

Information Status and Prosodic Prominence as Perceived by Korean Learners of English

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ABSTRACT

This study investigates the relationship between information status and prosodic prominence perceived by Korean learners of the English language, compared to English native speakers, in a complete public speech. Both groups of speakers were asked to mark words that they perceived as being prominent, while listening to a speech in real time. The information status of a word was annotated as a function of referential and lexical information, as well as focus. The results show that Korean native speakers perceive prosodic prominence in a similar manner to that of English native speakers. Both groups are more likely to perceive prominence for new or focused words than for given or non-focused words. The two groups, however, differ in that Korean native speakers tend to more frequently perceive prominence for words carrying lexical information than English native speakers. This bias seems to be influenced by parts-of-speech, in alignment with the findings of previous studies.

Keywords: prosodic prominence, information status, Rapid Prosody Transcription, The RefLex Scheme, Korean learners of English

1. Introduction

In English, prosodic prominence (henceforth, prominence) is the relative prominence among different words within intonational phrases, differentiated from lexical stress (Cruttenden 1986; Gussenhoven 2004; Ladd 2008). Prominence is reflected in phonetic realization of a word. Prominent words are longer in duration, stronger in intensity, and higher in pitch than non-prominent words in utterances (Beckman 1986; Beckman & Edwards 1994; Cole et al. 2007; among others).

Prominence conveys the semantic or pragmatic meaning of a word in discourse context. Prior research proposes that there is a one-to-one mapping between prominence and information status of a word (Pierrehumbert & Hirschberg 1990). Prominent words carry new information or focus, while non-prominent words deliver given information in discourse context. More recent studies, however, suggest

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that prominence is probabilistically associated with information status in discourse context (Calhoun 2006, S-Y Im et al. 2018, Sityaev 2000 for English; Baumann & Riester 2013, Mücke & Grice 2014 for German; Cangemi & Grice 2016 for Neapolitan Italian). The loose relation between prominence and information status may arise from the speaker's consideration of other factors in speech, for instance, speech rhythm (Büring 2007, Calhoun 2006, Sityaev 2000), speech style (De Ruiter 2015, Hirschberg 1993, S-Y Im et al. 2018), and emotion (Chodroff & Cole 2018).¹⁾

Another line of research proposes more complex distinctions of information status than dichotomous distinction (given versus new) to capture all possible relations between words in discourse context. One approach is the triple given-accessible-new distinction (Baumann & Grice 2006, Chafe 1976, Prince 1981). The accessible category captures the relation between words where the following word can be activated by the previous word in discourse context (e.g., part-whole relation). Another approach is the referential-lexical distinction of a word (Baumann & Riester 2013). The referential level denotes co-referential status of a word in relation to the preceding word, while the lexical level indicates the accessibility of lexical expression per se in prior context. The example (1) shows that prominence assignment interacts with the referential or lexical status of a word (adopted from Baumann & Riester 2013). The accented syllables are indicated in uppercase.

- (1) A: Yesterday, a friend of mine prepared a laSAGne for me.
B: I found it hard to enJOY the tasteless stuff.

In (1), “the tasteless stuff” is a new lexical expression in a conversation and is a possible landing position of prominence. However, it is unaccented, as it co-refers to “a lasagne” in the previous utterance.

The complex relation between prominence and discourse meaning is challenging for learners of English. Korean English learners are found to differ from English native speakers in producing prominence in relation to information status (J-K Lee 2005; H-Y Um et al. 2001; S-P Yi 2011). H-Y Um et al. (2001) examined how Korean English learners and English native speakers produced prosodic prominence in relation to givenness and focus using controlled question-answer sentences. For instance, in the sentences, “Did Esther enjoy the marathon? Yes. She WON the marathon,” speakers were expected to assign prominence (shown in uppercase) on

1) For a review of prosodic prominence and its role in discourse context, see Cole (2015).

the lexically new word (i.e., “won”), but not on the referentially or lexically given words (i.e., “she,” “the,” “marathon”). In another pair of sentences, “Esther saw the marathon? No, she WON the marathon,” the focused word (i.e., “won”) was expected to be salient while the non-focused words (i.e., “she,” “the,” “marathon”) were not. The results show that English native speakers assigned prominence on focused or lexically new words as expected, although they produced prominence on lexically repeated words in a few sentences. Korean English learners assigned prominence on content words regardless of information status. They produced prominence for the lexically given or non-focused words in the same manner with the lexically new or focused words. In the same study, H-Y Um et al. (2001) further examined whether Korean English learners’ inappropriate prominence assignment could cause a communication problem with English native speakers. Another group of English native speakers was asked to listen to answer sentences and identify the corresponding question sentences in the question-answer pairs from the production experiment. They indicated the correct question sentences with 100% accuracy for English native speakers but not for Korean native speakers. Among five different types of question-answer pairs with new or focused words in varying locations, only one type was identified with 85% accuracy and the other four types with less than 50% accuracy.

There is little research on the perception of prominence in relation to information status by Korean English learners compared with English native speakers. It is unknown whether or not Korean English learners differ from English native speakers in perceiving prominence as a function of givenness and focus. This is important for us to understand the link between perception and production of prominence in discourse context. It is possible that Korean English learners perceive prominence differently from English native speakers, and as a result, they differ in producing prominence compared with English native speakers. Or, Korean English learners may perceive prominence similarly with English native speakers, but they simply do not know how to assign prominence in relation to discourse meaning, which results in differences in prominence production compared with English native speakers.

The current study investigates the perception of prosodic prominence by Korean English learners and English native speakers in relation to information status of a word in a public speech. Rapid Prosody Transcription (Cole et al. 2010) is adopted to obtain prominence ratings from linguistically non-expert listeners in everyday speech. The RefLex Scheme (Riester & Baumann 2017) is used to annotate the

information status of a word at the referential, lexical, and focus (alternative expressions) levels. An intact and complete public speech is selected to provide full and rich discourse context to listeners. As an expansion of previous research on the production of prominence in relation to information status by Korean native speakers and English native speakers (J-K Lee 2005; H-Y Um et al. 2001; S-P Yi 2011), this study examines how Korean English learners, compared with English native speakers, perceive prominence as a function of referential and lexical givenness as well as focus in discourse context in English.

2. Method

2.1. Perception experiment

Thirty-five English native speakers and thirty Korean native speakers participated in perception experiments. The experiments were conducted at a midwestern university in the United States for the English native speakers and at a university in Seoul in Korea for the Korean native speakers. The Korean native speakers were undergraduate students majoring in English and were advanced learners of English (Average TEPS scores: 820). Advanced learners of English were recruited because they would show few difficulties in understanding the speech, which might influence their perceptual judgment on prominence.

The participants were asked to listen to a speech and simultaneously mark words perceived as prominent on a transcript of the speech on an online interface (Language Markup and Experimental Design Software, Mahrt 2013). The prominent words were defined as the “words that stand out in the speech stream by virtue of being louder, longer, more extreme in pitch, or more crisply articulated than other words in the same utterance.” The speech material was an intact and complete speech from TED entitled “Try Something New for Thirty Days” (Cutts 2011), delivered by a male speaker of American English in clear and engaging speech style (361 words, $t=2'25''$). The speech was played twice and was presented without punctuation and capitalization (see Figure 1), which may indicate the beginning or the end of an utterance and influence the participants’ perceptual judgement of prominence.

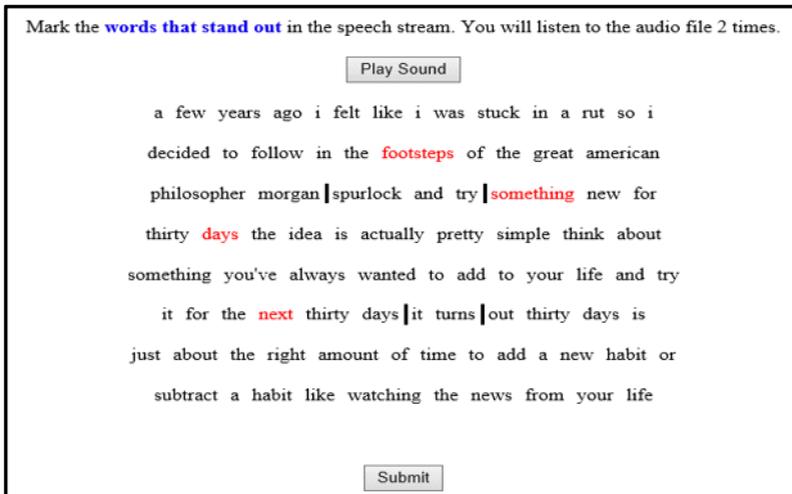


Figure 1. A screen capture of the perception experiment. Words were presented without punctuation and capitalization. The red words are the ones selected as prominent words. The black bars between words indicate perceived prosodic boundaries, which are not discussed in this study.

2.2. Annotation of information status

The speech material was annotated by two linguistic experts using the RefLex Scheme (Riester & Baumann 2017). Each word was labeled as a function of co-referential, lexical, and alternative (focus) relation with other words in complete discourse context. Nouns or noun phrases were annotated at the referential (r-) level for the co-referential status of the words. All the content words and some function words were labeled at the lexical (l-) level for the lexical status of a word in relation to the other words in the preceding five utterances. Any words or phrases in alternation were annotated at the alternative (alt-) level based on the alternative-based contrastive focus (Rooth 1992). In Table 1, the labels are presented in decreasing order of givenness: given > bridging > unused > new for the r-level, given > new for the l-level. The r-, l, and alt-none labels do not consist of the RefLex Scheme labels and were introduced in this study for the words that do not carry information at the given level following the RefLex Scheme. The r-, l, and alt-none labels were included in the analysis, but they will not be discussed. There were some labels with less than ten observations (r-cataphor = 1, l-accessible = 7), which were merged into other labels in Table 1 (r-bridging for r-cataphor, l-given for l-accessible).

For more details on the RefLex Scheme, see Riester and Baumann (2017).

Table 1. Annotation labels for information status

Level	Label	Description
R-level	R-given	Co-referring entity in discourse
	R-bridging	New entity that depends on discourse
	R-unused	Unique new entity in discourse
	R-new	Non-unique new entity in discourse
L-level	L-given	Expression repeated within the last five utterances
	L-new	Expression new within the last five utterances
Alt-level	Alt	Alternative expression in discourse

2.3. Analysis

For statistical analysis, a generalized linear mixed-effects model was run using the lme4 package (Bates et al. 2015) in R (R Core Team 2019). The binary prominence responses for each word (1 for a prominent word, 0 for a non-prominent word) were modeled as a function of the L1 group and three information status levels (r-level, l-level, alt-level) and the interaction between the L1 group and three information status levels. Participants were submitted as a random factor.

For further analysis, prominent (p-) scores were obtained by adding up the prominence responses for each word (Cole et al. 2010). P-score ranges from 0 to 1 where 1 indicates that all the listeners perceived a word as prominent, while 0 means that none of the listeners did so. P-score was calculated for each L1 group and will be discussed regarding information status informally.

2.4. Predictions

Korean native speakers are expected to differ from English native speakers in perceiving prosodic prominence in relation to information status. This prediction is made in parallel with the findings from the prior research on prominence production (J-K Lee 2005; H-Y Um et al. 2001; S-P Yi 2011), where Korean native speakers differed from English native speakers in assigning prominence on words with varying givenness and focus.

Whereas English native speakers would judge prominence more frequently for the words carrying new information than given information and for the words with focus than without focus, Korean native speakers are expected to rate prominence regardless of the information status of a word. In other words, Korean native speakers would rate prominence frequently on given or non-focused words as well as new or focused words. This prediction is based on the findings from the prior research (J-K Lee 2005; H-Y Um et al. 2001; S-P Yi 2011), where English native speakers produced prominence on new or focused words more frequently than given or non-focused words, while Korean native speakers assigned prominence similarly across the words varying with givenness and focus.

3. Results

Korean native speakers show similar but not identical prominence judgement, compared with English native speakers. Figure 2 shows an example of the prominence rating by the two L1 groups for an utterance analyzed in this study, “It turns out thirty days is just about the right amount of time to add a new habit or subtract a habit like watching the news from your life.”

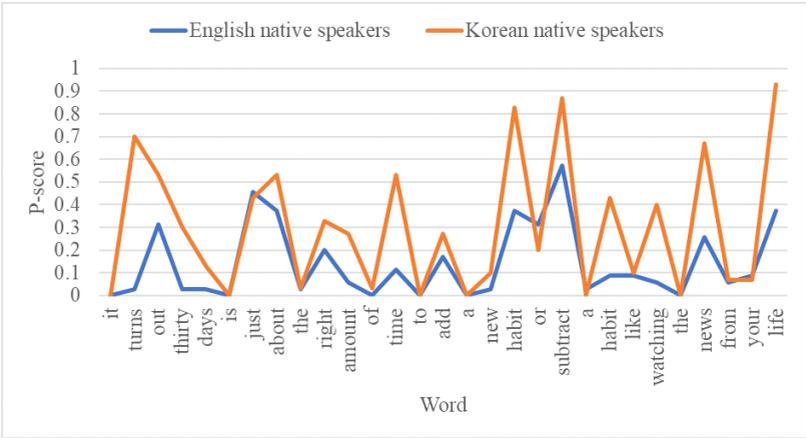


Figure 2. Prominence judgement by English native speakers (blue) and Korean native speakers (orange) for an utterance analyzed in this study.

Both L1 groups show low p-scores for function words. However, Korean native speakers differ from English native speakers in that they show high p-scores for some content words such as “turns,” “time,” and “habit” in Figure 2. In particular, on the lexical expression “habit” occurring twice in the utterance, more Korean native speakers marked prominence than English native speakers. For the first-occurring “habit”, labeled as a lexically new (l-new) word, 83% of Korean native speakers rated prominence while 37% of English native speakers did so. For the second-occurring “habit”, labeled as a lexically repeated (l-given) word, 43% of Korean native speakers marked prominence while only 9% of English native speakers did so. This implies that, despite the overall similarities, the two L1 groups may differ from each other in rating prominence on the words delivering lexical information.

Table 2 shows the results from the generalized linear mixed-effects model where the prominence rating is modeled in relation to the L1 group, information status levels, and the interaction between the L1 group and information status levels.

Table 2. Statistical results from the generalized linear mixed-effects model

		est.	SE	z	p
(Intercept)		-2.28	0.09	-25.67	<0.01**
L1 group	Korean native speakers	0.14	0.13	1.09	0.28
R-level	r-given	-0.29	0.08	-3.63	<0.01**
	r-bridging	-0.53	0.13	-4.18	<0.01**
	r-unused	0.54	0.08	7.01	<0.01**
	r-new	0.05	0.07	0.65	0.52
L-level	l-given	0.37	0.10	3.83	<0.01**
	l-new	1.43	0.06	25.04	<0.01**
Alt-level	alt	0.70	0.07	9.71	<0.01**
L1 group:R-level	Korean native speakers:r-given	0.10	0.11	0.88	0.38
	Korean native speakers:r-bridging	0.38	0.17	2.28	<0.05*
	Korean native speakers:r-unused	-0.15	0.11	-1.32	0.19
	Korean native speakers:r-new	0.03	0.10	0.33	0.74
L1 group:L-level	Korean native speakers:l-given	0.86	0.13	6.68	<0.01**
	Korean native speakers:l-new	0.50	0.08	6.11	<0.01**
L1 group:Alt-level	Korean native speakers:alt	0.15	0.11	1.41	0.16

In Table 2, the L1 group is not a significant factor of the estimated prominence rating. This suggests that there is no overall difference between English native speakers and Korean native speakers in the judgment of prominence. All the labels of r-, l-, and alt-levels, except r-new, have significant effects on the estimated perceived prominence, which means that information status is an important factor for the listeners in rating prominence. The interaction shows that Korean native speakers differ from English native speakers in judging prominence for the words carrying lexical information (l-level) but not for the most words delivering co-referential information (r-level) or alternative information (alt-level) in this speech. The interaction between L1 group and information status is further visualized in Figures 3-5.

In Figures 3-5, the x-axis is the labels for the r-level (Figure 3), the l-level (Figure 4), and the alt-level (Figure 5), respectively. The y-axis is the estimated effects of the information status on prominence rating. Across Figures 3-5, both L1 groups show similar patterns in that they are more likely to rate prominence as the givenness of a word decreases. In other words, they tend to perceive prominence more often for words carrying new information than given information (Figures 3-4) and for words with focus than words without focus (Figure 5).

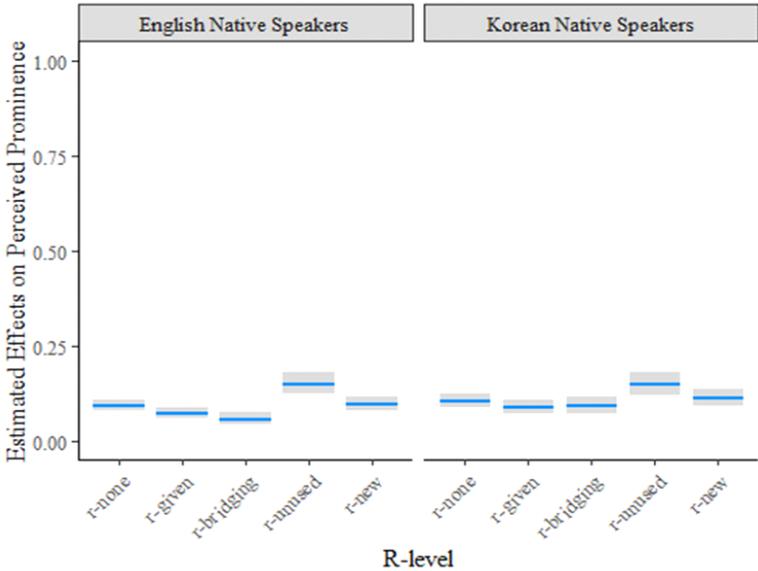


Figure 3. Estimated effects of the co-referential status of a word on the prominence judgement by English native speakers (left panel) and Korean native speakers (right panel).

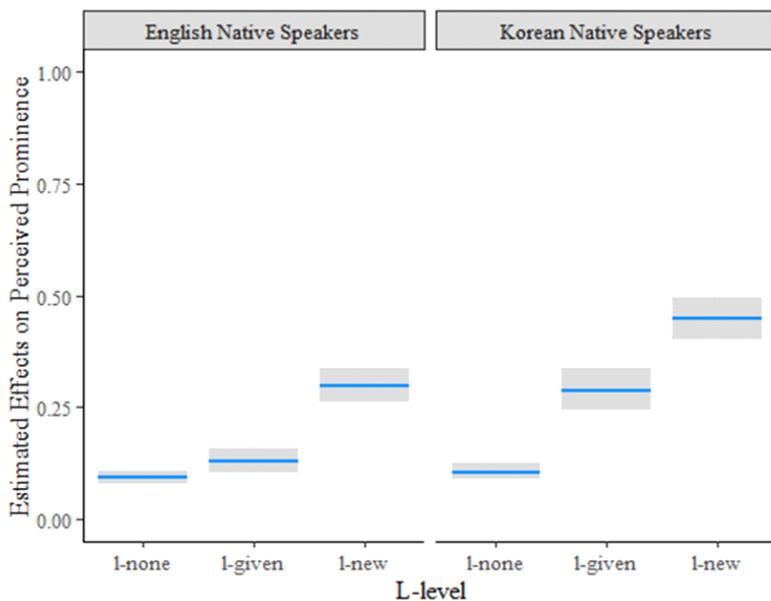


Figure 4. Estimated effects of the lexical status of a word on prominence rating by English native speakers and Korean native speakers.

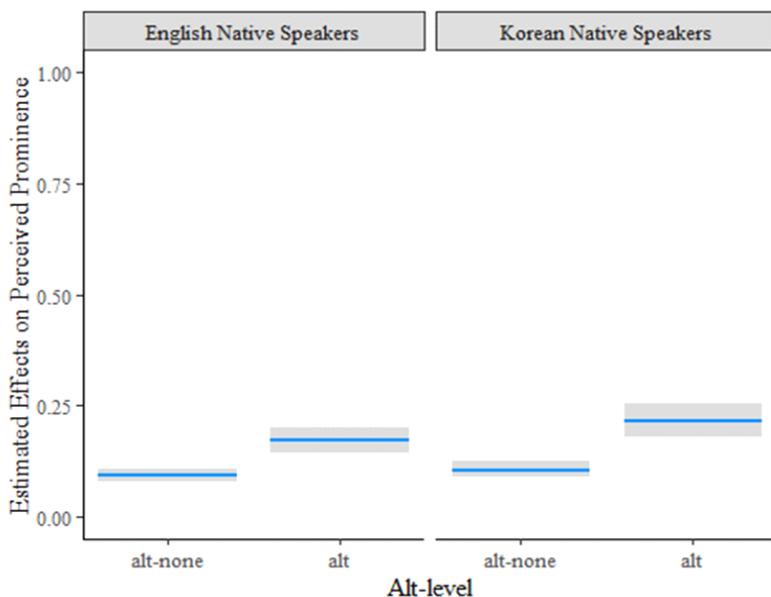


Figure 5. Estimated effects of the alternative status of a word on perceived prominence by English native speakers and Korean native speakers.

However, closer examination reveals that in Figure 4, there are differences between the L1 groups. Korean native speakers (right panel) show higher estimates than English native speakers (left panel) for both lexically repeated (l-given) and lexically new (l-new) expressions. This suggests that Korean native speakers are more likely to mark prominence on words delivering any lexical information than are English native speakers.

Further analysis was made to examine the possible influence of parts-of-speech (POS) on prominence rating in relation to information status. The POS of a word in the speech material was labeled using the Penn Treebank P.O.S. Tags (Taylor et al. 2003) and was re-categorized into content versus function words. In Figures 6-8, the x-axis is the information status labels at the r-, l-, and alt-levels, respectively. The y-axis is the percentage where the number of each POS tag is divided by the overall number of tags.

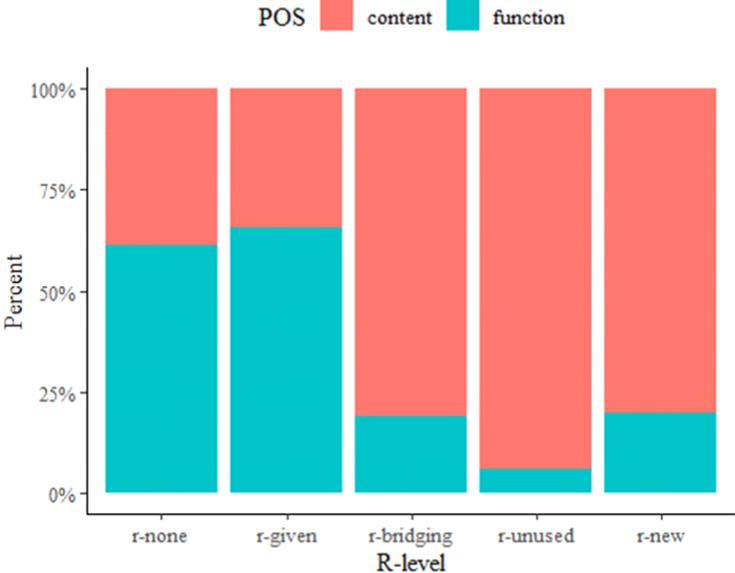


Figure 6. Parts-of-speech for words carrying referential information. Content words are shown in red and function words are in blue.

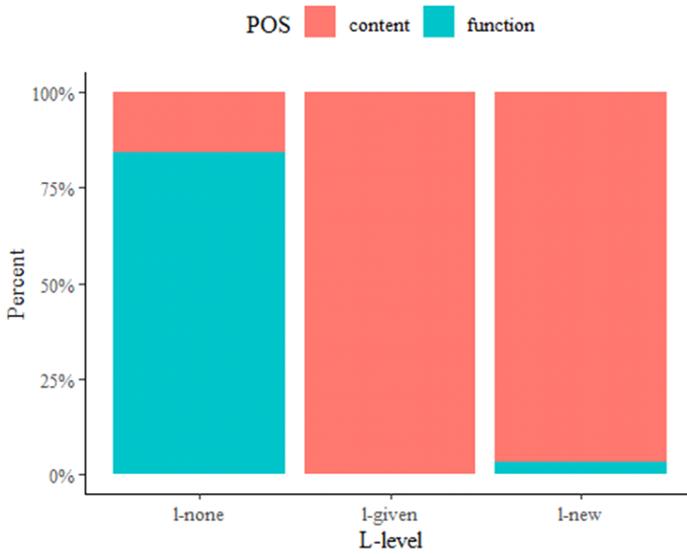


Figure 7. Parts-of-speech for words delivering lexical information.

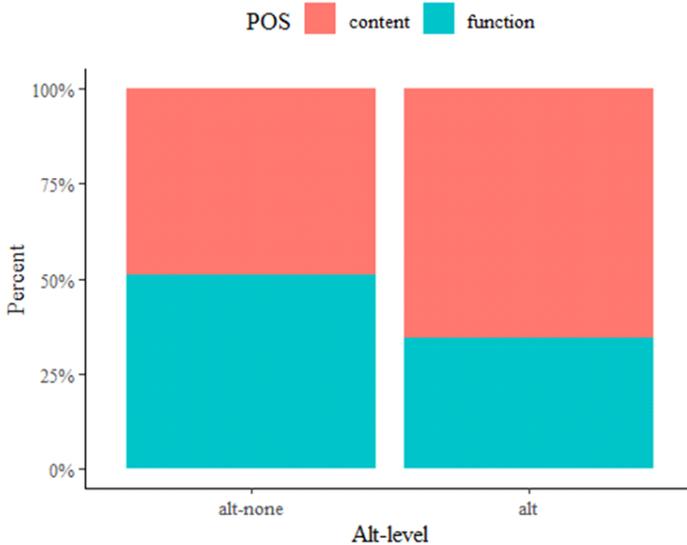


Figure 8. Parts-of-speech for words delivering alternative information.

In Figure 6, the words with r-bridging, r-unused, and r-new are mostly content words, as they are often associated with proper nouns (for r-unused) or new entities (for r-bridging and r-new) in discourse context. The words with r-given are mostly

function words, as co-referring expressions are often substituted with pronouns in English (e.g., “him” for “John”). In Figure 7, most words with 1-given and 1-new are content words, as the 1-level captures the lexical status of all the content words and some function words, which consist of lexical expressions (e.g., “to” for “go to sleep”). In Figure 8, the words with alt-label are more often content words than function words. Some alternative expressions in this speech are noun phrases.

4. Discussion and Conclusion

This study has investigated how Korean native speakers perceive prosodic prominence in relation to information status in an intact and complete speech, compared with English native speakers. Both L1 groups were asked to mark words perceived as prominent while listening to the speech in real time. The information status of a word was annotated for its referential, lexical, and alternative relation with other words in discourse context. In parallel with the findings on production of prominence in prior research (J-K Lee 2005; H-Y Um et al. 2001; S-P Yi 2011), it was predicted that Korean native speakers would differ from English native speakers in rating prominence regarding information status. While English native speakers would judge prominence more frequently as the givenness of a word decreased, Korean native speakers would rate prominence similarly across the words varying with givenness and focus. Results show that Korean native speakers perceived prominence in relation to information status in a similar way with English native speakers. Both L1 groups rated prominence more often for words carrying new information than given information and for words with focus than without focus.

In this motivational and engaging speech, prominence encodes not only information status but also other types of information such as speech style and speaker’s emotion (S-Y Im et al. 2018). Thus, it is highly unlikely that prominence is one-to-one mapped with different information status in the speech. Considering the loose relation between prominence and information status in this public speech, it is surprising to find that Korean English learners can perceive prominence similarly with English native speakers as the givenness of a word decreases. This can be explained only if Korean English learners (and English native speakers) can discriminate between the prominence associated with information status and the prominence linked with other factors (e.g., speech style and speaker’s emotion), and rate prominence according to the givenness of a word in discourse context. It is

little known when and how listeners' normalization of speech style and speaker's emotion takes place, which needs to be investigated in future research.

This study also finds that there are differences between Korean native speakers and English native speakers in judging prominence on words delivering lexical information. Korean native speakers are more likely to rate prominence on lexically given or new words than are English native speakers. Further examination of parts-of-speech reveals that the words carrying lexical information in this speech are mostly content words. In the previous production research (H-Y Lee 2011; H-Y Lee & J-E Song in press; G-B Lee et al. 2017; H-Y Um et al. 2001), Korean native speakers were found to assign prominence on all the content words and few function words. Considering this, Korean native listeners in the current study could have regarded all the content words as possible landing positions of prominence, which resulted in their increased rating of prominence on words carrying lexical information, compared with English native speakers. The interaction between information status and parts-of-speech needs to be further explored in a future study. The results in the present study also support the RefLex Scheme in that listeners vary in perceiving prominence on words carrying referential versus lexical information in discourse context and propose the consideration of the referential-lexical distinction of information status in future research on prominence.

This study presents evidence that Korean native speakers can perceive prosodic prominence in relation to information status, as well as focus, in complete discourse context similarly with English native speakers. In comparison, in the prior research on prominence production (J-K Lee 2005; H-Y Um et al. 2001; S-P Yi 2011), Korean English learners were found not to assign prominence in relation to information status appropriately, compared with English native speakers. Taken together, there is a discrepancy between perception versus production of prominence by Korean English learners. Korean English learners can perceive prominence as a function of information status, but this does not lead to their appropriate production of prominence regarding information status. In order to bridge the gap between perception and production of prominence, Korean English learners can be taught about the association between prominence and discourse meaning and practice it in their learning of English prosody. The information status of a word builds up in the course of discourse, so it must be informed in full and rich discourse context. For future study, the production of prominence by Korean English learners in relation to information status can be examined in an intact and complete speech.

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