanese and Seoul Korean are introduced. Section 3 presents the results of the paper-based stress assignment task, and discussions and concluding remarks will be provided in Section 4.

2. The prosodic systems in English, Japanese and Seoul Korean

English is a lexical stress language where the location of stress, which is phonetically realized with the combination of multiple acoustic cues such as vowel quality, duration and pitch, is lexically specified for each word (e.g., *Cá.na.da*, vs. *Ha.vá.na*; *digest* as a noun vs. *digést* as a verb). Although there are exceptional cases such as *catamarán*, most of the English nouns with three or more than three syllables have primary stress on the antepenultimate or the penultimate syllable. One of the interesting properties of English lexical stress system is that suffixes are either specified for ‘stress-neutral’ or ‘stress-shifting’. Stress-neutral suffixes are those which do not shift stress from the primary stress syllable of the base words (e.g., *dóminate* vs. *dóminating*; *párent* vs. *párentless*), while stress-shifting suffixes shift stress near to morpheme boundaries (e.g., *dóminate* vs. *dominátion*; *párent* vs. *paréntal*). All inflectional suffixes (e.g., *-ing*, *-en*, *-er*, *-est*) and derivational suffixes of Germanic origin (e.g., *-less*, *-ness*, *-er*, *-ish*, etc) are the representatives of stress-neutral suffixes. In contrast, most of the derivational suffixes of Latinate origin (e.g., *-ion*, *-al*, *-ic*, *-ity*, *-ous*) are stress-shifting.

The major dialects of Japanese, i.e., Tokyo Japanese and Kansai Japanese, have lexical accent¹, and accented syllables/morae are marked with a pitch fall only, which is called ‘pitch accent’. Although there is a difference of pitch accent vs. stress, Japanese is similar to English in that the lexical accent is specified for words in the lexicon.² For example, *kokoro* ‘mind’ has the penultimate accent (*kokóro*) in Tokyo and the antepenultimate accent (*kókoró*) in Kansai; *atama* ‘head’ has the final accent (*atamá*) in Tokyo and the penultimate accent (*atáma*) in Kansai. Like English, the accent in Japanese is most likely to fall on the antepenultimate or the penultimate syllable, which is especially evident in loanwords ([6]), not only in Tokyo but also in Kansai Japanese ([7]), e.g., *ká.na.da* ‘Canada’ and *bu.ré.zaa* ‘blazer’. Furthermore, the Japanese accent has a function to signal the morphological organization of words: it tends to fall near morpheme

¹ The term ‘Japanese’ in this paper refers to those major dialects, henceforth.

² Japanese has ‘unaccented’ words in addition to accented ones though English content words are all specified for the stress.

boundaries in complex words, which also tends to be the antepenultimate or the penultimate syllable ([8]), e.g., *kyóoto* ‘Kyoto’ vs. *kyootó-si* ‘Kyoto city’, *tábe* ‘eat (infinitive)’ vs. *tabé-reba* ‘eat (conditional)’ in Tokyo Japanese, *áge* ‘raise (inf)’ vs. *agé-reba* ‘raise (cond)’ in Kansai Japanese.

Seoul Korean, in contrast, has been claimed to lack lexical stress/accents ([9]). Although the language has tonal melodies, they are the properties of phrase-level constituents, i.e., the accentual phrase and the intonational phrase. According to [9], long accentual phrases, i.e., those with four or more than four syllables, are associated with a sequence of LHLH or HHLH tones unless they are intonational phrase-final, and whether or not they start with LH or HH depends on the nature of their initial segment. If the initial segment is a lenis obstruent or a sonorant, the accentual phrase begins with an LH tone. If it is an aspirated or fortis (tense) obstruent, however, an HH tone appears instead. In shorter accentual phrases, medial tones undergo undershoot, and accentual phrases starting with an L tone are realized as either LH, LLH or LHH, and those starting with an H tone are realized as HH, HLH or HHH ([9]). The morphological organization of lexical words, however, does not affect the tonal melodies in Seoul Korean.

Given the difference in the prosodic systems between Japanese and Seoul Korean, the question is whether or not JLE and SKLE behave differently when acquiring English lexical stress. If the difference affects their acquisition of English stress, then it is predicted that JLE are more alert and sensitive to lexical stress in English than SKLE, and they perform better when assigning stress to base words. It is also predicted that JLE prefer more stress-shift in inflected/derived words with suffixes than SKLE.

3. Experiment

3.1. The paper-based task

The task carried out for this study is paper-based. Participants were presented with English words (see Sec 3.3) written on questionnaire sheets and asked to write down a stress mark above the vowel of the syllable they considered primarily stressed. They also reported (a) whether or not they knew the meaning of each word and (b) how familiar they were with each word, scaling from 1 (not familiar) to 4 (very familiar). We also recorded the SKLE’s oral production of the words, of which results will be reported in our future paper.

3.2. Participants

50 JLE (36 females and 14 males from the Kansai Japanese speaking areas, ranging from 18 to 22 years old) and 19 SKLE (15 females and four males from the Seoul Korean speaking areas, ranging from 18 to 31 years old) participated in the experiment, who were all university students and had already learned English at least six years by the time the experiment took place. They were asked to report the scores of English proficiency tests, and 30 JLE and 11 SKLE disclosed their scores. Their scores were converted to the CEFR levels: eight at an A2, 17 at a B1, five at a B2 level among the JLE, and six at a B1, four at a B2, one at a C1 level among the SKLE.

3.3. Words used in the task

Words used in this study were divided into three groups, Groups I to III as shown below. Those words were randomly ordered on the sheets of paper presented to the participants.

Group I consists of verbs of base forms ending with *...ate* or *...ute*, words with a stress-neutral inflectional suffix *-ing*, and those with a stress-shifting derivational suffix *-ion* (see Table 1). The correct stress location of the base verbs and the inflected words with *-ing* is word-initial (e.g., *éducate*, *éducatíng*), whereas that of the derived words with *-ion* is stem-final (*educátion*).^{3,4}

Table 1: *Words in Group I*

Simple	Suffixed (Stress Neutral <i>-ing</i>)	Suffixed (Stress Shifting <i>-ion</i>)
agitate, allocate, aviate, complicate, concentrate, conjugate, dedicate, delegate, dominate, educate, estimate, generate, hibernate, immigrate, indicate, medicate, navigate, propagate, terminate	e.g., educating	e.g., education
constitute, execute, prosecute, substitute	e.g., constituting	e.g., constitution

Group II consists of pairs of base forms and suffixed words with stress-shifting *-al* or *-ic*. The correct stress location of the base words is word-initial (e.g., *párent*, *álcohol*), whereas that of the suffixed words with *-al* or *-ic* moves closer to stem boundaries (e.g., *paréntal*, *alcohólic*).⁵

Table 2: *Words in Group II*

Simple	Suffixed (Stress Shifting <i>-al</i> , <i>-ic</i>)
accident, origin, parent, alcohol, atom, symphony	accidental, original, parental, alcoholic, atomic, symphonic

The words in Group III are all morphologically simple nouns or verbs, and their correct stress location is the second syllable: *agénda*, *caméllia*, *veránda* (penultimate stress), and *convéy*, *obéy* (final stress).

Table 3: *Words in Group III*

Morphologically simple words only
agenda, camellia, veranda, convey, obey

The words in Group III were included to make sure if the participants have acquired the stress patterns of base words

³ Although the results obtained from the words of Group I have been presented in [10], the results of words in Groups II and III have not been reported in [10].

⁴ There is also a study [11] previous to the current study, which considered only inflected and derived words with *-ing* and *-ion*: Base words were not considered. Furthermore the participants in [11] and those in this study do not overlap at all.

⁵ The stress patterns of the suffixed words in Group II can be captured in terms of extrametricality: the final syllable is extrametrical in words ending with *-al* and the stress foot is formed immediately before it (e.g., *pa(rén)⟨tal⟩*, *o(rí.gi)⟨nal⟩*, where ‘⟨⟩’ is extrametrical and ‘()’ is the foot), whereas the final consonant is extrametrical in words ending with *-ic* and the foot is formed immediately before it (e.g., *alco(hó.li)⟨c⟩*).

with non-initial stress. All of the base words in Groups I and II are of initial stress, and even if the participants prefer the correct initial stress for those base words, it does not mean that they have acquired the stress patterns of English base words in general.

3.4. Results

Only the data from the participants with the English proficiency of a B1 or a B2 level in CEFR were analyzed to keep the English proficiency levels of both of the language groups as equal as possible. 22 JLE and 10 SKLE matched the criteria (see Sec 3.2). Because there is a possibility that participants' previous knowledge about the words affects their outcome, the results are shown separately for the cases where the participants knew the words and for those where they did not know the words.

3.4.1. Assignment of stress to words in Group I

The results of the words in Group I are summarized in Figures 1 to 3. The terms 'initial', 'second', '(stem-)final', and 'suffix' in the legends of the figures mean the syllables where the stress mark was placed. The term 'no stress' means that the participants answered that there was no stress. The correct stress locations are marked with an asterisk '*' in the legends.

Figure 1 summarizes the results of the base words. The number of the cases where the words were known by the participants was 322 (JLE) and 155 (SKLE), and that of the cases where the words were unknown was 182 (JLE) and 73 (SKLE). The most dominant stress pattern preferred by both the JLE and the SKLE was the correct initial stress regardless of whether or not the participants knew the words. Two *chi*-squared tests were carried out: one for the known words and the other for the unknown words. The cases of 'other' were excluded from the tests because the number of those cases was too small. Due to the multiple comparisons, the level of significance was adjusted to $\alpha=.025$ (.05/2) following Bonferroni's correction method. The result of the known and that of the unknown words were both significant ($\chi^2=35.26$, $df=3$, $p<.001$ for the known; $\chi^2=44.11$, $df=3$, $p<.001$ for the unknown). According to residual analyses, the JLE preferred more initial stress than the SKLE, and the SKLE preferred more 'no stress' than the JLE, regardless of whether or not they knew the words.

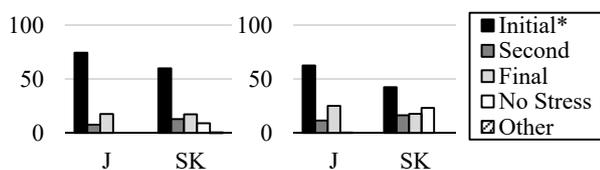


Figure 1: The percentage of stress assigned to each syllable of the *base* words (e.g., educate) in Group I, *known words (left); unknown words (right)*

Figure 2 summarizes the results from the inflected words with the suffix *-ing*. The number of the cases where the words were known was 286 (JLE) and 147 (SKLE), and that of the cases where the words were unknown was 219 (JLE) and 83 (SKLE). It is clear from the figure that the JLE preferred the stem-final stress (e.g., *e.du.cá.ting*) more often than the SKLE regardless of whether or not they knew the words. *Chi*-squared tests were carried out, from which the cases of 'suffix stress'

were excluded because the number of those cases was too small. The result of the known words and that of the unknown words were both significant at $\alpha=.025$ ($\chi^2=30.54$, $df=3$, $p<.001$ for the known and $\chi^2=83.31$, $df=3$, $p<.001$ for the unknown). According to residual analyses, the JLE were significantly more biased to stem-final stress than the SKLE, and the SKLE preferred significantly more 'no stress' than the JLE, regardless of whether or not they knew the words.

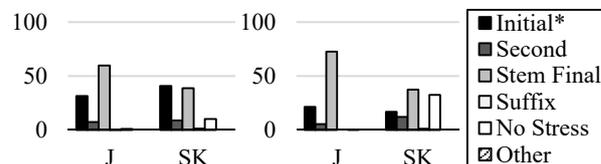


Figure 2: The percentage of stress assigned to each syllable in the words with *-ing* (e.g., educating) in Group I, *known (left); unknown (right)*

Figure 3 summarizes the results of the derived words with the suffix *-ion*. The number of the cases where the words were known was 307 (JLE) and 151 (SKLE), and that of the cases where the words were unknown was 199 (JLE) and 77 (SKLE). Although the most dominant stress pattern preferred by both of the language groups was the stem-final stress, the JLE was more strongly biased to the stem-final stress than the SKLE regardless of whether or not they knew the words. *Chi*-squared tests were carried out, from which the cases of 'suffix stress' and 'other' were excluded because the number of those cases was too small. The result of the known and that of the unknown words were both significant at $\alpha=.025$ ($\chi^2=71.18$, $df=3$, $p<.001$ for the known words and $\chi^2=79.2$, $df=3$, $p<.001$ for the unknown words). According to residual analyses, the JLE were significantly more biased to the stem-final stress than the SKLE, while the SKLE preferred the 'initial stress' and 'no stress' significantly more often than the JLE, regardless of whether or not they knew the words.⁶

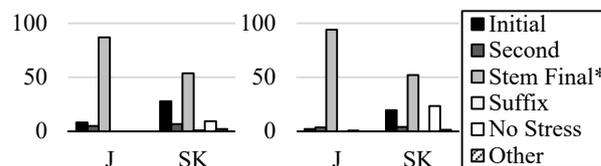


Figure 3: The percentage of stress assigned to each syllable in the words with *-ion* (e.g., education) in Group I, *known (left); unknown (right)*

3.4.2. Assignment of stress to words in Group II

The results of the words in Group II (e.g., *parent*, *parental*) are summarized in Figures 4 and 5. Figure 4 shows the results of the base words (e.g., *parent*). Because the number of cases where the participants did not know the words was too small (nine from JLE and five from SKLE), only the results from the cases where the participants knew the words are summarized in the figure (167 from JLE and 75 from SKLE). The most dominant stress pattern preferred by both of the language groups was the correct initial stress. A *chi*-squared test was

⁶ [11], the study with different groups of participants, have also obtained the same results for the *-ing* and the *-ion* forms: JLE preferred stem-final stress more often than SKLE.

carried out, from which the cases of ‘no stress’ (one from JLE, six from SKLE) were excluded because the number of those cases was too small. The result of the test was not significant at $\alpha=.05$: The stress assignment patterns to the base words were not significantly different between JLE and SKLE.

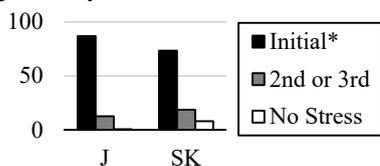


Figure 4: The percentage of stress assigned to each syllable in the base words (e.g., parent) in Group II, known words only

Figure 5 is of the words with a derivational suffix (e.g., parental). The number of the cases where the words were known was 146 (JLE) and 61 (SKLE), and that of the cases where they were unknown was 28 (JLE) and 17 (SKLE). ‘Non initial’ in the legend means that the stress was assigned to neither the initial syllable, the correct syllable, nor the syllable that contains the suffix. ‘Correct’ means that the stress was correctly shifted, and ‘suffix’ means that the stress was assigned to the syllable that contains the suffix. The JLE preferred the correct shifted stress more often than the SKLE regardless of whether or not the words were known. *Chi*-squared tests were carried out. ‘Non initial’, ‘suffix’ and ‘no stress’ were excluded from the tests because the number of those cases was too small. The result of the known and that of the unknown words were both significant at $\alpha=.025$ ($\chi^2=23.31$, $df=1$, $p<.001$ for the known; $\chi^2=5.214$, $df=1$, $p<.025$ for the unknown): The JLE were significantly more biased to the correct shifted stress (e.g., *parental*) than SKLE.

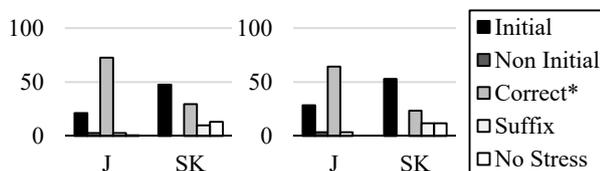


Figure 5: The percentage of stress assigned to each syllable in suffixed words with -al or -ic (e.g., parental) in Group II, known (left); unknown (right)

3.4.3. Assignment of stress to words in Group III

In order to make sure if the JLE and the SKLE had already acquired the stress patterns of simple words with non-initial stress, their stress assignment to the words in Group III, of which correct stress location is the second syllable (e.g., *a.gén.da*, *con.véy*), was considered. The base words in Groups I and II were of initial stress only, and even if the participants preferred the correct stress pattern for those words, it does not mean that they had acquired the stress patterns of English base words in general. Figure 6 summarizes the percentage of stress assigned to the initial and the second syllable of the known words in Group III (73 from JLE, 30 from SKLE).

Both the JLE and the SKLE preferred the correct second syllable stress more often than the initial stress. There was, however, a significant difference between the two groups according to a *chi*-squared test ($\chi^2=9.703$, $df=1$, $p<.003$): The JLE preferred the correct second stress significantly more often than the SKLE.

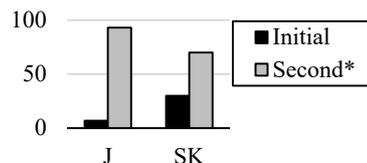


Figure 6: The percentage of stress assigned to the initial and the second syllable in the words of Group III (e.g., agenda), known words only

4. Discussion and conclusions

As for the base words in Groups I to III, both of the language groups preferred the correct stress patterns most frequently regardless of whether or not the correct stress was word-initial. Nonetheless, the JLE were significantly better than the SKLE in identifying the correct stress locations of the words in Group I and Group III. This result indicates JLE are more alert and sensitive to lexical stress locations than SKLE when they learn the stress patterns of words in L2. It is because Japanese is a lexical accent language (see Sec 2). That the native speakers of languages with lexical stress/accent is more sensitive to lexical stress in L2 has been reported in [12] and [13], and our results are in line with their findings.

As for the suffixed words, the JLE preferred more stress-shift in suffixed words than the SKLE regardless of whether the suffix was stress-neutral or stress-shifting. We consider the result due to the fact that Japanese is a language in which the lexical accent tends to move near to a morpheme boundary (see Sec 2), which makes JLE prone to overgeneralize the rule of stress-shift by suffix attachment in English and apply it even to words with stress-neutral suffixes.

Although the JLE preferred more stress-shift than the SKLE in the suffixed words with -ing in Group I regardless of whether the words were known or unknown, their bias to stress-shift looked stronger when the words were unknown than when known (see Figure 2). To make sure if the JLE’s percentage of stress assigned to the initial syllable (not shifted) and that of stress assigned to the stem-final syllable (shifted) were significantly different between the known and the unknown words, an additional *chi*-squared test was carried out. The result was significant ($\chi^2=7.56$, $df=1$, $p<.01$). What this means is that JLE are more likely to assign stress to the -ing forms based on their memory when they know the words, which gives correct ‘non-shifted’ patterns more often, whereas they are more likely to assign ‘shifted’ stress to the -ing forms by applying the overgeneralized stress-shifting rule being affected by their native prosodic system when they do not know the words.

In conclusion, although much remains to be done, the result of the current study indicates that JLE’s stress assignment to English words is influenced by their native prosodic system in the lexicon. In our future study, we will compare the oral production of JLE and that of SKLE when they read aloud the words used in this study. We still do not know if their stress assignment in a production task and their performance in the current paper-based task are parallel.

5. Acknowledgements

This work was supported by JSPS KAKENHI (C) JP17K02828, and by NINJAL collaborative research project ‘Cross-linguistic Studies of Japanese Prosody and Grammar’.

6. References

- [1] J. Archibald, "Transfer for L1 parameter settings: some empirical evidence from Polish metrics," *Canadian Journal of Linguistics*, vol. 37, pp. 301-339, 1992.
- [2] J. Archibald, *Language Learnability and L2 Phonology: The Acquisition of Metrical Parameters*. Dordrecht: Springer Science+Business Media, 1993.
- [3] S. G. Guion, T. Harada and J. J. Clark, "Early and late Spanish-English bilinguals' acquisition of English word stress patterns," *Bilingualism: Language and Cognition*, vol. 7, pp. 207-226, 2004.
- [4] S. G. Guion, "Knowledge of English word stress patterns in early and late Korean-English bilinguals," *Studies in Second Language Acquisition*, vol. 27, pp. 503-533, 2005.
- [5] S-H. Ou, and M. Ota, "Is second-language stress acquisition guided by metrical principles? Evidence from Mandarin-speaking learners of English," In Y. E. Hsiao & L-H. Wee (Eds.), *Capturing Phonological Shades Within and Across Languages*. New Castle upon Tyne: Cambridge Scholars Publishing, pp. 389-413, 2015.
- [6] H. Kubozono, "Where does loanword prosody come from? A case study of Japanese loanword accent," *Lingua*, vol. 116, pp. 1140-1170, 2006.
- [7] S. Tanaka, "Osaka hoogen gairaigo-no akusento-to siki-ni tuite [On the accent and the tonal register in Osaka Japanese loanwords]," *Proceedings of the 138th Conference of the Linguistic Society of Japan*. pp. 214-219, 2009.
- [8] H. Kubozono, "Constraint interaction in Japanese phonology: Evidence from compound accent," *Phonology at Santa Cruz*, vol. 4, pp. 21-38, 1996.
- [9] S-A. Jun, *The Phonetics and Phonology of Korean Prosody*. New York, London: Garland Publishing, 1996.
- [10] M. Sugahara, "Lexical stress assignment in English trisyllabic verbs ending with *-ate* and *-ute* by Japanese and Seoul Korean speakers," Poster presented at ICPP 2018, NINJAL, Japan, 2018.
- [11] M. Sugahara, "eigo-no daiitikyoosei-no itihandan-ni oyobosu bogo-no eikyoo: genzaibunsikei/doomeisikei *-ing* -to haseimeisikei *-ion* -eno kyooseihuyo-no ankeetochoosa-kara [The effect of native languages on the judgement of primary stress locations in English: a questionnaire study on stress assignment to present participle/gerundive forms with *-ing* and derived nominals with *-ion*]," *Doshisha Studies in English*, vol. 100, pp. 165-221, 2019.
- [12] E. Dupoux, C. Pallier, N. Sebastian and J. Mehler, "A destressing "deafness" in French?" *Journal of Memory and Language*, vol. 36, no. 3, pp. 406-421, 1997.
- [13] S. Peperkamp and E. Dupoux, "A typological study of stress 'deafness'," In C. Gussenhoven & N. Warner (eds.), *Laboratory Phonology 7*. Berlin: Mouton de Gruyter, pp.203-240, 2002.