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LF REPRESENTATION IN SCOPE AMBIGUITY BETWEEN NUMERAL QUANTIFIER AND NEGATION IN KOREAN*

SUNYOUNG LEE

This paper reports on an experiment on the interpretation of scope ambiguity with data from adult Korean speakers. The particular area under investigation involves the relation between *numeral* quantified nouns (floated vs. determinative quantified nouns) and negation (postverbal negation). Twenty eight subjects participated in the experiment using the Truth Value Judgement Task (Crain and Thornton 1998). The main finding is that Korean-speaking adults display a strong preference for negation wide scope (Neg > Two), and that the difference between floated and determinative quantified nouns in terms of scope ambiguity is not statistically meaningful. The results are discussed cross-linguistically, and I suggest several avenues for future research.

1. INTRODUCTION. Considerable research has recently addressed the question of how children and adults interpret the scopal ambiguity between quantified expressions and negation (Lidz and Musolino 2002; Musolino 1998; Musolino and Lidz 2003, among others). The present paper attempts to elucidate some aspects of scope relations, focusing exclusively on adults' representation. Since adults in previous studies were able to access the scope ambiguity without difficulty, adult data were not discussed further in the literature. However, I suspect that this may not be true for Korean, given the fact that there are two distinctive ways of forming negation in Korean (preverbal vs. postverbal) and the fact that the literature reports conflicting judgments with respect to the scope ambiguity for sentences containing quantified expressions and the two negation forms.

The particular area under investigation involves the relation between *numeral* quantified nouns and negation. More specifically, I examine ambiguous sentences containing postverbal negation with either *determinative* numeral quantifier or *floated* numeral quantifier. The empirical basis of the paper consists of data from Korean-speaking adults. The extensive studies of this topic have concentrated on English and European languages (see Su 2003 for Chinese data), and thus the claim seems to be in need of more empirical evidence from typologically different languages like Korean. Comparison of cross-linguistic data will help to provide insights into the processes involved in the resolution of the relevant scope ambiguity.

The paper is organized as follows. In section 2, I briefly summarize the linguistic background concerning the target construction. In section 3, I review the previous relevant studies. In section 4, I present an experiment with adults showing scope judgments based on the Truth Value Judgment Task (TVJT). Finally, in section 5, I discuss the particulars of the experiment followed by issues of further research.

2. LINGUISTIC BACKGROUND. It has been noticed that sentences containing numeral quantified nouns and negation in English create scope ambiguity. For example, sentence (1) is ambiguous.

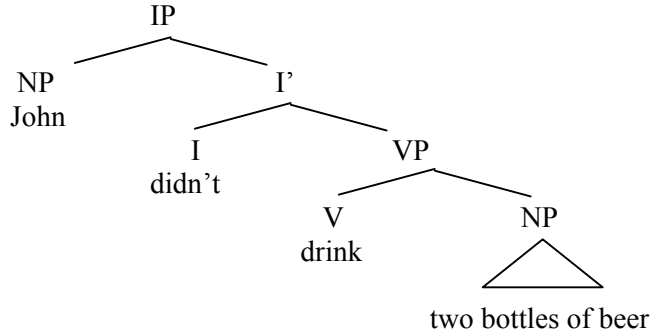
(1) John didn't drink two bottles of beer.

On one interpretation, sentence (1) means that the number of bottles of beer that John drank is not *two*, but say, *three*. Here, *two* receives a narrow scope reading with respect to negation (Neg > Two). With the other interpretation, sentence (1) means that there are two bottles of beer that John didn't drink, in which case *two* receives a wide scope reading with respect to negation (Two > Neg). In the

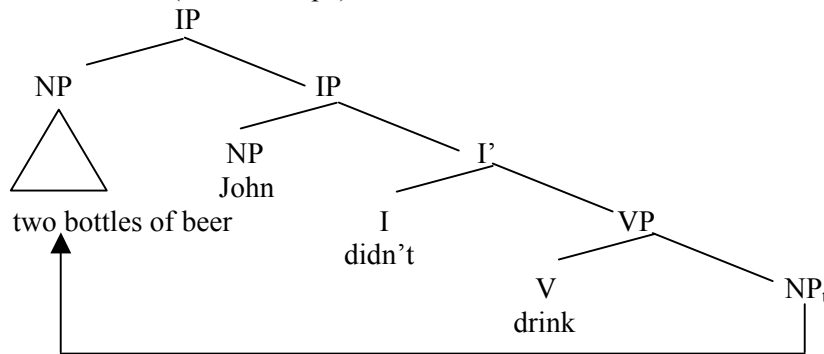
* My deepest thanks go to Dr. William O'Grady and Dr. Kamil Ud Deen for their helpful comments and suggestions in previous drafts of this paper. I am also grateful to all the participants in the experiment. Any remaining errors are mine.

first interpretation, the scope relation is straightforwardly consistent with its linear overt position. In the second interpretation, however, the scope relation does not correspond to the overt position but gives the inverse order. Tree diagrams (2a, b) help to illustrate this difference.

(2) a. Not > Two (surface scope)



b. Two > Not (inverse scope)



Following the standard view in generative grammar, I assume that scope is defined in terms of c-command.¹ That is, given two quantified elements X and Y, X takes scope over Y if X c-commands Y. Tree (2a) is a representation of the first interpretation, in which scope coincides with the surface position of the operators: the negation *not* c-commands the numeral quantified noun. However, in the second interpretation exemplified in (2b), one can see that the scope relation is determined at Logical Form (LF) via movement operations involving the raising of quantified phrases (May 1985).

Keeping this in mind, let us turn to the main target language in the paper, Korean. Korean is a head-final language, and its canonical word order is Subject-Object-Verb. Although it has been generally assumed that Korean also displays scope ambiguity between numeral quantified noun and negation, there has been no clear consensus on scope judgements among researchers. Before discussing this issue, it is worth noting that there are two distinctive ways of forming sentential negation in Korean.

Given that the affirmative sentence is (4a), (4b) is an example of the short-form negation (SFN), while the long-form negation (LFN) is shown in (4c).² In SFN, the negative morpheme *an* is placed

¹ C-command relation is formulated in the following way (Chomsky 1981):
x c-commands y iff,

- a. the first branching node dominating x also dominates y
- b. x does not dominate y
- c. $x \neq y$

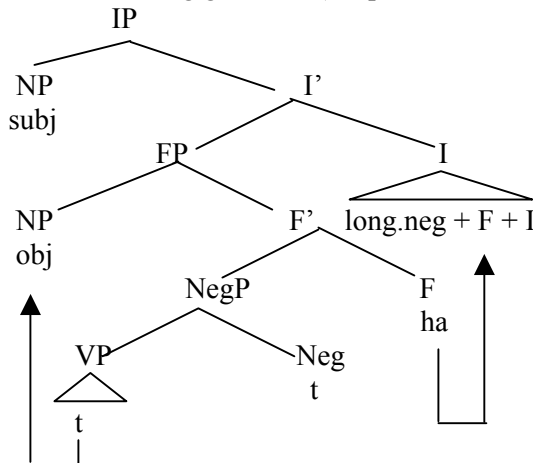
² According to researchers' linguistic viewpoints, the two ways of forming sentential negation have been given many names such as short vs. long (Martin 1969), pre-verbal vs. post-verbal (Cho 1975), type I vs. type II (Yang 1976), and simple vs. complex (Song 1988) etc. In the current study, I simply call them "short-form negation (SFN)" and "long-form negation (LFN)."

right before the verb – that is, preverbally, and in LFN, the nominalizer *ci* is suffixed to the verb and the negative morpheme *an*, accompanied by the auxiliary verb *ha-ta*, follows it – that is, postverbally.

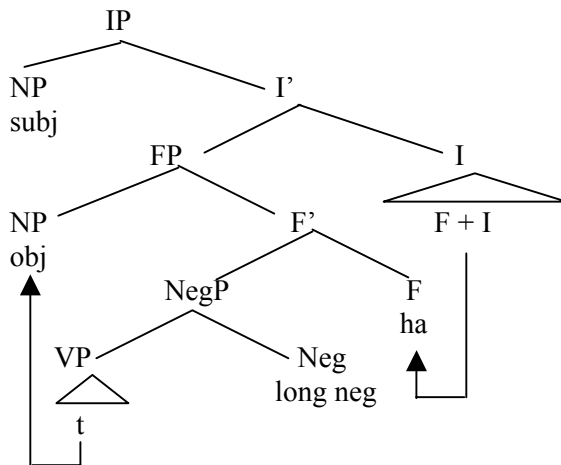
- (4) a. John-i twu pyeng-uy maykcwu-lul masi-ess-ta *Affirmative*
 John-NOM two bottles-GEN beer-ACC drink-PAST-DECL
 ‘John drank two bottles of beer.’
- b. John-i twu pyeng-uy maykcwu-lul an -masi-ess-ta *Short-Neg*
 John-NOM two bottles-GEN beer-ACC NEG-drink-PAST-DECL
 ‘John didn’t drink two bottles of beer.’
- c. John-i twu pyeng-uy maykcwu-lul masi- ci anh- ass-ta *Long-Neg*
 John-NOM two bottles-GEN beer-ACC drink-CI NEG do-PAST-DECL
 ‘John didn’t drink two bottles of beer.’

Since this study is concerned with LFN, as pointed out in the introduction, I will consider the tree diagram illustrating only LFN. One proposal about the hierarchical position of negation in Korean has been recently made by Han et al. (2005). They argue that there exist two grammars in Korean: a verb-raising grammar and an Infl-lowering grammar. The trees (5a, b) show the two grammars respectively.

- (5) a. Verb-raising grammar (adopted from Han et al. 2005: 57)



- b. INFL-lowering grammar (adopted from Han et al. 2005: 56)



Although there are many details involved in the proposal, and most of them go beyond the current study, the key points are as follows. Assuming that Korean has clitic-like negation, (5a) shows that long negation cliticizes to the auxiliary verb, *ha*, which then raises to I. Eventually, negation appears in a higher position than the quantified noun phrase, leading to negation wide scope. In contrast, (5b) shows that I lowers to *ha* and long negation cliticizes to *ha*, leading to quantifier wide scope.

If we follow Han et al. (2005)'s proposal, it may not be surprising to see the conflicting judgements about scope interpretations in the literature. For instance, Cho (1975) and Song (1988) reported that sentences with long negation are ambiguous, showing access both to quantifier wide scope and to negation wide scope. On the other hand, Suh (1989) claimed that the same constructions allow only the interpretation of quantifier wide scope. These scope facts still remain unsolved and point to the need for more refined research in the area in order to draw a complete picture of the issue.

Another interesting feature of Korean, unlike English, is that a numeral quantifier can be floated. Let us consider the following sentences.

(6) a. Determinative Numeral Quantifier (DNQ): Long Neg

John-i **twu** pyeng-uy maykcwu-lul masi- ci-anh- ass-ta
 John -NOM two bottles-GEN beer-ACC drink-CI NEG do-PAST-DECL
 'John didn't drink two bottles of beer.'

b. Floated Numeral Quantifier (FNQ): Long Neg

John-i maykcwu **twu** pyeng-ul masi- ci-anh- ass-ta
 John-NOM beer two bottles-ACC drink-CI NEG do-PAST-DECL
 'John didn't drink two bottles of beer.'

Sentence (6a) contains a *determinative* numeral quantifier, which modifies the following noun. In contrast, sentence (6b) shows that the numeral quantifier is *floated* – that is, it appears in a position other than at the beginning of the noun phrase, with which it is associated. There are many theoretical issues left about how a floated quantifier is different from a determinative quantifier, what triggers this floating, where the floating domain is, etc., but these matters cannot be discussed here.

3. PREVIOUS STUDIES. Several studies have reported how the scopal ambiguity is resolved in sentences containing numeral quantified nouns and negation. Musolino (1998) tested a sentence like (7) with English adults and children.

(7) Cookie Monster didn't eat two slices of pizza.

She found that English-speaking children show a strong preference for the numeral quantifier to take narrow scope in terms of negation. Since the word order and the c-command relation between negation and numeral quantified nouns in English are confounded, it is not clear whether the scopal preference of English-speaking children is due to linear order or hierarchical structure.

However, Lidz and Musolino's (2002) experiment on both English and Kannada, which used the same target constructions as in Musolino 1998, demonstrated that children are sensitive to a hierarchical relation of c-command rather than a linear word order. English is an SVO language and negation precedes the numeral quantified noun on the surface, showing that negation c-commands the quantified noun in direct-object position. On the other hand, Kannada is an SOV language and the numeral quantified noun precedes negation on the surface, unlike in English. Nonetheless, negation still c-commands the quantified noun in the object position. Therefore, if linear order matters in terms of children's interpretation of scope ambiguity, children in Kannada will show a preference for the wide scope reading of the quantified noun. In contrast, if the hierarchical relation of c-command matters, children in Kannada will show the opposite preference – narrow scope reading of the quantified noun with respect to negation. Table 1 summarizes the main findings in the study.

TABLE 1. Main findings in Lidz and Musolino 2002.

Language	Neg > Two		Two > Neg	
	Adult	Child	Adult	Child
English (SVO)	97%	81%	93%	33%
Kannada (SOV)	85.4%	75%	87.5%	23%

Children's higher acceptance of the negation wide scope reading, compared to the narrow scope counterpart in both languages, suggests that children compute the scope interpretation based on hierarchical relationship, not simply on the linear precedence on the surface syntax. Since more than 85% of adult subjects in both languages were readily able to access both scope readings, there was no further discussion of those results.

Su (2003) investigated how Chinese speakers resolve the scopally ambiguous sentences containing negation and a numeral quantified noun. Chinese word order is like that of English, subject-verb-object, as shown in (8).

- (8) nanhai meiyou qi liang-tou niu
 boy did not ride two-CL cow
 'The boy didn't ride two cows.'

Su conducted an experiment using a TVJT, which was very similar to Lidz and Musolino 2002. The mean percentage of acceptance of each scope is summarized in Table 2.

TABLE 2. Main findings in Su 2003.

Language	Neg > Two		Two > Neg	
	Adult	Child	Adult	Child
Chinese (SVO)	72%	35%	31%	63%

As shown in Table 2, Chinese-speaking children's data patterned in a different manner from the data in English and in Kannada. The children strongly preferred the wide-scope reading of the numeral quantifier (63% for numeral quantifier wide scope vs. 35% for numeral quantifier narrow scope). Interestingly, Chinese-speaking adults showed a strong preference for the narrow scope reading of the numeral quantifier (72% for numeral quantifier narrow scope vs. 31% for numeral quantifier wide scope). This finding is different from what Lidz and Musolino (2002) observed in their study. Note that English-and Kannada-speaking adults had almost equally high access to both interpretations of the sentences without difficulty. Based on these opposite patterns of interpretation in contrast to the previous findings, Su (2003) argued that the cross-linguistic differences in scope ambiguity resolution could arise due to the different structure of quantified phrases and negatives among languages.³

4. EXPERIMENT. So far, we have seen conflicting observations reported in the previous studies. Since both preverbal and postverbal negative constructions are possible in Korean, that language provides avenues to explore scope within the theoretical and empirical framework of typological markedness. In addition, comparison of the scope of floated and determinative numeral quantifiers with respect to negation will be particularly interesting in that the distribution of floated numeral quantifiers is compared directly to English.

The current experiment is designed: (i) to investigate adult Korean speakers' comprehension of scope ambiguity involving numeral quantifiers and negation; (ii) to examine whether Korean speakers' interpretation of scope ambiguity involving numeral quantifier and negation differs in terms

³ Su (2003) discussed the proposals of Huang (1988) and Wible and Chen (2000) with respect the structure of quantified phrases and negatives to particularly argue Chinese-speaking children's lack of the negation wide scope reading. She did not fully explain why the adults' data showed a preference for negation wide scope over quantified nouns. See Su 2003 for the detailed discussion.

of type of quantifier (determinative vs. floated); (iii) to compare the findings cross-linguistically. To address these questions, I conducted the following experiment.

Participants. A total of 28 adult native speakers of Korean participated in the experiment. 22 participants were current undergraduate or graduate students at the University of Hawai‘i at Mānoa. Six participants were temporary visitors to Hawai‘i. All were in their twenties and thirties.

Materials. I tested two factors with two levels each. The experiment was thus divided into four different conditions: scope difference (Neg > Two vs. Two > Neg) and type of numeral quantifiers (Determinative vs. Floated). Seven subjects were tested for each condition. The experimental design is summarized in Table 3.

TABLE 3. Experimental design.

Scope	Type of Quantifier	# of subjects
Neg > Two	Determinative	7
	Floated	7
Two > Neg	Determinative	7
	Floated	7

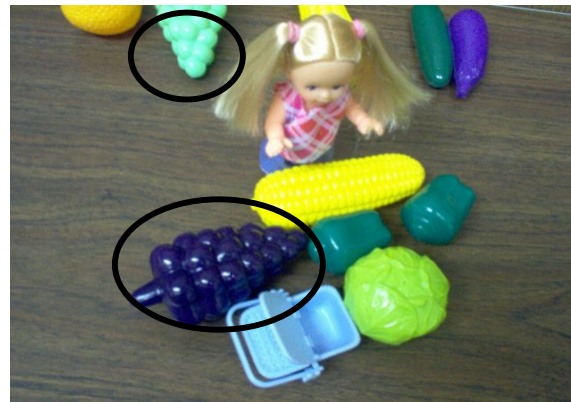
In order to test how participants interpret a sentence containing a numeral quantifier and negation, two versions of stories involving different scope reading were constructed. The testing statement of each scope reading contained negation with either determinative or floated numeral quantifier. The first and the last picture for each scenario are shown in Figure 1 and Figure 2. A detailed sample plot of each scope reading and the critical statements are illustrated below in English.

FIGURE 1. The first and the last scene of Neg > Two context.

<The first scene>



<The last scene >



Context: Neg > Two (English translation)

Plot: Jina goes to the market to buy vegetables and fruit for a picnic. She first buys two green peppers and one cabbage to make a salad. Then, she goes and sees fruit. She wants to buy an orange but she recalls that there are two oranges left in the refrigerator. Instead, she decides to buy grapes, which look very fresh. After she realizes that the price is too high, she eventually decides to buy one of two bunches of grapes.

Test trials (English translation)

“I know what happened in the story. **Jina did not buy two bunches of grapes at the grocery store**”

Det NQ (Test sentence in Korean)

Jina -nun sicang-eyse twu songi uy photo-lul ca-ci anh-ass-ta
 Jina -Top mart-at two bunch-Gen grape-Acc buy-ci Neg do-Past-Decl

Floated NQ (Test sentence in Korean)

Jina -nun sicang-eyse photo twu songi-lul ca-ci anh-ass-ta
 Jina -Top mart-at grape two bunch-Acc buy-ci Neg do-Past-Decl

FIGURE 2. The first and the last scene of Two > Neg context.

<The first scene>



<The last scene>

**Context: Two > Neg** (English Translation)

Plot: Sohee's mom asks Sohee to buy flowers and a pair of shoes to attend her brother's graduation. After she buys flowers, she stops by the shoe store. The owner shows four pairs of shoes to her. Sohee wants to try on all the shoes. Sohee first tries on the pink ones, which look very good on her. Then, she wants to try on the yellow shoes, but the owner says it is not a good idea because they are too small for her feet. Sohee thinks so, too. After looking at the sky-blue shoes, she also thinks they are too small. Then, Sohee tries on the blue shoes, which look quite similar to the pink shoes. However, Sohee likes them because they feel very comfortable. Now, she is thinking about which pairs of shoes are better to buy.

Test trials (English Translation)

"I know what happened in the story. **Sohee did not try on two pairs of shoes at the shoe store.**"

Det NQ (Test sentence in Korean)

Sohee-nun sinbalkakey eyse twu kyeylley-uy sinpal-ul sinepo-ci anh-ass-ta
 Sohee-Top shoe store-at two pairs -Gen shoes-Acc try on-ci Neg do-Past-Decl

Floated NQ (Test sentence in Korean)

Sohee-nun sinpal kakey eyse sinpal twu kyeylley-ul sinepo-ci anh-ass-ta
 Sohee-Top shoe store-at shoes two pairs -Acc try on-ci Neg do-Past-Decl

The list of test trials is presented in Table 4.

TABLE 4. Test trials (English translation).

NEG > Two
Jina didn't buy two bunches of grapes at the mart. Yuni didn't eat two drumsticks at KFC. Toli's mom didn't buy two birds at the pet shop. Snow White didn't touch two vases at the furniture shop. Junho didn't ride two cows at the amusement park.
Two > NEG
Sohee did not try on two pairs of shoes at the shoe store. Soli's mom didn't buy two nursing bottles at the department store. Minha's aunt didn't buy two handbags at the fashion mall. The dog didn't catch two rabbits in the yard. Younghee didn't find two boys at the playground.

Each participant was given five test trials. Also, five filler trials were given in order to test the participants' comprehension of numeral quantifiers and of negation separately. The answers of fillers were counterbalanced.

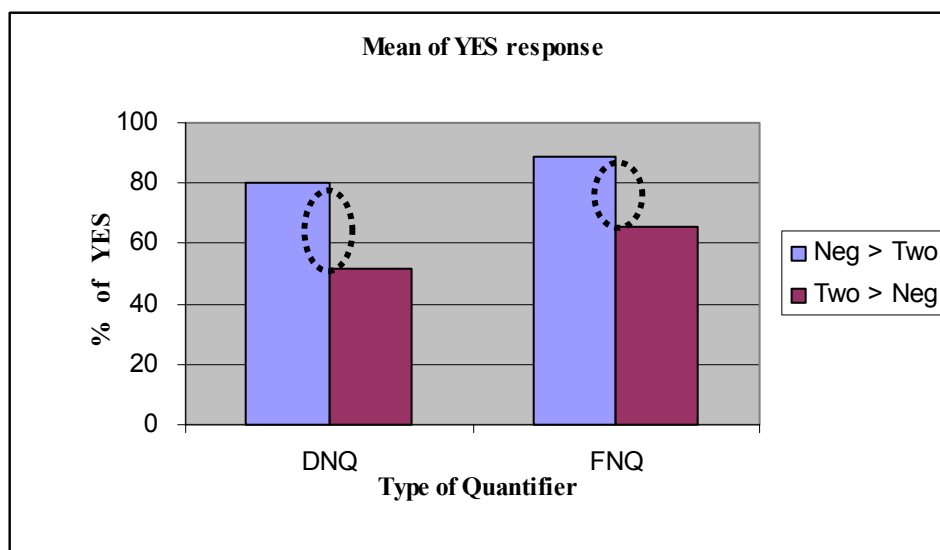
Procedure. Participants were tested individually. All picture-based scenarios were recorded with toys, a digital camera, and a PowerPoint tool. They were shown to each participant on a portable computer screen. Participants were first introduced to the task with two practice trials, in which one answer was true and the other answer was false. Then they were presented five test trials and five filler trials in random order. The methodology used in the experiment involved the Truth Value Judgment Task (TVJT) (Crain and Thornton 1998). In the standard TVJT task, two experimenters are involved: one experimenter tells each subject a story using toys and props, while a second experimenter controls a puppet which watches the story carefully and says what happened in the story. In the version of the experiment used with my adult subjects, I showed the slides to each subject on a portable computer screen, and the subject was asked to assess the validity of the statement based on the events shown on the screen. I distributed a score sheet, which asked the subjects to make a judgment of T(rue) or F(alse) and to justify their answers. The entire procedure lasted approximately 30 minutes.

5. RESULTS. The dependent variable was the proportion of "True" answers to the test statement for each condition. Subjects' performance on filler trials was almost perfect, showing that they had no difficulty with negation or numeral quantifiers or with the task itself. The overall mean percentage of test trials is given in Table 5 and in Figure 3.

TABLE 5. Mean of YES response.

Context	DNQ (%)	FNQ (%)
Neg > Two	80	91
Two > Neg	51	66

FIGURE 3. Mean percent of YES response.

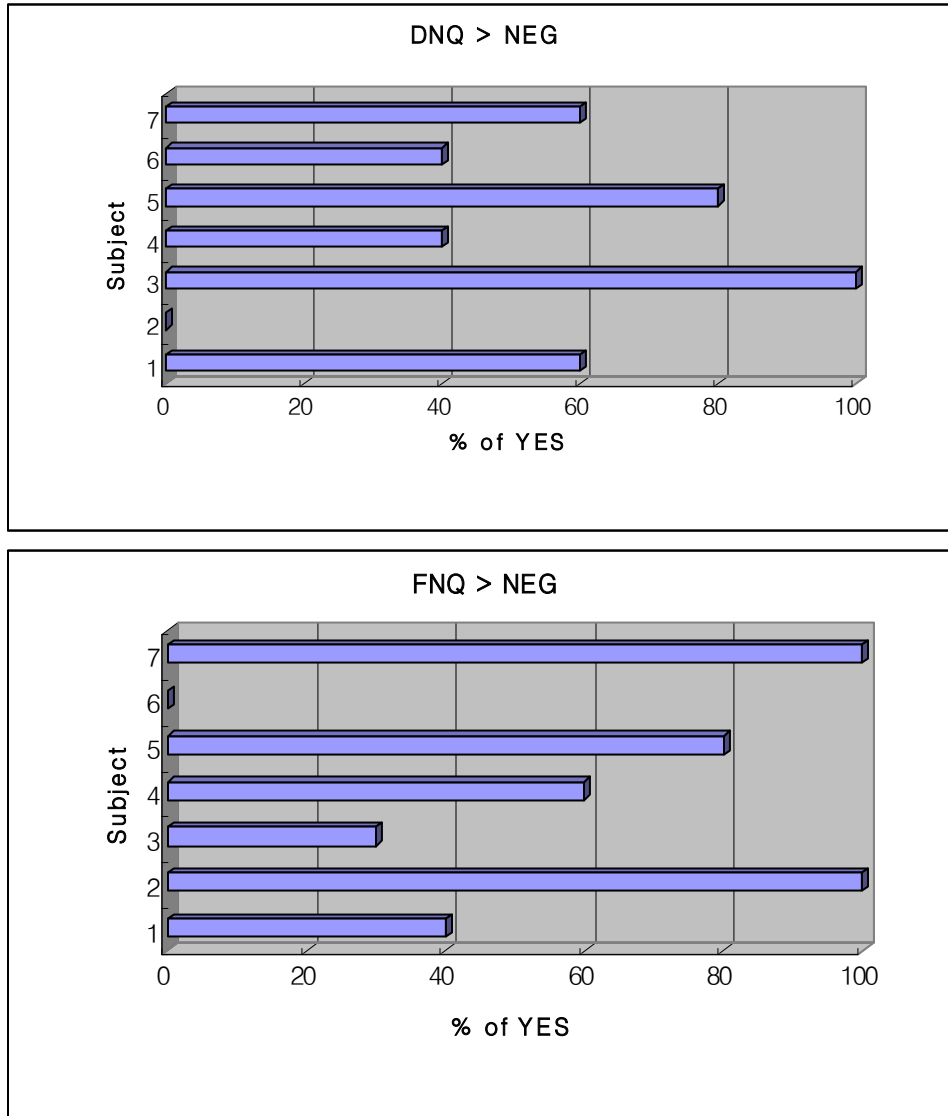


Korean-speaking adults accepted the negation-wide scope interpretation 80% of the time in the DNQ condition and 91% of the time in the FNQ condition. On the other hand, for the numeral quantifier wide scope reading, the rate of acceptance was relatively low, namely, 51% in the DNQ condition and 66% in the FNQ condition. The difference between the acceptance rates from the two different scope readings was significant (in the DNQ condition, Neg > Two vs. Two > Neg, $t(12) = 2.34$, $p > .05$ and in the FNQ condition, Neg > Two vs. Two > Neg, $t(12) = 2.41$, $p > .05$). However, the difference between the acceptance rates for the two different types of quantifiers was not significant (in Neg > Two condition, DNQ vs. FNQ, $t(12) = 0.89$, $p > .05$ and in Two > Neg condition, DNQ vs. FNQ, $t(12) = 0.63$, $p > .05$).

The results for the two scope interpretations were different from what Lidz and Musolino (2002) reported with English- and Kannada-speakers. English- and Kannada-speaking adults had no difficulty accessing both scope readings. However, Korean-speaking adults in the current study accepted negation wide scope reading more frequently than the numeral quantifier wide scope reading. Interestingly, this pattern was rather similar to the one observed in Chinese-speaking adults by Su (2003), despite the different word order in the two languages. The proportions of “True” answers were entered into an analysis of variance (ANOVA). It showed only a main effect of context ($F(1, 24) = 5.82$, $p < .02$), suggesting that subjects accepted Neg > Two reading significantly more often than Two > Neg reading, independent of quantifier type.

I examined the individual performance for each condition. The acceptance rate for negation wide scope reading was above 80% across all individuals. In contrast, the mean percentage of acceptance in numeral quantifier wide scope reading showed the split in judgments presented graphically in Figure 4. It is noteworthy that since the experiment had a between-subject design, the subjects for each condition were different from each other. What this means is that although the second subject in DNQ > Neg condition shows 0% of the response and the second subject in FNQ > Neg condition shows 100% of the response, these two subjects are not the same person.

FIGURE 4. Individual performance in Two > Neg condition



As shown in two figures, there is one subject who rejected all the test statements in each condition, whereas one subject in the DNQ > Neg condition accepted all of the test statements, and two subjects in the FNQ > Neg condition also did so. To make sure that participants were not patterning at chance, I read their justifications very carefully. When they rejected the statement, their answers were, for example, “the character in the story tried on two pairs of shoes,” “the character in the story bought two handbags there,” etc., indicating that they interpreted the statement as the negation wide scope reading.

6. DISCUSSION. Korean-speaking adults in the experiment were asked to judge whether a scopally ambiguous statement was true or false, based on the description in a story. The sentence type under question was the one containing negation and a numeral quantifier like ‘*John didn’t drink two bottles of beer.*’ The main finding is that Korean-speaking adults display a strong preference for negation wide scope (Neg > Two). This pattern is different from what Lidz and Musolino (2002) reported with English- and Kannada-speaking adults. In their study, although two languages differ with respect to word order, adults in both languages had equal access to both interpretations. However, Korean-speaking adults showed relatively low acceptance for numeral quantifier wide

scope, about 50% to 65% of the time. This tendency showed the same preferred interpretation as Chinese-speaking adults reported by Su (2003). Why should it be?

Before turning to a possible answer to the question, we should first ask whether numeral quantifier wide scope reading was tested in the right way. In the scenario set up for Two > Neg reading, participants were put in a situation where four objects are introduced in a story, and two of them were affected by the agent's action, but the other two were not. Participants were then asked to judge whether a statement like "X didn't do two Ys" was true or false. In this specific context, the universal set consisted of four, and thus "two Ys affected by the agent's action" and "the remaining two Ys unaffected by the agent's action" were equally salient in the description. That is, if "X didn't do two Ys out of four Ys" is true, "X did two Ys out of four Y" must be true as well. In fact, when participants evaluated the truth of the critical statement, they sometimes wanted to go back to the previous slides in order to double check the number of objects described in the story. Also, those who accepted the sentence as true even told me that the test trials sound too awkward to make a certain judgment. A split across judgements shown in Two > Neg conditions also provides indirect evidence that the given context may be not appropriate to test them.

What if we manipulate the context in a slightly different manner? Suppose that participants are placed in a setting where there are three objects in total, and only one out of three is affected by the agent's action, but the remaining two are not. Then they are asked to evaluate the statement "X didn't do two Ys." In this situation, both scope interpretations are true: in Neg > Two reading, it is true because it is not the case that X did two Ys, and in Two > Neg reading, it is also true because there are two Ys that X didn't do. Although this statement is still ambiguous, in this experimental setting it may be easier to observe the preference of interpretation, because one can readily separate two events (doing vs. undoing) with respect to partition of different numbers (one for doing vs. two for undoing).

Despite the methodological problems, cross-linguistic differences need to be explained, because all the experiments above employed the same methodology with almost same target constructions. The differences reported for English, Kannada, Chinese, and Korean are still a vexing problem. Even the proposal by Han et al. (2005) in the previous section, which suggested two coexisting grammars in Korean such as a verb-raising grammar and an INFL-lowering grammar, does not solve the problem. Their proposal may predict a possible split in scope interpretations, but does not predict which scope interpretation is preferred.

Interestingly, the results in the present study appear to undermine the view that "isomorphism" in scope interpretation is somehow universally unmarked for processing reasons, as implied by Kurtzman and Macdonald (1993). It has been observed in a number of psycholinguistic studies (Tunstall 1998; Anderson 2004, among others) that processing difficulty occurs with inverse-scope interpretations, compared to surface-scope interpretations. However, the current study with Korean-speaking adults revealed more preference for inverse scope reading than for isomorphic surface-scope reading. How can we account for this?

One possible answer could be that at least in Korean, the type of negation matters in terms of scope relation. As I discussed in Section 2, there are two ways of forming sentential negation in Korean – short negation and long negation. In this experiment, only the long negation form was tested with numeral quantifiers. Before generalizing cross-linguistic results, therefore, one needs to carry out a further study on short negation.

As for the two types of quantifiers (determinative vs. floated), the floated numeral quantifier condition showed a higher acceptance rate than the determinative numeral quantifier condition in both scope interpretations. However, the difference was not statistically meaningful. It is known that floated quantifier carries "partitive" information in certain context in Korean. Sentence (6) is repeated from Section 2.

- (9) a. John-i **twu** pyeng-uy maykcwu-lul masi- ci-anh- ass-ta DNQ
 John -NOM two bottles-GEN beer-ACC drink-CI NEG do-PAST-DECL
 'John didn't drink two bottles of beer.'

- b. John-i maykcwu **twu** pyeng-ul masi- ci-anh- ass-ta FNQ
 John-NOM beer two bottles-ACC drink-CI NEG do-PAST-DECL
 ‘John didn’t drink two bottles of beer.’

In (9a), the relation between the determinative numeral quantifier and the noun implies that there are two bottles of beer in total and that John drank these two. On the other hand, in (9b), the implied reading is that there are more than two bottles of beer and John drank only two of them.

Musolino and Gualmini (2004) report that English speaking children’s ability to access to wide-scope interpretation of the quantifier with respect to negation significantly increases when the *partitive* meaning is present in the quantifier (e.g., two of the Ns). Based on this finding, they conclude that using partitives in the test sentences may be one way to help children overcome the limits of the isomorphism effect shown in the previous studies. In the current experiment, adult Korean speakers showed more access to both scope readings with the floated quantifiers, which convey partitivity in meaning. However, since the current results did not reveal any meaningful effect on the scope interpretations, it is difficult to make a direct comparison related to the issue of partitivity between the two languages. It is necessary for future research to investigate the precise effect of partitivity in Korean and to explain cross-linguistic similarity, if any.

6. CONCLUSION. It has been argued that all things being equal, a negative statement is more difficult to comprehend in general due to the semantic complexity compared to the corresponding affirmative statement (Horn 1989:168, see Lee 2005 for a processing experiment of this observation). If quantification were added to negation, the difficulty would increase, because quantification in itself demands extra processing. This was partly confirmed in the current experiment. Korean-speaking adults were not confident in judging sentences containing negation and quantified expression in a certain context. In order to determine the nature of this uncertainty, however, I suggest several avenues for future research involving a different context, a different type of negation, etc. Most important, adults’ data should be probed along with children’s data in a separate experiment.

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