

## **Alternative Autosegmental Analyses of a Pitch-Accent System**

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### **1. Introduction**

This study is concerned with the pitch-accent system of the Taegu dialect of Korean spoken in the area around the city of Taegu. The dialect belongs to North Kyengsang dialects of the southeastern part of the Korean peninsula. Several works on the Taegu dialect have been done in a traditional accentual approach. Included in some exemplary studies are Hashimoto Mantaroo(1973), Rah S-S.(1974), Moon Hyo-Kun(1974) and Takao Ooe(1976). Chung Kook(1980) adds a functional approach to the previous studies. The approaches taken in this study are all in the framework of Autosegmental Phonology.

The purpose of this study is to compare three autosegmental approaches to the dialect and to select the best analysis for it. The first analysis follows Goldsmith(1976) in accepting accent marks and a tone melody as well as the whole three clauses of the Well-formedness Condition. This means there are both automatic tone spreading and dumping. The second analysis is presented in the couch of Williams(1976) with Association Conventions. This approach rejects automatic tone dumping but allows automatic tone spreading in addition to a tone melody and accent marks. The spirit of Clements and Ford(1979) may be said to be the same in this respect. The third analysis discards both automatic tone spreading and dumping as well as a tone melody and accent marks à la Pulleyblank(1983, 1986) where tonal underspecification is evidenced.

The paper is organized as follows: the data are introduced in section 2; section 3 presents the three analyses; and the conclusion is given in section 4, with the third analysis chosen as the best in terms of the number of rule types and the simplicity in the underlying lexical representations.

### **2. Data**

The data here are confined to nouns and they are mainly from Kim(1986, 1988). Illustrated in (1), (2), and (3) are mono-, di-, and trisyllabic mono-

morphemic nouns, the right column with a subject marker -i/ka.<sup>1)</sup>

- |        |                          |                     |
|--------|--------------------------|---------------------|
| (1) a. | pay- 'pear' [H]          | pay+ka [HL]         |
|        | kkoch 'flower' [H]       | kkoch+i [HL]        |
| b.     | pay 'stomach' [H]        | pay+ka [HH]         |
|        | pap 'rice' [H]           | pay+i [HH]          |
| c.     | pay 'double' [H]         | pay+ka [HH]         |
|        | täl 'field' [H]          | täl+i [HH]          |
|        |                          |                     |
| (2) a. | hanil 'sky' [HL]         | hanil [HLL]         |
|        | seli 'frost' [HL]        | seli+ka [HLL]       |
| b.     | namu 'tree' [LH]         | namu+ka [LHL]       |
|        | matang 'yard' [LH]       | matang+i [LHL]      |
| c.     | kulim 'cloud' [HH]       | kulim+i [HHL]       |
|        | nakci- 'octopus' [HH]    | nakci+ka [HHL]      |
| d.     | paychu 'cabbage' [HH]    | paychu+ka [HHL]     |
|        | tampay 'tobacco' [HH]    | tampay+ka [HHL]     |
|        |                          |                     |
| (3) a. | kamai 'straw mat' [HLL]  | kamai+ka [HLLL]     |
|        | kamuchi 'mullet' [HLL]   | kamuchi+ka [HLLL]   |
| b.     | kkamaku 'raven' [LHL]    | kkamaku+ka [LHLL]   |
|        | milichi 'anchovy' [LHL]  | milichi+ka [LHLL]   |
| c.     | cintallay 'azalea' [LLH] | cintallay+ka [LLHL] |
|        | satali 'ladder' [LLH]    | satali+ka [LLHL]    |
| d.     | halaypi 'grandpa' [HHL]  | halaypi+ka [HHLL]   |
|        | sekkalay 'raft' [HHL]    | sekkalay+ka [HHLL]  |
| e.     | samaku 'mole' [HHL]      | samaku+ka [HHLL]    |
|        | manula 'wife' [HHL]      | manula+ka [HHLL]    |

Although the two pay + kas in (1b) and (1c) are [HH], they are differentiated by the length of the vowel: the vowel in (1b) is short while that in (1c) is long. The same holds true in (2c) and (2d) and in (3d) and (3e). Since our main concern in this study is pitch, we are going to ignore the length difference in the

1) Yale Romanization is adopted for the transcription of Korean. However, wu and u are replaced with u and ɨ respectively.

descriptions to follow. Compound nouns composed of more than two morphemes are given in (4).

- (4) a. **kkoch** [H] – **cip** [H] → **kkochcip** [LH]  
 ‘flower’ ‘house’ ‘flower shop’  
**khong** [H] – **path** [H] → **khongpath** [LH]  
 ‘bean’ ‘field’ ‘bean field’
- b. **khong** [H] – **pap** [H] → **khongpap** [HL]  
 ‘bean’ ‘rice’ ‘bean-rice’  
**yang** [H] – **cec** [H] → **yangcec** [HL]  
 ‘goat’ ‘milk’ ‘goat milk’
- c. **pom** [H] – **pi** [H] → **pompi** [HH]  
 ‘spring’ ‘rain’ ‘spring rain’  
**kay** [H] – **cip** [H] → **kaycip** [HH]  
 ‘dog’ ‘house’ ‘dog house’
- d. **cam** [H] – **cali** [HL] → **camcali** [HHL]  
 ‘sleep’ ‘place’ ‘place to sleep’
- e. **polim** [HL] – **tal** [H] → **polimtal** [HLL]  
 ‘full-moon day’ ‘moon’ ‘full moon’
- f. **palam** [LH] – **caypi** [HL] → **palamcaypi** [LLHL]  
 ‘wind’ ‘catcher’ ‘philander’
- g. **kasil** [LH] – **chayso** [HH] → **kasilchayso** [LHLL]  
 ‘autumn’ ‘vegetable’ ‘autumn vegetable’
- h. **moktan** [HH] – **kkoch** [H] → **moktankkoch** [HHL]  
 ‘peony’ ‘flower’ ‘peony’  
**supak** [HH] – **mul** [H] → **supakmul** [HHL]  
 ‘water melon’ ‘water’ ‘water melon water’
- i. **kosimtochi** [HLLL] – **saykki** [HL] → **kosimtochisaykki** [HLLLLL]  
 ‘porcupine’ ‘cub’
- j. **kokuma** [HHL] – **ssak** [H] → **kokumassak** [HHLL]  
 ‘sweet potato’ ‘sprout’ ‘sweet potato sprout’
- k. **kkoch** [H] – **cip** [H] – **akassi** [LHL] → **kkochcipakassi** [LLLHL]  
 ‘flower’ ‘house’ ‘lass’
- l. **mul** [H] – **cangsa** [HH] – **ttal** [H] → **mulcangsattal** [HHLL]  
 ‘water’ ‘salesman’ ‘daughter’

The words in the right columns of (2) and (3) show that the pitch on the subject marker *-i/ka* is low, which makes it possible to postulate the pitch of the subject marker as low. Thus, we can induce from (1b) and (1c) that the high pitch on the subject marker is from that of the preceding noun. The three *pay + kas* in (1) indicate the difference in the underlying accents and S. Ramsey (1973) in his accentual analysis sets up two kinds of accents: accent and preaccent. Let us change the name "accent" into "accent proper" to prevent any confusion caused by the name. Accent proper is marked and realized on the relevant syllable, while preaccent is marked at the beginning of the syllable and realized on that syllable and the very next following syllable, if any. (5) shows how the two accents are represented in the underlying forms, where accent marks are postulated:

- (5) a.
- |                       |              |
|-----------------------|--------------|
| *pay 'pear' [H]       | *pay+ka [HL] |
| b. *pay 'stomach' [H] | *pay+ka [HH] |
| *pay 'double' [H]     | *pay+ka [HH] |

Thus, according to Ramsey, the two consecutive Hs in the surface forms of the above data are from an underlying preaccent as shown in (5b), while a single H in the surface forms is from an underlying accent proper as shown in (5a). In passing, the surface tones of the compound words in (4) show the need of accent deletion, because only one accent of the composing morphemes is realized in the surface forms. Now we turn to the autosegmental analyses having both accent marks and a tone melody in the underlying representations.

### 3. Alternative Analyses

Before the Well-formedness Condition (Goldsmith 1976) is developed, the Tone Mapping Rule (6) of Williams (1976) is posited to map tones onto tone-bearing units:

#### (6) Tone Mapping Rule

- (a) The mapping procedure maps from left to right a sequence of tones onto a sequence of syllables.
- (b) It assigns one tone per syllable, until it runs out of tones,

- (c) then, it assigns the last tone that was specified to the remaining un-toned syllables on the right,
- (d) until it encounters the next syllable to the right belonging to a morpheme with specified tone.
- (e) If the procedure above runs out of syllables, more than one tone may be assigned to the last vowel only if the grammar of the language includes a stipulation to that effect.

Clause (c) guarantees automatic tone spreading while clause (e) prohibits automatic tone dumping but allows language-specific tone dumping if the language in question has contour tones. Goldsmith proposes the Well-formedness Condition (WFC, henceforth) which governs the relation between autosegmental tiers at the whole derivational processes.<sup>2)</sup>

(7) Well-formedness Condition

- (a) All vowels are associated with at least one tone.
- (b) All tones are associated with at least one vowel.
- (c) Association lines do not cross.

(7a) implies automatic tone spreading when tone-bearing units (TBUs, henceforth) run out of tones, while (7b) implies automatic tone dumping when tones run out of TBUs.

Unlike tone languages, tones and TUBs are not associated one by one from left to right in pitch-accent systems. A convention like Initial Tone Assignment Rule (ITAR, henceforce) is necessary to take care of the association of the tones designated as accented to specific TBUs prior to the implementation of the WFC.

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2) Haraguchi (1977:11) uses Universal Tone Association Convention instead of the WFC because of some weakness of the latter.

## (8) Initial Tone Assignment Rule

*	( * : accented TBU, * : accented tone)
V	V      T
⋮	
⋮	
*	
T	

With this much about how to link tiers, let us see how the data in section 2 are analyzed. 3.1. presents an analysis adopting both automatic tone spreading and dumping implied in (7) with ITAR, while 3.2. shows an analysis adopting automatic spreading only and ITAR. Both analyses, however, use a tone melody and accent marks. On the other hand, 3.3. allows none of automatic tone spreading or dumping, a tone melody, and accent marks. Instead, lexically given Hs are shown to replace the role of accent marks and there is no need to stipulate an arbitrary tone melody.

3.1. *à la* Goldsmith

Illustrated in (9) are lexical representations of some examples from (1) to (3). LHL is assumed as the basic tone melody of the dialect. H is regarded as an accented tone and thus linked to the accented TBU by ITAR. However, there is no special reason to choose this melody over HL or LH. Arbitrary it may be, it seems that the surface tones of more than trisyllabic words in (3) and (4) make LHL the most eligible underlying tone melody.<sup>3)</sup> Since there is one accent per phonological word in accent languages, it is assumed that LHL is assigned to each underlying accent mark, accent proper or preaccent.

(9) a.	*	*		
	kkoch	kkoch+i	*pap	*pap+i
	LHL	LHL	LHL	LHL

3) If we take HL as a basic tone melody, there is no way to assign Ls to the syllable(s) which appear before H in (3) and (4). On the other hand, if LH is adopted, the Ls behind H cannot be explained, either, in this analysis and the following one in 3.2.

	*	*	*	*	
b.	hanil	hanil+i	namu	namu+ka	*kulim
	LHL	LHL	LHL	LHL	
	*	*	*		
c.	kamai	milichi	satali	*halaypi	
	LHL	LHL	LHL	LHL	

However, in order to implement ITAR, preaccent should be realized into accent proper. The Accent Realization Rule (ARR, henceforth) does this job:

(10) Accent Realization Rule

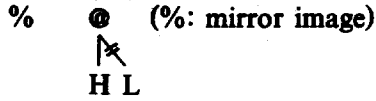
$$* \textcircled{\circ} (\textcircled{\circ}) \rightarrow \textcircled{*} (\textcircled{*}) (\textcircled{\circ}:\text{syllable})$$

After (10), ITAR applies, followed by the implementation of the WFC. Shown in (11) are exemplary derivations of monosyllabic nouns:

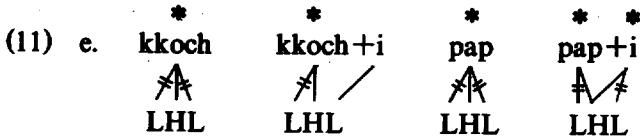
(11) a.	*	*	*	*
	kkoch	kkoch+i	*pap	*pap+i
	LHL	LHL	LHL	LHL
	⟨ARR⟩			
b.	_____	_____	*	* *
			pap	pap+i
	⟨ITAR⟩			
c.	*	*	*	* *
	kkoch	kkoch+i	pap	pap+i
	LHL	LHL	LHL	LHL
	⟨WFC⟩			
d.	*	*	*	* *
	kkoch	kkoch+i	pap	pap+i
	LHL	LHL	LHL	LHL

At the derivational stage of (11d) contour tones are derived. Since no contour tone is allowed at the lexical level in this dialect, it should be simplified. The Tone Simplification Rule (TSR, henceforth) works:

(12) Tone Simplification Rule

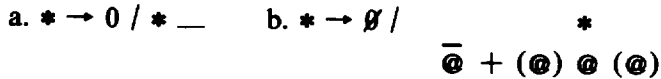


TSR changes (11d) into (11e) where delinked Ls are not realized phonetically:

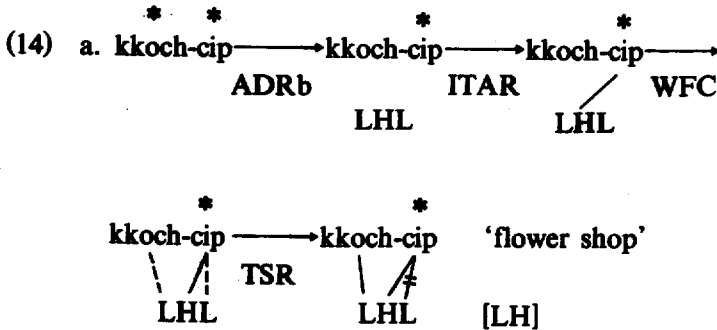


When it comes to the data in (4), we need to delete underlying accents except one. Two Accent Deletion Rules (ADR, henceforth) are postulated to handle this job:

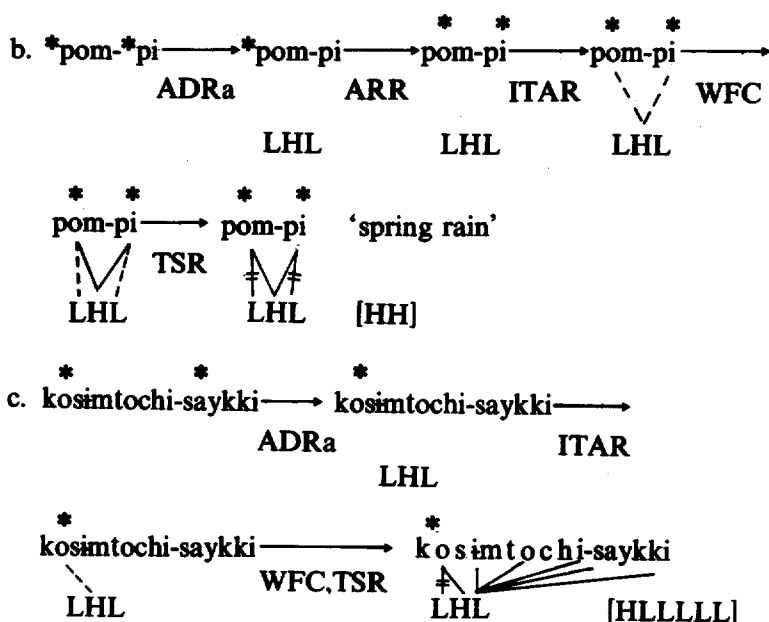
(13) Accent Deletion Rule



(13a) deletes the second accent, regardless of the accent type. (13b) deletes the first accent proper on the final syllable when followed by another accent proper. The order between (13a) and (13b) is taken care of by the Elsewhere Condition (Kiparsky, 1982). Thus, (13b), which is specific, applies prior to (13a), which is general. (14) shows some derivations:



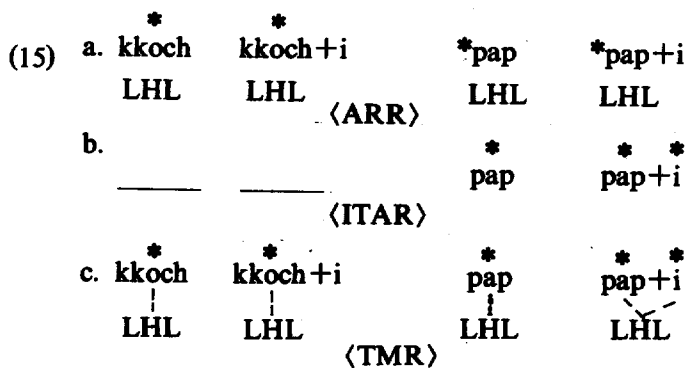


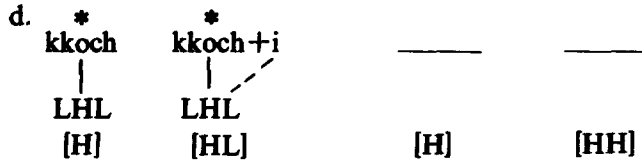


To derive correct surface tones in this analysis, ADR, ARR, ITAR, WFC and TSR are necessary in addition to underlying accent marks and a tone melody, LHL.

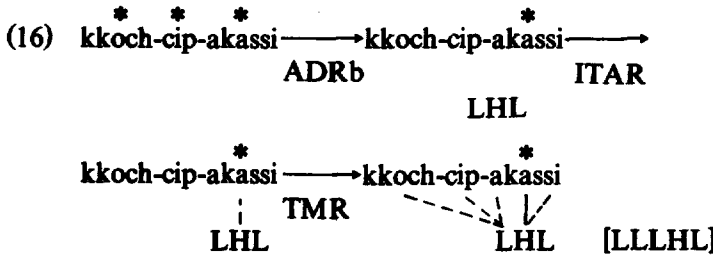
### 3.2. à la Williams

Since this analysis discards automatic tone dumping, we can predict that no TSR is necessary. The TMR (6) replaces the WFC. Thus, the derivations in (11) and (14) are simplified by one step.





For the tonal derivation of compound nouns, let us take (4k) as an example:



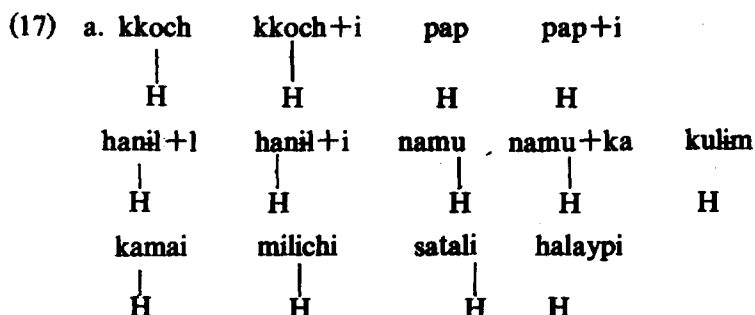
We see that H is linked only to the accented TBUs by ITAR and it never spreads. This is because when there arises competition between two tones, H and L, it is free tone L that becomes a candidate for the next linking. This analysis is simpler than that of 3.1., since the former needs ADR, ARR, ITAR, and TMR while the latter needs TSR in addition. Thus, the analysis stipulating automatic tone spreading alone is favored over the one with both automatic spreading and dumping. However, a tone melody and accent marks are specified in underlying representations in both analyses.

### 3.3. à la Pulleyblank

In the preceding two analyses both a tone melody LHL and accent marks are posited in the underlying forms. As we have seen, accent is bound to be realized as high pitch in the course of derivation. Since this is the case, it is far more economical to posit Hs lexically instead of accent marks and replace accent rules like ADR and ARR with tone rules. In this way accent marks, a tone melody, and accent rules can be dispensed with, leading to the simplification of lexical representations and the number of rule types.

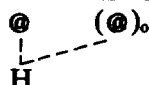
Two kinds of Hs, prelinked H and floating H, are lexically assigned instead of accent proper and preaccent, respectively. The representations in (17) are substi-

tuted for those in (9):



Since there is no tone melody stipulated at all, free TBUs should be assigned tone anyway. Assigning tones to free TBUs is not by either automatic tone spreading or dumping. First of all, floating H is linked to any available free TBUs by Floating H-Linking (FHL, henceforth):

(18) Floating H-Linking



However, two consecutive Hs appear only at the beginning of word as seen in the data above. Consequently, the Hs linked to the third syllable and after must be delinked. Third-H Delinking (Third D, henceforth) does this job:

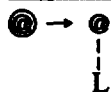
(19) Third-H Delinking



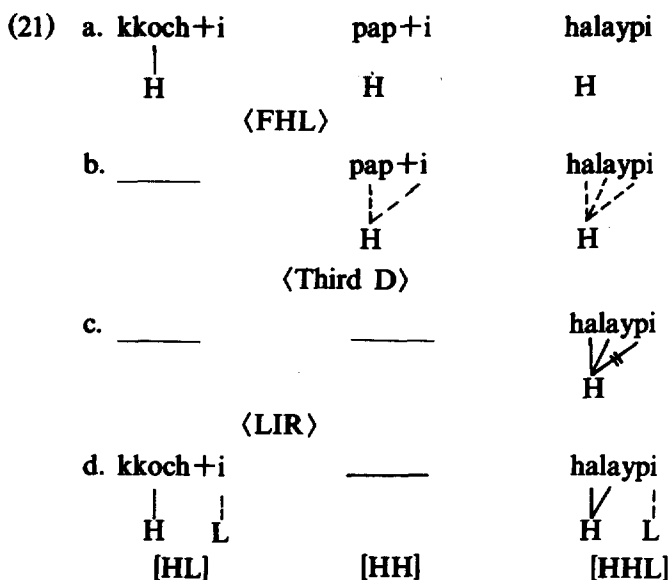
After FHL (18) and Third D (19) have applied, the still free TBUs, if any, are assigned Ls by default L-Insertion Rule (LIR, henceforth), since in two-tone systems L becomes a default tone by UG.<sup>4)</sup>

4) For more about deciding default tones, see Pulleyblank 1986, chapter 4.

(20) L-Insertion Rule



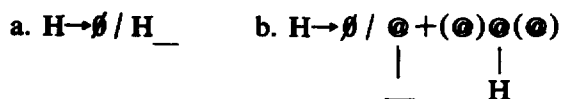
With these rules at hand, let us see how surface tones are derived in this approach.



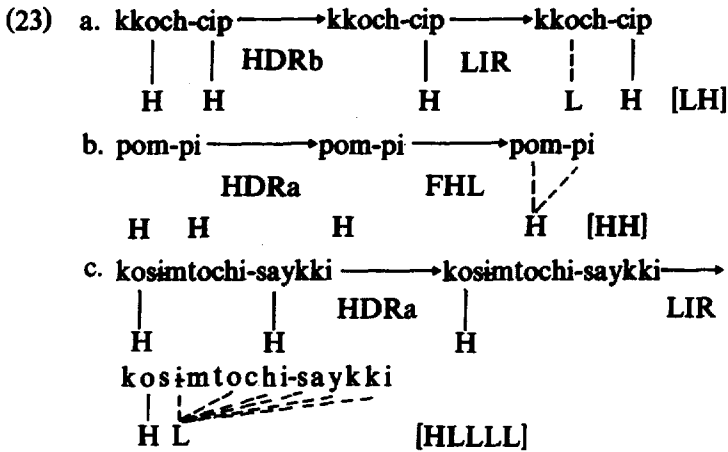
All the rules employed here are tone rules. Neither accent marks nor a tone melody is necessary in the underlying representations.

Let us consider compound nouns. Instead of the ADR in (13) two H-Deletion Rules (HDR, henceforth) are posited.

(22) H-Deletion Rule



What it does is exactly the same as what ADR does. Here again, the Elsewhere Condition determines the order in which (22b) applies before (22a). Shown in (23) are derivations of some compound nouns:



Default L-Insertion Rule applies after all the rules dealing with Hs. (For more detail about the position of the default rules in the grammar, see Pulleyblank 1986) What is needed for deriving surface tones in this analysis rejecting a tone melody, accent marks, automatic tone spreading or dumping is four rules: FHL, Third D, HDR, and LIR.

4. Conclusion

Let us see what the three autosegmental analyses stipulate:

(24)

	Goldsmith	Williams	Pulleyblank
underlying forms	LHL accent marks	LHL accent marks	prelinked & floating Hs
accent rules	ADR, ARR	ADR, ARR	*
accent-tone rules	ITAR	ITAR	*
tone rules	TSR	*	HDR, FHL, Third D (LIR)

In this table we do not include WFC and TMR as special rules since these are conventions provided by Universal Grammar. In the same vein, L-Insertion Rule in the third analysis is not treated as a language-specific rule since it is also provided by UG. So, we put LIR in the parentheses above.

At the end of 3.2. the analysis à la Williams(1976) is seen to be preferred to

the one following Goldsmith(1976) due to no need of TSR. Now we need only to compare the second and third analyses. First, in terms of the number of rules in total, the two are the same. However, the second analysis has both accent rules and an accent-tone rule, ITAR, which has to refer to both tones and accent marks. On the other hand, the rules in the third analysis are all tone rules. Thus, the third analysis is simpler in terms of rule types. Thirdly, when it comes to underlying representations, the second analysis with an LHL melody and accent marks is more complex than the third one positing preassigned Hs.

In consequence, we can choose the third analysis as the best analysis of the pitch-accent system of the Taegu dialect.

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