

The Necessity for an Intermediate Phrase in Korean Intonational Phonology

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Abstract

It has been claimed that there are only two prosodic levels – accentual phrase and intonational phrase – in Seoul Korean. This paper demonstrates the necessity for one more phrase level – an intermediate phrase. It is shown that the intermediate phrase is a domain of F₀ range reset, and the intermediate phrase level can be distinguished from the accentual phrase and the intonational phrase by its F₀ and the duration of its phrase-final syllable.

1. Introduction

It has been generally assumed that there are two intonationally defined prosodic phrase levels in Seoul Korean (Korean hereafter): accentual phrase (AP) and intonational phrase (IP). The AP is a hierarchically higher prosodic level than the phonological word, but lower than the IP, and the IP is the highest prosodic phrase level. Thus, an AP can consist of one or more phonological words and is marked by a phrase-final rising pitch / LH tonal sequence. An IP can have one or more APs and is marked by a boundary tone and phrase-final lengthening, followed by an optional pause. For more details of Korean prosodic structures see Jun (1996; 1998), Jun & Oh (1996), and Yim (2002; 2003).

Chung and Kenstowicz in their (1997) research on Focus in Korean, however, claim that it is necessary to introduce one more prosodic phrase level – an intermediate phrase (IMP) – which is higher than the AP, but lower than the IP. They claim the focused AP has a larger F₀ range, and the post-focus APs have considerably narrower F₀ range. They thus see the IMP as initiated by a focus and as a domain for downstep.

However, Jun and Lee in their (1998) research on contrastive focus criticise Chung et al. and deny the existence of the IMP level in Korean. They claim an IMP in Korean is not necessary because the focused peak in Korean itself marks its phonetic and phonological salience. That is, the perceptual prominence of the focused peak can be achieved by having the same or higher F₀ value compared to pre-focus peaks and much higher F₀ value compared to post-focus peaks, when the F₀ declination is taken into account. Therefore, it is natural for post-focus APs to have a narrower F₀ range than the focused AP, and it must not be construed as signalling F₀ resetting or downstep, but as signalling the prominence of the focused AP.

Jun and Lee's claim is contentious firstly because their research is just based on contrastive focus, and

secondly because it is, of course, an important function of focus to make a focused unit sound more prominent than adjacent units, but that may not be the only function of focus. If some APs are somehow closely related (whether grammatically or pragmatically) and demarcated in a unit which is smaller than the IP, there may be a necessity for introducing one more prosodic level in Korean, as Chung and Kenstowicz claim.

This paper first demonstrates what problems can be raised with two prosodic levels – the AP and the IP – in Korean, and shows how the problems can be solved by introducing an IMP. By doing so, the main function of the IMP in Korean is illustrated. Secondly, the paper shows how the IMP is different from the AP and the IP in terms of duration of the final syllable of each phrase level. (It may help to note that the intermediate phrase in English is closer to the AP in Korean and Japanese (see for details Venditti, in press)).

2. Intermediate Phrase

If we follow the two prosodic phrase levels hypothesis, some problems arise when we consider an utterance like the following:

/na-laŋ nol-tən kojaŋji-lil miwəha-tən Mino malie-jo/
me-with play-REL cat-OBJ hate-REL Mino talking
about-polite

This utterance has two different meanings: i) '(I am talking about) Mino who hated the cat I used to play with' and ii) '(I am talking about) Mino who I used to play with and who hated a cat.' These two meanings are clearly associated with different syntactic structures. In the former meaning, /nalaŋ noltən/ (me-with play-REL) modifies /kojaŋjilil/ (cat-OBJ), and /miwəha-tən/ (hate-REL) modifies Mino: the speaker used to play with a cat, and Mino hated it. On the other hand, in the latter meaning, both /nalaŋ noltən/ (me-with play-REL)

and /miwəha-tən/ (hate-REL) modify Mino: the speaker used to play with Mino and Mino hated a cat.

These differences, however, cannot be reflected in the prosodic structure if the two prosodic levels hypothesis is assumed, since the sentences would have the same prosodic structure regardless of their meanings. This structure is shown in (1).

(1) [[nalaŋ noltən]_{1stAP} [kojaŋilil]_{2ndAP} [miwəhatən]_{3rdAP} [Mino maliejo]_{4thAP}]_{IP}

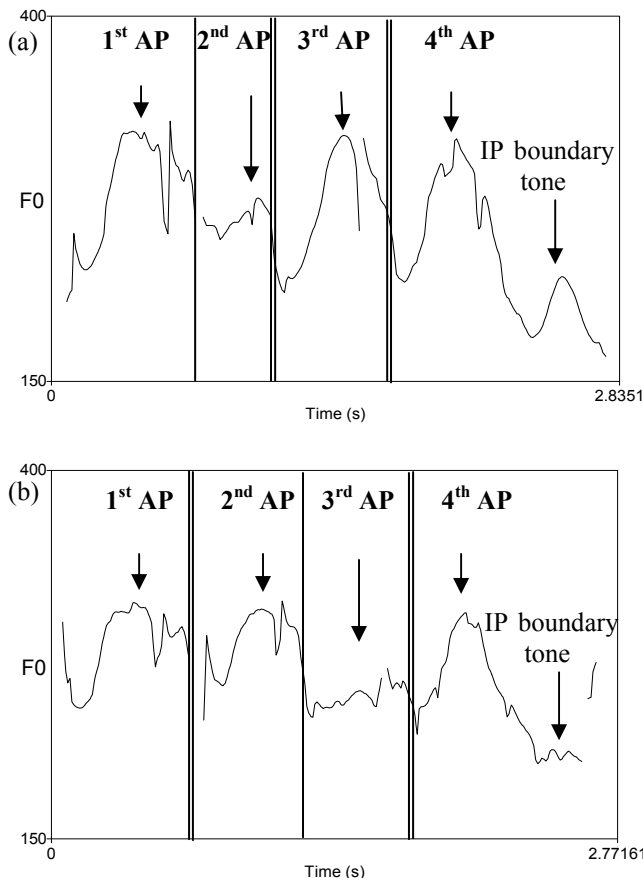


Figure 1: Segmented F0 traces of an utterance with two readings, (a) *'(I am talking about) Mino who hated the cat I used to play with'* and (b) *'(I am talking about) Mino who I used to play with and who hated a cat'*. Single vertical lines represent AP boundaries, double vertical lines represent IMP boundaries (**Click 'Time(s)' at the bottom of each figure to listen to the sound**).

Nevertheless, the two meanings are distinguishable by F0. This is shown in Figure 1(a) and (b), and the differences between the two figures can be reflected on the prosodic structure if one more prosodic level, namely an IMP, is assumed.

(2a) [[[nalaŋ noltən]_{AP} [kojaŋilil]_{AP}]_{IMP} [miwəhatən]_{AP}]_{IMP} [[Mino maliejo]_{AP}]_{IMP}]_{IP}

(2b) [[[nalaŋ noltən]_{AP}]_{IMP} [[kojaŋilil]_{AP} [miwəhatən]_{AP}]_{IMP} [[Mino maliejo]_{AP}]_{IMP}]_{IP}

By introducing the IMP, it is possible to explain why certain APs show much narrower F0 range than their preceding APs (e.g. the 2nd AP of Figure 1(a) and the 3rd AP of Figure 1(b)). It can be seen that the F0 range of an AP differs depending on its position in the putative IMP. If an AP is in IMP-medial position, it shows much narrower F0 range than an AP in IMP-initial position. This can be seen in both the 2nd AP peak in Figure 1(a) and the 3rd AP in Figure 1(b).

Very similar, but clearer results can be observed if we consider another utterance like the following:

/manil-il tɕohaha-nin Jəŋi-hako Jəŋwu-ka məknin-te-jo/
garlic-OBJ like-REL Youngi-and Youngwu-SUB eat-Retro-Polite

This also has two different readings. One is *'Youngi who likes garlic, and Youngwu, will eat'*. The other is *'Youngi and Youngwu, who like garlic, will eat'*. The two meanings are syntactically distinguishable, as /manil-il tɕohahanin/ (garlic-OBJ like-REL) modifies only /Jəŋi-hako/ (Youngi-and) in the first meaning, but /manil-il tɕohahanin/ (garlic-OBJ like-REL) modifies both /Jəŋi-hako/ (Youngi-and) and /Jəŋwu-ka/ (Youngwu-SUB) in the second.

However, the two meanings cannot be prosodically distinguished if the two prosodic levels hypothesis is assumed. This is shown in (3).

(3) [[manil-il]_{1stAP} [tɕohaha-nin]_{2ndAP} [Jəŋi-hako]_{3rdAP} [Jəŋwu-ka]_{4thAP} [məknin-te-jo]_{5thAP}]_{IP}

The two meanings are again reflected in the F0 patterns in Figures 2(a) and (b), and the differences in F0 patterns can be reflected in the prosodic structure by introducing the IMP.

(4a) [[[manilil]_{AP} [tɕohahanin]_{AP} [Jəŋihako]_{AP}]_{IMP} [[Jəŋwuka]_{AP} [məknintejo]_{AP}]_{IMP}]_{IP}

(4b) [[[manilil]_{AP} [tɕohahanin]_{AP}]_{IMP} [[Jəŋihako]_{AP} [[Jəŋwuka]_{AP}]_{IMP} [[məknintejo]_{AP}]_{IMP}]_{IP}

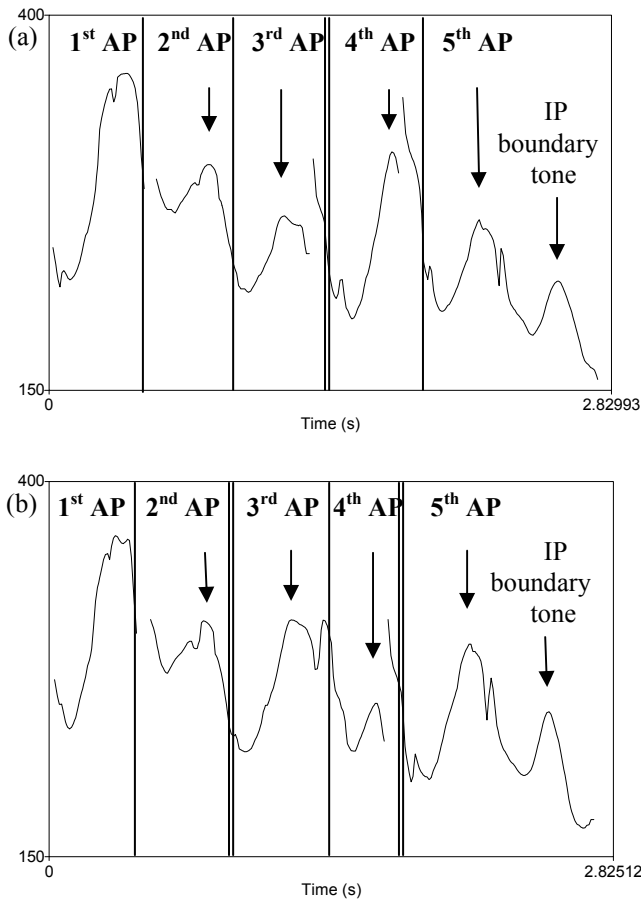


Figure 2: Segmented F0 traces of an utterance with two readings, (a) 'Youngi who likes garlic and Youngwu will eat' and (b) 'Youngi and Youngwu who like garlic will eat' (Click 'Time(s)' at the bottom of each figure to listen to the sound).

As observed in Figure 1, Figure 2 also shows that F0 range gradually decreases within the IMP. In Figure 2(a), the F0 range decreases from the 1st AP to the 3rd AP, since the APs form one IMP. The F0 range dramatically increases (though it is not as wide as the beginning of the sentence) from the 4th AP, since it is in the IMP-initial position (F0 range resetting), but again it drops on the 5th AP, since that is in the IMP-medial position. (The final F0 peak realises the (LHL) IP boundary tone. It shows a narrower F0 range than the 5th AP peak, but it is uncertain whether this is because it is affected by the F0 downtrend or the IP-final lowering).

In Figure 2(b), F0 range resetting takes place on the 1st AP, the 3rd AP, and the 5th AP. In other words, the sentence consists of three IMPs, and each IMP starts with the 1st, the 3rd, and the 5th APs. The APs in the IMP-medial position – the 2nd and the 4th APs – show much narrower F0 range compared to their preceding APs.

It is notable that the third AP of the first IMP in Figure 2(a) is also affected by the F0 range decrease as the F0 range narrows down from the 1st to the 3rd APs. This may be a good example showing that the IMP actually brackets grammatically / pragmatically more closely related APs, and functions as the domain of F0 range resetting.

The idea can be further supported if we can show how the same utterance can have different F0 patterns and different meanings depending on its IMP structure. Consider the following.

[A-raŋ]_{1stAP} [B-raŋ]_{2ndAP} [C-raŋ]_{3rdAP} [D manna-ss-ə-jə]_{4thAP}
 [A-with] [B-with] [C-with] [D meet-past-
 or and or and or and infinitive-polite]

This utterance can actually have three different F0 patterns and meanings depending on the locations of its IMP boundaries. If an IMP boundary is posited between the 3rd AP and the 4th AP, it may have an F0 range resetting on the 4th AP as in Figure 3, and the resulting meaning is '(I) met D with A, B, and C' (i.e I went with A, B and C to meet D).

The utterance can also be said and interpreted as '(I) met C and D with A and B' (i.e I went with A and B to meet C and D) if an IMP boundary is inserted between the 2nd and the 3rd APs. In this case, the F0 range resetting takes place on the 3rd AP, and this is shown in Figure 4.

Finally, when an IMP boundary is inserted between the 1st and the 2nd APs, the meaning of the sentence becomes '(I) met B, C and D with A' (i.e I went with A to meet B, C and D). As can be seen in Figure 5, this time F0 range resetting occurs on the 2nd AP of the sentence.

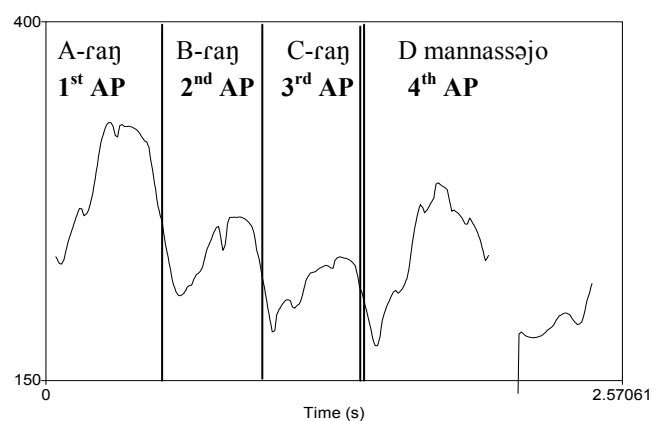


Figure 3: Segmented F0 trace of an utterance *Muniraŋ Namuraŋ Minuraŋ Minu manna-ssəjo* '(I) met Minu with Muni, Namu, and Mina' (Click 'Time(s)' at the bottom to listen to the sound)

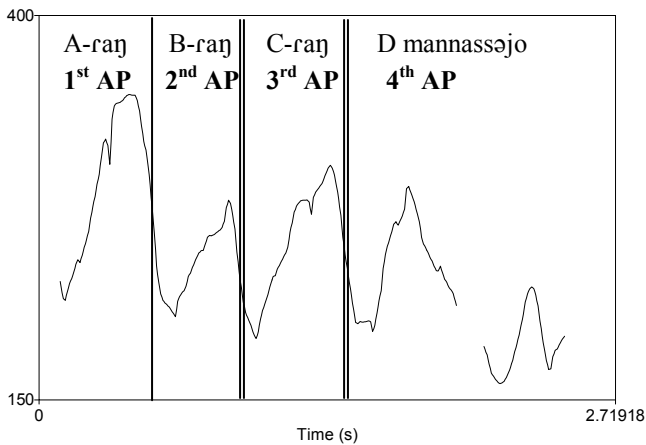


Figure 4: Segmented F0 trace of an utterance *Muniraŋ Namuraŋ Munoraŋ Minu mannaŋsəjo* '(I) met Muno and Minu with Muni and Namu' (Click 'Time(s)' at the bottom to listen to the sound)

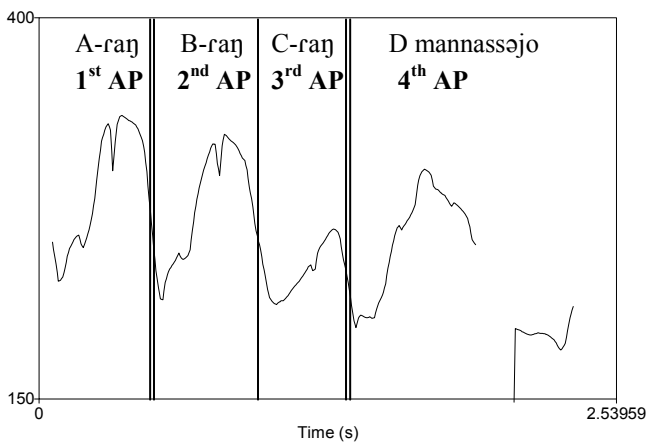


Figure 5: Segmented F0 trace of an utterance *Muniraŋ Munoraŋ Namiraŋ Minu mannaŋsəjo* '(I) met Muno Nami and Minu with Muni' (Click 'Time(s)' at the bottom to listen to the sound)

It should be noted that another IMP boundary can be seen between the 3rd and the 4th APs in both Figures 4 and 5. This is the result of focus which occurs when a sentence is said as an answer to a question, and does not bear on the problem at hand.

It is notable that the F0 range of the IMP-initial APs and the following APs is very similar to focused APs and post-focus APs respectively as discussed by Jun and Lee (1998). Like focused AP peaks, the IMP-initial AP peaks show much higher F0 values than adjacent AP peaks, and the IMP-medial AP peaks show much lower F0 values compared to the IMP-initial AP peaks, just like post-focus AP peaks. However, as illustrated in Figures 1 to 5, the differences between the IMP-initial

and -medial AP peaks do not involve achievement of perceptual prominence, but grouping syntactically closer APs into a unit, and this can be achieved by introducing one more prosodic unit, which is the domain of the F0 range resetting – the IMP.

The argument may be made that the IMP is not necessary as it is predictable from the syntactic structure. However, syntax is not the only factor that determines the IMP structure. As the AP in Korean does (Jun 1996), the IMP structure is also influenced by non-syntactic and non-linguistic factors such as speech rate, focus, and the phrase weight (the number of the APs in the phrase). For example, it has been observed that an IMP tends to contain three or fewer APs regardless of the syntactic structure. That is, when there are four to six APs in a single syntactic clause, the clause is mostly realised as two or sometimes three IMPs.

Figure 6 shows this. The sentence shown was said as '(I) met Minu with **Muni, Namu, Mina and Muno**' ((I) met E with A, B, C and D). Under the circumstances, the sentence might be expected to have four APs (bolded parts) in an IMP. However, its IMP structure is very similar to or the same as that produced as '(I) met Mina, Muno and Minu with Muni and Namu'. This is because an F0 range resetting, which can be construed as an IMP boundary, is observed between the 2nd and the 3rd APs.

However, the position of the IMP boundary in such a case can be varied between speakers or even within a speaker. For example, the same female speaker who produced the F0 contour shown in Figure 6 also showed an IMP boundary between the 3rd and the 4th APs in two tokens out of six.

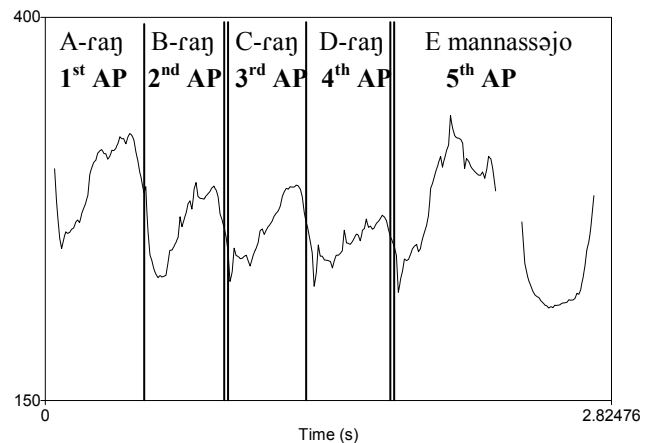


Figure 6: Segmented F0 trace of an utterance *Muniraŋ Namuraŋ Minuraŋ Munoraŋ Minu mannaŋsəjo* '(I) met Minu with Muni, Namu, Mina and Muno' (Click 'Time(s)' at the bottom to listen to the sound)

3. Duration

It is possible to argue that the problems mentioned in Figures 1 to 5 can be solved by simply replacing the IMP boundary with the IP boundary, since the IP also accompanies the F0 resetting. The main purpose of this section is to show how the IMP boundary is, in fact, different from that of the IP.

According to Lee (1998), the IP-final syllable has much longer duration than the AP-final syllable, as duration of the final syllable is very closely related to the prosodic structure. In view of this, we can hypothesise that the duration of IMP-final syllables may be intermediate between that of the AP and the IP, as it is prosodically higher than the AP, but lower than the IP.

Table 1: Three sets of corpus (Square brackets = AP boundary, single backward slash = IMP boundary, double backward slash = IP boundary. Target syllables are marked in bold)

(a) Sentences with IMP-final syllables targeted
1. [Munila ŋ] / [Munolaŋ] / [Minu manassəjo] (I) met Muno and Minu with Muni
2. [Munila ŋ] / [Munolaŋ] [Nami laŋ] / [Minu manassəjo] (I) met Muno, Nami, and Minu with Muni
3. [Munila ŋ] [Namula ŋ] / [Munolaŋ] / [Minu manassəjo] (I) met Muno and Minu with Muni and Namu
4. [Munilaŋ] [Namulaŋ] [Minala ŋ] / [Munolaŋ] / [Minu manassəjo] (I) met Muno and Minu with Muni, Namu, and Mina
5. [Munilaŋ] [Namulaŋ] [Minala ŋ] / [Munolaŋ] [Nami laŋ] / [Minu manassəjo] (I) met Muno, Nami, and Minu with Muni, Namu, and Mina

(b) Sentences with IP-final syllables targeted
1. [Munila ŋ] // [Munolaŋ] / [Minu manassəjo] (I) met Muno and Minu with Muni
2. [Munila ŋ] // [Munolaŋ] [Nami laŋ] / [Minu manassəjo] (I) met Muno, Nami, and Minu with Muni
3. [Munilaŋ] [Namula ŋ] // [Munolaŋ] / [Minu manassəjo] (I) met Muno and Minu with Muni and Namu
4. [Munilaŋ] [Namulaŋ] [Minala ŋ] // [Munolaŋ] / [Minu manassəjo] (I) met Muno and Minu with Muni, Namu, and Mina
5. [Munilaŋ] [Namulaŋ] [Minala ŋ] // [Munolaŋ] [Nami laŋ] / [Minu manassəjo] (I) met Muno, Nami, and Minu with Muni, Namu, and Mina

(c) Sentences with IMP-medial APs targeted

1. [Munila**ŋ**] [Namulaŋ] / [Minu manassəjo]
(I) met Muni, Namu, and Minu
2. [Munila**ŋ**] [Namulaŋ] [Minalaŋ] / [Minu manassəjo]
(I) met Muni, Namu, Mina, and Minu
3. [Munilaŋ] [Namula**ŋ**] [Minalaŋ] / [Minu manassəjo]
(I) met Muni, Namu, Mina, and Minu
4. [Munilaŋ] [Namulaŋ] [Minala**ŋ**] [Munolaŋ] / [Minu manassəjo]
(I) met Muni, Namu, Mina, Muno, and Minu
5. [Munilaŋ] [Namulaŋ] [Minala**ŋ**] [Munolaŋ] [Nami**laŋ**] / [Minu manassəjo]
(I) met Muni, Namu, Mina, Muno, Nami, and Minu

To investigate this, the final syllable of each phrase level was measured, using three sets of sentences produced by four female speakers. The corpus is presented in Table 1. The three sets basically have the same sentences, but differ only in that they have different prosodic structures. Sentences in Table 1(b) are different from those in Table 1(a) in that sentences in Table 1(b) were produced with a long hesitation ‘um~’ after the target syllable to elicit IP boundaries. Sentences in Table (c) are different from those in Table 1(a) and (b) in that they were produced with only two IMPs. Therefore, the three sets can be construed as a prosodic minimal triplet.

To investigate the difference between the three phrase levels in duration, ANOVA with post hoc Scheffé F-tests were conducted for each speaker. The results are presented in Table 5A and Table 5B respectively. In the tables, IMP means the duration of the final syllable of the IP-medial IMP-final AP, IP means the duration of the final syllable of the IP-final AP, and AP means the duration of the final syllable of the IP-medial IMP-medial AP.

Table 5A: Results of ANOVA for the duration (csec.) of final syllable of different phrase levels

F1	Mean	Std.	DF	F-test	Prob.
IMP	31.6	1.53	77	487.153	.0001
IP	50.2	3.54			
AP	30.8	2.26			

F2	Mean	Std.	DF	F-test	Prob.
IMP	37.4	2.11	84	382.217	.0001
IP	61.1	6.17			
AP	33.7	2.68			

F3	Mean	Std.	DF	F-test	Prob.
IMP	32.4	2.49	76	353.287	.0001
IP	58.8	6.02			
AP	33.2	2.78			

F4	Mean	Std.	DF	F-test	Prob.
IMP	34.9	2.62	89	301.217	.0001
IP	62.0	6.59			
AP	30.1	6.22			

Table 5B: Results of Scheffé F-tests (**, * = significant at 99% and 95% respectively, 'ns' = not significant)

F1	AP vs. IMP	AP vs. IP	IMP vs. IP
Scheffé F-Test	.546(ns)	344.818**	362.317**

F2	AP vs. IMP	AP vs. IP	IMP vs. IP
Scheffé F-Test	5.718**	310.636**	254.612**

F3	AP vs. IMP	AP vs. IP	IMP vs. IP
Scheffé F-Test	.193(ns)	205.479**	295.692**

F4	AP vs. IMP	AP vs. IP	IMP vs. IP
Scheffé F-Test	4.81*	257.504**	168.454**

The results partly support the hypothesis that the IP-final syllable is the longest syllable. All four speakers show that the IP-final syllable is significantly longer than both AP-final or putative IMP-final syllables. However, the hypothesis that the duration of the IMP-final syllable will be longer than the AP-final syllable is rejected. Although three speakers (F1 F2 and F4) show longer durations for the IMP-final syllables than the AP-final syllables, only F2 and F4 show a significant difference, and F1's results show the difference is not significant. Furthermore, in the case of F3, she shows longer duration in the AP-final syllable than the IMP-final syllable. The most important result, however, is that the IP-final syllable is clearly significantly longer than the IMP-final syllable. An IP boundary and an IMP boundary can thus be distinguished by the duration of their final syllable. This is a strong indication that a different boundary, and prosodic level, is indeed involved.

4. Conclusions

This paper has shown that, unlike the claim made by Jun and Lee (1998), one more prosodic level – the intermediate phrase – is necessary in Korean as it functions to group closely related APs. This has been shown by illustrating how the F0 range of APs changes depending on the position in the putative IMP. The F0 range of an AP shows gradual decrease at the IMP-medial position, but F0 range resetting takes place at the IMP-initial position. The IMP was also shown to be

distinguishable from the IP by the duration of its phrase-final syllable, since that of the IP shows a significantly longer final duration.

5. Acknowledgements

I would like to thank Dr. Phil Rose and two anonymous reviewers for their very helpful comments.

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