Intonational disambiguation of *wh*-words in Korean

Jiwon Yun & Hye-Sook Lee

It has been reported that the interpretation of a sentence containing a so-called *wh*-indeterminate in Korean such as (1) depends on intonation, and the most important intonational cue is the *phonological phrasing* (Lee 1990, Jun & Oh 1996, Yun 2012). When there is no phrase boundary between the *wh*-indeterminate and the following word, it is interpreted as a *wh*-question. The intonation model in Jun (1993) shown in (2) predicts that the distinct phonological phrasing is usually manifested by distinct *tonal patterns*, as illustrated in (3).

(1) *cikum   nuka   iyagihae*?
     now   WH/IND   talk
     YNQ: 'Is anyone talking now?'
     WHQ: 'Who is talking now?

(2)

L	(H)		(L)	H
σ	σ	(...)	σ	σ

The typical tonal pattern of a phonological phrase in Seoul Korean. The second and penult tones can be deleted if the phrase consists of fewer than 4 syllables.

(3) YNQ:

L	H	L	H	L	H
σ	σ	σ	σ	σ	σ

WHQ:

L	H			L	H
σ	σ	σ	σ	σ	σ

(solid vertical line: phrase boundary, shaded area: *wh*-indeterminate)

However, this theory predicts that the tonal patterns for the two readings can be identical in certain cases, such as a disyllabic *wh*-indeterminate followed by a disyllabic word at the end of the sentence, as shown in (4). This raises questions as follows: is intonational disambiguation still possible for cases like (4)? If so, what are the intonational cues that enable disambiguation? This paper aims to answer these questions through production and perception experiments.

(4) YNQ:

L	H	L	H
σ	σ	σ	σ

WHQ:

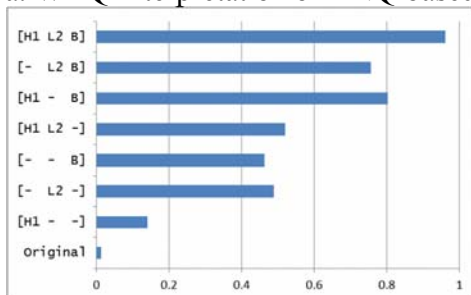| L	H	L	H
σ	σ	σ	σ

Production experiment. 180 sentences recorded from nine native Korean speakers (9 speakers x 10 sentences x 2 contexts) were analyzed. There were three major intonational factors that differentiated the two readings (WHQ vs. YNQ): i) *Boundary tone*: WHQs were mostly realized with an LH% at the end (68%), while YNQs were mostly with H% (78%). However, some WHQs were realized with H% (16%) and some YNQs were realized with LH% (12%); ii) *F0 peak on the wh-word*: WHQs showed a significantly higher F0 peak on the *wh*-indeterminate compared to YNQs (paired t-test: $t(7.1) = 88$, $p < .001$); iii) *Post-wh L tone*: an L tone was realized on the initial syllable of the post-*wh*-word in 90% of YNQs, but only 26.7% of WHQs. Besides, the timing of the post-*wh* L tone relative to the penultimate vowel onset was later in WHQs than YNQs. In other words, the post-*wh* L tone was either completely or partially undershot in most of the WHQs. The schematic representations of the typical intonation patterns of the two readings are illustrated in (5).

(5) YNQ:

WH		Post-WH	
L1	H1	L2	B = H%

WHQ:

WH		Post-WH	
L1	Higher H1	No L2	B = LH%
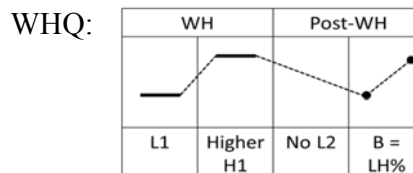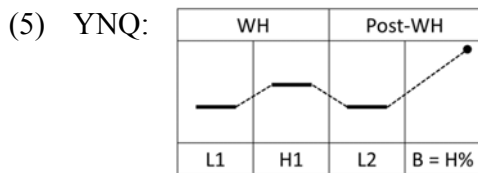
Perception experiment. Twenty sentences, ten each for the two contexts, from the production experiment were chosen for the perception experiment. Each sentence was manipulated to yield eight intonation types where none, one, two or all of the three selected acoustic factors were switched: the F0 peak height of the *wh*-word (H1), the post-*wh* L tone (L2), and the type of the boundary tone (B) as shown in (5). Thirty Korean native speakers listened to the stimuli and decided whether the sentence was either a *wh*-question or a yes-no question.

The results are summarized in (6). The original intonation was correctly identified for both contexts (99-100%). When it comes to manipulated stimuli, swapping the F0 peak value of *wh*-word (H1) had no significant effect in the interpretation. Changing the post-*wh* L tone (L2) and the sentence boundary tone (B), on the other hand, increased the preference for the switched interpretation. However, neither of the latter two factors could alter the interpretation of the sentence by itself. These two factors in conjunction altered the interpretation of the *wh*-indeterminate sentence more than 70% of the time.

(6) a. WHQ-interpretation of YNQ-based stimuli   b.YNQ-interpretation of WHQ-based stimuli
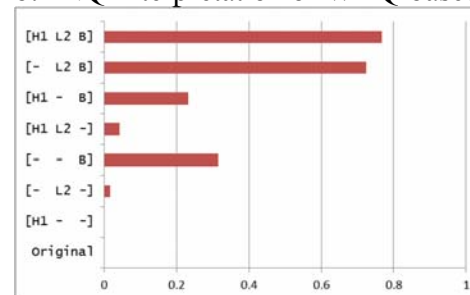
Implications. The tonal contrast between the two question interpretations, i.e. presence versus absence of the post-*wh* L tone, is maintained in the cases where the theory actually predicts the same tonal pattern for both a *wh*-question and a yes-no question. This might be a processing strategy that enhances the phrasing contrast between *wh*-questions and yes-no questions. The findings in this study coincide with the cross-linguistic observation that appropriate phonological phrasing is important in forming and understanding *wh*-questions (Fu 2002, Ishihara 2002, Richards 2010).

Selected References
Jun, Sun-Ah & Mira Oh (1996). A prosodic analysis of three types of *wh*-phrases in Korean. *Language and Speech* 39, 37-61.
Lee, Ho-Young (1990). *Kwukewunyullon* [Korean Prosody]. Hankwukyenkwuwen [Korean Study Institute].
Richards, Norvin (2010). Uttering trees: The MIT Press.
Yun, Jiwon (2012). The Deterministic Prosody of Indeterminates. *Proceedings of the 29th West Coast Conference on Formal Linguistics*, 285-93.