

A Prosodic Labeling System of Intonation Patterns and Prosodic Structures in Korean*

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ABSTRACT

The system proposed in this paper prosodically transcribes the intonation patterns, prosodic structures, phrasings, and other prosodic aspects of Korean utterances, on four parallel tiers: a tone tier, an orthographic tier, a break index tier, and a miscellaneous tier. The tone tier employs two phrase accents (L* and H*), three accentual phrase boundary tones (L-, H-, LH-), and four intonational phrase boundary tones (L%, H%, LH%, LHL%) in order to provide a phonological transcription of pitch events associated with accented syllables and phrase boundaries. The break index tier uses five break indices, numbered from 0 to 4, which mark a prosodic grouping of words and its prosodic structure in an utterance. Among the five indices, the break index 3 and the break index 4 align with an accentual phrase boundary tone and an intonational phrase boundary tone, respectively, in the tone tier.

Keywords: ToBI, tone, break index, accent, boundary

1. Introduction

A group of researchers (Silverman *et al.* 1992; Beckman and Ayers 1994; Beckman and Hirschberg 1994; Pitrelli, Beckman, and Hirschberg 1994) developed a ToBI (for **T**one and **B**reak Indices) transcription system which can account for the diverse prosodic features of English utterances and which can convey much information necessary to retrieve the intonational meanings

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associated with intonation patterns. The prosodic transcription system can contribute not only to the development of a detailed theory connecting prosody, syntax, and interpretation but also to the significant progress in quantitative computational modeling of prosody and building speech synthesis and speech recognition systems. To meet the need of such a robust system, this paper proposes a prosodic transcription system which can transcribe intonation patterns, prosodic structures, and other aspects of Korean utterances in four parallel tiers: a tone tier, an orthographic tier, a break index tier, and a miscellaneous tier. Among the four tiers, the tone and break-index tiers provide a kernel prosodic transcription for pitch events associated with accented syllables, phrase boundaries, phrasings, and prosodic structures.

The following sections provide the tier-specific principles, which are consistent with basic principles of the English ToBI system, for transcribing various Korean utterances collected from radio and television broadcasts where the standard Korean is used.

2. Orthographic Tier

The orthographic tier transcribes all of the words in the utterance, in ordinary Korean orthography (Romanization of orthographic words is avoided because romanized words are sometimes confusing.). In this tier, the label for each syllable is aligned to its right edge, as determined from the waveform or spectrogram record. Although the ToBI convention is to align the label for each word to the end of the final segment in the word, it is not possible to follow the convention in this system because the accent locus of the word in Korean is neither lexically determined nor predictable from the dictionary entries for the word, unlike Japanese or English. If the label for each word were aligned to its right edge, it would be very difficult to tell by eye which syllable is accented.

In addition to normal orthographic words, filled pauses such as *ㄱ* "you know" *음* "um" and *어* "uh" can be marked in this tier and should have some consistent form of transcription across labellers. Although the orthographic tier is not part of the core prosodic analysis, it provides a morphological and syntactic information.

3. Tone Tier

The tone tier provides phonological transcriptions for the diverse intonation patterns of utterances. It consists of high (H) and low (L) tones marked with diacritics representing either pitch events associated with accented syllables in a phrase or pitch events associated with boundaries of prosodic units in utterance. The inventory of pitch events that are transcribed on this tier are three types of phrase accents (H*, !H*, L*), three types of accentual phrase boundary tones (H-, L-, LH-), and four types of intonation phrase boundary tones (L%, H%, LH%, LHL%). The following subsections describe each phrase accent and boundary tone.

3.1 Phrase Accents: H* and L*

H* accent label marks the accented syllable whose pitch prominence is in the upper or middle part of the speaker's pitch range for the phrase, while L* accent label marks the accented syllable whose pitch prominence is in the lower part of the speaker's pitch range. In this notation, the tones H and L represent the degree of F_0 prominence while the diacritic * represents that the syllable is accented. So, if a syllable is associated with F_0 maximum of the local phrase, H* accent label is marked on that syllable. And if a syllable is associated with F_0 minimum of the local phrase, L* accent label is marked on that syllable. Unlike English ToBI or Japanese ToBI where the diacritic * is used to indicate that the accent aligns with a syllable which carries relative pitch prominence in the lexical entry level, the diacritic * in this system does not indicate the alignment of accents with lexically determined accented syllables. It simply represents that the syllable is accented for the phrase and functions as a phrase accent as in English ToBI and Japanese ToBI. Since the accent in Korean is a phrase accent, but not a lexical accent, the location of the accent, where either H* or L* aligns with, is neither lexically determined nor fixed. Although there are accent rules proposed by H. B. Lee (1973), H. Y. Lee (1990), and S. A. Jun (1993), lexical items in the phrase simply conform to the tunes chosen by the speaker and any syllable in the phrase can be accented according to the factors such as pragmatic forces, grammatical functions, utterance types, and so on.

The example utterances in Figure 1 and Figure 2 show the marking of the H* accent. For the utterance in Figure 1, H* accent labels are placed at the first syllable of 여자 "woman" in the first phrase and at the adjective 큰 "big"

in the second phrase. For the utterance in Figure 2, H* accent labels are placed

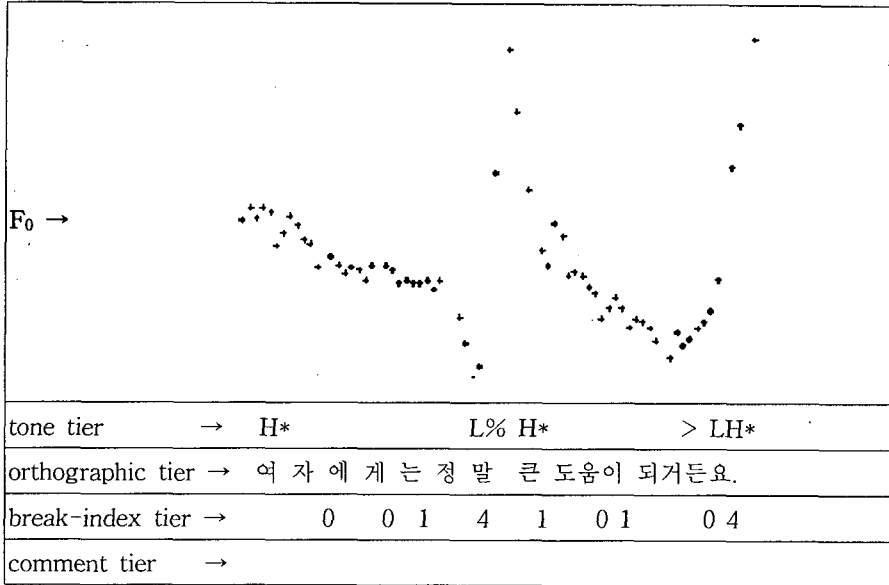


Figure 1. 여자에게는 정말 큰 도움이 되거든요. "It is a big help for women."

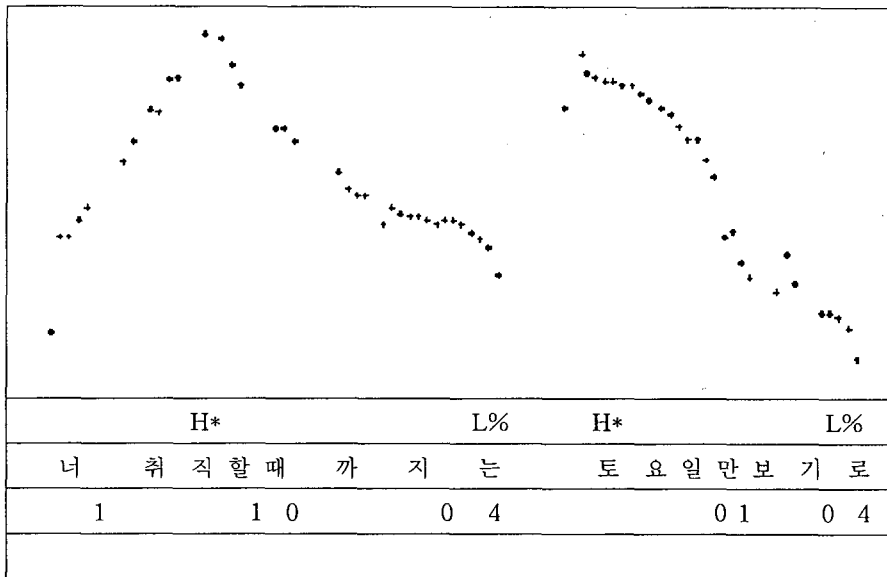


Figure 2. 너 취직할 때까지는 토요일만 보기로 " (You promised) to see me only on Saturday until you get a job."

at the second syllable of *취직* “being employed” in the first phrase and at the first syllable of *토요일* “Saturday” in the second phrase. In both figures, phrase accent labels H* are placed at the F₀ peaks of the phrase, indicating that the H starred syllable is the most prominent (*i.e.*, accented) syllable of the phrase, while the unaccented syllables are left unmarked for accents, simply representing the phonetic interpolation between the tonally marked syllables – between the syllable marked with a phrase accent and the syllable marked with a boundary tone. Though there is just a single H* accent in each phrase, it is possible to have more than one accented syllable in a phrase as shown in Figure 9, Figure 10, and Figure 13.

The example utterance in Figure 3 shows the marking of the L* accent on the first syllable of *만나면* “when (you) meet”. The F₀ valley between the two vertical lines in the second accentual phrase *저 만나면* “when you meet me” is associated with a syllable *만*, but not with a boundary between *저* “me” and *만나면* “when (you) meet” even though the F₀ valley could be an indication of a certain kind of boundary in other cases. Since the F₀ valley in this case is not a boundary phenomenon, a L* accent label, rather than a low boundary tone, should be assigned to the syllable *만*. However, one may wish to use a L*+!H accent label to mark the low accented syllable which is immediately followed by a sharp rise to a peak. In this notation, the L star is associated to the accented syllable indicated in the dictionary entry and !H is associated to the following F₀ rise. In other words, the L starred tone indicates the alignment of a local F₀ minimum with a lexically accented syllable and the following H tone indicates the late F₀ rise onto the next lexically unaccented syllable. Although it is possible to mark that pitch event with that label for a language like English where the stress patterns within words are largely predictable from the dictionary entries for the word, this L*+H scooped accent label is inappropriate in Korean because the use of this label presupposes that the syllable which aligns with the L starred tone is lexically designated for the accent. As noted above, the accent in Korean is not a word accent, it’s a phrase accent. The accent patterns within words are not predictable from the dictionary entries for the word. Therefore, as shown in the example utterance in Figure 3, there is a need to use a low phrase accent L* label in order to mark the syllable which is associated with a local F₀ minimum and which is perceived as more prominent than other peripheral H starred syllables. Then the F₀ fall and rise at the syllable *만* is explainable by a phonetic mechanism since

there are H* accents marked on the peripheral syllables. The marking of a L* accent can be also seen in the example utterances in Figure 7, Figure 10, and Figure 13.

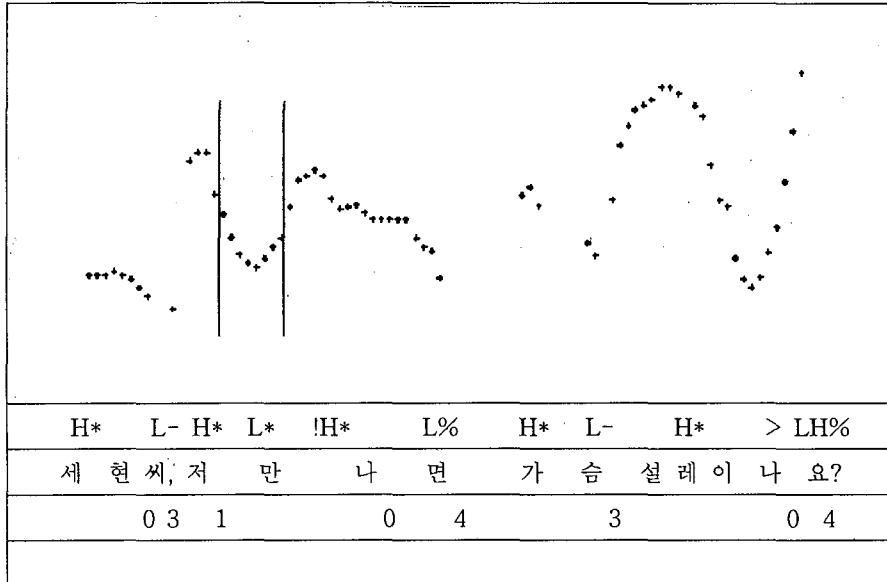


Figure 3. 세현씨, 저 만나면 가슴 설레이나요? "Dear Se-Hyun, are you excited when you meet me?"

3.2 Downstepped Accent: !H*

Downstep (Pierrehumbert 1980, Liberman & Pierrehumbert 1984, Poser 1984, Pierrehumbert & Beckman 1988) is a compression of the pitch range (the range between F₀ maximum and F₀ minimum) that lowers the peak F₀ values for any H tones subsequent to a downstep trigger. In this system, a diacritic ! is used with the H* accent label in order to represent the lowered second accent peak from the preceding H* accent. So, the syllable marked with a !H* accent represents that the syllable is accented and its accent peak is downstepped from the preceding accented syllable. The diacritic ! is never applied to the first phrase accent H* in an intonational phrase since there is no preceding downstep trigger. Once a downstep is triggered, it can affect any H accents subsequent to a downstep trigger before a new pitch range is reset.

The marking of a !H* accent is shown in the example utterance in Figure 4 in which the accent peaks after the first accent are gradually lowered over the course of an utterance. The first accent peak in this utterance is marked with a

H* accent because it has no preceding downstep trigger, and the subsequent accent peaks are marked with !H* accents. Since there are more than two downstepped accents in a row, each accent triggers downstep on the next accent, so that the subsequent accent peak is reduced relative to the immediately preceding one. This is a typical declination pattern of declarative utterances where a new pitch range is not chosen for any of the subsequent phrases after the first accented phrase. However, the example utterance in Figure 5 demonstrates that the downstep does not always affect all of the following phrases if a new pitch range is reset at one of the following phrases. Although the second accent peak in the second phrase 돌아다니면서 “hanging around” is downstepped from the first accent, downstep is interrupted at the third accentual phrase (the term “accentual phrase” is described in detail in section 3.3) where a new pitch range is reset. As a matter of fact, F₀ maximum of the utterance is attained at the third accent peak.

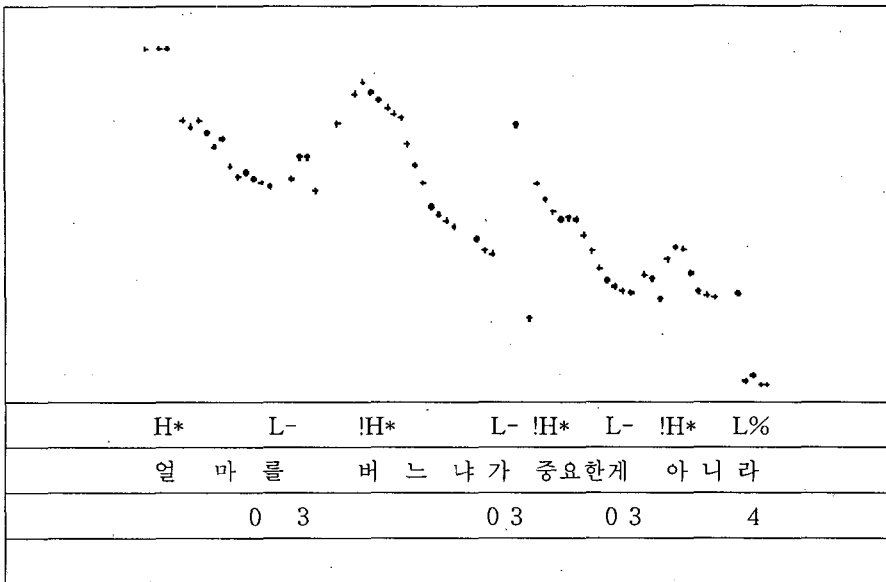


Figure 4. 얼마를 버느냐가 중요한 게 아니라. “It is not a matter of how much you make.”

The two examples above illustrate that whether or not a downstep can affect accent peaks across accentual phrases depends on the choice of speaker’s pitch range. However, a downstep cannot occur across intonation phrases (the term “intonation phrase” is described in detail in section 3.4) because at every

intonational phrase a new pitch range can be reset. For example, the utterances in Figure 1 and Figure 2 have two intonational phrases, and the second intonational phrase is not downstepped from the preceding intonational phrase because a new pitch range is reset at the second intonational phrase.

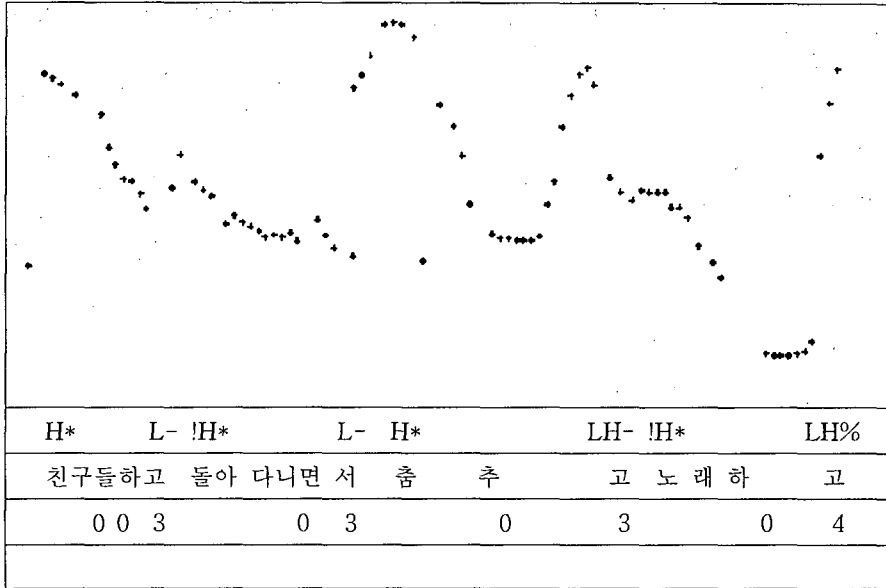


Figure 5. 친구들하고 돌아다니면서 춤추고 노래하고 "They sing and dance while hanging around with their friends."

3.3 Accentual Phrase Boundary Tones: H-, L-, LH-

The accentual phrase (Pierrehumbert & Beckman 1988, Jun 1993, Cho 1997) is the smallest prosodic unit that can be defined in terms of the intonation pattern of an utterance. Generally an accentual phrase is made up of one word or two followed by some kind of a marker and its boundary is marked by F_0 rise, fall, or fall-rise. In order to transcribe the pitch events associated with an accentual phrase boundary, this system uses H-, L-, and LH- tone labels. According to this notation, the tone indicates the F_0 realization and the - diacritic indicates an association of the tone with an accentual phrase boundary. Because the tone labels are associated with accentual phrase boundaries, they are referred to as accentual phrase boundary tones in the current system. The term "phrase accent" for the accentual phrase boundary tone is not used in order to avoid confusion with the phrase accent which marks the accented syllable in a phrase-medial position.

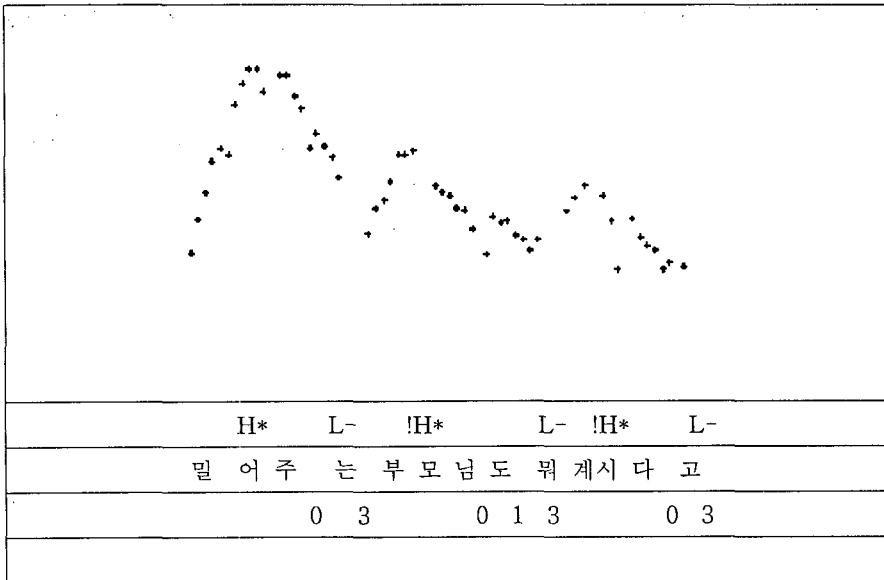


Figure 6. 밀어주는 부모님도 뭐 계시다고... "There are parents who support them."

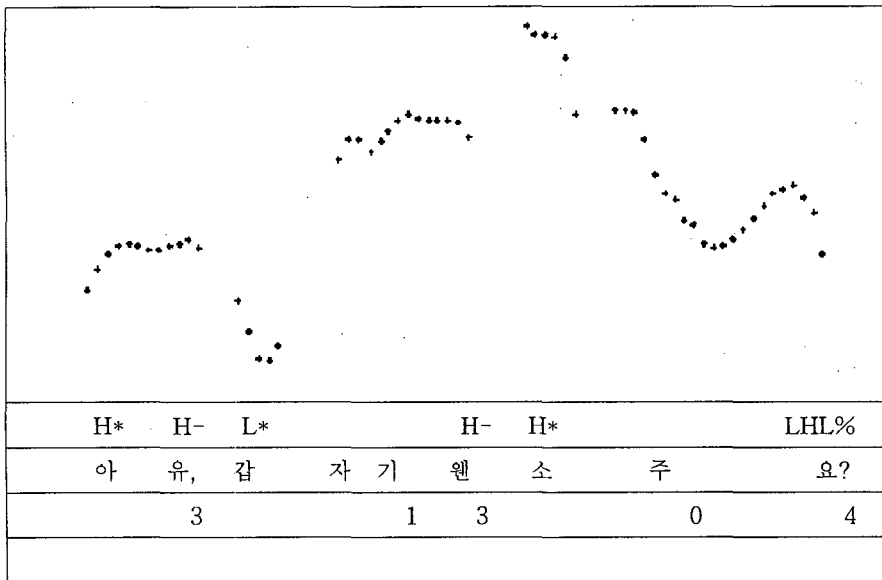


Figure 7. 아유, 갑자기 웬 소주요? "Gosh, why do you want to drink Soju all of a sudden?"

The example utterances in Figure 6 and Figure 7 show the marking of L- tone and H- tone, respectively. In these utterances, the right edges of accentual phrases are associated with either a L- tone or a H- tone. When F₀ falls to the low at the phrase boundary as in Figure 6, the L- tone is assigned to the right edge of the phrase. If F₀ rises or maintains a plateau high at the end of the phrase as in Figure 7, the H- tone is assigned to the right edge of the phrase. The L- tone is often observable at accentual phrase boundaries in a long declarative utterance, and the H- tone is generally accompanied by interrogatives.

In addition to the above phrase-final pitch contour types, there is also a phrase final fall-rise contour type. For the fall-rise contour type, there are two different F₀ realizations. One is F₀ fall-rise on the phrase-final syllable, the other is F₀ fall on the penultimate syllable of the phrase and F₀ rise on the phrase final syllable. Though there is no difference in meaning between the two different F₀ realizations, the F₀ fall-rise signals that there is a following statement right after this phrase.

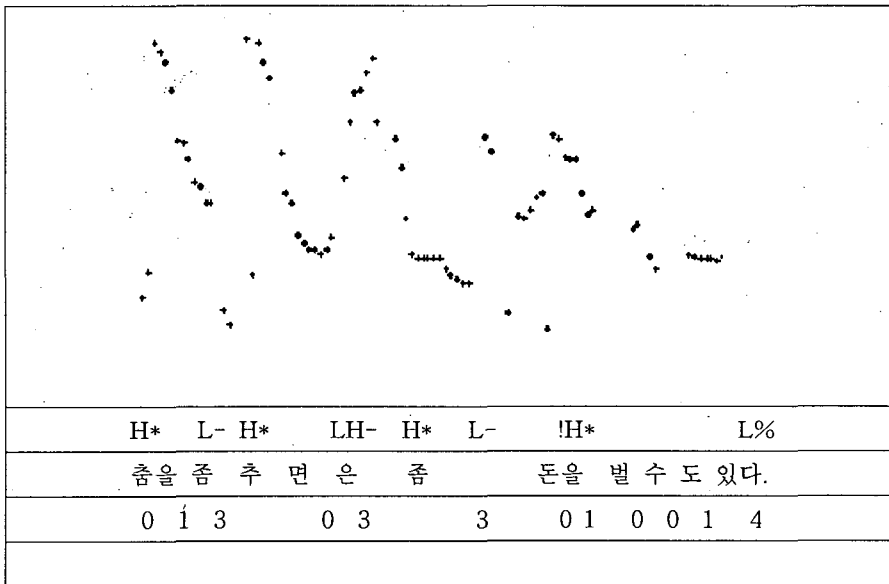


Figure 8. 춤을 좀 추면은 좀 돈을 벌 수도 있다. "If you dance well, you can make money."

The example utterance in Figure 8 shows the marking of the LH- tone label on the phrase-final syllable. In this utterance a strong fall-rise is realized on

the last syllable 은 “NOM” of the second phrase of the utterance and the LH- tone label aligns with the syllable. In the example utterance in Figure 9, the edges of the first and the third accentual phrases have fall-rise contours. The F₀ in each phrase falls to the low on the penultimate syllable of the phrase and the F₀ rises at the last syllable of the phrase. Since LH- tone label is a default tone which marks the phrase final fall-rise in this system, “>” label should be placed at the penultimate to mark the early F₀ fall on the penultimate syllable. Accordingly, the LH- tone label aligns with the edge of each boundary and > label is placed at the penultimate syllables: 편 in the first accentual phrase and 싶 in the third accentual phrase.

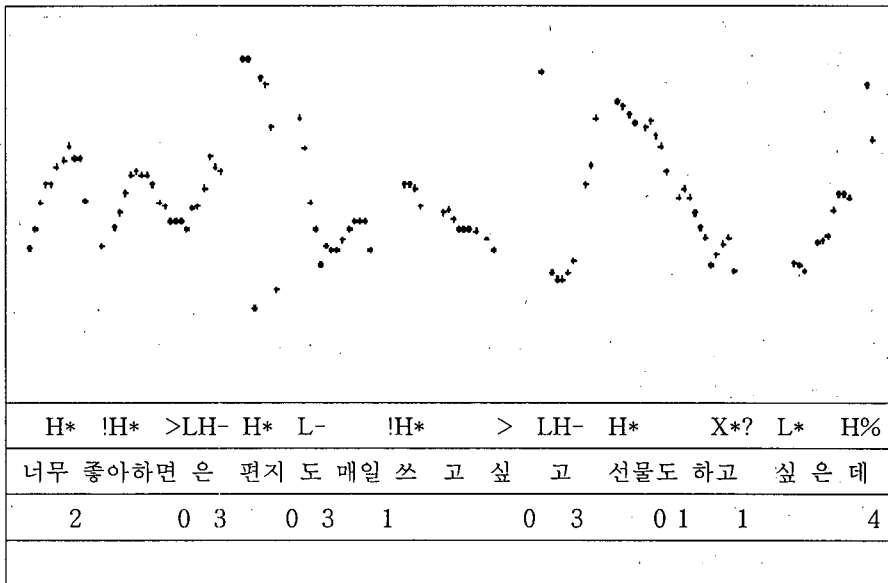


Figure 9. 너무 좋아하면은 편지도 매일 쓰고 싶고 선물도 하고 싶은데. “If someone likes (somebody) a lot, that person wants to write letters and send gifts to (him).” (X*? marks uncertainty over what accent type to assign.)

So far, it has been shown that the accentual phrase is delimited by one of the three accentual phrase boundary tones: L-, H-, and LH-. As in the example utterances above, one word followed by some kind of a marker constitutes an accentual phrase in most cases. When the number of words in a phrase is considered, an accentual phrase is fairly smaller than an intermediate phrase used in the transcription of English prosody. This is one of the reasons why the term accentual phrase is used instead of the term intermediate phrase.

3.4 Intonation Phrase Boundary Tones: L%, H%, LH%, and LHL%

An intonational phrase is a prosodic unit above an accentual phrase in the prosodic hierarchy and its boundary is delimited by one of the four tones: H%, L%, LH%, and LHL%. The tone labels used with the diacritic % are marked at the right edge of the intonational phrase and aligns with a break index label 4. Since the tone labels are associated with intonation phrase boundaries, they are referred to as intonation phrase boundary tones. As diverse pitch events can be observable at the end of intonational phrase boundaries, more boundary tones than phrase accents are employed to mark phrase-final pitch events than phrase-medial pitch events.

3.4.1 L%

The L% label marks a final low boundary for an intonation phrase. The boundary tone typically occurs at the end of declarative utterances and sometimes on utterance-medial intonation phrase boundaries. The L% should be placed at the right edge of the intonation phrase to mark the terminal F₀ fall.

The example utterance in Figure 10 shows the marking of the L% intonational phrase boundary tone. There is a terminal fall from the second peak of the utterance to the last syllable of the utterance and there is no intervening peak in-between. To mark the terminal fall of the utterance in this example, the L% tone is placed at the last syllable of the utterance.

3.4.2 LH%

The LH% label is used to mark the fall-rise intonation contour at the edge of an intonational phrase. This type of terminal F₀ fall-rise typically occurs at the end of interrogative utterance, but is sometimes found at the intonational phrase boundary of a declarative utterance as in Figure 5. The example utterance in Figure 11 shows the marking of the LH% intonational phrase boundary tone for an interrogative utterance. There is a terminal fall-rise at the final syllable of the utterance and the LH% tone aligns with it. However, the terminal fall-rise may not occur exclusively on the utterance final syllable for interrogatives. The pitch event may occur over the last two syllables like an accentual phrase boundary LH- tone. The example utterances in Figure 2 and Figure 3 show the F₀ fall on the penultimate syllable and rise at the utterance final syllable. In order to mark the early F₀ pitch event, a ">" label is placed at the penultimate syllables of the utterance while the LH% tone is placed at the

utterance final syllable.

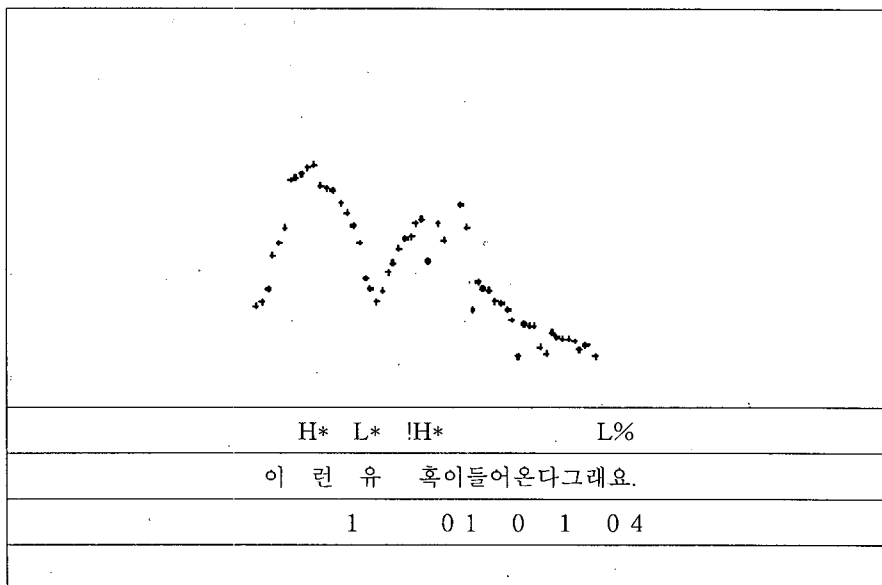


Figure 10. 이런 유혹이 들어온다 그래요. "There is this kind of temptation."

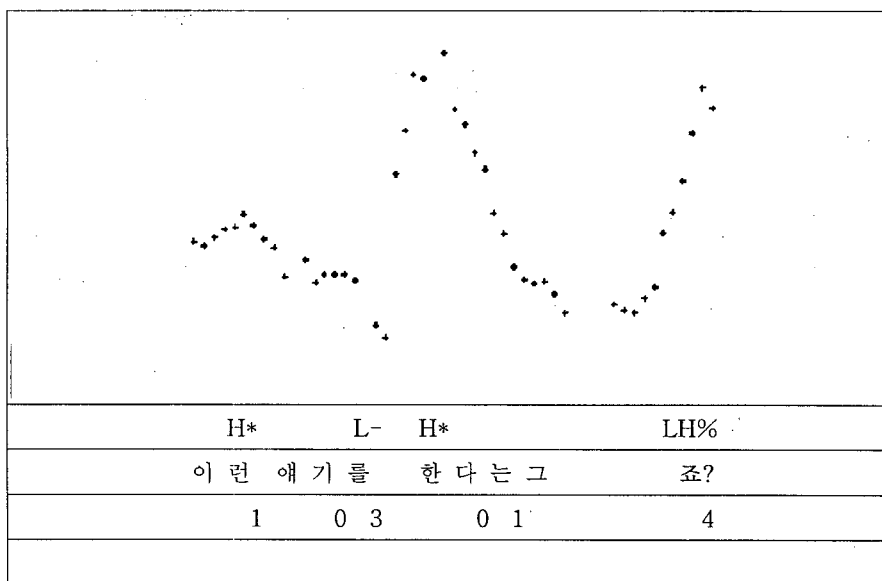


Figure 11. 이런 얘기를 한다는 그죠? "They are talking like this?"

3.4.3 H%

The H% label marks a terminal rise at an intonation phrase boundary. This boundary tone occurs at the end of interrogative utterances. Because usually there is a high tone spreading from the preceding syllables, a high F_0 plateau is maintained until the terminal rise. This type of high tone spreading and final rise is very uncommon in an interrogative utterance. This intonation pattern occurs when the speaker uses a high pitch range to express the speaker's anger or to blame the person one talks to.

The example utterance in Figure 12 shows the marking of the H% intonational phrase boundary tone. In this utterance a high pitch range is used throughout the utterance and there is a flat high tone spreading from the second syllable of the utterance across the accentual phrase boundary up to the penultimate syllable of the utterance. Due to the spreading of a high tone throughout the utterance, there is no F_0 valley before the terminal rise unlike a typical interrogative utterance as in Figure 11. In order to mark the terminal F_0 rise at the last syllable of the utterance the H% is placed at the last syllable of the utterance.

3.4.4 LHL%

The LHL% marks a fall-rise-fall pitch event for an intonation phrase boundary. This type of a fall-rise-fall pitch event occurs at the end of an interrogative utterance or at the utterance-medial intonation phrase boundary where the degree of disjuncture between the two intonation phrases is very strong. When this intonation pattern is used for an interrogative, the speaker is not really asking even if the utterance has an interrogative syntactic form. The speaker is not really expecting an answer to the question, either. Instead, the speaker is just expressing anger or surprise.

The example utterance in Figure 13 shows the marking of a LHL% tone. The fall-rise-fall intonational phrase boundary tone pattern occurs at the last syllable of an utterance. Unlike other syllables which align with intonational phrase boundary tones, the duration of the utterance final syllable in this example utterance is much longer than other syllables in the utterance and the pitch contour fluctuates. In this utterance, the speaker expresses anger to her mother, and she does not really expect her mother's response.

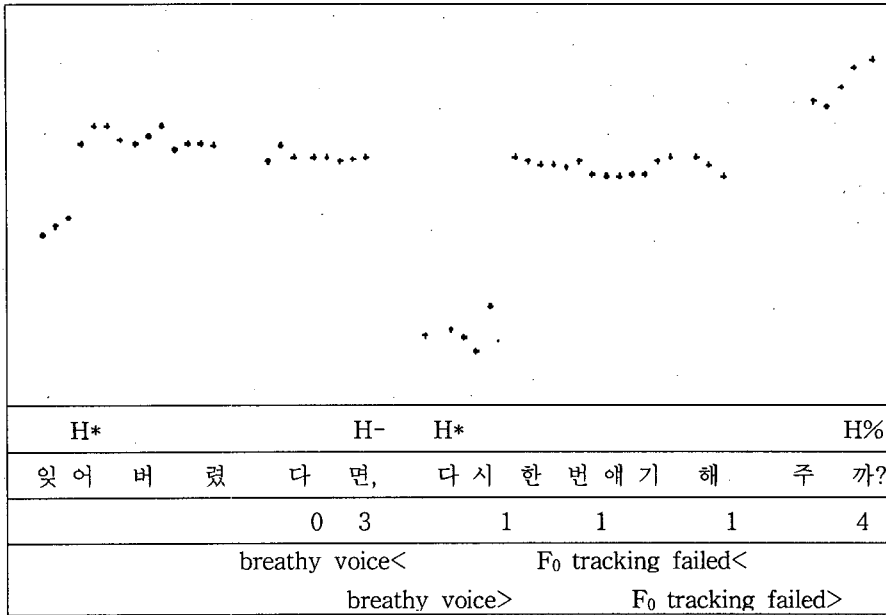


Figure 12. 잊어버렸다면 다시 한번 얘기해줄까? "If you forgot, would you like me to remind you again?"

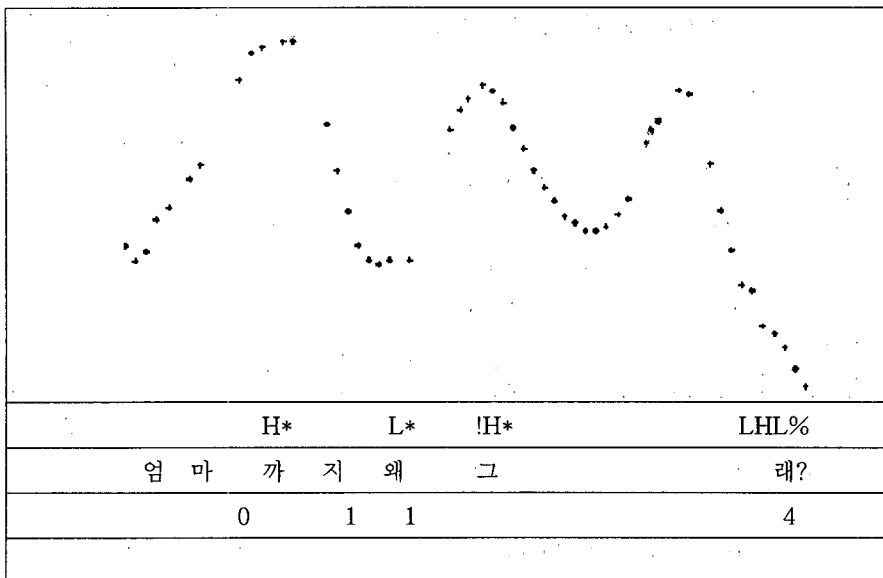


Figure 13. 엄마까지 왜 그래? "Even you, mommy?"

4. Break-Index Tier

The break-index tier contains break-indices which represent a prosodic grouping of words and its hierarchical structure in an utterance. The break-indices are numbered from 0 to 4 and the number represents the degree of disjuncture. Greater break indices represent a greater disjuncture between words, while smaller break indices represent a smaller disjuncture between words. The break-indices are to be marked at the end of each word in the orthographic tier for the perceived strength of disjuncture between consecutive word pairs in an utterance. The disjuncture can be signalled by a pause, a phrase final lengthening (pre-boundary lengthening), or a deep F_0 valley. However, the degree of the perceived disjuncture is subjective and labellers have to often rely on the subjective evaluation of the disjuncture.

4.1 Break Index 0 and 1

The break-index 0 is the lowest-level index among break-indices and represents the smallest degree of disjuncture. The break index 0 can be marked between words and markers such as nominative case markers (-i, -ga, -nən, -ə n), accusative case markers (-rəl, -əl), dative case markers (-ege), focus markers (-man), inflectional or derivational endings, and so on. In most cases, words and markers are very closely connected in speech and they often involve phonetic processes such as lenis stop voicing and consonantal assimilation. However, unlike English, such phonetic processes are not required conditions for marking the break-index 0. Even if there is no phonetic process between words and markers, the break-index 0 can be labelled between them since markers are very closely connected to the preceding words and they cannot stand alone in utterance.

The break index 1 is a level higher break-index than the break-index 0 and represents a very small degree of disjuncture between individual word boundaries. Since the degree of disjuncture is small, a phonetic process can be involved where applicable.

The example utterance in Figure 14 shows the marking of the break-index 0 and the break-index 1. The break-index 0 is marked between 저녁 "dinner" and 은 "NOM", and between 안한 "didn't" and 거야 "interrogative ending", while the break-index 1 is marked between 어제 "yesterday" and 저녁.

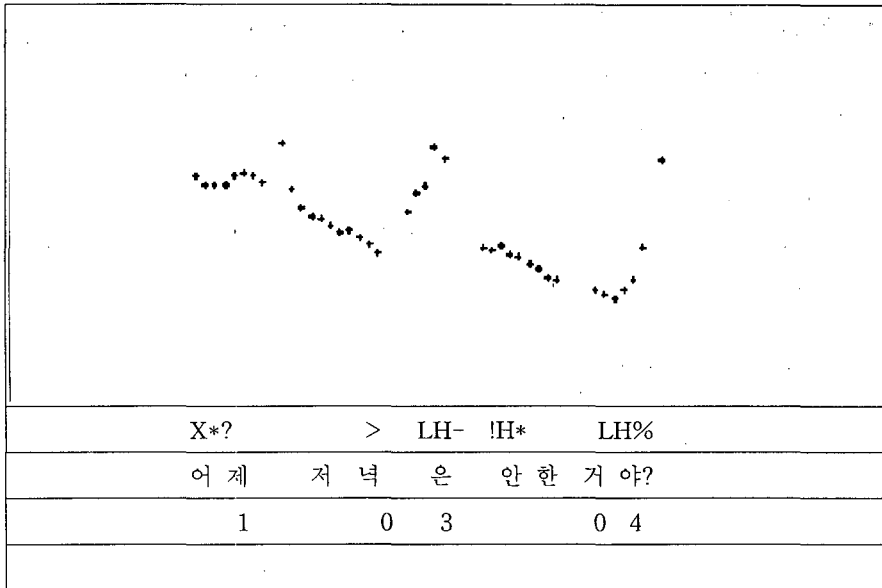


Figure 14. 어제 저녁은 안한거야? "Didn't you have dinner last night?"

4.2 Break Index 3 and 4

The break-index 3 and the break-index 4 mark the intonational categories, such as accentual phrases and full intonation phrases. Break-index 3 marks an accentual phrase boundary where a strong degree of disjuncture between adjacent words is perceived. The break-index 3 aligns with the last word of the accentual phrase in the orthographic tier and also aligns with a corresponding L-, LH-, or H- tone label, on the tone tier. In general one word or two words form an accentual phrase and its size is smaller than the size of an intermediate phrase used to describe an English intonation category.

Break-index 4 marks the strongest degree of disjuncture between adjacent words or between a final word and silence. This break-index corresponds to the boundary of an intonation phrase, the highest level of the prosodic hierarchy of Korean, and aligns with one of intonational boundary tone labels such as L%, H%, LH%, and LHL%, on the tone tier and with the last word of an intonational phrase on the orthographic tier.

The utterance in Figure 14 shows the marking of the break index 3 and the break index 4. The break index 3 marks the accentual phrase boundary between *어제 저녁* "dinner last night" and *안한 거야?* "didn't you have?" while the break index 4 at the end of the utterance marks the intonational phrase boundary. Though there is a second accentual phrase in this utterance, the

break index 3 is not marked at its boundary because the boundary coincides with an intonational phrase boundary. As in this utterance, one or more than one accentual phrase can make up an intonational phrase.

4.3 Break Index 2

Break index 2 marks a disjuncture at a boundary between the adjacent words where the pitch pattern does not show sufficient cues for one of the break indices described above. The disjuncture marked by break index 2 is stronger than that marked by break index 1 and weaker than that marked by break index 3.

The example utterance in Figure 15 shows the marking of break index 2. In this utterance, every inter-word juncture is signalled by an F_0 valley and a well-formed tune, declination, continues across the juncture. The disjuncture perceived between two words is weaker than expected at the boundary of an accentual phrase and break index 2 is assigned to every F_0 valley in order to mark this medium degree of disjuncture between adjacent words. In this case, however, break index 2 does not align with any of the tone labels since the break index 2 does not mark intonation categories such as accentual phrases or intonational phrases.

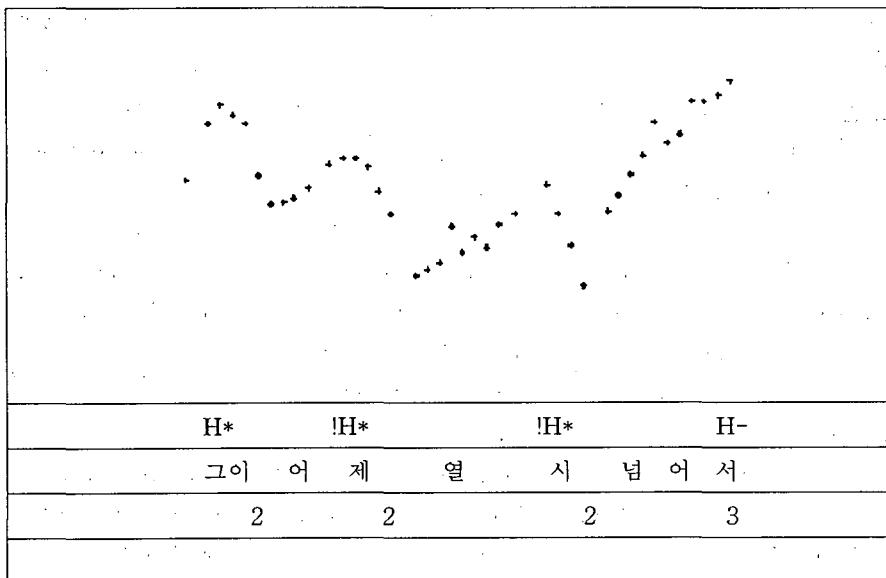


Figure 15. 그이 어제 열시 넘어서. "Last night he (came home) after 10 O'clock."

5. Miscellaneous Tier

The miscellaneous tier is a comment tier where labellers can mark any events that are not described on the orthographic tier, the tone tier, and the break index tier. The events include the disruption of a smooth rhythm or the interruption of the intonation contour caused by disfluencies, repairs, laughing, coughing, pitch tracking failures, and so on. These events are marked by diacritics < and > for both their beginnings and their ends, respectively, as shown in Figure 12. The diacritics are used in pairs in order to indicate the time span where the events occur since it is sometimes hard to determine the precise region where the events occur.

Although the miscellaneous tier is not part of the kernel prosodic analysis, it provides important information for interpreting the labels on the tone and break index tiers.

6. Conclusion

The accent loci of words in Korean are neither lexically determined nor predictable from the dictionary entries for the word, and the accent locus in a phrase is not associated with a particular syllable of a specific word. The accent locus in a phrase can shift according to pragmatic forces, grammatical functions, utterance types, and other aspects of prosody. Generally one or two phrase accents occur within an accentual phrase, and the first phrase accent usually falls on the first or the second syllable of the phrase. In the proposed system the accented syllable is marked with either a L* accent on the tone tier when the accented syllable is in the lowest part of the speaker's pitch range, or a H* accent on the tone tier when the accented syllable is in the upper part of the speaker's pitch range for the phrase. However, unlike ToBI system, the starred accent does not indicate an association of the accent with a lexically designated syllable. It simply indicates that the syllable is accented. Although phrase accent patterns within phrases are rather simple - a straightforward alignment of either a H* or a L* with a prominent syllable, the intonation patterns at the phrase boundaries are more diverse. An accentual phrase (which is made up of one or more than one word) boundary is marked by F0 rise, fall, and fall-rise, and each pitch event is marked with H-, L-, and LH-, on the tone tier, respectively. The - diacritic indicates an association of the tone with

the phrase boundary, and the tone labels align with a break index 3 on the break index tier. An intonation phrase (which is made up of one or more than one accentual phrase) boundary is marked by F0 rise, fall, fall-rise, fall-rise-fall, and each pitch event is marked with H%, L%, LH%, and LHL%, on the tone tier, respectively. The % diacritic indicates an association of the tone with the phrase boundary, and the tone label aligns with a break index 4 on the break index tier. In addition to these proposed boundary tones, there might be more boundary tones since phrase final pitch events seem more diverse than we can encounter while collecting data.

In sum, the proposed system in this paper prosodically transcribes the above mentioned intonation patterns on the four parallel tiers. Among the four tiers, the tone and break-index tier provide core prosodic analysis of utterances: the tone tier provides a phonological transcription of pitch events associated with accented syllables and pitch events associated with phrase boundaries; the break index tier provides a prosodic grouping of words and its prosodic structure in an utterance. The prosodic transcription system is so robust that it can not only account for the diverse intonation patterns and prosodic structures of Korean but also contribute to the development of complex speech and natural language processing technologies. I hope this paper can shed light on establishing a standard for labelling prosodic features of digital speech databases in Korean, so that prosodically transcribed large corpora can be shared across research sites.

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