Factors for Preferred Internal Orderings of Korean Noun Phrases

Kum-Jeong Joo
(University of Hawai'i at Mānoa)

Joo, Kum-Jeong. (2015). Factors for Ppreferred Internal Orderings of Korean Noun Phrases. *Language Research*, 51.2, 383-400.

This study explores what factors affect preferred internal orderings of Korean noun phrases (nps) that include demonstratives, numerals, adjectives, and nouns. I consider a syntactic account, a processing account, and a semantic compositionality account. I conducted an experiment in which native Korean-speaking adults completed an acceptability judgment task and an online self-paced reading task. The results of the acceptability judgment indicate a ranking in the naturalness of the structures. The most acceptable np is DEM+A+N+NUM, and the least acceptable is A+DEM+ NUM+N. The self-paced reading task found that the np with the highest acceptability, DEM+A+N+NUM, shows the fastest response times, while the np with the lowest acceptability, A+DEM+ NUM+N, shows the slowest response times. The results suggest that the preferred internal orderings of Korean nps are those in which processing is facilitated by two conditions: domain minimization and semantic compositionality.

Keywords: Processing, syntax, compositionality, noun phrases, Korean

1. Introduction

Noun phrases can include demonstratives, numerals, adjectives, and nouns. In phrases including all four of these elements, 24 orderings are mathematically possible. Typological studies have reported, however, that some patterns are more common in the world's languages. For example, Greenberg (1963: 87) acknowledged three patterns among the 30 languages he examined. In the generalization known as Universal 20, he reported that when all three other items precede the noun, they are always found in the order DEM+NUM+A+N; if they follow the noun, the order is either N+DEM+NUM+A or N+A+NUM+DEM.[1)] Subsequently, Hawkins (1983: 119-

{NOTE:0150}20) found three more postnominal patterns commonly occurring in languages – N+NUM+A+DEM, N+A+DEM+NUM, and N+DEM+A+NUM – thus undermining Universal 20.

Several accounts have been proposed to explain the word order patterns in NPs. Cinque (2005) proposed that 14 orders are available in the world's languages, and that they are either the base-generated syntactic structure DEM+NUM+A+N or structures derived from it. Hawkins (2004) suggested that the patterns are biased toward those that minimize the distance between the head and the dependent. Groenendijk and Stokhof (2005) suggested that there is a semantic rule for how to put DEM, NUM, A, and N together.

This paper focuses on processing and preference of internal orderings of NPs in Korean. The research question of this study is as follows: Can the three theories explain the *preferred* internal orderings of Korean noun phrases? This study addresses this question experimentally. In what follows, Section 2 discusses the proposals put forth by Cinque (2005), Hawkins (2004), and Groenendijk and Stokhof (2005) and considers what predictions each proposal makes about the preferred Korean word orders. Section 3 presents the methods and results of the current study. Lastly, Section 4 concludes the paper with general discussion.

1) Abbreviations used in glosses in the present study are as follows: A: adjective; DEM: demonstrative; CL: classifier; GEN: genitive; N: noun; NUM: numeral.

2. Background

2.1. Cinque's (2005) syntactic account

Cinque (2005) suggested 14 typologically available orders, including one prenominal and 13 postnominal patterns. See Table 1.

Table 1. Fourteen Available Orders Proposed by Cinque (2005)

Category	Patterns
Prenominal ordering (n = 1)	DEM+NUM+A+N
Postnominal ordering (n = 13)	DEM+NUM+N+A, DEM+N+NUM+A, N+DEM+NUM+A, A+N+DEM+NUM, N+A+DEM+NUM, DEM+A+N+NUM, DEM+N+A+NUM, N+DEM+A+NUM, NUM+A+N+DEM, NUM+N+A+DEM, N+NUM+A+DEM, A+N+NUM+DEM, N+A+NUM+DEM

According to Cinque, the key to explaining the word order phenomenon is a movement operation in the syntactic structure. He acknowledged that if the noun appears at the end of the np, the order of certain modifiers is rigid (DEM+NUM+A+N); however, in languages in which N is initial, he observed significant ordering variation. Based on this finding, he claimed that noun movement is a fundamental mechanism in determining reordering. His account can be summarized as follows: First, the base-generated syntactic structure is DEM+NUM+A+N, which is the prenominal ordering, as seen in Figure 1 (Cinque, 2005: 317-21). Second, all movements move a subtree containing N. Third, all movements target a c-commanding position. Fourth, there is successive movement to each Spec with the pied-piped category. A specific example of the movement operation is presented in (1-3). First, the np *books* moves to Spec of Agr_yP, as illustrated in the first step in Figure 1. This gives the order DEM(P) - NUM(P) - N(P) - A(P), as in (1); t = trace of movement.

(1) those two books big t

Second, the NP can move again, this time to Spec of Agr_xP. If this happens, the NP brings with it the entire Agr_yP *books big* (hence the term "pied-pip-

ing"), giving the order DEM(P) - N(P) - A(P) - NUM(P), as in (2).

(2) those books big two t

Finally, the whole phrase including the NP, the AP, and the NUMP (*books big two*) moves as a single unit to the spec of Agr_wP across the DEMP. This results in the sequence of N(P) - A(P) - NUM(P) - DEM(P), as exemplified in (3). Here, the NP pied-pipes both the AP and the NUMP.

(3) books big two those *t*

Note that the 14 possible orderings that Cinque proposed are those that this movement operation allows.

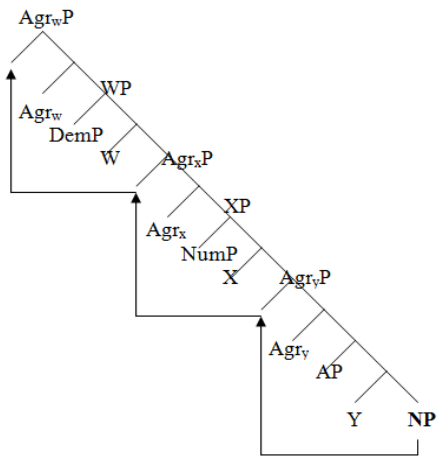

Figure 1. Cinque's base generated tree structure (2005, p. 317).

However, Cinque's account does not cover some possible orderings in Korean. According to him, there is only one prenominal ordering, DEM+NUM+A+N, which is the base-generated syntactic structure. His proposal does not allow prenominal orderings such as DEM+A+NUM+N. Korean, however, allows (4a-b), which are DEM+NUM+A+N and DEM+A+NUM+N, respectively.[2)]

(4) a. ce twu-kay-uy ppalkan sakwa
those two-cl-gen red apple
'those two red apples' [DEM+NUM+A+N: Possible order in Cinque's proposal]

b. ce ppalkan twu-kay-uy sakwa
those red two-cl-GEN apple
'those two red apples' [DEM+A+NUM+N: Impossible order in Cinque's proposal]

Although Cinque's proposal does not explain patterns like (4b) in Korean (for discussion on 4b, see An, 2014; for recent studies on Korean NPs, among others, see Hong 2008; Kim 2013; Park 2008),[3] its proponents might suggest that Cinque's "possible" patterns (e.g., base-generated syntactic structure DEM+NUM+A+N) would be preferred over the "impossible" patterns. In other words, they might predict that there would be a significant difference between the possible patterns (e.g., 4a) and the impossible patterns (e.g., 4b) in terms of acceptability.

2.2. Hawkins's (2004) processing account

Hawkins (2004) claimed that there is no straightforward grammatical account for preferred and less preferred language structures. The patterns found in a language are a reflection of degrees of preference that are related to performance and ease of processing. That is, the more natural something sounds, the easier it is to process. The key concept of the

2) Korean uses classifiers when counting objects. Classifiers are always followed by numbers. There are two different points of view regarding the status of classifiers. Some researchers insist that Num and classifiers form a single syntactic unit (Muromatsu, 1998), while others argue that they are two different functional heads (Gil, 1994; Greenberg, 1975). In the present paper, I will not deal with whether or not they constitute a single syntactic unit. In addition, the presence of the classifiers is not mentioned in the paper except in the example phrases. In addition, *twu-kay-uy* 'two-CL-GEN' can be viewed an adnominal phrase, as one of the reviewers pointed out. These can be major issues, which should not be overlooked. I acknowledge that these are some of the limitations that this study has.

3) Cinque himself acknowledged these exceptions in Korean. In fn.2 (p. 315), he stated that "this apparent exception should be considered with caution."

domain minimization theory that Hawkins proposes is that a language seeks to minimize the distance between the verb and the head of its dependent phrase. That is to say, a smaller distance between the verb and the head of its dependent phrase is easier to process. As a result, constructions with smaller distances between these elements' positions become the preferred patterns.[4] As a first step, let's apply domain minimization theory to the four examples in (5).

(5) a. vp[went pp[to the movies]]
|----------|
0

b. [[the movies to]pp went]vp
|----------|
0

c. vp[went[the movies to]pp]
|--------------------|
2

d. [pp[to the movies]went]vp
|--------------------|
2

5a and 5c show structures for head initial (or VO) languages. These two phrases contain the same number of immediate constituents (henceforth, IC) as VP and PP. However, they differ in terms of the number of words between the verb and the head of the PP. More specifically, in the case of 5a, there is no intervening word between the verb and P, the lexical head of the PP; and in 5c, there are two intervening elements. These differences between the two phrases lead to the following results: the lack of intervening elements in 5a makes the phrase optimally efficient

4) The benefit of locality domain was also advocated by Gibson (1998, 2000) in terms of Dependency Locality Theory.

to process, so it is preferred over 5c, which has two intervening elements. The same phenomenon can be found in 5b and 5d: due to the short distance between the head and the verb of 5b, 5b is preferred over 5d, which has two intervening words (Hawkins 2004: 124).

The concept of Hawkins's (2004) domain minimization theory can be applied to the NP structure, although this is slightly different from the original idea. The original idea deals with the distance between the head noun and the verb. For NPs, the head noun can stand alone, while DEM, A and NUM cannot stand alone but modify the head noun. Thus, I believe that it is the distance between the dependent and the head noun that is significant.[5] See (6a-c) for examples.

(6) a. Ordering 1
DEM+A+N+NUM
|--------|----||-------|
1 + 0 + 0 = 1

b. Ordering 2
DEM+NUM+A+N
|--------|-------|-----|
2 + 1 + 0 = 3

c. Ordering 3
A+DEM+NUM+N
|------|--------|------|
2 + 1 + 0 = 3

I calculate the processing cost for the three orderings in (6a-c) as follows. For (6a), before the head noun, there are two preceding elements: the determiner and the adjective. Because the adjective appears between the determiner and the noun, the distance from the determiner to the noun is counted as 1, whereas the distance from the adjective to the head noun

5) The dependents such as A, NUM, and DEM have been considered as adjuncts (Carnie, 2002).

is 0 because there is no intervening element. The distance between the number and the noun is also 0 because there is no intervening element. In sum, the overall distance of DEM+A+N+NUM is 1. Applying the same rule, both Ordering 2 and Ordering 3 have a distance of 3.

However, the domain minimization theory alone does not account for the possible/impossible NP structures in Korean. For example, the overall distance of DEM+N+A+NUM is 1, but it is an impossible NP structure in Korean. As for the preferred word orders that are possible, the proponents of Hawkins's (2004) approach would predict that the word order with the least distance between the head noun and the dependents is more preferred than the other word orders.

2.3. Groenendijk and Stokhof's (2005) semantic compositionality account.

According to Groenendijk and Stokhof (2005), semantic compositionality is at the very heart of syntactic structure. They point out that there can be no syntax without semantics. The importance of compositionality is emphasized by Chomsky as well (1975, cited in Boeckx, Fodor, Gleitman, and Rizzi 2009: 219). Groenendijk and Stokhof's main argument is that when we compose an NP with determiner, adjective, noun, and number, there is a rule for how to put them together. In brief, first, the elements expressing properties of a noun tend to be closer to the noun (e.g., *big apple*); second, the determiner closes off the phrase (e.g., *these+three+nice+books*). Let us consider the three np structures in (6a-b) in terms of compositionality. See (7a-b).[6)]

(7) a. Ordering 1
DEM+[[A+N]+NUM] (✓)

b. Ordering 2
DEM+[NUM+[A+N]] (✓)

6) As one of the reviewers correctly pointed out, it should be noted that DEM does not have to be on the left edge of the NP, as listed in the example in the stimuli item.

c. Ordering 3
A+DEM+NUM+N (×)

In the case of Ordering 1 (7a), the adjective is closer to the noun, and the demonstrative closes off the phrase. It therefore satisfies the requirements of the compositionality hypothesis. By the same token, Ordering 2 (7b) conforms to the hypothesis in that the preceding determiner modifies the whole phrase, and the adjective is closely linked to the noun. However, in the case of Ordering 3 (7c), the adjective is placed further away from the noun, and the determiner is placed between the adjective and the noun. Thus, it becomes an intervening element and cannot modify the whole phrase. For this reason, Ordering 3 does not fit the compositionality hypothesis. In sum, when the compositionality hypothesis is applied to these three conditions, Orderings 1 and 2 satisfy the requirements, but Ordering 3 does not.

However, semantic compositionality alone does not determine the possible/impossible NP structures in Korean. For example, although n and a are together in DEM+N+A+NUM, this ordering is not allowed in Korean. In addition, as one of the reviewers correctly pointed out, semantic compositionality cannot explain a noun-initial word order well. As for the preferred word orders among the possible word orders, the proponents of Groenendijk and Stokhof (2005) would predict that native speakers will prefer the NP structures that correspond to semantic compositionality.

2.4. Assessing the three proposals

I assume that the preferred phrase sounds natural and is easy to process (Hawkins 2004; O'Grady 2005). Therefore, we expect that people would rate the preferred phrase as having the highest acceptability and respond to it more quickly than to a less preferred phrase. We designed an experiment with an acceptability judgment task and an online processing task to test the predictions of the three proposals.

3. The Current Study

3.1. Methods

To examine Korean-speaking adults' judgments on multiple possible word orderings with four elements – determiners, adjectives, numbers, and nouns – we recruited 30 native Korean-speaking adults (age range = 22-29) to participate in the experiment. At the time of testing, they were all university students in Seoul, Korea. All participants received the equivalent of $8 as compensation for their time.

The testing items employed noun phrases with six different word orderings chosen from the 24 mathematical possibilities. I selected the six orderings based on the results of a preliminary test in which I asked five native Korean speakers, who did not participate in the main experiment, to describe a picture depicting two red apples in various ways, but always including the words *ce* 'that, these, those', *twu* 'two', *ppalkan* 'red', and *sakwa* 'apple'. They produced the following six orderings: DEM+A+N+NUM, A+DEM+N+NUM, DEM+NUM+A+N, NUM+DEM+A+N, A+DEM+NUM+N, and DEM+A+NUM+N. Notably, only two of these orderings (DEM+A+N+NUM, DEM+NUM+A+N) are possible according to Cinque (2005).

The experimental materials were four tokens of each of the six conditions (i.e., the six orderings), yielding a total of 24 test items. Each test item had seven or eight syllables. Forty-eight filler phrases used inflectional particles; 12 fillers contained a noun followed by a particle (e.g., *uysa-man* 'doctor-ONLY'), which is the correct order in Korean; in the remaining 36 fillers, the particle preceded the noun (e.g., *man-uysa* 'ONLY-doctor'), which is not allowed in Korean. Each participant therefore read and judged 72 phrases (24 grammatical test items, 12 grammatical fillers, and 36 ungrammatical fillers) in total. The experiment used E-Prime 2.0 to present each stimulus on a laptop computer screen, one at a time. The participants moved through the task by pressing a key. E-Prime 2.0 also measured the response times of each participant by recording the time between key presses.

Participants were individually tested. They were first given both written and verbal instructions explaining the procedure of the experiment. They were informed that their task was to rate how natural the stimuli sounded,

based on a 5-point Likert scale (1: very unnatural; 2: unnatural; 3: intermediate; 4: natural; 5: very natural), by pressing one of the keys on the keyboard. They were asked to rely on their first intuitive reaction to the phrases. Before the main test, participants completed five training tests. First, a fixation mark (+) appeared on the screen. When participants pressed the spacebar, they automatically moved to the next screen, and the stimulus appeared. When they saw a test item on the screen, they rated the item by pressing one of five keys on the keyboard. The presentation order of the items was randomized. On average, the task took less than 20 minutes.

3.2. Predictions.

See Table 2 for example test items and the word orderings that should be acceptable according to the proposals made by Cinque (2005) and Groenendijk and Stokhof (2005). See Table 3 for the word orderings that should be preferred in processing according to Hawkins (2004).

Table 2. Types of Test Items and Predictions on Acceptability

#	Conditions	Example set of experimental conditions	Cinque (2005)	Groenendijk and Stokhof (2004)
1	DEM+A+N+NUM	ce ppalkan sakwa twu-kay those red apple two-CL 'those two red apples'	More acceptable (Possible)	More acceptable (A and N together)
2	A+DEM+N+NUM	ppalkan ce sakwa twu-kay red those apple two-CL 'those two red apples'	Less acceptable (Impossible)	Less acceptable (A and N separated)
3	DEM+NUM+A+N	ce twu-kay-uy ppalkan sakwa those two-CL-GEN red apple 'those two red apples'	More acceptable (Possible)	More acceptable (A and N together)
4	NUM+DEM+A+N	twu-kay-uy ce ppalkan sakwa two-CL-GEN those red apple 'those two red apples'	Less acceptable (Impossible)	More acceptable (A and N together)
5	A+DEM+NUM+N	ppalkan ce sakwa twu-kay red those apple two-CL 'those two red apples'	Less acceptable (Impossible)	Less acceptable (A and N separated)
6	DEM+A+NUM+N	ce ppalkan twu-kay-uy sakwa those red two-CL-GEN apple 'those two red apples'	Less acceptable (Impossible)	Less acceptable (A and N separated)

Table 3. Types of Test Items and Predictions on Processing Preference

#	Conditions	Example set of experimental conditions	Hawkins (2004)
1	DEM+A+N+NUM	ce ppalkan sakwa twu-kay those red apple two-CL 'those two red apples'	More preferred (distance=1)
2	A+DEM+N+NUM	ppalkan ce sakwa twu-kay red those apple two-CL 'those two red apples'	More preferred (distance=1)
3	DEM+NUM+A+N	ce twu-kay-uy ppalkan sakwa those two-CL-GEN red apple 'those two red apples'	Less preferred (distance=3)
4	NUM+DEM+A+N	twu-kay-uy ce ppalkan sakwa two-CL-GEN those red apple 'those two red apples'	Less preferred (distance=3)
5	A+DEM+NUM+N	ppalkan ce sakwa twu-kay red those apple two-CL 'those two red apples'	Less preferred (distance=3)
6	DEM+A+NUM+N	ce ppalkan twu-kay-uy sakwa those red two-CL-GEN apple 'those two red apples'	Less preferred (distance=3)

I expected that the phrases that receive the highest acceptability ratings would have the fastest response times, while the phrases with the lowest acceptability ratings would have the slowest response times. In this respect, the specific predictions of what each proposal makes are as follows: For the prediction based on Cinque, the possible phrases (i.e., Conditions 1 and 3) should have higher acceptability ratings and faster response times than the impossible phrases (i.e., Conditions 2, 4, 5, and 6). For the prediction based on Groenendijk and Stokhof, the conditions in which the noun and the adjective are adjacent to each other (i.e., Conditions 1, 3, and 4) should have higher acceptability ratings and faster response times than the conditions in which the noun and the adjective are separated (i.e., Conditions 2, 5, and 6). For the prediction based on Hawkins, the conditions with lower processing cost (i.e., Conditions 1 and 2) should have faster response times and higher acceptability ratings than the conditions with higher processing cost (i.e., Conditions 3, 4, 5 and 6).

3.3. Results

Analyses were conducted with acceptability score and response time as dependent measures. Reading times that were more than 2.5 standard deviations above and below the mean were replaced with the 2.5 standard deviation above and below the mean scores. This affected 1.0% of the data. Figure 2 shows the average ratings of the acceptability of the six types of NP. As can be seen in the figure, the average ratings of the six phrase types vary from 3.3 to 4.2 (out of 5). That is, all the conditions were acceptable to the participants. The mean acceptability score of Condition 1 (DEM+A+N+NUM) is the highest at 4.2; Condition 3 (DEM+NUM+A+N), Cinque's (2005) basic word-order pattern, gets the second highest score of 3.8. Condition 5 (A+DEM+NUM+N) gets the lowest score of 3.3.

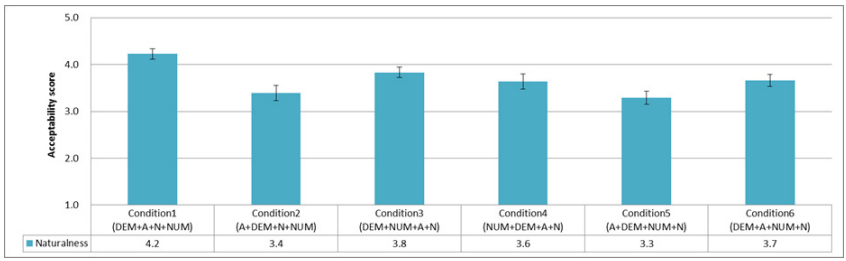

Figure 2. Acceptability scores.

Response times in the six conditions are shown in Figure 3. The variations in the response times were compared using a repeated-measures ANOVA test, which shows that there is a difference in the response times in the six conditions ($F_1(1,29) = 14.852$, $p < .01$ by subject analysis; $F_2(1,23) = 5.530$, $p = .028$ by item analysis). Condition 1 (DEM+A+N+NUM), which has the highest acceptability score, shows the fastest response times, with an average of 3170 milliseconds. Responses to Condition 5 (DEM+NUM+A+N), with the lowest acceptability score, took longer, with an average of 4139 milliseconds. Condition 3 (DEM+NUM+A+N), Cinque's (2005) basic word-order pattern, falls in the middle, with an average response time of 3787 milliseconds. The results of the experiment reveal a strong correlation between acceptability scores and ease of processing as reflected in response time (correlation coefficient = 0.86). That is, the highest acceptability leads to

the fastest response times, and the lowest acceptability causes the slowest response times.

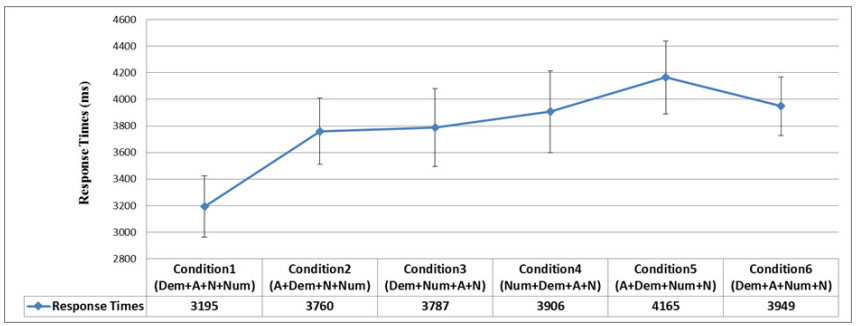

Figure 3. Response times.

Let us assess how well the results fit the predictions based on the three proposals. According to Cinque (2005), only Conditions 1 and 3 are possible. The fact that Conditions 1 and 3 showed the highest acceptability ratings seems to support Cinque. Notably, however, Condition 3 is the base-generated phrase, but the acceptability and response time in this condition are not significantly different from those for Cinque's impossible phrases (Conditions 2, 4, 5, and 6). If Condition 3 is the universal underlying structure, the question arises of why it does not get the highest acceptability rating and show a significant difference from the "impossible" word orders in acceptability ratings and response times. For Groenendijk and Stokhof (2004), Conditions 1, 3, and 4 would be more preferred than the other conditions. The results in the current experiment seem to support this prediction in that Conditions 1 and 3 showed higher acceptability ratings and faster response times than Conditions 5 and 6. However, a question still remains as to why Condition 1 showed faster response times than Condition 3. Finally, for Hawkins (2004), Conditions 1 and 2 would be more preferred than the other conditions; in this experiment, Conditions 1 and 2 are the two conditions with the fastest response times. However, the processing account alone cannot account for the faster response time in Condition 1 than in Condition 2. That is, Hawkins (2004) cannot fully explain the processing preference for the Korean word orders, although it is a theory of processing.

4. General Discussion

The two main findings from the experiment are as follows: First, in six internal orderings of Korean NPs with demonstrative, numeral, adjective, and noun, if the given NP is easy to process, it gets high acceptability scores, whereas if it is difficult to process, it gets lower acceptability scores. According to the proponents of the processing account, real-time processing is at the heart of linguistic phenomena; if a pattern is easy to process, people prefer that pattern. This study investigated the relation between ease of processing and preference, and found a strong connection between them.

Second, the differences in the acceptability scores, which judge naturalness, and the speed of processing for the six NPs demonstrate that preferences for word order do exist: DEM+A+N+NUM was the most acceptable, and A+DEM+NUM+N was the least acceptable. And DEM+NUM+A+N, the basic word order for all languages according to Cinque (2005), fell between these two extremes. Of the three proposals I considered, no single one can explain the grammar and preferences for the internal orderings of noun phrases in Korean.

The findings in this study, however, can be explained if we apply the compositionality hypothesis and the domain minimization theory together to the six np structures. Condition 1 has the shortest distance between the head noun and the dependent. It also complies with the compositionality hypothesis. If both distance and compositionality are factors affecting acceptability, this explains why Condition 1 would be the most preferred word order. Because the preferred word order is easier to process, it affects how quickly people respond to the given nps; thus, the response times for the most highly acceptable phrase, DEM+A+N+NUM, were the quickest. As for Condition 5, it has a long distance between the head noun and the dependent, and it does not satisfy the compositionality hypothesis. Again, if both distance and compositionality affect acceptability, Condition 5 would be expected to receive low acceptability ratings and be responded to slowly, just as this study found. As for Condition 3, which is the basic word order for Cinque, it showed higher acceptability

ratings and faster response times than Condition 5. This is due to the fact that Condition 3 satisfies the compositionality hypothesis and Condition 5 does not.

In sum, the participants' responses to the two phrases that conform to compositionality but differ in the distance between the head and the dependent demonstrate that both factors crucially affect acceptability and response times. In other words, phrases that both fit the compositionality hypothesis and are easier to process because they have a short distance between head noun and dependent are more acceptable and evoke faster responses. On the other hand, phrases that do not fit the compositionality hypothesis and/or have a long distance between the head noun and dependent have lower acceptability and slower response times.

5. Concluding Remarks

This study found a relationship between the ease of processing and the degree of acceptability. Ease of processing relies on two factors: conformity to compositionality and domain minimization. The study demonstrates, therefore, that semantic compositionality and processing burden affect preferences for the internal orderings of noun phrases in Korean.

As one of the reviewers pointed out, it is also noteworthy that factors discussed in previous theories can be considered as a constraint that can be violated, rather than a categorical/rigid grammar. The more violations we have, the less preferred the structure is. This paper, dealing with processing and preference of internal orderings of NPs, is one of the attempts to reveal the effects of such constraints in language processing.

References

An, Duk-Ho. (2014). Genitive Case in Korean and its implications for noun phrase structure. *Journal of East Asian Linguistics* 23.4, 361-392.

Boeckx, Cedric, Fodor, Janet D., Glertman, Lila, and Rizzi, Luigi. (2009). Round table: Language universals: Yesterday, today, and tomorrow. In M. Piattelli-Palmarini, J. Uriagereka & P. Salaburu (Eds.), *Of minds and language: A dialogue with Noam Chomsky in the Basque country* (pp. 195-220). Oxford: Oxford University Press.

Carnie, Andrew. (2002). *Syntax: A generative introduction*. Oxford: Blackwell Publishing.

Chomsky, Noam. (1975). *The logical structure of linguistic theory*. New York: Plenum Press.

Cinque, Guglielmo. (2005). Deriving Greenberg's Universal 20 and its exceptions. *Linguistic Inquiry* 36.3, 315-332.

Gibson, Edward A. F. (1998). Linguistic complexity: Locality of syntactic dependencies. *Cognition* 68.1, 1-76.

Gibson, Edward A. F. (2000). The dependency locality theory: A distance-based theory of linguistic complexity. In A. Marantz, Y. Miyashita & W. O'Neil (Eds.), *Image, language, brain* (pp. 95-126). Cambridge, MA: MIT Press.

Gil, David. (1994). Sum: Numeral classifiers. *Linguist List* 5, 466.

Greenberg, Joseph. (1963). Some universals of grammar with particular reference to the order of meaningful elements. In J. Greenberg (Ed.), *Universals of grammar* (pp. 73-113). Cambridge, MA: MIT Press.

Greenberg, Joseph. (1975). Dynamic aspects of word order in the numeral classifier. In C. Li (Ed.), *Word order and word order change* (pp. 27-46). Austin: University of Texas Press.

Groenendijk, Jeroen and Stokhof, Martin. (2005). Why compositionality? In G. N. Carlson & F. J. Pelletier (Eds.), *Reference and quantification: The Partee effect* (pp. 83-105). Stanford, CA: CSLI Press.

Hawkins, John A. (1983). *Word order universals*. New York: Academic Press.

Hawkins, John A. (2004). *Efficiency and complexity in grammar*. Oxford: Oxford University Press.

Hong, Yong-Cheol. (2010). Peripheral nominal modifiers and noun phrase structure in Korean. *Studies in Generative Grammar* 20, 27-50.

Kim, Jong-Bok. (2013). Floated numeral classifiers in Korean: A non-derivational, functional account. *Lingua* 133, 189-212.

Muromatsu, Keiko. (1998). *On the syntax of classifiers.* Unpublished doctoral dis-

sertation, Baltimore: University of Maryland.
O'Grady, William. (2005). *Syntactic carpentry: An emergentist approach to syntax*. Mahwah, NJ: Lawrence Erlbaum.
Park, So-Young. (2008). Functional categories: The syntax of DP and DegP. Unpublished doctoral dissertation. USC.

Kum-Jeong Joo
Dept. of Linguistics
University of Hawai'i at Mānoa
1890 East-West Road
Honolulu, Hawai'i 96822
Email: kumjeong@hawaii.edu

Received: June 30, 2015
Revised version received: August 6, 2015
Accepted: August 11, 2015