

Focus often changes pitch accent distribution and forces to delete pitch accents on the post-focal elements: in the given example (2B), ‘books’ and ‘Mary’, which were supposed to bear pitch accents.

Similarly to deaccenting, languages can show rephrasing patterns when focus is introduced in a sentence. Korean is one of the examples and shows a dephrasing pattern. In Korean, focus is prosodically interpreted by deletion of phrase boundaries following a focused item. An example is provided in (4B), whose phonological phrasing differs from the neutral phrasing in (3).

- (3) (Mina-ga)_{PPh} (Ben-ul)_{PPh} (teoa-he)_{PPh} (Neutral reading)
 Mina-NOM Ben-ACC like-DEC ‘Mina likes Ben’
- (4) A: Nuga Ben-ul teoahani? ‘Who likes Ben?’ (Focus reading)
 B: (**Mina**-ga Ben-ul teoahe)_{PPh} ‘Mina likes Ben’ (Dephrasing)

When focus falls on the subject in (4), the given sentence surfaces with one phonological phrase, which is supposed to form three phonological phrases in the neutral reading in (3). No other identical level of phonological phrases (i.e., PPh) is allowed after the focused element, here the subject, which forms a separate phrase in (3).¹

Focus-driven restructuring phenomena have well been documented in the work of Pierrehumbert (1980), Pierrehumbert & Beckman (1986) and Ladd (1996) for English, and Jun (1993) for Korean. Recent analyses of general focus effects are also found in Truckenbrodt (1995, 1999), Selkirk (2000), Büring (2001), and Féry and Samek-Lodovici (2004) within Optimality Theory (Prince and Smolensky 1993, McCarthy and Prince 1993). The OT framework, in particular, allows us to look at constraint interaction of relevant constraints that may come from different levels of grammar, that is, phonology, syntax/semantics. In this respect, focus restructuring output in evaluation can be achieved by ranked and violable constraints that are basically independent grammatical requirements. Different effects of focus across languages can be understood as a result from the interaction of focus with other grammatically-driven constraints.

The two seemingly incomparable phenomena, deaccenting and dephrasing, are discussed in this paper and will be accounted for by focus-driven prominence preservation strategies activated in the phonology of English and Korean. The main proposal of this paper is that the two types of restructuring patterns, although different in terms of accent-sensitive or phrase-sensitive in deletion, are both motivated by high-ranked EDGEST constraints (LEFTMOST/RIGHTMOST) of focus prominence. In other words, when focus is assigned to a non-final element, prosodic restructuring is necessary to satisfy

¹ An exceptional case may occur in a hyper-correction style, where a focused item can form a phrase on its own. In this case, a bigger prosodic boundary, such as Intonational Phrase (IP), has to follow the focused including element. This is considered as a variant in focus phrasing and will be discussed in later section.

a prominence-edgemoost requirement of focus. The new analyses provided in this paper not only account for the restructuring patterns with possible variation found in English and Korean, but it reveals a similarity between the two languages in terms of focus prominence location instead of a parametric difference implied in the previous studies (Truckenbrodt 1995, 1999, Selkirk 2000).

This paper is organized as follows. Section 2 gives a brief introduction to focus-related prosodic restructuring patterns in English and Korean. Section 3 discusses problems found in previous analyses: 1) English focus phrasing variation cannot be accounted for by the grammar proposed in Selkirk (2000) without an input speculation treatment. 2) Align_L -Focus constraint, proposed in Truckenbrodt (1995, 1999), fail to account for Korean focus phrasing. Section 4 revises possible focus requirements that motivate the restructuring patterns in English and Korean, and the new requirements will be formulated into LEFTMOST/RIGHTMOST constraints based on a focus-prosody interaction. We will see that the revised constraints correctly account for the focus variation in English as well as Korean dephrasing without further speculations. Typological predictions by LEFTMOST/RIGHTMOST constraints and the preference of rightmost location of focus prominence are discussed in section 4.3. Section 5 summarizes the discussions and concludes the proposal of this paper.

2. Prosodic restructuring patterns motivated by focus

Prosodically acceptable speech must contain accents on appropriate words for speakers to preserve the Cooperative Principle in communication as described in Grice (1989). It says “Make your contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged (Grice 1989: 26).” Prosodic appropriateness is also important in our interpretation of utterances when focus is involved. When focus is broad in English, 'normal stress' rule predicts pitch accent placement as shown in example (5), where the pitch accents fall on the main verb and the nouns inside the focused domain (the whole sentence).

- (5) A: What happened?
 B: She **borrowed** some **books** from **Mary**. (Broad focus)

In contrast, 'narrow focus,' which is sometimes comparable to 'contrastive focus,' requires accents only on the focused words as in (6) and (7). Narrow focus usually contrasts one or more items within the sentence as in (6), or a single word as in (7):²

² For the purpose of focus description, we will use the terms, 'broad focus' vs. 'narrow focus,' as described in Ladd (1980). 'Broad focus' refers to focusing on whole constituents, not just on individual words.

- (6) A: Did Sue borrowed some books from John?
 B: No, she borrowed some books from **Mary**, not from **John**. (Narrow)
- (7) A: Did Sue buy some books from Mary?
 B: No, she **borrowed** some books from Mary. (Narrow)

The pitch accent distributions in (5B) and (7B) are illustrated in (8a) and (8b), following the notations proposed by Pierrehumbert (1980): T*, T⁻ and T% represent pitch accents, intermediate phrase (ip) boundary tones, and Intonational phrase (IP) boundary tones (T = High/Low), respectively. Both (8a) and (8b) are possible in broad focus on the verb phrase, but only (8b) is acceptable for a narrow focus reading.³

- (8) a. [[She borrowed some books]_{ip} [from Mary]_{ip}]_{IP}
 H* H* H⁻ H* L⁻ L%
 b. [[She borrowed some books from Mary]_{ip}]_{IP}
 H* L- L%

The phrasing patterns and the pitch accent distributions in (8) differ in that (8a) accents every newly introduced element with H* pitch accents while (8b) accents only the verb ('borrowed'), eliminating post focal accents. In terms of phrasing, (8a) can consist of two intermediate phrases, while (8b) shows only one intermediate phrase.⁴

2.1 Deaccenting in English

The term 'deaccenting' was first explicitly adopted in Ladd (1980), where he used it to refer to the phenomenon, in which a word that we might expect to be accented fails to be accented in a certain context. Examples for contextual deaccenting (Ladd 1966: 175) are shown in (9i) and (9ii), and focus related deaccenting in (9iii). In (9i-ii), the underlined words 'German' and 'whisky' are deaccented because those words are given information from the given context. A second type of deaccenting involves focus, and an example is provided in (9iii).

³ The implicational meaning may differ slightly depending on focus types but we will not discuss further in this paper. We will mention types of focus only when it is crucial in determining phrasing patterns.

⁴ In the given example per se, one ip formation may be preferred since the sentence is relatively short. However, two ips would also be acceptable for the given sentence structure as a variant (e.g., when a speech rate is slow or when the following prepositional phrase is relatively long). Consider the following example: [[She borrowed some books]_{ip} [from a stranger she just met on the street]_{ip}]_{IP}.

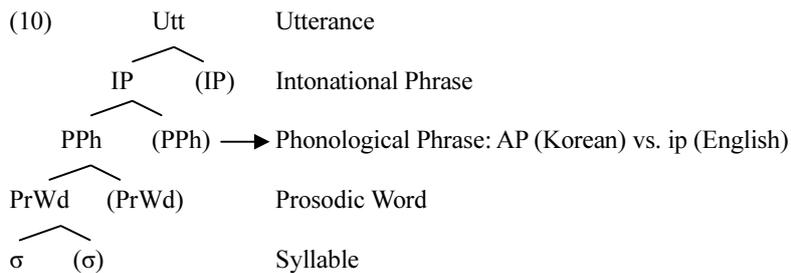
- (9) i. A: I found an article for you in a German journal.
 B: I don't **read_F** German.
 ii. I brought her a bottle of whisky, but it turns out she doesn't **like** whisky.
 iii. She **loaned_F** her rollerblades to Robin. (Selkirk 2000: 251)

In this paper, we will discuss focus and deaccenting of the second type (9iii), where pitch accents are deleted after focus. The example (9iii) is one of the two possible focus phrasing patterns, where focus on the verb 'loan' deletes the post focal accents on "rollerblades" and "Robin." In this case, there is one phonological phrase that includes both the focused element and the following elements. The second variant involves a boundary insertion without deleting the post-focal pitch accents. These two variants, analyzed in Selkirk (2000), will be reviewed in Section 3.

2.2 Dephrasing in Korean

In Korean, one of the effects of focus on prosody is the change in phrasing, which is interpreted as a restructuring pattern of Accentual Phrases (AP). Jun (1993) describes the phenomenon as follows: "the effect of focus is to dephrase all following words within the same Intonational Phrase (IP) unless one of those following words itself is focused (Jun 1993: 185)." The prosodic system of Korean is different from that of English in that it uses a tonal pattern of 'L(or H)(HL)H' as a marker of phrasing.

The prosodic hierarchy that is relevant to sentence intonation is shown in (10), where Accentual Phrase in Korean is equivalent to the phonological phrase defined in the Prosodic Hierarchy (Selkirk 1984). This paper follows Jun's (1993) analysis of Korean intonational structure, where the Accentual Phrase (henceforth AP) is taken to be equivalent to the Phonological Phrase in the prosodic hierarchy in Selkirk (1984).



When focus is involved in Korean, dephrasing occurs. This means that some APs predicted in neutral readings fail to appear on the surface form of an utterance. Compare the phrasing pattern in (11a), which shows a focus phrasing with dephrasing, to the phrasing in (11b) which is acceptable only in a non-focus reading. The sentence in (11) includes focus on the object. We can determine the surface AP phrasing for the verb phrase (VP) by means of the presence (11a) and absence (11b) of /l/ flapping of the coda in the accusative marker (/l/→[ɾ]). We also know that the first two APs are separate because there is no lenis stop voicing on the initial segment of the noun phrase (/pullans_Λ-l-ruɯl/) in both (11a) and (11b).

- (11) [[mij_Λŋ-ika]_{NP} [[pullans_Λ-l-ruɯl]_{NP-Foc} [al-ajo]_{VP}]_s
 'Miyoung'-_{NOM} 'French language'-_{ACC} 'know'-_{DEC}
 'Miyoung knows French language'
 a. [(mi.j_Λŋ.i.ga)_{AP} (pul.lan.sa.Λ.ru.ɾa.ra.jo)_{AP}]_{IP}
 (L H L H) L H L(H)⁵HL%
 b. *[(mi.j_Λŋ.i.ga)_{AP} (pul.lan.sa.Λ.ruɯl)_{AP} (a.ra.jo)_{AP}]_{IP}
 [(L H L H) (L H L H) (LL(H))HL%
 ※Note: the asterisk here represents that the sentence is “prosodically ungrammatical.”

The phrasing in (11b) is acceptable in a neutral reading or with focus on the verb [**arajo**], but unacceptable for the relevant focus reading as marked in (11). The phrasing in (11a) is the possible phrasing of focus for the given context.⁶

The following section will review previous analyses of English focus phrasing and then construct a possible grammar for Korean focus phrasing.

3. OT analyses of focus related phrasing

Focus related phrasing phenomena have been analyzed in the OT framework as in Truckenbrodt (1995, 1999), Selkirk (2000), Büring (2001), and Féry and Samek-Lodovici (2004). All of these studies treat focus effects in terms of constraints regulated by phonological or syntactic grammar of a language. Truckenbrodt (1995), in particular, gave the insight of focus restructuring patterns among languages, providing typological predictions in terms of focus effects. Selkirk (2000) analyzed English focus phrasing based on Truckenbrodt's (1995, 1999) proposal. This section will begin with the review of Truckenbrodt's (1995) as background of the general analysis of focus and then discuss Selkirk's (2000) analysis for English focus phrasing to

⁵ The final H tone in AP in IP final position can be overridden by boundary tone.

⁶ In Korean, the main cue for focus is dephrasing, while in English focus is expressed by enhancing pitch prominence followed by post focal deaccenting. Furthermore, dephrasing without pitch excursion can properly mark focus in Korean while pitch highlighting alone, e.g., making the second H tone of 'LHLH' more prominent without dephrasing, cannot be interpreted as a focus reading.

highlight potential problems in extending her approach to Korean focus phrasing. We will see that the Alignment Focus constraint itself can account for neither the phrasing variation found in English nor the dephrasing pattern in Korean.

3.1 Truckenbrodt's (1995) analysis of focus phrasing

Truckenbrodt (1995) investigated how focus phrasing is relevant to different sub-grammars such as syntax and prosodic structure, and accounted for restructuring patterns driven by focus in terms of constraint interaction. He dealt with 1) the relation between syntactic phrases and phonological phrases, 2) the relation between phonological phrases and edgemoost prominence, and 3) relation between syntactic phrases and phrasal prominence. These relations are captured by Wrap-XP, Alignment constraints in terms of head prominence, and its Right/Left parameters in the directionality of alignment, each of which will be defined below.

Prosodic restructuring under focus may take a change in phrasing and/or accent distribution. These restructuring patterns can be formalized as deletion of accents/boundaries or insertion of a boundary as follows:

- (12) a. Deletion of boundaries by focus: dephrasing.
 b. Deletion of accents by focus: deaccenting.
 c. Insertion of a boundary under focus.

In order to explain the three types of restructuring patterns, Truckenbrodt (1995) formulates the prosodic requirement of focus as a constraint in (13).

- (13) Focus: If F is a focus and DF is the domain of focus, then the highest prominence in DF will be within F . (Truckenbrodt 1995: 11)

In addition, the generalized alignment constraints originally proposed in McCarthy and Prince (1993), are extended in Truckenbrodt (1995) to align prosodic heads within a prosodic domain as given in (14).⁷

- (14) a. Align- φ = Align (φ , edge, H(φ), edge) φ : phonological phrase
 b. Align-I = Align (I, edge, H(I), edge) I: Intonational phrase
 c. Align-U = Align (U, edge, H(U), edge) U: Utterance

The alignment constraints in (14a-c) play a key role in mapping the relation between a phonological phrase and its prosodic head. Based on this

⁷ Generalized Alignment (McCarthy and Prince 1993) - "Where Cat_1 , Cat_2 are prosodic, morphological, or syntactic categories and $Edge_1, Edge_2 \in \{\text{Right}, \text{Left}\}$: ALIGN ($Cat_1, Edge_1; Cat_2, Edge_2$) \Leftrightarrow For each Cat_1 there is a Cat_2 such that $Edge_1$ of Cat_1 and $Edge_2$ of Cat_2 coincide."

formulation, edgemoost prominence within prosodic constituents is implemented in terms of the alignment of a prosodic constituent edge with its head prominence at a given prosodic level ($\phi/I/U$). Each prosodic head, which is marked as $H(\phi/I/U)$, will be evaluated in terms of its edge aligning condition with a phrasal edge. The well-formedness of the Alignment constraints here can be interpreted as ‘Left/Right edge-aligned phrasal stress with a given phrase edge among ϕ , I, and U.’ Given these two types of constraints, Focus and Alignment constraints, Truckenbrodt (1995) gave an analysis of focus restructuring patterns and showed typological predictions.

Let us first look at how deletion of accents/phrase boundaries can be evaluated. Align-U constraint is particularly important in the analysis of Truckenbrodt (1995), which requires head prominence at the level of the utterance to be aligned with the edge of an utterance. Any structure including prosodic boundaries and prominence at any level below the utterance, will incur violations if intervenes between the head prominence and the relevant boundary (by definition: "The right edge of X, Right (X) is defined as all the structure that X dominates, and all the structure that X precedes."). Since violation of alignment is gradient, the optimal candidate is the one whose alignments violate a set of Align constraints the least. This statement predicts that (15b) is preferred over (15a) below: (15a) has more material x' in terms of the structure intervening between the prosodic head x_α and the edge α than (15b) aside from the segment string e through g since these segments cannot be deleted due to a faithfulness condition in lexicon.

| | | | | |
|----------------------------------|----|------------------------|----|----------------------|
| (15) (Truckenbrodt 1995:182,183) | a. | x_α | b. | x_α |
| Prosodic structure: | | $(\dots x' x')_\alpha$ | | $(\dots x))_\alpha$ |
| Segmental level: | | $a b c d e f g$ | | $a b c d e f g$ |

The interaction of focus with Alignment is shown in (16) below, where Focus constraint eliminates candidate (a), which is perfectly right-aligned but violates Focus constraint because the focused element is not associated with the prosodic head at the level of utterance. In (16b), the focused element is most prominent within DF as required by the Focus constraint in (13). This implies that whenever focus is not assigned to the right edge of boundaries, the structure cannot avoid Align-U violations to some extent. The relation found in (16) can be applied to the cases of deletion by focus. Both deletion of accents and deletion of boundaries are attributed to the ranking of Align-U constraint above Align- ϕ and Align-I. This ranking order always chooses the deletion of ϕ or I phrase boundaries as a strategy to improve U boundary alignment with its head when misalignment is involved.

(16) An illustration of interaction of Focus with Align-U constraint

| | Focus | Align-U |
|---|-------|---|
| a. \bar{x} (x) _U [x x x] _I (x)(x)(x) ϕ (x)(x)(x) ρ w word1 word2 word3 [Foc] _{DF} | *! | |
| b. \bar{x} (x) _U [x x x] _I (x)(x)(x) ϕ (x)(x)(x) ρ w word1 word2 word3 [Foc] _{DF} | | x x (x)(x) ϕ (x)(x) ρ w word2 word3 |

The following tableau in (17) shows the relationship between prosodic head alignment and the deletion strategy to improve misaligned structure.

(17) Focus >> Align-U >> Align- ϕ , Align-I

| | Focus | Align-U | Align- ϕ | Align-I |
|---|-------|---|---------------|---|
| (a) \bar{x} (x) _U [x x x] _I (x)(x)(x) ϕ (x)(x)(x) ρ w word1 word2 word3 [Foc] _{DF} | *! | | | |
| (b) \bar{x} (x) _U [x x x] _I (x)(x)(x) ϕ (x)(x)(x) ρ w word1 word2 word3 [Foc] _{DF} | | x x (x)(x) ϕ (x)(x) ρ w w2 w3 | | x x (x)(x) ϕ (x)(x) ρ w w2 w3 |
| (c) \bar{x} (x) _U [x] _I (x) ϕ (x) ρ w word1 word2 word3 [Foc] _{DF} | | w2 w3 | w2 w3 | w2 w3 |

Note that boundary deletion (e.g., ϕ , w) in (c) can be used as a strategy since Align- ϕ and Align-I constraint are lower ranked than Align-U. The relation between Focus and Align-U can be interpreted as follows: first, since focus forces the utterance prosodic head to be aligned with the focused element, Align-U may be violated. As a repair strategy, intervening structures can be reformed at the cost of violations of Align- ϕ and Align-I since they are lower ranked than Align-U. It would be reasonable to consider this situation as a strategic repairing process when there is a conflict among constraints.

Now let us look at the boundary insertion strategy triggered by focus. Truckenbrodt (1995) uses Chichewa language for this analysis.⁸ Phonological phrasing in Chichewa can be identified by lengthening of the penultimate vowel in the phonological phrase, one of the rules sensitive to phonological phrases discussed in Kanerva (1989, 1990). If there is a High tone on the phrase final syllable, it will be retracted to the penultimate syllable. These are shown respectively in (18a) and (18b):

- (18) Lengthening and H tone retraction
 a. (mleendo) ϕ ‘visitor’ b. (mlendouuwu) ϕ ‘this visitor’
-

The underlined syllables in (18) show a lengthening process on the penultimate vowel within a phonological phrase domain. The high tone in (18b) is re-linked to the penultimate vowel which is lengthened as is the case in (18a).

Focus phrasing can also be identified by this lengthening rule and tonal behavior. Boundary insertion under focus can be explained by the interaction of Align-U with other alignment constraints such as Align-I and Align- ϕ . Under the ranking of Align- ϕ above Align-U, both of which are dominated by the Focus constraint, there appears the possibility of misaligning the prominence head with its relevant boundary. When Align- ϕ is higher ranked than the other alignments, deletion of boundaries cannot be employed. Instead, boundary insertion is chosen in order to improve Align- ϕ . This interaction is analogous to what happens in English focus phrasing, as we will see in the analysis of Selkirk (2000).

Let us see how Focus and Align- ϕ constraints interact in order to select a candidate with boundary insertion. In (19), candidate (a) violates the Focus constraint since head prominence is not aligned with the focused element while candidate (b) does not violate the Focus because it aligns the prominence head with the focused item. Candidate (b) violates Align- ϕ due to the segment material x that intervenes between the head and the boundary.

⁸ For Chichewa analysis, see Kanerva (1989, 1990) and Bresnan and Kanerva (1989).

On the other hand, candidates (c) and (d), where boundary insertion saves Align-φ with no violations, are equally good in terms of Align-φ, but (c) is ruled out by the Focus constraint. The difference between (c) and (d) is that the prominence on the focused element in (c) is as prominent as on the unfocused item, and it therefore does not satisfy the requirement that Focus must be most prominent within its domain. Recall that the domain of focus is larger than the two φs in candidate (c). This deficiency of candidate (c) is overcome in (d) by adding a phrasal boundary and its head on the focused element.

(19) Boundary-insertion case with focus (Truckenbrodt 1995:181)

| | Focus | Align(φ,R,X _φ ,R) | Align(I,R,X _I ,R) |
|--|-------|------------------------------|--|
| a. $\begin{matrix} & & x_\phi \\ (x & x & x)\phi \\ [& \text{Foc} &]_{DF} \end{matrix}$ | *! | | |
| b. $\begin{matrix} & & x_\phi \\ (x & x & x)\phi \\ [& \text{Foc} &]_{DF} \end{matrix}$ | | x | |
| c. $\begin{matrix} & & x_\phi & & x_\phi \\ (x & x) & (x) & \phi \\ [& \text{Foc} &]_{DF} \end{matrix}$ | *! | | |
| d. $\begin{matrix} & & x_I \\ (& x_\phi &) & (x_\phi) & I \\ (x & x) & (x) & \phi \\ [& \text{Foc} &]_{DF} \end{matrix}$ | | | $\begin{matrix} (x_\phi) & I \\ (x) & \phi \end{matrix}$ |

In summary, when focus is relevant and Align-U is higher ranked than the other Alignment constraints in a given grammar, deletion of boundaries (or accents) will be predicted as shown in tableau (17). On the other hand, if Align-U is outranked by the other alignment constraints under focus, insertion of a boundary at a relevant prosodic level will improve the higher ranked alignment constraints as shown in tableau (19). This is the way Truckenbrodt (1995) accounts for the interaction between focus prominence and the alignment conditions. For Truckenbrodt (1995) to derive focus restructuring patterns, the location of head prominence plays a crucial role at different prosodic phrase levels.

Next section will introduce the analysis of English focus phrasing in Selkirk (2000) and discuss potential problems to capture focus-driven restructuring patterns in general.

3.2 Selkirk (2000): Focus-driven restructuring in English

English focus intonation analyzed in Selkirk (2000) adopts the proposal by Truckenbrodt (1995, 1999) with the interaction between Focus and

Alignment constraints. The analysis illustrates how focus and prosody interact in order to satisfy focus requirements in English.

In English focus phrasing, there are two types of variants as exemplified in (20). The first pattern (20a) is to form a separate intermediate phrase (ip) right after a focused element, and the second variant (20b) is to form one Major phrase (= intermediate phrase) combining a focused element and the post focal elements.⁹ In the latter phrasing, we always find deaccenting after the focused element.

- (20) [she [[loaned]_{V-Foc} [her rollerblades]_{NP} [to Robin]_{PP}]_{VP}]_S
 a. (she **loaned**)_{MaP} (her rollerblades)_{MaP} (to Robin)_{MaP}
 b. (she **loaned** her rollerblades to Robin)_{MaP} (*Deaccenting*)

In a non-focus phrasing situation, Selkirk (2000) finds that Wrap-XP and Align_R-XP are not ranked with respect to each other. The two constraints are defined in (21) and (22).

(21) Align-L/R-XP: Align (XP, L/R; MaP, L/R): "The left/right edge of any XP in syntactic structure must be aligned with the left/right edge of a MaP in prosodic structure."

(22) Wrap-XP: Wrap (XP; MaP): "The elements of an input morpho-syntactic constituent of type XP must be contained within a prosodic constituent of type MaP in output representation."

We see how these two constraints regulate English phrasing in (23). In a neutral reading, both phrasing patterns (23a-b) are acceptable and the relative ranking of the two constraints cannot be determined.

(23) English normal phrasing example (Selkirk 2000: 247).

| [she [[loaned] _V [her rollerblades] _{NP} [to Robin] _{PP}] _{VP}] _S | WrapXP | Align _R -XP |
|--|--------|------------------------|
| ☞ a. (she loaned her rollerblades to Robin) _{MaP} | | * |
| ☞ b. (she loaned her rollerblades) _{MaP} (to Robin) _{MaP} | * | |

Besides the two constraints, Bin (MaP) constraint, which was introduced in Selkirk (2000), plays a role in English phrasing. Bin (MaP) defined in (24), basically requires a major phrase to be binary having two minor phrases. As we see in (25) below, candidate (c) will be ruled out because it violates the Bin (MaP) constraint critically.

⁹ In Selkirk (2000), Major phrase (MaP) is assumed to be equivalent to intermediate phrase. In terms of Selkirk's (1984) prosodic hierarchy, MaP can also be a phonological phrase. There is no single factor which defines MaP phrasing and there seems to be a debate on an account of English Major/intermediate phrasing as well as Minor phrasing (Selkirk 2000: 15, fn. 13).

(24) Bin (MaP): "A major phrase consists of just two minor phrases."

(25) The role of Bin(MaP) constraint

| [she [[loaned] _V [her rollerblades] _{NP} [to Robin] _{PP}] _{VP}] | WrapXP | Align _R -XP | Bin(MaP) |
|---|--------|------------------------|----------|
| ☞ a. (she loaned her rollerblades to Robin) _{MaP} | | * | * |
| ☞ b. (she loaned her rollerblades) _{MaP} (to Robin) _{MaP} | * | | * |
| c. (she loaned) _{MaP} (her rollerblades) _{MaP} (to Robin) _{MaP} | * | | *!*** |

Let us now examine focus related phrasing. The phrasing with a focused verb is (26c) and three types of unacceptable phrasing are illustrated in (26a, b) and (26d) (examples from Selkirk 2000: 247). The stress mark indicates that pitch accents are preserved on individual words.

- (26)
- | | |
|------|---|
| | [she [[loaned] _{V-Foc} [her rollerblades] _{NP} [to Robin] _{PP}] |
| a. * | (she loaned her róllerblades to Róbin) _{MaP} |
| b. * | (she loaned her róllerblades) _{MaP} (to Róbin) _{MaP} |
| c. | (she loaned) _{MaP} (her róllerblades) _{MaP} (to Róbin) _{MaP} |
| d. * | (she loaned her róllerblades) _{MaP} (to Róbin) _{MaP} |

The prosodic marking of a focused item (Right alignment) has been analyzed as the alignment of prosodic structure with the focus constituent by a number of authors (Pierrehumbert and Beckman 1988, Kanerva 1989, Vogel and Kenesei 1990, Hayes and Lahiri 1991, Jun 1993, Selkirk 2000, among others). This focus alignment constraint is defined in (27):

(27) Align_{L/R}-Focus: Align (Focus, L/R; MaP, L/R)

"Align the left/right edge of a Focus constituent in informational or syntactic structure with the left/right edge of a major phrase (MaP) in the phonological structure." (Selkirk 2000: 238)

In (26c) above, the focused constituent is Right-aligned with MaP, while the other candidates are not. Thus, Align_R-Focus should be ranked higher than the other constraints, Wrap-XP and Align_R-XP. However, as Selkirk (2000) observes, focus phrasing allows a variant as in (28b). The variant in (28b) is accompanied by deletion of accents after the focused item, and it violates Focus Right Alignment.

- (28) [she [[lóaned]_{V-Foc} [her róllerblades]_{NP} [to Róbin]_{PP}]_{VP}]
- | | |
|----|--|
| a. | (she lóaned) _{MaP} (her róllerblades) _{MaP} to Róbin) _{MaP} |
| b. | (she lóaned her rollerblades to Robin) _{MaP} |

In order to explain the variation in (28a, b), Selkirk (2000) introduced MiP (Accent) constraint, as defined in (29). It requires accent preservation within

a Minor phrase.¹⁰

(29) MiP(Accent): "A minor phonological phrase (MiP) contains at least one accent."

In addition to MiP (Accent) constraint, Selkirk's (2000) solution for the observed variation was to assume two different inputs as shown in (30-31). The difference between the two tableaux is in the accent distribution in the inputs, which is represented by an accent mark ('). Note that pitch accents are marked (') in both input and output.

(30) Focus phrasing with full accents as input

| [she [[lóaned] _{V-Foc} [her róllerblades] _{NP} [to Róbin] _{PP}] _{VP}] | MiP (Accent) | Align _R Focus | Wrap XP | Align _R XP | Bin (MaP) |
|---|-----------------|-----------------------------|------------|--------------------------|--------------|
| a. (she lóaned her róllerblades to Róbin) _{MaP} | | *! | | * | * |
| b. (she lóaned her róllerblades) _{MaP} (to Róbin) _{MaP} | | *! | * | | * |
| c. (she lóaned) _{MaP} (her róllerblades) _{MaP} (to Róbin) _{MaP} | | | * | | *** |
| d. (she lóaned) _{MaP} (her róllerblades to Róbin) _{MaP} | | | * | *! | * |

(31) Focus phrasing with partial accents (on the verb) as input

| [she [[lóaned] _{V-Foc} [her rollerblades] _{NP} [to Robin] _{PP}] _{VP}] | MiP (Accent) | Align _R Focus | Wrap XP | Align _R XP | Bin (MaP) |
|---|-----------------|-----------------------------|------------|--------------------------|--------------|
| a. (she lóaned her rollerblades to Robin) _{MaP} | | *! | | * | * |
| b. (she lóaned her rollerblades) _{MaP} (to Robin) _{MaP} | *! | * | * | | * |
| c. (she lóaned) _{MaP} (her rollerblades) _{MaP} (to Robin) _{MaP} | ***! | | * | | *** |
| d. (she lóaned) _{MaP} (her rollerblades to Robin) _{MaP} | *! | | * | * | * |

In (30), the Align_R-Focus constraint chooses (c) as the optimal phrasing since the candidate (d) violates both Wrap-XP and Align_R-XP. In (31), on the other hand, the MiP (Accent) constraint selects (a) as the optimal phrasing, where the focus phrasing (31a) violates Focus Alignment to satisfy MiP (accent), which was not active in (30).

The analysis so far seems to account for the variation in the focus phrasing of English with the input specification (having two different inputs for two variants). However, the analysis is unsatisfactory in that we find no reason why the inputs should differ between (30) and (31) with no difference in meaning. Furthermore, what really happens in the phrasing variants is that the predicted accents fail to survive on the surface due to focus; in other words, deaccenting happens due to one of possible focus requirements. Thus, what we want to explain in the grammar is the trigger or the motivation of

¹⁰ Selkirk (2000) assumes that Minor phrasing in English consists of at least one pitch accent. This paper follows the given definition. See other debate on the role of Minor phrase in Selkirk (2000: fn. 15).

deaccenting when focus is involved, and the solution for (31), which is at best a last resort speculation.

The two outputs in focus phrasing are identical in focus interpretation and their restructuring patterns are motivated by the same reason, i.e., focus. As long as we identify the two phrasing patterns as equal variants, they should be accounted for with no difference in the input. The optimal candidate shown in (31) is in fact a phonetically realized deaccenting variant, which is regulated by the grammar and not by the underlying input. In other words, we cannot exclude potential pitch accents that are presumably associated with the stressed syllables in the input.

Given the same input as in (32), Selkirk (2000) fails to explain the deaccented variant in English focus phrasing since the grammar chooses candidate (32a) as the optimal phrasing and cannot save candidate (32c), which is also an acceptable variant (marked with a symbol "☺").

(32) a grammar that fails to explain the two phrasing variants in English

| [she [[lóaned] _{V-Foc} [her róllerblades] _{NP} [to Róbin] _{PP}] _{VP}] | MiP (Accent) | Align _R -Foc | Wrap; XP | Align _R XP | Bin (MaP) |
|---|-----------------|----------------------------|-------------|--------------------------|--------------|
| ☺ a. (she lóaned) _{MaP} (her róllerblades) _{MaP} (to Robin) _{MaP} | | | * | : | *** |
| b. (she lóaned) _{MaP} (her rollerblades) _{MaP} (to Robin) _{MaP} | ***! | | * | : | *** |
| ☺ c. (she lóaned her rollerblades to Robin) _{MaP} | | *! | : | * | * |
| d. (she lóaned her róllerblades to Róbin) _{MaP} | | *! | : | * | * |
| e. (she lóaned) _{MaP} (her róllerblades to Róbin) _{MaP} | | | * | : | *! |

The role of MiP (accent) in (32) was to select candidate (c) over candidate (b), where the minor phrases in the two major phrases fail to satisfy MiP (accent). As Selkirk (2000) discussed, there are DEP constraints which penalize epenthesis of accents and MAX constraints which penalize accent deletion. Candidate (c) will be penalized by Max constraints since it lost two pitch accents on the surface as well as the violation of the Focus Alignment constraint. A question to be answered is then what saves candidate (c), which is acceptable only in a focus reading.

In summary, Selkirk's (2000) analysis raises two questions: first, her solution is to assume two different input specifications, but the nature of the input in principle should not be restricted. As long as we accept that both phrasing patterns are from the same source of focus interpretation, we should not expect different inputs. Second question is about how the grammar processes. The deaccenting case should also be predictable from a grammar, showing how focus-prosody interaction permits deaccenting as a variant and what saves the deaccented phrasing. Although constraints are in fact violable in theory, violation should be minimal and only to avoid a higher ranked constraint than the violated constraints. In this respect, the grammar established in Selkirk (2000) fails to show the actual interaction of focus-prosody constraints in English.

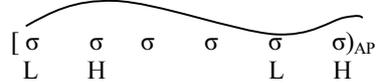
In the following section, we will discuss dephrasing patterns in Korean,

which is similar to one of the surface restructuring variants in English. The Korean dephrasing will show that Selkirk's speculative analysis cannot be extended to various focus restructuring patterns.

3.3 Focus-driven restructuring in Korean

An Accentual phrase (AP) in Korean is marked by a basic tonal pattern of 'L(or H)(HL)H', as described in Jun (1993). It forms an initial rise with no pitch prominence at the boundary high (slightly higher than the preceding low target) as illustrated in (33).¹¹

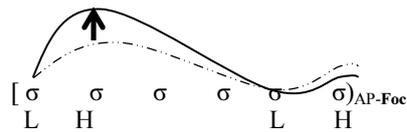
(33) Tonal pattern in Korean: 'L(or H) (HL)H' for an AP



Every AP shows the basic tonal pattern in (33), which may involve an interpolation between the medial H and L when more segmental material is available (e.g., more than 4 syllables). In a focus speech, the initial peak associates with pitch prominence on a focused item, normally resulting in a greater pitch range than a normal LH rising.

The following configuration is schematic to illustrate focus prominence. The dotted line is assumed to be a normal pitch contour while the solid line is the focused prominence. As we sketched in (34), focus prominence can be implemented with the initial peak of an AP though this pitch excursion may not be necessary. Dephrasing, on the other hand, is more critical to express focus interpretation of an utterance.

(34) Focus association with initial peak: 'L(HL)H' for an AP



Normal and focus phrasing patterns in Korean are exemplified in (35), where relevant focused elements are bold-faced. When focus is involved, dephrasing is necessary whenever there are post-focal phonological phrases (e.g., 35c-e).

¹¹ The initial tone target can be influenced by segmental features. For instance, aspirated and fortis obstruents in Korean tend to be realized with an initial High tone, resulting in "HHLH" rather than "LHLH". Since this variation is not a main issue here, we will use "LHLH" as a default tonal pattern for the purpose of simplification in this paper.

- (35) [[mijʌŋ-ika]_{NP} [[Pomi-eke]_{NP} [kapaŋ-ʌl]_{NP} [pil.ljʌ.tɛu.ʌt.ta]_V]_{VP}]_S
 'Miyoung'_{-NOM} 'Pomi'_{-DAT} 'bag'_{-ACC} loan'_{-PAST-DEC}
 'Miyoung loaned (her) bag to Pomi'
- a. ((mi.jʌŋ.i.ga)_{AP} (po.mi.e.ge)_{AP} (ka.baŋ.ʌl)_{AP} (pil.ljʌ.tɛu.ʌt.ta)_{AP})_{IP}
 b. ((mi.jʌŋ.i.ga)_{AP} (po.mi.e.ge)_{AP} (ka.baŋ.ʌl)_{AP} (**pil.ljʌ.tɛu.ʌt.ta**)_{AP-Foc})_{IP}
 c. ((mi.jʌŋ.i.ga)_{AP} (po.mi.e.ge)_{AP} (**ka.baŋ.ʌl**)_{Foc} bil.ljʌ.tɛu.ʌt.ta)_{AP})_{IP}
 d. ((mi.jʌŋ.i.ga)_{AP} (**bo.mi.e.ge**)_{Foc} ga.baŋ.ʌl bil.ljʌ.tɛu.ʌt.ta)_{AP})_{IP}
 e. ((**mi.jʌŋ.i.ga**)_{Foc} bo.mi.e.ge ga.baŋ.ʌl bil.ljʌ.tɛu.ʌt.ta)_{AP})_{IP}

In (35a-e), the presence and absence of lenis stop voicing of the initial stop in each phrase can serve to define AP phrasing, as lenis stop voicing is known to occur within an accentual phrase. The phrasing pattern in (a) is interpreted as a neutral reading while the other patterns (b-e) can be interpreted as focus readings. Note that (b) may differ from (a) in that the latter (focus reading) may have more prominence in the initial rising, as discussed earlier.

The neutral phrasing structure in (35a) tells us that Align XP is higher ranked than Wrap-XP in Korean since each XP forms its own phonological phrase. We can first establish (36) to explain the optimal phrasing for a non-focused case (e.g., 35a):

(36) Non-focus phrasing in Korean (AP: Accentual Phrase ≈ MaP)

| | Align _R XP | WrapXP |
|---|-----------------------|--------|
| a. (mi.jʌŋ.i.ga) _{AP} (po.mi.e.ge) _{AP} (ka.baŋ.ʌl) _{AP} (pil.ljʌ.tɛu.ʌt.ta) _{AP} | | * |
| b. (mi.jʌŋ.i.ga) _{AP} (po.mi.e.ge) _{AP} (ka.baŋ.ʌl bil.ljʌ.tɛu.ʌt.ta) _{AP} | *! | * |
| c. (mi.jʌŋ.i.ga) _{AP} (po.mi.e.ge ga.baŋ.ʌl bil.ljʌ.tɛu.ʌt.ta) _{AP} | *!* | * |
| d. (mi.jʌŋ.i.ga bo.mi.e.ge ga.baŋ.ʌl bil.ljʌ.tɛu.ʌt.ta) _{AP} | *!*** | |

Recall that Wrap-XP penalizes whenever any maximal projection XP is not wrapped in a phonological phrase, here an AP. Candidates (a) through (c) all violate Wrap-XP constraint since VP constituents are separated in different phonological phrases. In (36), candidate (a) is chosen to be optimal under the condition that Align_R-XP is higher ranked than Wrap-XP.

Now let us look at focus phrasing in Korean. A focused element in this language dephrases whatever follows the focused element. This can be analyzed with Left Alignment of Focus, which requires left demarcation of the focused element. The grammar in (37) evaluates the phrasing pattern with focus on the indirect object /pomi-eke/ 'to Pomi' (e.g., 35d). The ranking of relevant constraints is given below:¹²

¹² Relevant constraints may be more than what are assumed here but we will limit ourselves to the constraints under discussion. For example, Min (AP), which says an AP should include at least two syllables, will play a role in phrasing but this phrasing is not relevant to our data and is therefore omitted.

(37) $\text{Align}_L\text{-Focus} \gg \text{Align}_R\text{XP} \gg \text{Wrap-XP}$

| | $[[\text{mij}\lambda\eta\text{jika}]_{\text{NP}} [[\text{Pomieke}]_{\text{NP-Foc}} [\text{kapa}\eta\text{wul}]_{\text{NP}} [\text{pillj}\lambda\text{teu}\lambda\text{tta}]_{\text{V}}]_{\text{VP}}]_{\text{S}}$ | $\text{Align}_L\text{-Focus}$ | Align_RXP | Wrap XP |
|------|--|-------------------------------|---------------------------|------------------|
| • a. | $(\text{mij}\lambda\eta\text{jiga})_{\text{AP}} (\text{pomiege})_{\text{AP}} (\text{kapa}\eta\text{wul})_{\text{AP}} (\text{pillj}\lambda\text{teu}\lambda\text{tta})_{\text{AP}}$ | | | * |
| b. | $(\text{mij}\lambda\eta\text{jiga})_{\text{AP}} (\text{pomiege})_{\text{AP}} (\text{kapa}\eta\text{wul} \text{ billj}\lambda\text{teu}\lambda\text{tta})_{\text{AP}}$ | | *! | * |
| c. | $(\text{mij}\lambda\eta\text{jiga})_{\text{AP}} (\text{pomiege} \text{ gapa}\eta\text{wul})_{\text{AP}} (\text{pillj}\lambda\text{teu}\lambda\text{tta})_{\text{AP}}$ | | *! | * |
| ⊙ d. | $(\text{mij}\lambda\eta\text{jiga})_{\text{AP}} (\text{pomiege} \text{ gapa}\eta\text{wul} \text{ billj}\lambda\text{teu}\lambda\text{tta})_{\text{AP}}$ | | **! | |
| e. | $(\text{mij}\lambda\eta\text{jiga} \text{ bomiege} \text{ gapa}\eta\text{wul} \text{ billj}\lambda\text{teu}\lambda\text{tta})_{\text{AP}}$ | *! | *** | |

$\text{Align}_L\text{-Focus}$ constraint will rule out candidates that include a focused item not beginning an AP. It eliminates candidate (e), which consists of a single AP and fully satisfies Wrap-XP . The actual output is (d) but the grammar incorrectly chooses (a) as the optimal output (•), which has no violation of $\text{Align}_R\text{-XP}$. Recall the normal phrasing pattern shown (36), where the grammar with $\text{Align}_R\text{-XP}$ correctly chose the output phrasing. The main difference between (36) and (37) is that focus is projected in the latter structure, which means that the focus effect is a critical factor in interacting with other constraints. However, when focus constraint is at play as in (37), the grammar incorrectly chooses candidate (a) as the optimal output. Note that re-ranking the three active constraints does not improve the situation. This problem is reminiscent of the English example, as repeated in (38).

- (38) $[\text{she} [[\text{lóaned}]_{\text{NP-Foc}} [\text{her} \text{róllerblades}]_{\text{NP}} [\text{to} \text{Róbin}]_{\text{PP}}]$
 a. ☞ (she **lóaned**) (her **róllerblades**) (to**Róbin**)
 b. ☞ (she **lóaned** her **rollerblades** to **Robin**) - *deaccenting*

Comparing (38b) with (39b) below, we see that both patterns are sentence-medial rephrasing, which applies to the elements after a focused element. That is, we find that pitch accents after the focused element are deleted in English and phrase boundaries are deleted in Korean.

- (39) $[[\text{mij}\lambda\eta\text{-ika}]_{\text{NP}} [[\text{Pomi-eke}]_{\text{NP-Foc}} [\text{kapa}\eta\text{-wul}]_{\text{NP}} [\text{pillj}\lambda\text{teu-}\lambda\text{tta}]_{\text{V}}]_{\text{VP}}]_{\text{S}}$
 a. • (mi.j\lambda\eta.i.ga) (**po.mi.e.ge**)_{-Foc} (ka.ba\eta.wul) (pil.lj\lambda.teu.\lambda.t.ta)
 b. ☞ (mi.j\lambda\eta.i.ga) (**po.mi.e.ge**)_{-Foc} ga.ba\eta.wul bil.lj\lambda.teu.\lambda.t.ta) - *dephrasing*

If we assume that the only motivation for rephrasing is the focus alignment requirement, (38a) for English and (39a-b) for Korean are the optimal phrasing patterns since they satisfy the right/left alignment of focus with a phonological phrase, showing a parametric difference between the two languages ($\text{Align}_{L/R}\text{-Focus}$). This leaves us with two problems: first, (38b) is also acceptable in English, and second, the optimal phrasing in Korean is (39b) rather than (39a).

To summarize, deaccenting and dephrasing, both of which emerge only when focus is involved, cannot be accounted for by the grammar we have

seen so far.

4. Revisiting focus alignment and a new analysis

This section will revisit Focus alignment constraints proposed in Truckenbrodt (1995, 1999) and revise focus requirements as EDGEMOST constraints with which we can uniformly account for deaccenting in English and dephrasing in Korean.

4.1 Focus alignment constraints vs. EDGEMOST constraints

We have seen in sections 3.2 and 3.3 that Focus alignment constraint is satisfied by aligning a focused item with a prosodic edge. The definition of Focus alignment constraint is given in (40), following Selkirk (2000):

(40) $\text{Align}_{L/R}\text{-Focus}$: $\text{Align}(\text{Focus}, L/R; \text{MaP}, L/R)$: "Align the left/right edge of a Focus constituent in informational or syntactic structure with the left/right edge of a major phrase (MaP) in the phonological structure."

Any intervening prosodic structure between a focused element and a prosodic edge will incur violations in output evaluation. Given the definition in (40), we predict that a focused element should be aligned to the edge of a major phrase, that is, an intermediate phrase (ip) in English and an accentual phrase (AP) in Korean. The two types of English focus phrasing are configured in (41 i and ii). In the second type (41 ii), deaccenting is obligatory and this is comparable to Korean dephrasing as in (42 a-c) in that the focused element does not allow potential pitch prominence (i.e., APs) afterward.

(41) English: Right Alignment of Focus

Constraint ranking: $\text{MiP}(\text{accent}) \gg \text{Align}_{\text{R}}\text{-Focus} \gg \text{Wrap-XP}, \text{Align-XP}$

Syntactic structure: $[(\quad)_{\text{XP}} (\quad)_{\text{XP}} (\quad)_{\text{XP}}]$

i. Type 1: Focus phrasing without deaccenting

a.[**X-Foc**]_{MiP}]_{MaP}

b. [**X-Foc**]_{MiP}]_{MaP} (.....

c. ([**X-Foc**]_{MiP}]_{MaP} (.....

ii. Type 2: Focus phrasing with deaccenting

a.[**X-Foc**]_{MiP}]_{MaP}

b.[**X-Foc**]_{MiP}]_{MaP}

c. ([**X-Foc**]_{MiP}]_{MaP}

(42) Korean: Left Alignment of Focus with dephrasing

Constraint ranking: $\text{Align}_{\text{L}}\text{-Focus} \gg \text{Wrap-XP}, \text{Align-XP}$

Syntactic structure: $[(\quad)_{\text{XP}} (\quad)_{\text{XP}} (\quad)_{\text{XP}}]$

a. ([**X-Foc**])_{MaP}

b. ([**X-Foc**])_{MaP}

c. ([**X-Foc**])_{MaP}

The elements that precede the focused item in (41) and (42) follow the given constraint ranking independent of the focus constraint. However, the elements after the focused element are sensitive to the focus constraint. That is, in the English focus phrasing structure, the focused element either ends with a major phrase as shown in (41i), or it dephrases all the following elements triggering deaccenting within the major phrase, as shown in (41ii). Accent deletion does not apply to the part of the sentence preceding the focused element. This is also true for dephrasing in Korean. The second type of focus phrasing in English (41ii) involves deaccenting while Korean focus phrasing is accompanied by dephrasing. Comparing (41ii) with (42), in which rephrasing occurs with focus, we find a similar pattern in terms of the post-focal phrasing structure: English does not allow pitch accents after the focused element and Korean shows no following accentual phrase boundaries. The two patterns together seem to suggest that in addition to ensuring some prominence on the focused item itself, the implementation of focus also requires the deletion of post-focal prominence. This strategy can be viewed as a focus requirement that motivates deaccenting in English and dephrasing in Korean.

We have two phenomena that are apparently distinct but motivated by the same factor, focus. If we consider the whole intonational contour for English and Korean, there seems to be a common asymmetrical property regarding focus restructuring. That is, focus prominence does not seem to restrict its preceding structure in terms of culminativity of pitch, but it does restrict what follows after a focused element. One implication is that focus allows no additional prominence to the right side in a relevant prosodic domain. The strategy that focus must be most prominent in a given domain can be captured as RIGHTMOST prominence, and it is not necessarily right-edge alignment. In other words, any intervening material or structure does not necessarily violate the focus requirement as long as it eliminates potential prominence, such as pitch accents in English and APs in Korean.

If we view focus prominence (FP) in terms of RIGHTMOST, as defined in (43), satisfaction of this constraint predicts that no post-focal pitch prominence can follow in a given domain.

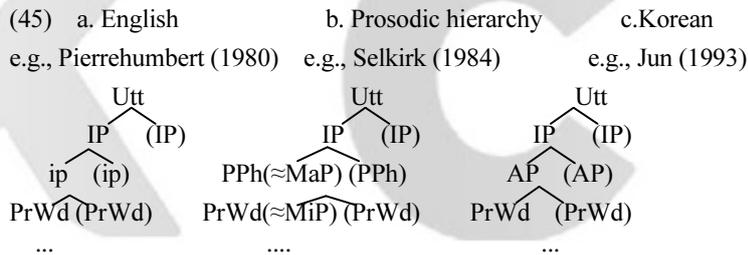
(43) RIGHTMOST/LEFTMOST (FP): RIGHTMOST/LEFTMOST (FP, Right/Left, PD, Right/Left) - "Focus Prominence (FP) is RIGHTMOST/LEFTMOST within a relevant prosodic domain (PD)."

The focus requirement in (43) unifies the two types of focus restructuring, deaccenting in English and dephrasing in Korean, despite the different focus implementations involved in the two languages (i.e., accentuation in English and tonal distribution in Korean). The statement in (43) is further elaborated in (44) including the definition of the prosodic domain:

(44) RIGHTMOST/LEFTMOST (FP): Rightmost/Leftmost (FP, Right/Left, D_{XP} , Right/Left)

- i. Focus Prominence is RIGHTMOST/LEFTMOST in an intonational domain XP , D_{XP} .
- ii. The domain XP is determined as follows:
 - a) If a level C^n is a minimum prosodic domain for pitch prominence other than lexical level, the level C^{n+1} will be the domain of RIGHTMOST/LEFTMOST (FP).
 - b) A level of C^{n+1} is higher than C^n in prosodic hierarchy (e.g., Selkirk 1984) and no prosodic level intervenes between C^{n+1} and C^n .

Following the definition in (44), the domain of RIGHTMOST (FP) in English is the major phrase since the minor phrase is the minimum domain for pitch accent. On the other hand, the Korean tonal pattern applies to the AP which serves as a minimum prosodic domain (e.g., an initial rising contour), so the domain of RIGHTMOST (FP) will be Intonational Phrase, one level higher than AP. Consider the prosodic hierarchy in (45b) as a base in order to compare the two intonational structures in (45a) and (45c).



We have seen so far that different domains of pitch contour formation in a language serve also as the domains in the application of RIGHTMOST (FP). A new approach is then that normal focus phrasing in English satisfies Rightmost Focus Prominence constraint by inserting a boundary after a focused element. The other variant also satisfies Rightmost Focus Prominence constraint by eliminating post-focal pitch accents. The new analysis of English focus phrasing will be provided in the following section together with Korean focus phrasing.

4.2 New analyses for English and Korean focus phrasing with RIGHTMOST

Let us first apply the focus prominence constraint to the English phrasing variation case, which could not be accounted for without input specification in Selkirk (2000). The output evaluation in (46) shows that it cannot choose candidate (c) as one of the optimal phrasing outputs since candidate (c)

violates Align_R-Focus. Compare the previous analysis in (46) with a new analysis in (47), where Rightmost (FP) serves as a focus requirement in the output evaluation:

(46) Previous grammar (Selkirk 2000)

| [she [[lóaned] _{V-Foc} [her rólleblades] _{NP} [to Róbin] _{PP}] _{VP}] _S | MiP (Accent) | Align _R - Focus | Wrap XP | Align _R XP |
|---|-----------------|-------------------------------|------------|--------------------------|
| ☞ a. (she lóaned) _{MaP} (her rólleblades) _{MaP} (to Róbin) _{MaP} | | | * | |
| b. (she lóaned) _{MaP} (her rollerblades) _{MaP} (to Robin) _{MaP} | **! | | * | |
| ⊙ c. (she lóaned her rollerblades to Robin) _{MaP} | | *! | | * |
| d. (she lóaned her rólleblades to Róbin) _{MaP} | | *! | | * |
| e. (she lóaned) _{MaP} (her rólleblades to Róbin) _{MaP} | | | * | *! |

* Note that an accent mark (´) represents a pitch accent.

(47) Revised grammar

| [she [[lóaned] _{V-Foc} [her rólleblades] _{NP} [to Róbin] _{PP}] _{VP}] _S | RIGHTMOST (FP) | MiP (accent) | Wrap XP | Align _R XP |
|---|-------------------|-----------------|------------|--------------------------|
| ☞ a. (she lóaned) _{MaP} (her rólleblades) _{MaP} (to Róbin) _{MaP} | | | * | |
| b. (she lóaned) _{MaP} (her rollerblades) _{MaP} (to Robin) _{MaP} | | *!* | * | |
| ☞ c. (she lóaned her rollerblades to Robin) _{MaP} | | | | * |
| d. (she lóaned her rólleblades to Róbin) _{MaP} | *! | | | * |
| e. (she lóaned) _{MaP} (her rólleblades to Róbin) _{MaP} | | | * | *! |

In (47), candidates (a) and (c) fare equally well: the focused element ("lóaned") in (a) bears the focus prominence (with an accent mark) which is located rightmost within a MaP and it is also rightmost in (c) since the potential pitch prominence, e.g., pitch accents on the NP ("rollerblades") and the PP ("Robin"), are deleted to avoid additional prominence after the focus prominence. The revised grammar with RIGHTMOST (FP) constraint chooses both (a) and (c) as optimal phrasing outputs even though candidate (c) violates Max (stress) constraint while (a) does not violate it at all. The optimal focus phrasing seems to regard (c) as an acceptable sacrifice or at least as a second best candidate among others. We can understand this process as a repair strategy to meet the focus requirement expressed in RIGHTMOST (FP).

We have seen so far that English focus phrasing has two options to satisfy the higher ranked RIGHTMOST (FP): one is to violate Wrap-XP, which will save RIGHTMOST focus prominence within its MaP focus domain. The other option is to sacrifice Align_R-XP and Max (stress) since by doing so it can save RIGHTMOST focus prominence within the MaP domain.¹³ These two

¹³ The grammar in (47) shows partial evaluation, including most relevant constraints in evaluating focus phrasing. As an anonymous reviewer points out, there are other constraints that are violated by the candidates. For instance, since candidates (b-c) lost

strategies are compatible in the sense that both are to reconcile with a focus requirement and to satisfy the higher ranked constraint by minimally violating other constraints.

Now, let us look at how the RIGHTMOST constraint works with Korean focus phrasing. The previous problem is shown in tableau (48), where $\text{Align}_L\text{-Focus}$ incorrectly chooses the optimal output as (48a). The grammar in (48) can be compared to the revised grammar in (49), where RIGHTMOST (FP) chooses correctly (d) as the optimal output.

(48) Previous grammar with $\text{Align}_L\text{-Focus}$

| $[[\text{mij}\Delta\eta\text{jika}]_{\text{NP}} [[\text{pomie}\text{ke}]_{\text{Foc}} [\text{kapan}\eta\text{ul}]_{\text{NP}} [\text{pill}\Delta\text{teu}\Delta\text{tta}]_{\text{V}}]_{\text{VP}}]_{\text{S}}$ | $\text{Align}_L\text{-Focus}$ | $\text{Align}_R\text{-XP}$ | Wrap XP |
|--|-------------------------------|----------------------------|---------|
| ♣ a. $(\text{mij}\Delta\eta\text{jiga})_{\text{AP}} (\text{pomie}\text{ge})_{\text{AP}} (\text{kapan}\eta\text{ul})_{\text{AP}} (\text{pill}\Delta\text{teu}\Delta\text{tta})_{\text{AP}}$ | | | * |
| b. $(\text{mij}\Delta\eta\text{jiga})_{\text{AP}} (\text{pomie}\text{ge})_{\text{AP}} (\text{kapan}\eta\text{ul}\text{bill}\Delta\text{teu}\Delta\text{tta})_{\text{AP}}$ | | *! | * |
| c. $(\text{mij}\Delta\eta\text{jiga})_{\text{AP}} (\text{pomie}\text{ge} \quad \text{gapan}\eta\text{ul})_{\text{AP}} (\text{pill}\Delta\text{teu}\Delta\text{tta})_{\text{AP}}$ | | *! | * |
| ⊙ d. $(\text{mij}\Delta\eta\text{jiga})_{\text{AP}} (\text{pomie}\text{ge} \quad \text{gapan}\eta\text{ul} \quad \text{bill}\Delta\text{teu}\Delta\text{tta})_{\text{AP}}$ | | ***! | |
| e. $(\text{mij}\Delta\eta\text{jiga} \quad \text{bomie}\text{ge} \quad \text{gapan}\eta\text{ul} \quad \text{bill}\Delta\text{teu}\Delta\text{tta})_{\text{AP}}$ | *! | *** | |

(49) Revised grammar with RIGHTMOST (FP)

| $[[\text{mij}\Delta\eta\text{jika}]_{\text{NP}} [[\text{pomie}\text{ke}]_{\text{NP-Foc}} [\text{kapan}\eta\text{ul}]_{\text{NP}} [\text{pill}\Delta\text{teu}\Delta\text{tta}]_{\text{V}}]_{\text{VP}}]_{\text{S}}$ | RIGHTMOST (FP) | $\text{Align}_R\text{-XP}$ | Wrap XP |
|---|----------------|----------------------------|---------|
| a. $(\text{mij}\Delta\eta\text{jiga})_{\text{AP}} (\text{pomie}\text{ge})_{\text{AP}} (\text{kapan}\eta\text{ul})_{\text{AP}} (\text{pill}\Delta\text{teu}\Delta\text{tta})_{\text{AP}}$ | *! | | * |
| b. $(\text{mij}\Delta\eta\text{jiga})_{\text{AP}} (\text{pomie}\text{ge})_{\text{AP}} (\text{kapan}\eta\text{ul} \quad \text{bill}\Delta\text{teu}\Delta\text{tta})_{\text{AP}}$ | *! | * | * |
| c. $(\text{mij}\Delta\eta\text{jiga})_{\text{AP}} (\text{pomie}\text{ge} \quad \text{gapan}\eta\text{ul})_{\text{AP}} (\text{pill}\Delta\text{teu}\Delta\text{tta})_{\text{AP}}$ | *! | * | * |
| ⊙ d. $(\text{mij}\Delta\eta\text{jiga})_{\text{AP}} (\text{pomie}\text{ge} \quad \text{gapan}\eta\text{ul} \quad \text{bill}\Delta\text{teu}\Delta\text{tta})_{\text{AP}}$ | | ** | * |
| e. $(\text{mij}\Delta\eta\text{jiga} \quad \text{bomie}\text{ge} \quad \text{gapan}\eta\text{ul} \quad \text{bill}\Delta\text{teu}\Delta\text{tta})_{\text{AP}}$ | | ***! | |

RIGHTMOST (FP) in (49) properly rules out (a) through (c) because they violate RIGHTMOST (FP), which is undominated in the grammar. The other two candidates under consideration, (d) and (e), fare equally well until candidate (e) is ruled out by its cumulatively more violations of $\text{Align}_R\text{-XP}$ than (d). Note that the revised grammar does not need to employ $\text{Align}_L\text{-Focus}$ constraint, which was a parametric difference earlier in (41-42) between English and Korean. According to the new grammar, $\text{Align}_R\text{-XP}$ can be violated but minimally, as long as RIGHTMOST (FP) is satisfied.

Not only have we solved the problem of English focus phrasing variation

potential prominence on the surface (deaccented), they will be penalized by the MAX (stress), which is lower ranked than both the Wrap-XP and the $\text{Align}_R\text{-XP}$. On the other hand, candidates (a) and (c) violate Bin (MaP), which is also lower ranked than both the Wrap-XP and the $\text{Align}_R\text{-XP}$ (See the tableau in (32)). For the current discussion, we assume that MAX (stress) and Bin (MaP) are unranked below the Wrap-XP and the $\text{Align}_R\text{-XP}$. Thus, both candidates (a) and (c) remain optimal in the current evaluation since candidate (a) has more violations of Bin (MaP) while candidate (c) has more of MAX (stress).

by proposing a revised RIGHTMOST constraint of focus prominence, but the revised grammar selects the correct output for Korean focus phrasing. It correctly predicts dephrasing as a consequence of focus constraint when the RIGHTMOST (FP) is undominated in the grammar, and dephrasing is the best way to satisfy this requirement in the prosodic system of Korean. This focus-phrasing interaction in Korean is analogous to the restructuring in English focus in that English focus prominence eliminates potential pitch accents after the focused element, which result in deaccenting on the surface, while Korean focus makes the prominence RIGHTMOST by dephrasing the following APs, which can potentially form additional pitch prominence.

4.3 Predictions and typological implications with EDGEMOST constraints

RIGHTMOST (FP) constraint implies that there is also the opposite direction to locate focus prominence, LEFTMOST (FP). These EDGEMOST constraints yield typological predictions, which require further discussions. We will first show two advantages implied in the RIGHTMOST (FP) analysis and search for the motivation behind the proposed constraints. We then examine a LEFTMOST (FP) undominated case with typological implications.

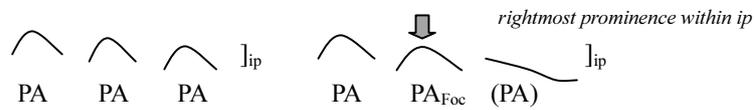
One of the advantages implied in the RIGHTMOST (FP) approach is that EDGEMOST constraints predict typologically attested restructuring patterns only. The analysis of Truckenbrodt (1995), on the other hand, predicts more unattested cases than the attested ones. For instance, the set of prosodic head alignment constraints, previously shown in (14), repeated in (50), imply two edges (left/right) at individual prosodic levels.

- (50) a. $\text{Align-}\varphi = \text{Align}(\varphi, \text{edge}, H(\varphi), \text{edge})$ φ : phonological phrase
 b. $\text{Align-I} = \text{Align}(I, \text{edge}, H(I), \text{edge})$ I: Intonational phrase
 c. $\text{Align-U} = \text{Align}(U, \text{edge}, H(U), \text{edge})$ U: Utterance

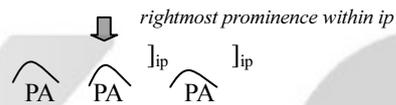
These general prosodic head alignment plays an important role in predicting focus phrasing patterns in Truckenbrodt (1995, 1999). The Focus alignment (Left/Right) constraints when combined with these prosodic head alignment produce 16 types of alignment patterns ($= 2^4$), only three of the combinations are potentially attested: firstly, one of the English phrasing variants based on the combination of $\text{Align-}\varphi / U\text{-R}$ and $\text{Align}_R\text{-Focus}$. Secondly, pause insertion before and after a focused item (e.g., one of the Korean focus phrasing, although less natural) when $\text{Align-}\varphi / U\text{-R}$ is combined with $\text{Align}_L\text{-Focus}$. Thirdly, focus fronting in some languages when both $\text{Align-}\varphi / U\text{-L}$ and $\text{Align}_R\text{-Focus}$ are undominated in the grammar so that the focused element should move to the front, possibly violating constraints of syntactic structure preservation. The rest of the combinations of prosodic head constraints and focus alignment constraints are hard to formulate.

On the other hand, the revised version with EDGEMOST constraints predicts the two possible restructuring patterns regarding focus restructuring. When RIGHTMOST constraint is active and higher-ranked in the grammar, deletion of accents/boundaries or insertion of boundary will take place post-focally as a repair strategy. In English, in order to make the focused item located rightmost, either deletion of pitch accents (PA) after the focused element as in (51b), or insertion of a boundary as in (51c) can be proper strategies to satisfy the focus requirement.

(51) a. Normal phrasing b. Deletion of accents (= deaccenting)



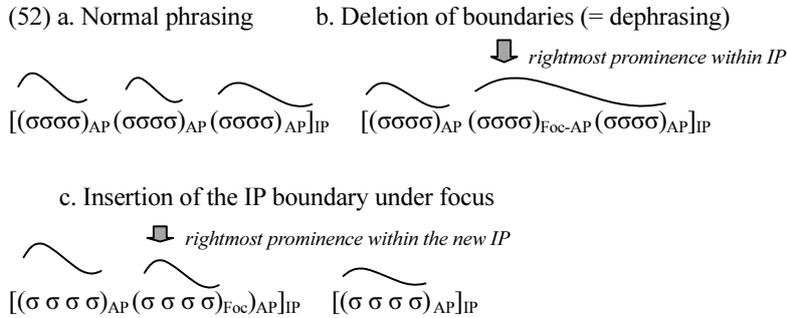
c. Insertion of a boundary under focus



The RIGHTMOST approach can predict the variation in English focus phrasing and account for two variants shown in (51b) and (51c). In addition, RIGHTMOST (FP) constraint is self-explanatory for the reason why deaccenting and dephrasing occur in a progressive direction, and not in a retrogressive direction.

Second advantage is that the RIGHTMOST analysis can account for the main focus phrasing in Korean together with, though less common, a possible variant. In Korean focus phrasing, post-focal boundary insertion is also allowed if the inserted boundary is an IP, which is one level higher than AP.¹⁴ This is because another AP boundary will make an initial rise within the domain (IP) according to the focus constraint (as defined in (44)), and the additional AP initial rising can be interpreted as additional prominence within the domain. Therefore, (52a) is not acceptable for focus phrasing in Korean while (52b) with dephrasing satisfies rightmost location of focus prominence. In (52c), when the inserted boundary is an IP, which resets the domain of focus prominence, becomes a possible strategy since it keeps the focus prominence still rightmost within the new IP.

¹⁴ The IP insertion, sometimes described as pause insertion after a focused item, can be identified by a boundary tone and final vowel lengthening at the right edge.



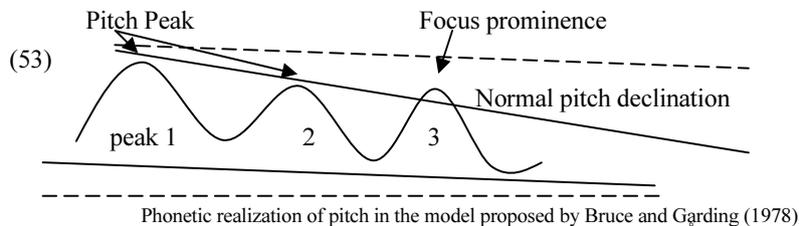
Even though the phrasing in (52c), which is often found in a hyper speech, seems to be less natural than the one with dephrasing, it is still acceptable when the focused element is emphasized with a paralinguistic factor.¹⁵ This pattern can also be accounted for by the RIGHTMOST constraint.

So far, we have observed that both English and Korean prefer a rightmost location for the landing site of focus prominence. In addition, the RIGHTMOST constraint can correctly account for deaccenting and dephrasing with the same motivation. With the RIGHTMOST constraint, we can now remove the unnecessary parametric difference ($Align_{L/R}$ -Focus) between English and Korean. This can be the third advantage of a RIGHTMOST approach.

Two questions need to be answered at this point: firstly, what could be the common motivation of RIGHTMOST preference of focus prominence? Secondly, what typological predictions do RIGHTMOST/LEFTMOST constraints make?

To explore an answer to the first question, we will consider focus manifestation on the surface. Rightmost prominence in conciliation can be more effective because it is less costly than LEFTMOST, which requires, if necessary, a certain changes in syntactic constituency. For instance, when focus is marked by pitch prominence preceded by higher prominence (either by pitch accents or by a tonal pattern), it can still be perceived as being perceptually prominent because the prominence itself is relatively perceived depending on its surrounding context rather than absolute pitch height. The following figure in (53) schematizes natural pitch declination. The first two peaks are normal pitch accents that are realized as H* normally following the declination line. This is the reason why we see lower peaks overall as the utterance continues. This declination continues until we have another pitch reset, which accompanies a bigger boundary (IP or Ut).

¹⁵ If an IP boundary is inserted under focus, pitch excursion would be greater than normal focus utterance. Also, greater intensity and longer duration on the focused item are predicted. Compared to this case, dephrasing is not necessarily involved with these paralinguistic factors.



Considering the pitch declination in a normal speech, the third pitch excursion associated with focus can also be prominent. Focus prominence in this case does not necessarily manifest its pitch peak as high as the first one since the pitch excursion above the declination can still be heard as prominent perceptually. In this sense, focus prominence on site is fairly less effortful than moving the focus prominence to the front (e.g., leftmost).

Now let us discuss typological predictions born out with EDGEST constraints. If the LEFTMOST constraint is chosen as a focus strategy in a language, we would expect to see restructuring in order to locate focus prominence to be leftmost. As Downing (2003, 2004) discussed, sentence initial position in Bantu languages is preferred for focus construction as well as post verbal position, as shown in (54). In the given examples, the focused elements are located sentence initially. When a language allows syntactic movement of a constituent on the surface, such as free word order or fronting, the movement of a focused element to a sentence initial position can be a choice for focus prosody using a leftmost strategy.

- (54) Chitumbuka (from Downing 2004)
- a. ma-búuku wa-ka-pása !wáana ('!' indicates downstep)
BOOKS_{Foc} they gave children
 'They gave the children BOOKS.'
- b. Pa-mu-páanda zi-ka-úka mb!úuzi
OVER THE WALL_{Foc} jumped goats.
 'The goats jumped OVER THE WALL.'

The IP initial position, in particular, is prosodically most prominent because it produces potentially the highest pitch in an intonational phrase due to the declination of natural speech. In this sense, LEFTMOST (FP) is a strategy to move a focused element to the structurally prominent position. However, the utterance initial (or IP initial) position as a landing site for focus prominence potentially bears a lot of costs linguistically: it may violate faithfulness of syntactic structure. This strategy would be possible only if a language allows constituent order variation, that is, when the faithfulness of syntactic structure is lower ranked. There are more languages that do not allow this change, and in this sense, utterance initial position seems to be less advantageous.

The rarity of LEFTMOST application under focus has no strong argument in this paper. One aspect, however, can be mentioned here in terms of the cognitive process of sentence with prosody. When focus falls on sentence medial position, LEFTMOST requires restructuring in its preceding elements. This implies that the complete prosody for an utterance should completely be restructured before it spells out. It seems to be true that speech follows a look-ahead planning, which is evidently supported by some phonological phenomena such as Rhythm Rule, Early Accent (Horne 1990, Liberman 1975, among others), or speech errors, such as ‘spoonerism’ affected by upcoming words. In addition, partial processes such as compounding and phonological phrasing can be built up before focus is introduced. When focus is introduced at some point, speech process should go back and restructure the elements that have already organized. In such cases, backing process for focus-driven restructuring can be a possible repairing strategy but more costly than afterward-restructuring. It will be more convincing to view focus-driven restructuring as one of the natural speech processes that are organized incrementally and successively.¹⁶

In summary, (55) and (56) shows the different typological predictions and accountability between the analyses with Align_{L/R}-Focus constraint (Truckenbrodt 1995, 1999, Selkirk 2000) and with the RIGHTMOST/LEFTMOST proposed in this paper.

(55) Align_{L/R}-Focus constraints:

- i. When Align_R-Focus is undominated (e.g., English):
 - 1) One of the two focus phrasing patterns is accounted for.
 - 2) Deaccenting is unpredicted.

(Although the motivation for deaccenting is focus)

¹⁶ There have been two divergent points of view about the primacy in manifesting focus prominence. One point of view, the Accent-to-Focus, is that pitch cue is the only universal factor to signal focus, and the other is that phrasing is a better cue for focus. The former point of view considers pitch accent placement when focus is involved, and it explains focus prominence as directly implemented by pitch excursion of accents. The latter view points out that pitch prominence is not crucial to the application of focus prominence and that only the phrasing pattern is the primary cue for focus. Ladd (1996) discussed that we find more languages that show a tendency to use phonological phrasing as the cue for focus than to use pitch prominence alone. The proposal in the current paper suggests a third view, where both phrasing and accents are involved to satisfy focus-prominence preservation. That is, prosodic restructuring patterns, either deletion/insertion of accents or boundaries, are the result of interaction, if necessary, between accents and phrasing in order to satisfy focus requirements. Indeterminacy of the primacy of focus manifestation can be explained by the proposal in this paper, where phrasing and accent distribution are in fact in a cooperative relation to satisfy focus requirements (i.e., EDGEMOST). Similar discussions can be found in Downing (2003, 2004): focus-prosody realization in several Bantu languages, including Chichewa, Chitumbuka, and Xhosa, shows a culminative function of accent together with phrasing option under focus. More examples are found in Lahiri and Fitzpatrick-Cole (1999) with Bengali focus restructuring.

ii. When $\text{Align}_L\text{-Focus}$ is undominated (e.g., Korean):

- 1) Focus constraint cannot account for focus phrasing.
- 2) Dephrasing is unpredictable.

(Although the motivation for dephrasing is focus)

(56) Rightmost/Leftmost constraints:

i. When Rightmost is undominated (e.g., Korean and English):

- 1) Post-focal boundary insertion.
- 2) Deaccenting/dephrasing are available strategies to satisfy focus requirements.

ii. When Leftmost is undominated (e.g., Bantu languages): focus fronting in syntax is a possible strategy to satisfy focus requirements.

5. Conclusion

This paper examined focus restructuring patterns in English and Korean and successfully provided OT grammars that can uniformly account for deaccenting and dephrasing, both of which are two representative patterns commonly found among languages. According to the new analyses, English and Korean are similar in that they use rephrasing strategy to make focus prominence rightmost, and they differ in that the way of restructuring is either by deleting pitch accents (deaccenting) or prosodic boundaries (dephrasing). This difference is attributable to the nature of prosodic system that a language adopts and not to the parametric difference between the two languages.

The two restructuring patterns turn out to be the result of focus-prosody interaction, which requires the RIGHTMOST location of focus prominence. The main generalization is then that both restructuring patterns are attributed to the requirement of focus prominence, which allows no following pitch prominence within its prosodic domain. It is further interpreted as RIGHTMOST constraint, which is active in both Korean and English, and possibly cross-linguistically.

The main discussions in this paper can be summarized as follows. Firstly, this paper argued that focus restructuring as analyzed in Truckenbrodt (1995) employs unnecessary stipulations such as interactions of focus requirement with prosodic head alignments, yielding a number of unattested predictions. In addition, the revised version of focus-alignment constraints in Truckenbrodt (1999), $\text{Align}_{L/R}\text{-Focus}$, is not sufficient to account for the English focus variation. As discussed with the analysis of Selkirk (2000), input specification is deficient in terms of the Richness of Base in OT, and a proper grammar should explain why a deaccented output is also acceptable in focus phrasing without the pre-specified phonological input for the possible variants.

Secondly, the analysis with $\text{Align}_{L/R}\text{-Focus}$ showed difficulties in predicting the optimal output for Korean focus phrasing. The prosodic head

alignments at different levels of phrases, which played an important role in the analysis of Truckenbrodt (1999) and Selkirk (2000), failed to account for the English focus variation unless we accept the input speculation. In addition, Align_L -Focus is not enough to explain the optimal phrasing in Korean in that it fails to predict why dephrasing must occur when focus is involved. This is parallel to the problem we find in accounting for the focus phrasing variant in English.

Finally, we discussed potential advantages with the current proposal. The RIGHTMOST (FP) constraint not only accounts for both English and Korean restructuring without involving the prosodic head alignment constraints, but it also correctly predicts the two surface restructuring strategies, deaccenting and dephrasing. The LEFTMOST (FP) constraint, on the other hand, accounts for syntactic fronting of a focused element in some languages. These two EDGEMOST constraints predicted attested typological patterns of focus restructuring and they remove a number of unattested predictions implied in the analysis of Truckenbrodt (1995). In addition, the analysis with rightmost preference highlights a similarity between English and Korean focus phrasing rather than the parametric difference suggested in previous studies with $\text{Align}_{L,R}$ -Focus. The rightmost preference can be connected to the perceptual account of pitch prominence in principle, while leftmost is attributed to syntactic constraints that allow focus fronting.

The proposal made in this paper implies that the rightmost location of prominence is cross-linguistically preferred for prosodic focus marking, regardless of the differences in prosodic systems. English represents one type where focus prominence is realized in terms of pitch accents, and Korean belongs to another type, where focus prominence considers potential pitch prominence associated with tonal pattern. Further research needs to be done as to the accountability of EDGEMOST constraints for cross-linguistic patterns of focus-prosody interaction.

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