

# Form-Meaning Interface in Constraint-based Unified Grammar: Prosody and Pragmatics

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## Abstract

The present work aims at a formal description of the interface between prosody and pragmatics in the framework of Constraint-based Unified Grammar CUG. It focuses on two main aspects of this interface: (1) intonation patterns vs. speech acts and (2) stress vs. topic-focus articulation. First, four terminal contours are proposed: *fall*, *mid*, *rise*, and *high rise*. They are then mapped into the speech-act types of *asserting*, *asking*, *requesting*, etc., centering on the grammatical constructions of nonstandard questions. Second, four levels of stress are also proposed: *0*, *1*, *2*, *3*. They are linked to the four types of topic-focus articulation: *zero topic*, *topic*, *narrow focus* and *contrastive topic/focus*. With these prosodic markings, various discourse-oriented data are analyzed to illustrate and support the principle of compositionality for building up of lexical to phrasal constructions as well as various principles and conventions in CUG such as principle of ordering, stress lineup, and TFA composition.

## 1. Introduction

Two aspects of prosody-pragmatics interface in Korean, intonation vs. speech act and stress vs. topic-focus articulation (TFA) are presented in descriptive terms: first, four types of terminal contours (*fall*, *mid*, *rise*, and *high rise*) are set up and mapped to the speech-act types of *asserting*, *asking*, *requesting*, etc. on the basis of the prosodic features of echo utterances and tag questions. Second, four types of stress (*0*, *1*, *2*, *3*) are also set up and mapped to four types of TFA: *zero topic*, *topic*, (*narrow*) *focus* and *contrastive topic/focus*. The interface between prosody and pragmatics is then presented in formal terms in the framework of Constraint-based Unified Grammar, analyzing discourse-oriented examples of nonstandard questions and a dialogue exchange to explicate building up of lexical to phrasal constructions along with grammar-internal principles and conventions such as principle of ordering, stress lineup, and TFA composition.

## 2. Prosody and pragmatics

Before describing terminal contours and question-answer types, a brief exposition on Korean

sentence types and levels is in order.

## 2.1. Sentence types and sentence levels

The following table shows the morphological conflation of the two dimensions, sentence type and sentence level in Korean (Chang 2001).

(1) ST \ SL	Deferential	Plain	Familiar	Blunt	Intimate	Polite
	<i>p</i>	<i>a</i>	<i>ey</i>	<i>o</i>	<i>e</i>	<i>yo</i>
Declarative	-(su)pnita	-ta	-ney	-o	-e	-yo
Interrogative	-(su)pnikka	-nya	-na	-o	-e	-yo
Imperative	-psio	-(e)la	-key	-o	-e	-yo
Propositive	-(u)psita	-ca	-sey	-o	-e	-yo

Three sentence levels (SLs)—blunt, intimate and polite-- are morphologically nondistinctive as to their sentence types (STs); the distinction is partially made by the terminal contour of falling (↘) or rising (↗), as shown in (2).

(2) Mia-ka wa.ss.e			% PST = PAST IMT=INTIMATE
SM come.PST.IMT			
a. Mia-ka wa.ss.e ↘	‘Mia came. / Mia is here.’	(declarative)	
b. Mia-ka wa.ss.e? ↗	‘Did Mia come? / Is Mia here?’	(interrogative)	

## 2.2. Nonstandard questions and terminal contour

Depending on the terminal contour (TC) and the lexical meaning of *nwuka* (‘who’ and ‘someone’), (3) has four readings: a statement, two standard questions (yes/no-question (ynQ) and wh-question (whQ)) and an echo question (echoQ).

(3) Nwuka wa.ss.e			
who/someone come.PST.IMT			
a. nwu.ka wa.ss.e ↘	‘Somebody came.’	(statement)	
b. nwu.ka wa.ss.e? ↗	‘Did anybody come?’	(ynQ)	
c. nwu.ka wa.ss.e? ↘	‘Who came?’	(whQ)	
d. nwu.ka wa.ss.e? ↗	‘Who did you say came?’	(echoQ)	

### 2.2.1. Echo utterances

An echo utterance is the speaker’s reprise or retortion of the whole or part of a previous utterance: that is, the speaker questioning the hearer’s utterance or asserting his own previous utterance.

(4) A: Mia-ka wa.ss.e ↘ (=2a)	
‘Mia came./ Mia is here.’	

B: Mia-ka wa.ss.ta.ko ? ↗

come.PST.DEC.QM

% DEC=DECLARATIVE QM=QUOTATIVE MARKER

‘Did you say Mia came?’

In the echo question (4B) the quotative connective *ko* (colloquially, *kwu*) marks A’s utterance (4A) as an embedded declarative sentence linked to the unexpressed predicate such as *malhay.ss.nya?* ‘did you say?’. In the dialogue exchange (5), the speaker repeats his earlier utterance in the form of echo statement (5c). (5d) is another type of echo questions, called ‘incredulity question’ (incr-Q) (Jun and Oh 1996).

(5) a. A: Mia-ka wa.ss.e ↗

‘Did Mia come?’

b. B: Mia-ka wa.ss.nya.ko ↗

‘Did Mia come—did you ask?’

c. A: Ung. Mia-ka wa.ss.nya.ko ↘

‘Yeah, did Mia come? I asked.’

d. Mia-ka wa.ss.e ↗ ↗

‘Did you say Mia came? It’s surprising/unbelievable/...’

### 2.2.2. Tag questions

A typical Korean tag question is what I call ‘negative tag question (neg-tagQ)’,<sup>1</sup> which is in the form: *an* ‘not’ + *ha?* ‘do/be’, analogous to the English *isn’t it?* or the French *n’est ce pas?*

(6)	[s	...(tense) ci]	an.ha?	..., isn’t it?	(English)
				..., n’est ce pas?	(French)
		PACK	TAG		

It has two terminal contours, rising (↗) and falling (↘), each distinct in speech-act meaning. The tag question with a falling contour generally shows the speaker’s attitude of seeking a confirmation from the hearer and the one with a rising contour is seeking an agreement. For ease of reference they are called here: confirmative tag question (conf-tagQ) and agreeing tag question (agr-tagQ), respectively. They are biased questions in that the speaker is not simply asking a question but (s)he is biased in favor of the proposition expressed in the pack.

(7) Mia-ka wa. ss. ci an. h.a ↗ (or ↘)  
come.PST.SUP.NEG.be/do.IMT

‘Mia came, didn’t she ↗ (or ↘)’

(8) Mia-ka o.ci an.ha.ss.e ↗  
come.SUP NEG.be/do.PST.IMT

‘Didn’t Mia come?’

(SUP = suppositive)

A constraint on the two types of interrogatives, negative tag question (neg-tagQ) and negative

<sup>1</sup> Another type of Korean tag called ‘postsentential tag’ (form: *an* ‘not’+ *kulay* ‘so be/do’) (Chang 1985) is assumed to have a mid-level TC before the tag.

i. Mia-ka wa.ss.ci → an.kul.ay? ↗ ‘Mia came, I suppose--isn’t it so?’  
come.PST.SUP. NEG. so.be/do.PL/INT

question (negQ), is shown in (9). Note that tense cannot be marked in both positions.

- (9)
- |             | PACK                                     | TAG                          | TC     |
|-------------|--|------------------------------|--------|
| a. neg-tagQ | [ <sub>S</sub> ... (TENSE). <i>ci</i> .  | NEG. <i>ha</i> (*TENSE)...]  | ↗ or ↘ |
| b. negQ     | [ <sub>S</sub> ... (*TENSE). <i>ci</i> . | NEG. <i>ha</i> .(TENSE) ...] | ↗      |
- (10) \*Mia-ka wa.**ss**. *ci* *an*. *ha*.**ss**.*e* (Didn't Mia come?)  
 come.**PST**.**SUP**. NEG.*be/do*.**PST**.**IMP**

### 2.3. Linking speech act and terminal contour

Speech acts (SAs), roughly corresponding to the four major sentence types, are classified as in (11); the expositive type is further subtyped. Representative speech-act verbs are provided together with their sense numbers as entered in Princeton's WordNet (version 2.1). The basic sense number #1 is written off for simplicity.

(11) Speech act types: <sup>2</sup>

- a. *expositives*: {*state*(#1), *tell*(#1), *say*(#1)}
- i. *assertives* {*assert*#2, *affirm*#2, *state*, ...}
  - ii. *informatives* {*inform*, *report*#2, *describe* #2, ...}
  - iii. *confirmatives* {*confirm*#2, *conclude*, *judge*#2, ...}
  - iv. *assentives* {*agree*#2, *accept*#3, *assent*#3, ...}
  - v. *dissentives* {*disagree*, *dissent*#1, *differ*, ...}
  - iv. *suppositives* {*suppose*, *assume*, *presume*, ...}
- b. *rogatives*: {*ask*, *inquire*, *question*#3, ...}
- c. *directives*: {*request*#2, *ask*#2, *orde*, ...}
- d. *commissives*: {*promise*, *offer*, *propose*, ...}

Terminal contours are mapped informally to speech acts and types of nonstandard questions in (12) and then to the IP (intonational phrase) boundary tones (Jun 2000) in (13).

(12) TC-SA linking

- [a = speaker, b = hearer, P=proposition]
- |                    |                          |             |
|--------------------|--------------------------|-------------|
| a. <i>fall</i> (↘) | assert (a, b, P)         | (statement) |
|                    | ask(a, b, wh-P)          | (whQ)       |
|                    | ask(a, b, confirm(b, P)) | (conf-tagQ) |

<sup>2</sup> Bach and Kent (1979:42-44) set up 15 subtypes of 'constatives' (our 'expositives'); 'rogative' is the term used by Leech (1983) for the type of questioning, which is normally regarded as a subtype of directives (Searle 1969).

b. <i>rise</i> (↗)	ask(a, b, if-P)	(ynQ)
	ask(a, b, say(b, a, P))	(echoQ)
	suppose(a, P) ∧ ask(a, b, agree (b, P))	(agr-tagQ)
c. <i>hi-rise</i> (↗↗)	ask(a, b, say(b, a, P) ∧ surprised(a, P)	(incr-echoQ)
d. <i>mid</i> (→)	(pause)	

(13) TC IP BOUNDARY TONE

a. <i>fall</i> (↘)	L%, HL%, LHL%, HLHL%, LHLHL%	statement, whQ, conf-tagQ
b. <i>rise</i> (↗)	LH%, HLH%, ...	echoQ, agr-tagQ
	H%	ynQ
c. <i>high-rise</i> (↗↗)	LHLH%, ...	incr-echoQ
d. <i>mid</i> (→)	H%	

In (13), LHL% and LHLH% are supposed to intensify the meaning of HL%; the speaker is persuasive, insisting, confident, or the like (Jun 2000). WhQ and incr-echoQ are distinguished not only by boundary tones but also amplitude and pitch range (Jun and Oh 1996).<sup>3</sup>

#### 2.4. Stress and topic-focus articulation

On the basis of Chung and Kenstowicz's (1997) findings in their acoustic experiments including the measurements of fundamental frequencies and pitch accent of topic-focus expressions in Seoul Korean, I set up four types of Korean stress (Chang 2002).

##### (14) Stress patterns and TFA

	STRESS	F0(HZ)	TFA TYPE	SHORTHAND
a.	0		zero topic	t0
b.	1	286	thematic topic	t
c.	2	327	narrow focus	f
d.	3	347	contrastive topic/focus	tc/fc

In terms of the fundamental frequencies (F0), contrastive focus is higher than narrow focus, so two focus levels are made distinct to each other. The speaker's contrastive response to the hearer's *inactivated* knowledge base at the time of his inquiry is assumed to be focal; his contrastive response to the hearer's *activated* knowledge base is topical (C. Lee 1999, Chang 2002).

In the exchange (15), Q may be interpreted as three distinct echo Qs, as illustrated in (16).

<sup>3</sup> H. Y. Lee (1997) maps 'nuclear' boundary tones (low-level, low-fall, mid-level, etc.) to the speaker's attitude ('business-like', 'kindly', 'joyous', etc.). Chung (2002), based on her experiment with four subjects on Seoul Korean, claims whQ is marked with a rising boundary tone (LH%); it is treated here as falling or HL%.

(15) a. A: Mia-ka wa.ss.e. (=2a, 4a)

‘Mia came. / Mia is here.’

b. Q: Mia-ka wa.ss.ta.ko ?

come.PST.DEC.QM

‘Mia come? / Mia is here?’

(16) A: Mia-ka wa.ss.e. ↘

2 2  
f f

a. Q1: Mia-ka wa.ss.ta.ko ? ↗ echoQ ‘Did you say Mia came?’

2 2  
f f

b. Q2: **Mia-ka** wa.ss.ta.ko ? ↗↗ incr-echoQ ‘Did you say it’s **Mia** who came? Surprising!’

3 2  
fc f

c. Q3: Mia-ka **wa.ss.ta.ko** ? ↗↗ incr-echoQ ‘Did you say she (Mia) is here? Surprising!’

2 3  
f fc

### 3. Prosody-pragmatics interface in CUG

CUG,<sup>4</sup> which has been in growth since mid 90’s, has prosody and pragmatics as integral components of the grammar. It is eclectic and adaptive to many linguistic resources, especially to HPSG. (Head-driven Phrase Structure Grammar). After an overview of its major feature types, presentation will focus on the feature structures of PROSODY (PROS) and PRAGMATICS (PRA) in consonance with the description in section 2.

#### 3.1. Feature structures of PROS and PRA

(17) FS of PROSODY

[PROS [TC *list(tc)* % *tc: fall, level, rise, hi-rise, nil*  
STR *list(str)* ] ] % *str: 0, 1, 2, 3, nil*

The value of TC is assigned only to an IP boundary tone.

(18) FS of PRAGMATICS

PRA [ SA [ C-INDS [ SP *ref* % C-INDS = contextual indices SP = speaker  
HR *ref* % HR = hearer  
UT *ref* ] % UT = utterance time  
TAM *list(tam-rel)* % TAM = time-aspect-mode  
IA *list(ia-rel)* % IA = illocutionary act  
DL *list(dl-rel)* ] % DL = discourse level

<sup>4</sup> CUG/K has been growing since the mid-90s (Chang 1993, 1999, 2001, 2005; Chang and Choe 1994).

DF [ TFA [ TOP <i>list(expression)</i>	% DF = discourse function
FOC <i>list(expression)</i> ]	% TOP = topic FOC = focus
CTR <i>list(ref)</i>	% CTR = center <i>ref</i> = <i>referent</i>
POV <i>ref</i> ]	% POV = point of view
BKG [ PRSP <i>set(sofar)</i>	% BKG = background PRSP = presupposition
IMPL <i>set(sofar)</i> ]]	% IMPL = implicature <i>sofar</i> = <i>state of affairs</i>

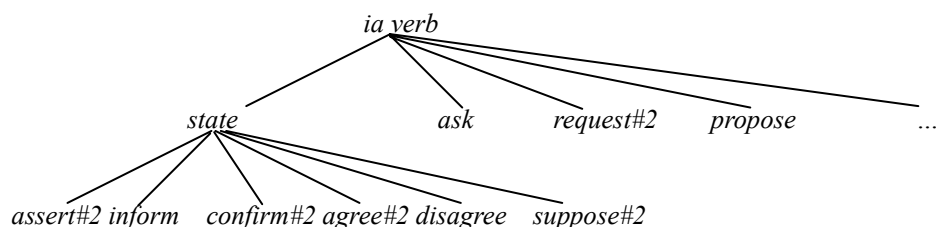
The feature structure of PRA has three attributes: SA, DF and BKG. The feature structure of SA has four: C-INDS, TAM, IA and DL. C-INDS consists of indexical coordinates, including speaker (SP), hearer (HR) and spatiotemporal indices like UT (utterance time). TAM consists of attributes TEM, ASP and MDL and their values are temporal, aspectual and modal relations. Partial subtypes of TAM values are given in (19).

(19) Partitions of *tam-relation* (partial)

- a. Partition of *temporal relation*: *precede, overlap, ...*
- b. Partition of *aspectual relation*: *ongoing, complete, resultant, ...*
- c. Partition of *modal relation*: *intend, predict, recall, cognize, surprise*,<sup>5</sup> ...

The value of the feature IA is *illocutionary-act verb*, which is subtyped as in (20).

(20) Type hierarchy of illocutionary-act verbs (partial)



DL is linked with sentence levels in syntax and honorific expressions encoded with the honorific verbal suffix *-hon*: e.g., [SL: *plain-level* ] ↔ [ DL [RELN *plain*] ]; [ FORM *hon* ] ↔ [ DL [ RELN *honor*] ]. DL is captured as *dl-relation* and partitioned as in (21).

(21) Partition of *dl relation*: *plain, polite, intimate, deferential, familiar, blunt, honor*.

### 3.2. Form-meaning interactions

<sup>5</sup> Note that *surprise* in the modal relation has a synonym set {*affect, impress, move#9, strike#3*} as an immediate hypernym type (i.e., supertype) in WordNet. *Affect* may as well be given as default value for *incr-echoQ*.

### 3.2.1. Interaction of SYN and PRA

Sentence type *declarative* and sentence level *plain*, which are realized as [FORM *pl.dec*] in SYN, are constrained on the illocutionary act of *assert-relation* and the discourse level of *plain-relation* in PRA. See AVM (22). Note that *assert-relation* is defeasible and, as such, it is marked with a slashed (/) default value.

(22) [ SYN [ HEAD *verb*[ FORM *pl.dec*] ]  
PRA [ SA [ IA < [ RELN / *assert* ] >  
DL < [ RELN *plain* ] > ] ] ]

### 3.2.2. Interaction of PROS, SEM, and PRA

The prosodical feature [PROS [TC *fall*]] is added to (22) as a partial and informal feature structure of the echo question (4B).

(23) (=4B) Mia.ka wa.ss.ta.ko ↗  
[ PROS [ TC *rise*  
SEM [ INDEX *s<sub>I</sub>*  
RESTR < [ come(*t<sub>I</sub>, x<sub>I</sub>, s<sub>I</sub>) ] > ]  
PRA [ SA [ IA < [ RELN *ask(t<sub>2</sub>, a, b, say(t<sub>3</sub>, b, a, s<sub>I</sub>) ) ] > ] ] ] ]**

### 3.2.3. Interaction: TFA and STRESS

TFA, consisting of TOP and FOC, has structural correlates with four types of stress (0, 1, 2, 3), as indicated in (24). The value of TOP or FOC is assumed to be an expression itself.

(24) TFA-Stress Interface

a. zero topic (t0):

[1] [ STR < 0 >  
TFA [ TOP [1] ] ]

b. thematic topic (t):

[1] [ STR < 1 >  
TFA [ TOP [1] ] ]

c. narrow focus (f):

[1] [ STR < 2 >  
TFA [ FOC [1] ] ]

d. contrastive focus (fc):

[1] [ STR < 3 >  
TFA [ FOC [1] ] ]

e. contrastive topic (tc):



[1] [ STR < 3 >  
TFA [TOC [1]] ]

### 3.2.4. Principles and conventions

CUG has a handful of grammar-internal principles and conventions for building up constructions from a lexical to a phrasal and eventually to a sentential expression; most of them come from HPSG. (25) is the principle of ordering formulated in constructional terms (Sag et al. 2003:480); according to this word-order principle, in a *head-specifier construction* the head daughter (e.g., verbal predicate) comes last in the DTRS list; by contrast, in a *head-marker construction* the marker daughter (e.g., quotative *ko* or the tag *an.ha* ‘isn’t it?’) comes last.

(25) Principle of Order

cx: [ MOTHER [PHON [A1] ⊕ ... ⊕ [An] ]  
DTRS < [PHON [A1]], ..., [PHON [An] ] > ]

(26) and (27) are the conventions for sequencing stress values and composing TFA values, respectively. Note that the value of MOTHER’s feature (STR or TFA) is the union of the values of DTRS’ feature (STR or TFA).<sup>6</sup>

(26) Stress Lineup Convention

cx: [ MOTHER [STR [1] ⊕ ... ⊕ [n] ] % ⊕ = append  
DTRS < [STR [1]], ..., [STR [n] ] > ]

(27) TFA Compositionality Convention

cx: [ MOTHER [TFA [ [1] ⊕ ... ⊕ [n] ] ]  
DTRS < [TFA [1] ], ..., [TFA [n] ] > ]

## 4. Illustrations

Echo question (4B) and tag question (7), repeated below as (28) and (29) respectively are treated as head-marker constructions. Their simplified tree structures and a detailed AVM analysis for (28) are given in Appendix. A short dialogue exchange is given in (30) with its skeletal feature structure in (31).

<sup>6</sup> Similarly, semantic content, i.e. the value of SEM|RESTR is collected from daughters’ SEM|RESTR values: Semantic Compositionality Principle (cf. Sag et al. 2003)

cx: [ MOTHER [ SEM [ RESTR [1] ⊕ ... ⊕ [n] ] ]  
DTRS < [ SEM [RESTR [1] ] ], ..., [ SEM [RESTR [n] ] ] > ]

Note that in CUG/K, SEM is delimited to propositions; it is a ‘flat’ semantics along the line of MRS (Minimal Recursion Semantics) (Copestake et al. 1999).

(28) (=4B) Mia.ka wa.ss.ta. ko? ↗ (echoQ) ‘Did you say **Mia** came ↗?’  
 HEAD MARKER

(29) (=7) Mia.ka wa.ss.ci an.ha ↘ (conf-tagQ) ‘Mia came, didn’t she ↘’

(30) Dialog exchange

Q1: Nwu.ka sam Kim.ul coh.aha.y? ‘Who likes three Kims?’  
 who three OM like.do.IMT?

A1: Mia-ka DJ-lul coha.ha.y. Yuna-to. JP-nun ta silhe.ha.y. ‘Mia likes DJ. Yuna, too.’  
 SM OM like.do.IMT too TM all dislike.do.IMT JP everybody dislikes.’

Q2: JP-nun ta silhe.hanta.ko? ‘Everybody dislikes JP--Did you say?’  
 TM all dislike.do.PL/DEC.COMP

A2: Ung, ta silhe.han.ta.ko. ‘Yeah, everybody dislikes him, I said.’  
 yes all dislike.do.PL/DEC.COMP

(31) AVM (simplified)

Q1: Nwu.ka sam Kim.ul coh.aha.y? ↗ ‘Who likes three Kims?’  
 [ TC rise  
 STR < 3 , 1 , 1 >  
 PHON < nwuka<sub>[1]</sub>, sam kimul<sub>[2]</sub>, coha.hani<sub>[3]</sub>>  
 TFA [ TOP < [2], [3] >  
 FOC < [1] > ]

A1: a. Mia-ka DJ-lul cohahay. ↘ ‘Mia likes DJ.’  
 [ TC fall  
 FOC < [1] > ]

b. Yuna-to ↘ ‘Yuna, too.’  
 [ TC fall  
 STR < 2 . 0 , 0 >  
 PHON < yuna.to<sub>[1]</sub>>  
 GAP < [2], [3] >  
 TFA [ TOP < 0 , 0 >  
 FOC < [1] > ]

c. JP-nun ta silhe.hyay. ↘ ‘JP everybody dislikes.’  
 [ TC fall  
 STR < 2 , 2 , 2 >  
 PHON < JP-nun<sub>[1]</sub>, ta<sub>[2]</sub>, silhe.hyay<sub>[3]</sub>>  
 TFA [ FOC < [1], [2], [3] > ]

Q2: JP-nun ta silhe.hanta.ko? ‘JP everybody dislikes--did you say?’  
 [ TC rise  
 STR < 1 , 1 , 1 >  
 PHON < JP-nun<sub>[1]</sub>, ta<sub>[2]</sub>, silhe.hanta.ko<sub>[3]</sub>>  
 TFA [ TOP < >  
 FOC < [1], [2], [3] > ]

A2: Ung, ta silhehantako. ↘ ‘Yeah, everybody dislikes him, I said.’  
 [ TC fall STR < 2 , 0 , 1 , 1 >

PHON < ung<sub>[1]</sub>, ta<sub>[3]</sub>, silhehantako<sub>[4]</sub> >.  
GAP < [2] >  
TFA [TOP < [2], [3], [4] >  
FOC < [1] > ]]

#### 4. Concluding remarks

Being fuzzy areas in general linguistics, both prosody and pragmatics have been neglected in the main stream of grammar. In CUG, however, they are properly treated as mutually interacting components of language and information. Hopefully, this work has shown with some degree of success how they are systematically constrained by various principles and conventions laid out in the grammar. It is a desideratum, however, that more detailed work be carried in the future especially for the prosodic linking of ontologically more relevant modal relations that represent the finer-grained cognitive mindset of the speaker with properly subtyped terminal contours as well as well-defined and prosodically distinctive boundary tones.

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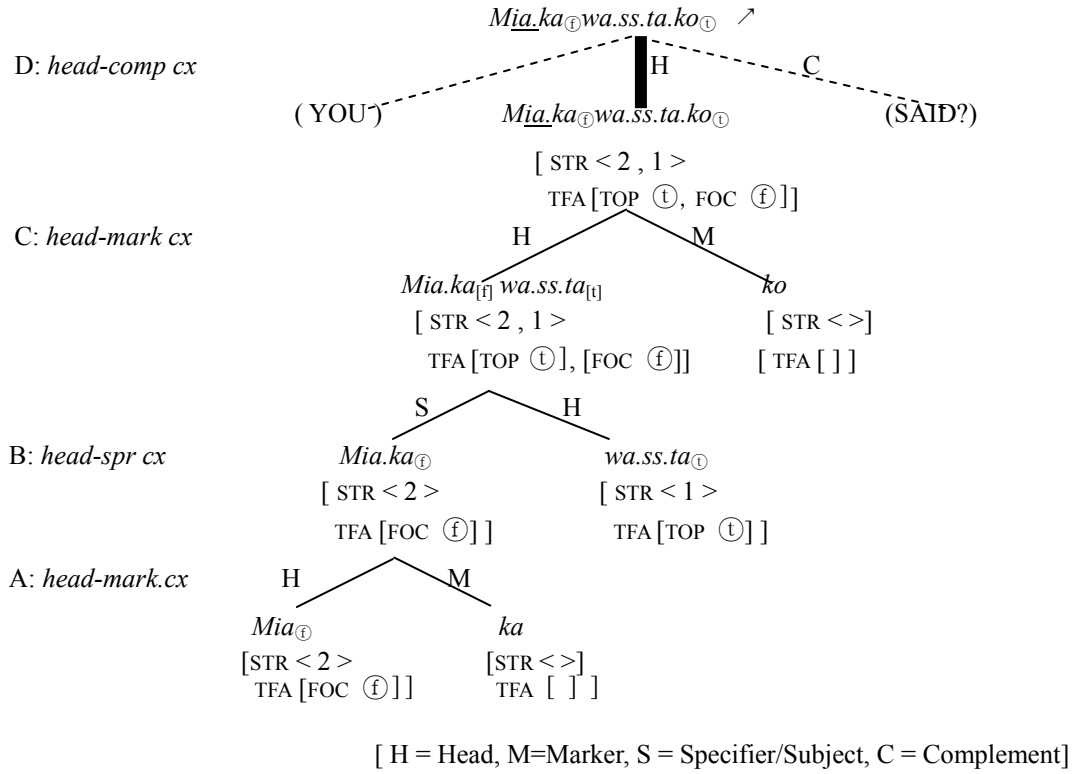
#### References

- Austin, J. L. 1962. *How to Do Things with Words*. Oxford: Oxford University Press.
- Bach, K. and R. M. Harnish. 1979. *Linguistic Communication and Speech Acts*. Cambridge, MA: MIT Press.
- Bolinger, D. L. 1957. *Interrogative Structures of American English*. Alabama: University of Alabama Press.
- Chafe, W. 1976. Givenness, Contrastiveness, Definiteness, Subjects, Topics, and Point of View, C. N. Li, ed. *Subject and Topic*, New York: Academic Press, pp. 25-55.
- Chang, S.-J. 1973. *A Generative Study of Discourse: Pragmatic Aspects of Korean with Reference to English*. *Language Research* 9, Supplement.
- Chang, S.-J. 1985. Tag Questions in Korean. *Festschrift for Professor Kim Hyung-Ki*, Taejon, pp. 607-621.
- Chang, S.-J. 1993. *Information-based Korean Grammar* [in Korean]. Seoul: Hanshin
- Chang, S.-J. 2001. Information Unpacking: a Constraint-based Grammar Approach to Topic-Focus Articulation, *Japanese-Korean Linguistics Conference* 10. Stanford: CSLI Publications, pp. 141-155
- Chang, S.-J. 2005. Retrospective Mood in Korean: a Cconstraint-based Approach, S. S.

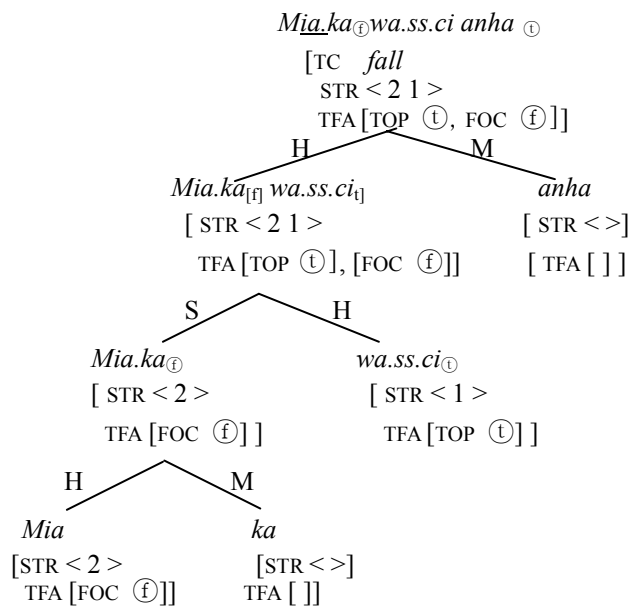
- Mufwene, E. J. Francis and R. S. Wheeler, eds. *Polymorphous Linguistics: Jim McCawley's Legacy*. Cambridge, MA: MIT Press, pp. 293-326.
- Chang, S.-J. and J.-W. Choe. 1993. Toward Understanding Discourse Structure: Flow of Contextual Information in Spoken Korean, C. Lee and B. Kang, eds. *Language, Information and Computation*. Seoul: Taehaksa, pp. 1-13.
- Chung, M. S. 2002. An Experimental Study of Sentence-final Intonation of Two Kinds of Questions, *Proceedings of the 17th Korean Linguistics Meeting*, pp. 33-42.
- Chung, S.-J. and M. Kenstowicz. 1997. Focus Expression in Seoul Korean, *Harvard Studies in Korean Linguistics* 7, pp. 93-120
- Copestake, A., D. Flickinger, I. A. Sag, and C. Pollard. 1999. Minimal Recursion Semantics: an Introduction. ms, CSLI, Stanford.
- Ginsburg, J. and I. A. Sag. 2000. *Interrogative Investigations: the Form, Meaning, and Use of English Interrogatives*. Stanford, CA: CSLI Publications.
- Hajičová, E., P. Sgall and H. Skoumalova. 1995. An Automatic Procedure for Topic-Focus Identification, *Computational Linguistics* 21.1, pp. 81-94.
- Jespersen, O. 1924. *The Philosophy of Grammar*. London: Allen and Unwin.
- Jun, S.-A. 2000. K-ToBI (Korean ToBI) Labelling Conventions, *Speech Sciences* 7, pp.143-169
- Jun, S.-A and M. Oh. 1996. A Prosodic Analysis of Three Types of Wh-Phrases in Korean, *Language and Speech* 39.1, pp. 37-61.
- Kim, J.-B. 2004. *Korean Phrase Structure Grammar* [in Korean]. Seoul: Hankuk Munhwasa.
- Lee, C. 1999. Contrastive Topic: How It Is Topical and How It Is Focal,' ms. Seoul National University/UCLA.
- Lee, H. Y. 1997. *Korean Prosody* [in Korean]. Seoul: Hankuk Yenuwon.
- Lee, H.-J and H. Kim. 1997. Phonetic Realization of Seoul Korean Accentual Phrase, *Harvard Studies in Korean Linguistics* 7, pp.153-166.
- Leech, G. N. 1983. *Pragmatics*. London: Longman.
- Pollard, C. and I. A. Sag. 1994. *Head-driven Phrase Structure Grammar*. Stanford: CSLI, Stanford University.
- Sadock, J. 1970. WH Imperatives, Sadock and L. Vanek, eds. *Studies Presented to Robert B. Lees by His Students*. Edmonton, Alberta: Linguistic Research.
- Sag, I. A., T. A. Wasow and E. Bender. 2003. *Syntactic Theory: A Formal Introduction* (Second Edition). Stanford, CA: CSLI Publications.
- Searle, J. A. 1969. *Speech Acts: an Essay in the Philosophy of Language*. Cambridge: Cambridge University Press.
- Vallduví, E. and E. Engdahl. 1995. Information Packaging and Grammar Architecture, *NELS* 15, pp. 519-533.

Appendix 1

(28=4B) Mia-ka wa.ss.ta-ko ↗ (echoQ) ‘Did you say MIA came?’  
 - Tree Structure (simplified)



(29=7) Mia-ka wa.ss.ci an.h.a ↘ (tagQ) ‘Mia came, didn’t she ↘



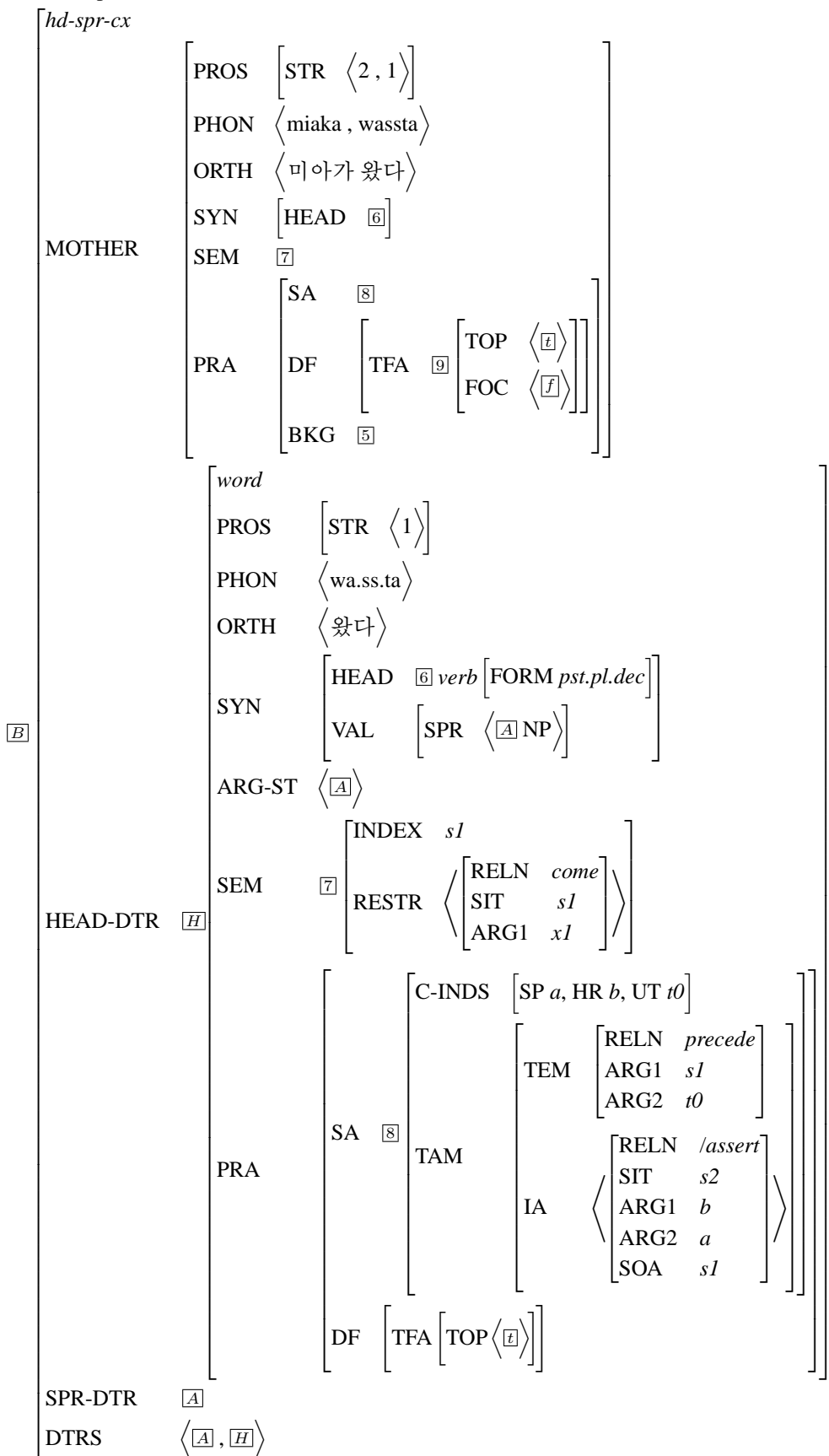
## Appendix 2

(28) *Mia-ka wassta-ko?*

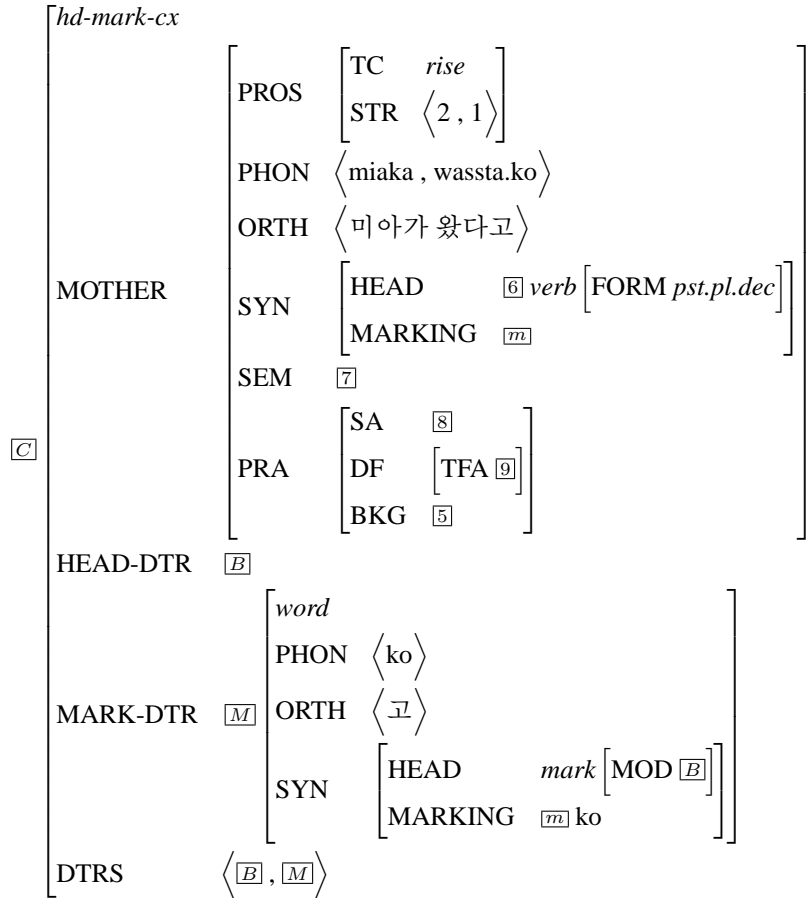
A: Head-marker Construction: *Mia-ka*

$\left[ \begin{array}{l} \text{MOTHER} \\ \text{HD-DTR} \\ \text{MARK-DTR} \\ \text{DTRS} \end{array} \right.$	$\left[ \begin{array}{l} \text{PROS} \left[ \text{STR} \langle 2 \rangle \right] \\ \text{PHON} \langle \text{mia, ka} \rangle \\ \text{ORTH} \langle \text{미아, 가} \rangle \\ \text{SYN} \left[ \begin{array}{l} \text{HEAD} \quad [1] \\ \text{MARKING} [2] \end{array} \right] \\ \text{SEM} [3] \\ \text{PRA} \left[ \text{DF} \left[ \text{TFA} [4] \right] \right] \end{array} \right.$
$\left[ \begin{array}{l} \text{HD-DTR} \\ \text{MARK-DTR} \end{array} \right.$	$\left[ \begin{array}{l} \text{PROS} \left[ \text{STR} \langle 2 \rangle \right] \\ \text{PHON} \langle \text{mia} [f] \rangle \\ \text{ORTH} \langle \text{미아} \rangle \\ \text{SYN} \left[ \text{HEAD} [1] \text{noun} \right] \\ \text{SEM} [3] \left[ \text{INDEX } x1 \right] \\ \text{PRA} \left[ \begin{array}{l} \text{DF} \left[ \text{TFA} [4] \left[ \text{FOC} [f] \right] \right] \\ \text{BKG} [5] \left\{ \begin{array}{l} \text{RELN } \textit{named} \\ \text{ARG1 } x1 \\ \text{ARG2 } \textit{mia} \end{array} \right\} \end{array} \right] \end{array} \right.$
$\left[ \begin{array}{l} \text{MARK-DTR} \\ \text{DTRS} \end{array} \right.$	$\left[ \begin{array}{l} \text{PHON} \langle \textit{ka} \rangle \\ \text{ORTH} \langle \textit{가} \rangle \\ \text{SYN} \left[ \begin{array}{l} \text{HEAD } \textit{mark} \left[ \text{MOD} [h] \right] \\ \text{MARKING} [2] \textit{ka} \end{array} \right] \end{array} \right.$
$\left[ \begin{array}{l} \text{DTRS} \end{array} \right.$	$\langle [h], [m] \rangle$

B: Head-specifier Construction: *Mia-ka wassta*



C: Head-marker Construction: *Mia-ka wassta-ko?*





D: Head-comp construction: (ney-ka) Mia-ka wassta-ko (malhaysnyya)?

