

Scrambling in Korean: A Marker-based Approach

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S.-Y. Cho and J.-J. Choe. 2001. Scrambling in Korean: A Marker-based Approach. *Language and Information* 5.1, 73–85. The purpose of this paper is to explore the relationship between nominal markers and scrambling in Korean by providing proper LP constraints based on Cho & Chai (2000) and Cho & Choe (2001). In doing so, we introduce a new type *marker* which includes case, postpositions, and delimiters, and propose the Adjunct LP Constraint and the Argument LP Constraint. Our LP constraints present a solution to the problems of the previous analyses such as Kuno's (1980) Crossing-Over Constraint. The newly postulated type *marker* enables us to account for the scrambling possibilities of the NPs containing cases as well as postpositions and delimiters.

1. Introduction

It is well known that arguments with the same case marker cannot be scrambled out of a VP-complement or an S-complement in Korean and Japanese as long as they precede their head. However, it is also true that not all arguments and adjuncts can be scrambled out of a VP- or an S-complement. To distinguish whether or not they can be scrambled, Kuno (1980) has proposed the so-called 'Crossing-Over Constraint (COC)', 'which says that two NPs with the same grammatical markers cannot be scrambled. Chung (1998) has also adopted a similar scrambling constraint based on obliqueness. The COC seems to be successful in handling the scrambling possibility of the NPs with the same case, as illustrated in (1). The two NPs, *John-i* and *uysa-ka*, cannot be scrambled because they share the same case marker.

- (1) a. John-i uysa-ka toyess-ta.
J-Nom doctor-Nom became-Decl
'John became a doctor.'
b. *Uysa-ka John-i toyess-ta.

On the contrary, the previous analyses wrongly predict that the two NPs with the same marker in (2a), *Mary-lul* and *ton-ul*, should not be scrambled, but they can be scrambled, as in (2b)¹. Similarly, the two NPs with the same marker in (3a), *cicin-i* and *sey pen-i*, should not be scrambled under the previous analyses. But it is not the case as shown in (3b).

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1. In fact, (2) and (3) are not counterexamples to Chung (1998) because the two NPs with the same case marker have the same degree of obliqueness under his analysis. Yet his theory still faces difficulties accounting for the grammaticality in long-distance scrambling phenomena in Korean.

- (2) a. John-i Mary-lul ton-ul cwuess-ta.
 J-Nom M-Acc money-Acc gave-Decl
 'John gave Mary some money.'
 b. John-i ton-ul Mary-lul cwuess-ta.
- (3) a. Yekise cicin-i sey pen-i ilenass-ta.
 here earthquake-Nom three times-Nom occurred-Decl
 'The earthquake occurred three times.'
 b. Yekise sey pen-i cicin-i ilenass-ta.

This contrast in scrambling possibilities between (1) and (2-3) points to the fact that the previous analyses based on the COC are not sufficient to explain the scrambling phenomenon in Korean.

In order to appropriately account for this phenomenon, a theory must answer what constraints are needed to restrict the possibility of scrambling among NPs. To answer this question, we claim that not only the surface markers but also all the possible markers of an NP should be considered.

To support our claim, we present a marker-based analysis on the scrambling phenomenon in the framework of Head-Driven Phrase Structure Grammar (HPSG) in section 2. In section 3, we demonstrate that our theory can provide a simpler explanation for various scrambled sentences in Korean. We will conclude this paper with a discussion on the theoretical implications of this claim.

2. A Marker-Based Analysis

2.1 Our Proposal

Current syntactic theories including Pollard & Sag (1987, 1994) consider the value of CASE to be monadic. On the contrary to the current syntactic theories, Cho & Chai (2000) have proposed that the traditional 'monadic' value of CASE feature like NP[*nom*] should be redefined as a complex entity composed of Potential Case (PC) and Realized Case (RC). In addition, they also introduce the notion of the 'animacy' of NPs. With these devices in hand, Cho & Chai (2000) have claimed that two NPs cannot be scrambled within a sentence, either when they have the same PC value (PC Constraint) or when they have the same values for both RC and ANIMACY (RC & ANI Constraint). This enables us to correctly predict that the two NPs with the same case marker in (2) can be scrambled while those in (1) cannot. Specifically, the NP in (2), *Mary-*, might have either an accusative or a dative case marker, though it is realized as the accusative marked NP, *Mary-lul*. So the two NPs, *Mary-lul* and *ton-ul*, have different PC values. Moreover, they have different ANI values though they share the same RC value. Hence, the scrambling between the two NPs is acceptable as in (2b).

- (2) a. John-i Mary-lul/eykey ton-ul cwuess-ta.
 J-[PC <Nom>] M-[PC <Acc/Dat>] money-[PC <Acc>] gave-Decl
 [RC <Nom>] [RC <Acc>] [RC <Acc>]
 [ANI +] [ANI +] [ANI -]
 'John gave Mary some money.'
 b. John-i ton-ul Mary-lul cwuess-ta.

While Cho & Chai (2000) presents a fine-grained analysis, where *Mary's* PC value, Acc/Dat, reflects the possibility of the case alternation of the NP with regard to the predicate, Kuno's COC based on the surface (or realized) case wrongly predicts that

the two NPs, *Mary* and *ton* 'money', cannot be scrambled because they have the same accusative case.

However, the analysis of Cho & Chai (2000) above appears to face some theoretical and empirical problems. Sentence (4), where the two NPs, *unhayng-i* 'bank' and *ton-i* 'money', have the same ANIMACY value, could be a challenge to this theory. In other words, though the PC Constraint does not apply to (4) because of the different PC values of the two NPs, the RC & ANI Constraint wrongly predicts that the two NPs cannot be scrambled because they have the same RC and ANIMACY values. So this sentence seems to constitute a counterexample to this analysis.

- (4) a. Unhayng-i ton-i manh-ta.
 bank-[PC <Nom/Dat>] money-[PC <Nom>] much-Decl
 [RC <Nom>] [RC <Nom>]
 [ANI -] [ANI -]
 'The bank has much money.'
 b. Ton-i unhayng-i manh-ta.

Although this shortcoming stems from the fact that Cho & Chai (2000) dealt with the scrambling phenomenon only among arguments, they should account for the difference in the scrambling possibilities of (1) and (2-4) in order to form a complete theory of the scrambling phenomenon in Korean.

Based on a new concept of case as a complex entity and Urushibara's (1991) claim that the Korean dative *-ey/eykye* should be a postposition, we introduce a type *marker*, which not only separates postpositions from cases, but also includes delimiters. As illustrated in the format of Attribute-Value Matrix (AVM) of HPSG in (5), the type *marker* has two attributes, PM (for Potential Marker) and RM (for Realized Marker).²

- (5)
$$\left[\begin{array}{l} \textit{marker} \\ \textit{PM} \quad \left[\begin{array}{l} \textit{POSTP} \quad \langle \boxed{1} \rangle \\ \textit{CASE} \quad \langle \boxed{2} \rangle \\ \textit{DEL} \quad \langle \boxed{3} \rangle \end{array} \right] \\ \textit{RM} \quad \langle (\boxed{1}), (\boxed{2}/\boxed{3}) \rangle \end{array} \right]$$

PM in turn has as its value POSTP (for postposition), CASE (for case), and DEL (for delimiter), which are all list-valued. RM has as its value a list of POSTP, CASE, and DEL as indicated by boxed integers, or 'structure sharing' in HPSG terms. By definition, the value of RM is optional as indicated by parentheses. If they are all realized, they must be in that order. However, case and delimiter do not usually appear at the same time, which is captured by the slash (/) notation. Note that the values of PM and RM are given by the predicate in the lexicon.³ They will be unified (or structure shared) with the value of the PHONOLOGY attribute of an NP.

2. In this paper, we did not classify delimiters into two types : X-Lim and Z-Lim. (Cf. Cho & Sells 1995). Hence, the delimiter *man* seems to be problematic. But it can be easily fixed by postulating RM <($\boxed{1}$), ($\boxed{3}$), ($\boxed{2}$)>.

3. It can possibly be said that the locus of case (marker) assignment is the dependency structure, or DEPS, proposed by Bouma *et al.* (1999). In current HPSG, DEPS contains all the dependents including arguments and adjuncts, while argument structure, or ARG-ST, accommodates only arguments. Though we acknowledge that the more abstract case assignment system should be provided to be a complete case theory, we leave this issue for further research.

Keeping in mind the modification of the case system above, we need to reconsider the LP constraints. Korean, as a head-final language, observes a general LP constraint called the Head-final Constraint. According to this constraint, all the dependents including arguments and adjuncts must precede their head. We present the Head-final Constraint schematically in (6).

(6) Head-final Constraint:

[] < Head (Where '<' stands for 'precedes'.)

Adjuncts can be freely scrambled with arguments in Korean as long as they are in the same clause. As shown in (3), the numeral adjunct NP *sey pen* 'three times' can be scrambled with the subject argument NP *cicin-i* 'earthquake-Nom' in the same sentence.

- (3) a. Cicin-i sey pen ilenass-ta.
 earthquake-Nom three times occurred-Decl
 'The earthquake occurred three times.'
 b. Sey pen cicin-i ilenass-ta.
 three times earthquake-Nom occurred-Decl

However, when a sentence is embedded as a subordinate clause, the adjunct NP cannot be scrambled out of the clause. Look at sentence (7) which has sentence (3a) as a subordinate clause. The adjunct NP *sey pen* in the subordinate clause cannot be scrambled with the subject argument *John-i* in the matrix sentence, as shown in (7b).

- (7) a. John-i [s Cicin-i sey pen ilenass-ta-ko] malhayss-ta.
 J-Nom earthquake-Nom three times occurred-Decl-Comp told-Decl
 'John told that the earthquake occurred three times.'
 b. * Sey pen John-i [s cicin-i ilenass-ta-ko] malhayss-ta.
 three times J-Nom earthquake-Nom occurred-Decl-Comp told-Decl

The contrast of the scrambling possibility between (3) and (7) enables us to say that adjuncts cannot be scrambled out of the clause. Adopting the Domain Theory of Reape (1994), we postulate the Adjunct Constraint on the scrambling possibility of adjunct NPs as described informally in (8).

(8) Adjunct LP Constraint:

Adjuncts cannot be scrambled out of their S domain.

The Adjunct Constraint is permissive in that it allows adjuncts to be located anywhere within S. In this respect, the Adjunct Constraint is a general constraint like the Head-final Constraint. However, the Adjunct Constraint is restrictive in that adjuncts cannot be scrambled out of the S domain. This shows the asymmetry in scrambling possibilities between adjuncts and arguments.

With these general constraints and the type *marker*, we present an LP constraint regarding the scrambling possibilities of arguments. We posit the Argument Constraint informally with two clauses (i) and (ii), each of which is schematically presented as (a) the PM Constraint and (b) the RM & ANIMACY Constraint, respectively, as shown in (9).⁴ (Cf. Cho & Chai (2000))

4. How much information must be encoded for the elements in each domain could be conceptually at issue. As Pollard et al. in a grant proposal pointed out, this requires empirical and theoretical considerations. Hence, it is beyond the scope of this paper.

(9) Argument LP Constraint:

Two argument NPs cannot be scrambled,

(i) EITHER when they have the same PM value

(ii) OR when they have the same values for both RM and ANIMACY.

a. PM Constraint:

$$\text{domain}_1[\text{NP}_1 [\text{PM } \alpha]] < \text{domain}_2[\text{NP}_2 [\text{PM } \alpha]]$$

b. RM & ANIMACY Constraint:

$$\text{domain}_1[\text{NP}_1[\text{RM } \alpha, \text{ANI } \beta]] < \text{domain}_2[\text{NP}_2[\text{RM } \alpha, \text{ANI } \beta]]$$

where domain 1 is higher than domain 2.

The PM Constraint and the RM & ANI Constraint belong to the Argument Constraint, but they operate independently. The PM Constraint says that when two argument NPs have the same PM value, the NP in the higher domain should precede the NP in the lower domain. The RM & ANIMACY Constraint requires that when two argument NPs have the same values for both RM and ANIMACY, the higher NP should precede the lower NP. Note that by the definition of *marker*, the two LP constraints can deal with postpositions and delimiters as well as case markers.

2.2 How This Theory Works

Given the LP constraints in (6), (8) and (9), we can provide a simpler explanation to various scrambled sentences including arguments and adjuncts. To demonstrate how this theory works, we will show how sentence (2), where the scrambling between two arguments occurs, can be analyzed. Our analysis correctly predicts that in (2a), the NP, *ton-ul*, in the domain 2 can be scrambled with the NP, *Mary-lul*, in the domain 1. This is so because they do not share the PM and ANI value, and hence they need not be subject to the PM or the RM & ANI Constraint.

- (2) a. John-i domain1[Mary-lul/eykey domain2[ton-ul cwuess-ta.]]
 J-[PM <Nom>] M-[PM] CASE <Acc> money-[PM <Acc>] gave-Decl
 | POSTP <Dat>]
 [RM <Nom>] [RM <Acc>] [RM <Acc>]
 [ANI +] [ANI +] [ANI -]
 'John gave Mary some money.'
 b. John-i ton-ul Mary-lul cwuess-ta.

Moreover, sentence (10), where the scrambling between an argument and an adjunct happens, also can be accounted for without additional tools. Sentence (10a) headed by the predicate *manh-* 'abound in' consists of a subject argument, *sonamwu* 'pine trees', and a locative adjunct, *i san* 'this mountain.' When the location is focused, the adjunct NP *i san* can bear a (contrastive) 'focus' marker, which happens to have the same morphological form of nominative case, as shown in (10b).⁵ In this case, the two NPs can be scrambled freely as shown in (10c).

- (10) a. Sonamwu-ka i san-ey manh-ta.
 Pine trees-Nom this mountain-Loc abound in-Decl
 'Pine trees abound in this mountain.'
 b. Sonamwu-ka i san-i manh-ta.
 Pine trees-Nom this mountain-Foc abound in-Decl

5. Following Cho (1999), we use the term Focus in the glossary of *i san-i* in (10b) and (10c), instead of Nom. Though some theories regard the morpheme as Nom, it seems that there has been no concrete evidence on which term is correct so far. Hence, we assume that the morpheme is a focus marker.

- c. I san-i sonamwu-ka manh-ta.
 this mountain-Foc pine trees-Nom abound in-Decl

Under our analysis, the Argument Constraint does not apply to sentences in (10), because the NP *sonamwu* is an argument and the other NP *i san* is an adjunct. So the Adjunct Constraint is relevant to (10), but not the Argument Constraint. By the definition of the Adjunct Constraint, the two NPs in (10) can be freely scrambled because they are in the same S domain. For comprehensibility, our informal representation of (10c), using the type *marker*, is illustrated as in (11).

- (11) _s[I san-i sonamwu-ka manh-ta.]
 -[PM|POSTP<Loc>] -[PM <Nom>] abound in-Decl
 |DEL <Foc>|
 [RM <Foc>] [RM <Nom>]
 [ANI -] [ANI -]
 'Pine trees abound in this mountain (not in that one).'

By the same token, the scrambling phenomenon in (4) can be accounted for under our analysis. A closer examination reveals that the sentence pattern of (4a) is almost the same as (10c), and that the sentence pattern of (4b) is similar to that of (10b). Under our analysis, sentence (4a) can be represented as in (12a). Since the NP *unhayng* is regarded as an adjunct, the Adjunct Constraint correctly predicts that it can be freely scrambled with the subject NP *ton*.

- (12) a. _s[Unhayng-i ton-i manh-ta.] (=4a)
 bank-[PM|POSTP<Loc>] money -[PM <Nom>] much-Decl
 |DEL <Foc>|
 [RM <Foc>] [RM <Nom>]
 [ANI -] [ANI -]
 'The bank has much money.'
 b. Ton-i unhayng-i manh-ta. (=4b)

3. Data Analysis

This analysis enables us to predict the grammaticality of various scrambled sentences. In fact, there is not only clausae-internal scrambling but also long-distance scrambling in Korean. To demonstrate how well our theory works, we will begin with the clause-internal scrambling of the Double Nominative Construction (DNC), which offers a challenge to any word order theory in Korean.

3.1 Clause-internal Scrambling

3.1.1 Double Nominative Construction. The Double Nominative Construction (DNC) is a sentence containing two or more nominative-marked NPs with regard to its predicate. According to Cho (1999), there are at least two types of the DNC which exhibit somewhat different scrambling possibilities between the two NPs. The two nominative-marked NPs in sentence (13) cannot be scrambled, whereas the two NPs in sentence (14) can.

- (13) a. John-i (NP1) emeni-ka (NP2) yeyppu-si-ta.
 J-Nom mother-Nom pretty-Hon-Decl
 'John's mother is pretty.'
 b. *Emeni-ka John-i yeyppu-si-ta.

- (14) a. John-i (NP1) son-i (NP2) khu-ta.
 J-Nom hand-Nom big-Decl
 ‘John’s hands are big.’
 b. Son-i John-i khu-ta.

In order to account for the difference in scrambling possibility, Cho (1999) claims, following O’Grady (1991), that the first NP (NP1) in (13a) is the specifier of the sentence and the second NP (NP2) is the subject of the sentence, while NP1 in (14a) is the subject and NP2 is the adjunct of the sentence. Following his analysis, we will call the DNC like (13a) the ‘Specifier-Subject’ type and the DNC like (14a) the ‘Subject-Adjunct’ type. It is then expected that the Argument LP Constraint is relevant to the Specifier-Subject type since the two NPs are argument NPs, while the Adjunct LP Constraint is relevant to the Subject-Adjunct type as one of the two NPs is the subject argument and the other an adjunct.

Under our analysis, the Specifier-Subject type in (13) is described as in (15), where NP1 *John-i* is in the higher domain and NP2 *emeni-ka* is in the lower domain.

- (15) a. dom_1 [John-i dom_2 [*emeni-ka* *yeyppu-si-ta.*]]
 J- [PM <Nom>] mother-[PM <Nom>] pretty-Hon-Decl
 [RM <Nom>] [RM <Nom>]
 [ANI +] [ANI +]
 b. **Emeni-ka* John-i *yeyppu-si-ta.*

The two NPs are arguments, so the Argument LP Constraint is responsible for their scrambling possibility. According to the PM Constraint, the two NPs cannot be scrambled since they have the same PM value, namely ‘Nom.’ The RM & ANIMACY Constraint also says that the two NPs cannot be scrambled as they have the same values for both RM and ANIMACY. In short, both clauses of the Argument LP Constraint correctly predict that scrambling cannot take place in the Specifier-Subject type of the DNC.

Our analysis describes the Subject-Adjunct type of DNC like sentence (14) as shown in (16a), where both NPs are in the same S domain. In this type of DNC, the two NPs can be freely scrambled by the definition of the Adjunct LP Constraint as shown in the scrambled sentence (16b).

- (16) a. [_S John-i son-i khu-ta.]
 J-[PM <Nom>] hand-[PM <Nom>] big-Decl
 [RM <Nom>] [RM <Nom>]
 [ANI +] [ANI -]
 b. Son-i John-i khu-ta.

We have shown that the scrambling possibilities of the DNC can be explained by the Argument LP Constraint and the Adjunct LP Constraint. The former constraint is relevant to the Specifier-Subject type and the latter to the Subject-Adjunct type. Unlike the DNC, the Double Accusative Construction (DAC) shows different behavior as to scrambling phenomenon.

3.1.2 Double Accusative Construction. This analysis also provides a simpler explanation for the scrambling phenomenon in the Double Accusative Construction (DAC).⁶

6. Following Cho (1997), we regard the two NPs with the marker *-lul* as the two accusative NPs in (17). But it does not mean that we reject the claim that one of them should be a focused NP. We will not pursue this problem here, since it is beyond the scope of this paper.

- (19) a. John-i [Mary-ka papolako] mitnun-ta.
 J-[PM <Nom>] M-[PM <Nom>] be stupid believes-Decl
 [RM <Nom>] [RM <Nom>]
 [ANI +] [ANI +]
 'John believes that Mary is stupid.'
 b. *Mary-ka John-i [papolako] mitnun-ta.

This scrambling possibility just follows from the fact that under our analysis, (19b) violates the RM and ANI Constraint of the Argument Constraint.

3.2.2 'Persuade' Construction. Likewise, the verb *seltukha-* 'persuade' subcategorizes for two NPs and a VP to make a complete sentence. As shown in (20a), *seltukha-* takes *Mary* as a subject, *John* as an object, and *Kim-eykey/ul ton-ul cwu-lako* as a VP complement. The VP complement headed by *cwu-* 'give' has two object NPs, *Kim-eykey/ul* and *ton-ul*. In this case, *Kim* subcategorized by *cwu-* and *John* subcategorized by *seltukha-* cannot be switched as in (20b) while the two NPs, *ton* subcategorized by *cwu-* and *John* subcategorized by *seltukha-*, can be scrambled as in (20c).

- (20) a. Mary-ka [John-eykey/lul [Kim-eykey/ul ton-ul cwu-lako] seltukhayss-ta.]
 Mary- John- Kim- money- give-Comp persuaded-Decl
 [PM| CASE <Acc>] [PM| CASE <Acc>] [PM <Acc>]
 [POSTP <Dat>] [POSP <Dat>]
 [RM| CASE <Acc>] [RM| CASE <Acc>] [RM <Acc>]
 / [POSTP <Dat>] / [POSTP <Dat>]
 [ANI +] [ANI +] [ANI -]
 'Mary persuaded John to give money to Kim.'
 b. *Mary-ka [Kim-eykey/ul John-eykey/lul ton-ul cwu-lako seltukhayss-ta.]
 c. Mary-ka [ton-ul John-eykey/lul Kim-eykey/ul cwu-lako seltukhayss-ta.]
 d. [Ton-ul Mary-ka John-eykey/lul Kim-eykey/ul cwu-lako seltukhayss-ta.]

The previous surface case-based analyses cannot explain why the two NPs, *John* and *Kim* in (20b), cannot be scrambled with each other even when they have different CASE values. Furthermore, the surface case-based approach faces difficulties accounting for why the two NPs, *John* and *ton* in (20c), can be scrambled with each other, though they have the same CASE value. However, this analysis can predict that the scrambled sentence (20c) is grammatical whereas (20b) is ungrammatical. As illustrated in (20a), the second NP *John* and the third NP *Kim* have the same value for PM, because they both alternate their markers. Therefore, the two NPs cannot be scrambled in terms of the PM Constraint. In contrast, the fourth NP *ton* can be scrambled freely with other NPs in the given sentence as in (20c) because it does not share a value for PM or ANI with other NPs. The first NP *Mary* does not share the PM value or RM value with other NPs, so it can also be scrambled with other NPs as in (20d).

3.2.3 'Promise' Construction. The verb *yaksokha-* 'promise' in (21) subcategorizes for two NPs and a VP-complement. In this construction, when the NP *Tom* in the VP complement has a dative marker, it cannot be switched with *Mary*, as in (21b). When it has an accusative marker, it can be switched with any NP, as in (21c).

- (21) a. John-i Mary-eykey [Tom-eykey/ul ton-ul cwukeyssta-ko] yaksokhan-ta.
 John- Mary- Tom- money- give-Comp promises-Decl
 [PM <Nom>] [PM <Dat>] [PM] CASE <Acc> [PM <Acc>]
 |POSTP <Dat> |
 [ANI +] [ANI +] [ANI +] [ANI -]
 'John promises Mary to give money to Tom.'
- b. *John-i Tom-eykey Mary-eykey ton-ul cwukeyssta-ko yaksokhan-ta.
 [RM <Dat>] [RM <Dat>]
 [ANI +] [ANI +]
- c. ?John-i Tom-ul Mary-eykey ton-ul cwukeyssta-ko yaksokha-n-ta.
 [RM <Acc>] [RM <Dat>]
 [ANI +] [ANI +]
- d. Mary-eykey John-i ton-ul Tom-eykey/ul cwukeyssta-ko yaksokhan-ta.
 [PM <Nom>] [PM <Acc>]
 [ANI +] [ANI -]

Under this analysis, the scrambling facts in this construction can be explained as follows. As illustrated in (21), the second NP *Mary* and the third NP *Tom* have different PM values, so they are not constrained by the PM Constraint. However, since the two NPs have the same value for ANI, they cannot be scrambled with each other when they have the same value for RM as in (21b), by the definition of the RM and ANI Constraint. On the contrary, in (21c), where the two NPs, *Mary* and *Tom*, have different RM values, they can be scrambled because there are no constraints to restrict their scrambling. As in (21d), the two NPs, *John* and *ton*, can be freely switched because the former does not share the PM value with the others and the latter does not share the PM and ANI values.

3.3 Further Data Analysis

So far, we have shown that this analysis can account for both clause-internal and long-distance scrambling among NPs with a certain marker, which would be hard to explain by the previous analyses. Furthermore, we will show in the following section that this analysis can explain clause-internal and long-distance scrambling among NPs with delimiters or without any markers. This would be a challenge to any existent theory on free word order in natural language.

3.3.1 Scrambling among Arguments and Adjuncts with Markers. The fact that this analysis can deal with all markers via the LP Constraints above enables us to predict that the two NPs bearing the same delimiters such as the 'topic' marker *un/nun* cannot be scrambled in Korean. The two argument NPs in (22), *Mary* and *ku namca* 'that man', bear the same topic marker, and also have the same ANIMACY values. In this construction, the two NPs with the same marker cannot be scrambled.⁸

8. When we can get a reading like 'that man likes Mary' from sentence (22a), then (22b) should be regarded as grammatical. If it is true, this theory might face some difficulties accounting for why the two NPs with the same PM, RM and ANI value can be scrambled. Furthermore, as an anonymous reviewer pointed out, the first NP with a topic marker can be construed as a topic NP in (22), whereas the second one, as a contrastive focused NP. If so, PM|DEL <Top> would be PM|DEL <Contrastive Focus> so that the latter is mapped to RM <Top('nun')>. Consequently, our theory can correctly predict the grammaticality of (22) without any other constraint. But it is clear that our theory needs to be elaborated to be a complete theory of markers in Korean.

- (22) a. Mary-nun ku namca-nun cohahan-ta
 M-[PM|CASE<Nom>] that man- [PM | CASE<Acc>] likes-Decl
 [DEL <Top> | | DEL <Top> |
 [RM <Top>] [RM <Top>]
 cm [ANI +] [ANI +]
 'Mary likes that man.'
 b. *Ku namca-nun Mary-nun cohahan-ta.
 'That man likes Mary.'

Under this analysis, the RM & ANIMACY Constraint of the Argument Constraint correctly predicts that the two NPs cannot be scrambled since they share the same RM and ANIMACY values.

Furthermore, this theory can also make a correct prediction for the grammaticality of the scrambled sentence with an argument NP and an adjunct with the same delimiter. In (23), though the argument NP, *sonamwu-*, and the adjunct, *i san-*, share the same delimiter, they can be freely scrambled as illustrated in (23b). It is so because they need not observe the Argument Constraint.

- (23) a. I san-un sonamwu-nun manh-ta.
 -[PM|POSTP <Loc>] pine trees-[PM|CASE <Nom>] abound in-Decl
 [|DEL <Top>] [|DEL <Top>]
 [RM <Top>] [RM <Top>]
 [ANI -] [ANI -]
 'Pine trees abound in this mountain.'
 b. Sonamwu-nun i san-un manh-ta.

3.3.2 Scrambling among Arguments without Markers. Also, it seems that the two NPs bearing no markers cannot be scrambled in Korean. The two argument NPs in (24a), *Mary* and *ku namca* 'that man', have no overt marker and the same ANIMACY values. In this case, the two NPs with no marker cannot be scrambled as in (24b).

- (24) a. Mary-∅ ku namca-∅ cohahay
 M-[PM|CASE<Nom>] that man-[PM | CASE<Acc>] likes-Decl
 [RM < >] [RM < >]
 [ANI +] [ANI +]
 'Mary likes that man.'
 b. *Ku namca- Mary- cohahay.
 'That man likes Mary.'

This analysis correctly predicts that (24b) is ungrammatical by the definition of the RM & ANI Constraint. Specifically, the two argument NPs cannot be scrambled because they share the same RM and ANIMACY value, i.e. < > and +, respectively.

By contrast, an argument NP and an adjunct without any marker appear to be scrambled with each other. In (25), though the argument NP, *ku namca-*, and the adjunct, *hakkyo-*, have no marker, they can be freely scrambled because they need not observe the Argument Constraint.

- (25) a. Hakkyo- ku namca- kass-e.
 school-[PM <Loc>] that man-[PM <Nom>] went-Decl
 [RM < >] [RM < >]
 [ANI -] [ANI +]
 'That man went to school.'
 b. Ku namca- hakkyo- kass-e.

The scrambling among arguments (and adjuncts) without markers or with the same marker can be accounted for under this analysis by regarding the empty list as a value of the RM. However, this theory seems to face a difficulty in explaining scrambling between an NP with a marker and one without any marker. For instance, when the NP with a topic marker and the NP without any marker are scrambled, the sentence might have two readings as shown in (26a): 'Mary likes that man.' or 'Mary, that man likes'. To get the latter reading, the second NP, *ku namca-nun*, in (26a) should be stressed. In this case, if the two NPs are switched in order, the sentence seems to get only the former reading.

- (26) a. Mary- ku namca-nun cohahay.
 Mary- that man-Top likes-Decl
 [PM— CASE<Nom>] [PM — CASE<Acc>]
 [RM < >] [RM <Top>]
 [ANI +] [ANI +]
 'Mary likes that man .' OR 'Mary, that man likes.'
 b. *Ku namca-nun Mary- cohahay.
 'That man likes Mary.'

Though it is predicted, under this analysis, that the two NPs with different markers in (26) can be scrambled because the two arguments do not violate any LP constraint, it appears to be hard to explain why the scrambled sentence in (26b) can get only one reading. This would be a challenge to this theory. We will leave this problem for further research.

4. Concluding Remarks

It is a well-known fact that the Korean language has various nominal markers and is a relatively free word order language. Lots of linguists believe that there might be some relationship between case markers and the scrambling possibilities. To explore this relationship, Kuno (1980) has proposed the COC constraint, which cannot explain various scrambling phenomena in Korean. However, it is argued that the previous theories based on the COC are insufficient to cover the empirical data presented above mainly because the COC is implemented with a surface case whose value is monadic.

For a theory of scrambling phenomena to be complete, we have proposed a new type of *marker* and the Adjunct LP Constraint, in conjunction with the Argument LP Constraint. These LP constraints might be interpreted as one of our processing strategies: when a given sentence is ambiguous, we tend to regard the sentence as an unscrambled one. It is clear that this tendency is formally expressed within the two LP Constraints. In principle, argument NPs are freely scrambled unless they share the same marker, and adjuncts are freely switched as long as they are in the minimal S domain. This idea enables us to provide a simpler explanation for various scrambled sentences. Furthermore, we can account for the scrambling phenomena among arguments (and adjuncts) with delimiters or without any markers, which would be hard to explain under the previous analyses.

We have theoretically suggested that this theory can be a complete theory of scrambling phenomenon by providing the new type *marker* and the two LP constraints, i.e. the Adjunct LP Constraint and the Argument LP Constraint. Empirically, we have also demonstrated that although there remain some residual problems, this theory enables us to analyze further scrambling data in Korean.

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