The Role of Korean *-(n)un* in Comprehending Negated Disjunction on the Direct Object Position

On—Soon Lee

(Dong—A University)

Lee, On-Soon. (2017). The role of Korean *-(n)un* in comprehending negated disjunction on the direct object position. *The Linguistic Association of Korea Journal, 25*(3), 51-68. A Korean sentence like *John-un ice cream-ina kheyik-ul an mek-ess-ta* ('John did not eat ice cream or cake') is temporarily ambiguous, permitting either the conjunctive interpretation ('John ate neither ice cream nor cake') or the disjunctive interpretation ('John did not eat ice cream or John did not eat cake'). Yet theoretically, the topic marker *-(n)un* on the direct object position ('ice cream-ina kheyik') forces the contrastive focus reading (Han, 1996). To assess the semantic effect of the Korean topic marker *-(n)un* in resolving this temporary ambiguity, a self-paced reading experiment with a Truth-Value Judgment Task was conducted with thirty native Korean-speaking adults. The participants chose the conjunctive interpretation more often in the topic-marked condition than in the accusative-marked condition. Moreover, their judgment times were shorter in the topic-marked condition. These results suggest that the semantic information carried by the topic marker *-(n)un* (i.e., contrastive focus) helps to resolve the temporary ambiguity of such sentences by reducing the processing load they impose.

Key Words: topic marker, contrastive focus, disjunction, ambiguity, sentence processing

1. Introduction

In psycholinguistic research, a question of much interest is how the comprehension system handles temporarily ambiguous sentences. For example, a sentence beginning *John-un ice cream-ina kheyik-ul an mekessta* as in (1), can be

temporarily ambiguous, allowing either the conjunctive 'neither-nor' interpretation ('John ate neither ice cream nor cake') or the disjunctive 'one or the other' interpretation ('John did not eat ice cream or he did not eat cake'). A study by O'Grady, Lee, and Lee (2011) suggests that the sentence in (1) is temporarily ambiguous[1], despite finding that the conjunctive 'neither-nor' interpretation appears to be dominant.

(1) John-un ice cream-ina kheyik-ul an mek-ess-ta.[2]
    John-TOP ice cream or cake-ACC NEG eat-PST-DECL[3]
    'John ate neither ice cream nor cake.' (conjunctive interpretation)
    'John did not eat ice cream or he did not eat cake.' (disjunctive interpretation)

Much work in this field has looked at the difficulties of processing sentences that have temporary ambiguity between more than one grammatically possible analysis. A successful explanation of how temporary ambiguity is resolved is provided by the constraint-based approach. This approach argues that the processor can activate multiple parallel analyses, employing both syntactic and non-syntactic information in the initial stage (e.g., MacDonald, 1994; MacDonald, Pearlmutter, & Seidenberg, 1994; McRae, Spivey-Knowlton, & Tanenhaus, 1998; Spivey-Knowlton & Sedivy, 1995; Taraban & McClelland, 1988; Trueswell, 1996; Trueswell, Tanenhaus, & Garnsey, 1994; Trueswell, Tanenhaus, & Kello, 1993). For example, comprehenders feel difficulties of processing sentence (1), but the semantic effect of topic marking -(n)un on the *or* phrase (*ice cream-ina kheyik*, 'ice cream or cake') facilitates to reduce the difficulties of processing the sentence (1). This will help to resolve the temporary ambiguity, showing the shorter reading time in topic-marked *or* phrase. Despite considerable research attention on temporary ambiguity in various English structures, much less is

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1) During the processing of a sentence, readers will feel difficulty at some point in permitting either the conjunctive interpretation or the disjunctive interpretation. This is called 'temporary ambiguity.' This ambiguity can be quickly resolved based on syntactic and semantic information received during the processing (Fromkin, Rodman, & Hyames, 2011).
2) This paper follows the Yale Romanization System in romanizing Korean expressions.
3) ACC=accusative; DECL=declarative; INF=infinitival; NEG=negation; NOM=nominative; PST=past; PRS=present; REG=register; TOP=topic

known about temporary ambiguity in Korean, such as that caused by the interaction between the disjunction (-(i)na) and negation. Therefore, this study adds cross-linguistic research to the constraint-based approach by examining the semantic effect of the topic marker -(n)un on or phrase with negation, as in sentence (1).

2. Background

2.1. Previous studies on Korean −(i)na[4] 'or' under negation

When English or appears between two objects of a negated verb, as in (2), it permits a conjunctive 'neither-nor' interpretation (Chierchia et al., 2001). In contrast, the Japanese ka 'or' between two objects of a negated verb, as in (3), results in a disjunctive 'one or the other' interpretation (Goro & Akiba, 2004).

(2) John does not like ice cream or cake.
   'John ate neither ice cream nor cake.'
   (conjunctive 'neither-nor' interpretation)
(3) John-wa aisu   ka   keeki-o   tabe-nakat-ta.
   John-TOP ice cream or   cake-ACC eat-NEG-PST
   'John did not eat ice cream or he did not eat cake.'
   (disjunctive 'one or the other' interpretation)

The Korean counterpart of English or and Japanese ka, -(i)na 'or', differs from them in permitting either interpretation. O'Grady and his colleagues conducted a Truth-Value Judgment Task (TVJT, Crain & McKee, 1985; Crain & Thornton, 1998) in order to determine how Korean-speaking monolingual adults and children interpret sentences including Korean disjunction under negation. The participants were eighteen Korean-speaking children aged 3 to 5 years (mean age 4;8) and twenty Korean-speaking adults aged 19 to 25 (mean age 20;5). The experiment was conducted in two sessions. In the first session, each participant

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4) Korean disjunction -(i)na alternates depending on its phonological environment; –na is used after a vowel, whereas –ina is used after a consonant.

was asked to listen to five illustrated stories (including one practice story) that favored either the conjunctive or the disjunctive interpretation. One week later, they listened to another five illustrated stories that favored the other interpretation. The order of sessions was counterbalanced. In each session, participants were asked to answer "true" or "false" to fifteen sentences, including five target sentences and ten filler sentences, which were presented by a puppet while the participant was looking at a picture that summarized the outcome. The English translation of a sample story follows:

Sample story favoring a conjunctive interpretation

The teacher told a mouse, a pig, and a dog that they should eat all their food to be healthy. There were cakes, carrots, and tomatoes. The teacher gave ice cream to any animal who ate all the food. Let's see who got the ice cream. The mouse ate a cake and a carrot. The dog ate only a cake. However, the pig ate a cake, a carrot, and a tomato because he was very hungry. Who do you think received the ice cream? [Answer: the pig]
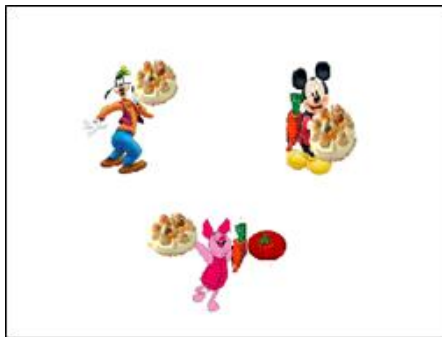

Figure 1. Sample picture in a story favoring the conjunctive interpretation.

After each story, participants were asked to judge whether the three sentences presented by the puppet were true or false while looking at the picture summarizing the final outcome of the story. English translations of three sample test sentences including fillers are given here:

a. Filler: The mouse ate a carrot. [Answer: True]
b. Test sentence: The dog ate a cake. [Answer: True][5]

However, the dog did not eat a carrot or a tomato.
[Answer: True]
c. Filler:　　　　　The pig did not eat a tomato. [Answer: False]

All the participants answered correctly on most of the filler sentences (99%). Both adults and children accepted the conjunctive interpretation 100% of the time in the context supporting the conjunctive interpretation. They accepted the disjunctive interpretation around 37% of the time in contexts supporting the disjunctive interpretation. The difference between the acceptance rates of the two contexts is significant. It can be concluded that Korean native speakers allow a conjunctive interpretation in a conjunctive context, but accept disjunctive interpretations only a third of the time in a disjunctive context. Based on this finding, it is predicted that Korean adults will find such sentences temporarily ambiguous in real-time sentence processing. If so, the semantic information carried by a topic marker may help to resolve the temporary ambiguity. The following section explains the semantic properties of the Korean topic marker *-(n)un*.

2.2. Semantic Properties of Korean Topic Marker ‐*(n)un*[6]

The Korean topic marker *-(n)un* can mark a generic expression, referring to a general class of entities, as shown in (4) or a contrastive topic, as illustrated in (5) (Choi, 1999; Kuno, 1973; Kuroda, 2005; Laleko & Polinsky, 2013).

(4) Sayngsen-un yene-ka masiss-ta.[7]
　　fish-TOP　salmon-NOM delicious-DECL
　　'Speaking of fish, salmon is delicious.'

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5) Romanized Korean test sentence is as follows:
   Kay-nun kheyik-ul　mek-ess-eyo.
   dog-TOP　cake-ACC　eat-PST-REG
   Kulehciman, kay-nun tangkun-ina　thomatho-lul　an　　mek-ess-eyo.
   however　dog-TOP carrot ‐or　　tomato-ACC　NEG eat-PST-REG
6) The topic marker ‐*un/nun* alternates depending on its phonological environment; *-un* is used after a consonant whereas ‐*nun* is used after a vowel.
7) Sentences are taken from Laleko and Polinsky (2013, p.5).

(5) Na-nun pothong ilpon umak-un tut-ciman seyang umak-un tut-ci
I-TOP usual Japanese music-TOP listen-but Western music-TOP listen-INF
ahn-nun-ta.
NEG-PRS-DECL
'I usually listen to Japanese music but I do not listen to Western music.'

Unlike generic topics, contrastive topics pick out entities from a set of alternatives and thus always imply a contrastive relationship between two or more elements within a sentence, as shown in (5).[8]

According to Han (1996), a *-(n)un*-marked noun phrase (NP) can have three different interpretations: a topic reading, a contrastive topic reading, or a contrastive focus reading. (6) exemplifies the topic reading and contrastive topic reading, and (7) exemplifies the contrastive focus reading.

(6) John-un Mary-lul coaha-n-ta.[9]
John-TOP Mary-ACC like-PRS-DECL
' John likes Mary.' (topic reading)
' John likes Mary, (Frank likes Susan, and Peter likes Laura).'
(contrastive topic reading)
(7) a. John-i Mary-nun coaha-n-ta.
John-NOM Mary-TOP like-PRS-DECL
' John likes Mary, (but not others).' (contrastive focus reading)
b. John-i Mary-nun an coaha-n-ta.
John-NOM Mary-TOP NEG like-PRS-DECL
'John does not like Mary, (but not others).' (contrastive focus reading)

The sentence in (6) has a subject marked with *-(n)un*, and it can have either a topic reading or a contrastive topic reading. The sentence in (7) has a direct object marked with *-(n)un*. It presupposes that John dislikes everybody except for Mary, as in (7a), and that John likes everybody except for Mary, as in (7b). This contrastive focus reading is also confirmed in sentences including the

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8) Contrastive topics always carry emphatic stress. While the forms' phonological realization is beyond the scope of this study, it will be addressed in a future study.
9) Sentences are taken from Han (1998, p.2).

quantifier *motun* ('all'), as shown in (8).

(8) John-i motun sakwa-nun mek-ess-ta.
    'John-NOM all apple-TOP eat-PST-DECL
    'John ate all the apples, but not the other fruits.' (contrastive focus reading)

Taken together, the previous analyses described above suggest that a *-(n)un*-marked object in a sentence forces the contrastive focus reading, implying a contrastive relationship between two or more elements within the sentence.[10] Following this suggestion, the *-(n)un*-marked object in the sentence in (9b) resolves the temporary ambiguity of the sentence by forcing the contrastive focus reading ('John ate neither ice cream nor cake, but not others.'). The sentence with a *-(l)ul*-marked object in (9a), on the other hand, is still temporarily ambiguous. To test the semantic effect of the topic-marker *-(n)un* on the resolution of the ambiguity of sentences like (9a), this study conducted a self-paced reading task along with a TVJT. The following section will present previous studies on semantic effects on the resolution of syntactic ambiguity.

(9) a. John-un ice cream-ina kheyik-**ul** an mek-ess-ta.
       John-TOP ice cream-or cake-ACC NEG eat-PST-DECL
       'John did not eat ice cream or cake.'
   b. John-un ice cream-ina kheyik-**un** an mek-ess-ta.
       John-TOP ice cream-or cake-TOP NEG eat-PST-DECL
       'John did not eat ice cream or cake.'

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10) Previous studies have agreed that *-(n)un* on the direct object position triggers the contrastive focus reading, implying that a topic-marked *or* phrase is considered as a single element, in contrast to an accusative-marked *or* phrase. In sentence (9b), the topic-marked *or* phrase receives a contrastive focus reading (e.g., 'John ate neither ice cream nor cake [but he did not eat other food either]'). Thus, topic marking *-(n)un* will force the contrastive focus reading on a sentence like (9b), resulting in shorter judgment times for the conjunctive interpretation.

2.3. Semantic Effect in Resolution of the Syntactic Ambiguity[11]

While there is increasing research interest in the effects of syntactic information on sentence processing, there is little research on how semantic prominence (i.e., topic and contrastive focus) might contribute to processing. However, using an eye-tracking paradigm, recent work by Cowles, Walenski, and Kluender (2007) found that the semantic prominence of a sentence topic (10a) or a clefted focus (10b) played a role in resolving an ambiguous relationship between a pronoun (i.e., *she* in [11]) and its antecedent.

(10) a. A new movie opened in town. So, Anne called Sarah.
　　 b. A new movie opened in town. It was Anne who called Sarah.
(11) But later that night, she could not go to the movie after all.

Their results showed that the prominent referent (*Anne*) in both (10a) and (10b) was chosen immediately as the antecedent of the pronoun (*she*) in (11), unlike the non-prominent referent (*Sarah*). This finding shows that the semantic prominence triggered by linguistic structure can contribute to disambiguating sentences.

In the same vein, Bornkessel-Schlesewsky and Schlesewsky (2009) argue that, cross-linguistically, semantic prominence[12] has an important role in real-time comprehension. They proposed prominence-driven sentence processing, in which the degree of semantic prominence of the referent determines the difficulty of comprehending relative clauses, transitive constructions, or antecedents of reflexive pronouns. This is in line with the constraint-based approach. For example, processing difficulty can result when two possible interpretations of a sentence remain activated before one interpretation is selected. Such processing difficulties can be observed in longer reading times (see Van Gompel, Pickering, & Traxler, 2001). Based on these studies' findings,

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11) Previous studies have been interested in both semantic and pragmatic effects of Korean topic marking. Although pragmatic effects are beyond the scope of this study, the pragmatic properties of topic marking are an important issue, which I will address in a future study.

12) According to Bornkessel-Schlesewsky and Schleswewsky (2009), prominence is a cover term for features such as case marking, animacy, and definiteness.

the current study tests whether semantic information triggered by topic marking will facilitate the resolution of temporary ambiguity, resulting in shorter reading times.

To test this possibility that the semantic information carried by the Korean topic marker *-(n)un* will have an influence on the resolution of ambiguous sentences such as (9a), this study employed sentences containing *-(i)na* 'or', which coordinates two objects of a negated verb. The study's findings will provide cross-linguistic evidence regarding the processor's use of non-syntactic information in online comprehension. The specific research questions are as follows:

(1) In sentences in which the verb is negated, will native Korean-speaking adults choose the conjunctive interpretation more often for topic-marked direct-object *or*-phrases or for accusative-marked direct-object *or*-phrases?
(2) Will native Korean-speaking adults show shorter judgment times in the topic-marked condition or the accusative-marked condition?

The study predicts, first, that the conjunctive interpretation response rate will be higher in the topic-marked condition than in the accusative-marked condition, and second, that judgment times will be shorter in the topic-marked condition than in the accusative-marked condition.

3. Study

3.1. Participants

Thirty native speakers of Korean (13 male, 17 female; mean age = 24.5, *SD* = 1.23, range = 19‑27) participated in the self-paced reading task via Truth-Value Judgment Task. They received compensation equivalent to five dollars or course credit for their participation in the experiment.

3.2. Materials and Procedures

The experiment used two types of contexts (conjunctive-biased vs.

disjunctive-biased) and two types of markers in *or*-phrases (accusative marker
-*(l)ul* vs. topic marker -*(n)un*). Examples (12) and (13) show sample items; (12) is
a context that favors the conjunctive 'neither-nor' interpretation, while (13) is a
context that favors the disjunctive 'one or the other' interpretation.

(12)
  a. Sample story (conjunctive-biased context): In a painting class, there were a
  mouse, a bear, and a duck. The teacher would give a new sketchbook to any
  animal who drew a circle, a square, and a triangle. The duck wants to have
  a new sketchbook, so she drew a circle, a square, and a triangle. The
  mouse drew a circle and a square. The bear drew a circle.
  b. **Target sentence (-*lul*-marked *or*-phrase)**
  Kom-un tongkulami-lul kulyess-ci-man, **neymo-na seymo-lul** an kulye-ss-eyo.
  bear-TOP circle‐ACC draw-PST-but square-or triangle-ACC NEG draw-PST-REG
  c. **Target sentence (-*nun*-marked *or*-phrase)**
  Kom-un tongkulami-lul kulyess-ci-man, **neymo-na seymo-nun** an kulye-ss-eyo.[13]
  bear-TOP circle-ACC draw-PST-but square-or triangle-TOP NEG draw-PST-REG.
  'The bear drew a circle, but did not draw a triangle or a square.'
  d. **Answer**
  TRUE: conjunctive 'neither-nor' interpretation
  'The bear drew neither a triangle nor a square.'
  FALSE: disjunctive 'one or the other' interpretation
  'The bear did not draw a triangle or he did not draw a square.'

For both (12b) and (12c), if the target sentence is interpreted as conjunctive, the
response will be 'true'. If the target sentence is interpreted as disjunctive, the
response in both cases will be 'false.'

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13) A reviewer was concerned about the effect of -*man* (*but*) in a target sentence. In sentence
(12c), the contrastive relationship between *tongkulami-lul* and *neymo-na semo-nun* could be
formed due to another contrastive focus (-*man*). Upon encountering -*man* after reading the
affirmative clause in a first conjunct, a comprehender would immediately expect the
negative clause in the second conjunct. This might lead to the conjunctive interpretation on
direct object *or*-phrase (*neymo-na seymo-nun*). I acknowledge this as a potential limitation of
this study, which I will address in a future study.

(13)

a. <u>Sample story (disjunctive-biased context)</u>: For lunch, there were noodles, cucumbers, and apples. The teacher gave chocolate to any animal who ate some of each food. The bear ate only noodles. The mouse ate a cucumber, an apple, and noodles. However, the pig ate only a cucumber and noodles.

b. **Target sentence (-*lul*-marked *or*-phrase)**

Tawyci-nun kwukswu-lul mek-ess-ci-man **sakaw-na oi-lul** an mek-ess-eyo.

pig-TOP noodle-ACC eat-PST-but apple-or cucumber-ACC NEG eat-PST-REG

c. **Target sentence (-*nun*-marked *or*-phrase)**

Tawyci-nun kwukswu-lul mek-ess-ci-man **sakaw-na oi-nun** an mek-ess-eyo.

pig-TOP noodle-ACC eat-PST-but apple-or cucumber-TOP NEG eat-PST-REG

'The pig ate noodles, but did not eat apples or cucumber.'

d. **Answer**

TRUE: disjunctive 'neither-nor' interpretation

'The pig did not eat apples or he did not eat cucumber.'

FALSE: conjunctive 'one or the other' interpretation

'The pig ate neither apples nor cucumber.'

For both (13b) and (13c), if the target sentence is interpreted as disjunctive, the response will be 'true.' If the target sentence is interpreted as conjunctive, the response in both cases will be 'false.'

After reading each story sentence-by-sentence, the participants were asked whether the target sentence was true or false according to the story. All participants were asked to respond to 28 target sentences (12 target sentences with 16 filler sentences), with three sentences for practice. Table 1 summarizes the expected responses by context. For the data analysis, the 'true' responses were counted and the judgment times were measured.

Table 1. Summary of expected responses by context

Contexts	Conjunctive Interpretation	Disjunctive Interpretation
Conjunctive-biased (*n*=6)	True	False
Disjunctive-biased (*n*=6)	False	True

3.3. Results

All participants did well on the filler sentences (99%), which did not include *or*, indicating that they comprehended each story well. Figure 2 presents the percentage of "true" responses by context. As seen in Figure 2, a topic-marked *or*-phrase is more likely than its accusative-marked counterpart to receive the conjunctive interpretation in contexts that favor this interpretation (94% vs. 74%, $t(29) = -4.400$, $p < .01$). On the other hand, there is no difference between topic-marked and accusative-marked *or*-phrases in the context favoring the disjunctive interpretation (33% vs. 29%, $t(29) = .247$, $p > .05$). This indicates that topic marking semantically triggered a contrastive focus reading ('John ate neither ice cream nor cake, but not others') but accusative marking did not. The result confirms that the semantic information carried by the Korean topic marker *-(n)un* has the effect of reducing sentence ambiguity.
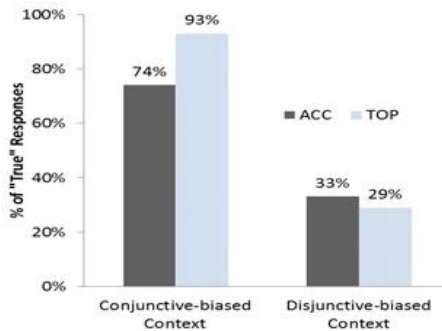

Figure 2. % of "true" responses by context

Figure 3 shows the judgment times for the TVJT. As seen in Figure 3, the judgment times are significantly shorter for sentences with a topic-marked *or*-phrase than for those with an accusative-marked *or*-phrase in the context favoring the disjunctive interpretation (e.g., 2167.71 ms vs. 1483,95 ms, $t(29) = 2.125$, $p < .05$), as predicted. On the other hand, no significant difference was found between accusative-marked and topic-marked *or*-phrases in the context favoring the conjunctive interpretation despite the numerical difference of judgment times (1206.09 ms vs. 967.38 ms, $t(29) = .907$, $p > .05$). This finding

indicates that Korean adults takes time to select either interpretation due to the temporary ambiguity of sentences in the accusative-marked condition. This ambiguity caused an additional processing load, resulting in longer judgment times. On the other hand, the topic-marked condition showed shorter judgment times in both types of context, indicating that the contrastive focus interpretation encouraged by topic marking helps to reduce processing difficulties by contributing to the resolution of temporary ambiguity.
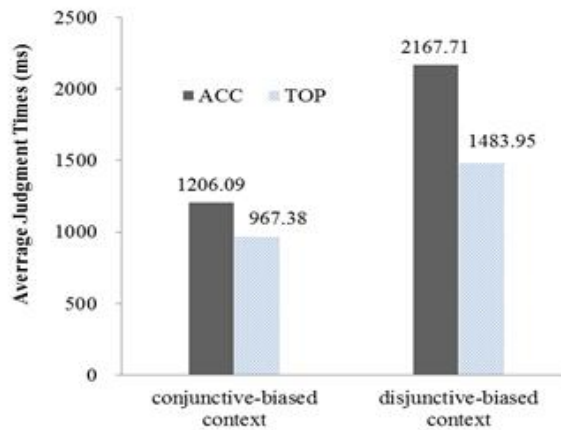

Figure 3. Judgment times for the Truth−Value Judgment Task

Closely looking at the judgment times of only conjunctive interpretation, as Figure 4 shows, the judgment times for the conjunctive interpretation in the disjunctive-biased context are significantly shorter for sentences in the topic-marked condition than for those in the accusative-marked condition (1586.9 ms vs. 1273.28, t(29) = 2.320, $p < .05$). This finding parallels the results reported in Figure 3.
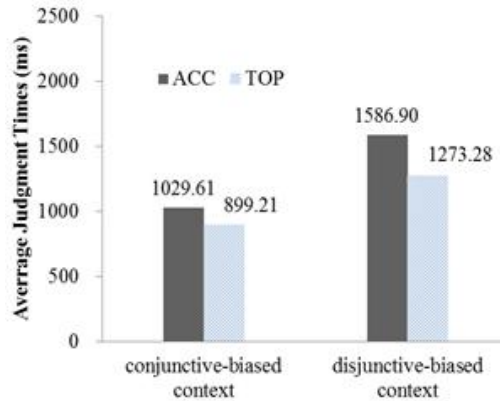
Figure 4. Judgment times for conjunctive interpretation by context and case marking

Again, Figures 3 and 4 indicate that topic-marking on *or*-phrases facilitates the conjunctive interpretation regardless of context bias. In addition, judgment times are shorter in the topic-marked condition than in the accusative-marked condition. This is consistent with the possibility that topic marking encourages the contrastive focus reading of *or*-phrases that are objects of a negated verb, as analyzed in previous studies (e.g., Han, 1996, 1998; Laleko & Polinsky, 2013, 2016).

4. Discussion

This study explored two research questions to examine the semantic effect of the Korean topic marker in the processing of ambiguous sentences. The first research question was addressed by the percentage of participants' "true" responses. As shown in Figure 2, Korean sentences with negated verbs and *-(i)na* 'or' direct object phrases received more conjunctive interpretations in the topic-marked condition (9b) than in the accusative-marked condition (9a). Topic marking *-(n)un*, by creating contrastive focus, prepares the comprehender to easily accept the conjunctive interpretation on a negated *or* phrase, comprehending the direct-object *or*-phrase as a single element in the sentence. This finding could contribute to the experimental evidence in the literature on

topic marking (Han, 1996, 1998; Laleko & Polinsky, 2013, 2016).

The second research question was answered by the judgment time results (Figures 3 and 4). The judgment times were shorter in the topic-marked condition, regardless of context. This shows that the participants, after encountering the temporary ambiguity in sentences like (9a) and (9b), experienced less processing difficulty for sentences with topic-marking, like (9b). These findings suggest that it is possible to cautiously generalize that topic-marking forces the conjunctive interpretation and therefore reduces the degree of temporary ambiguity. This finding also could contribute the cross-linguistic evidence to the psycholinguistic research literature, supporting the prediction of constraint-based approach that the parser activates two or more interpretations in parallel, initially using syntactic or semantic information during the comprehension.

To sum up, the results from this experiment confirm the analysis proposed by Han (1996) regarding a semantic feature of Korean -(n)un: the study found higher rates of the conjunctive interpretation in the topic-marked condition than in the accusative-marked condition, regardless of context bias. Moreover, the shorter judgment times in the topic-marked condition indicate that the semantic information carried by topic-marking reduces processing cost. The reduced processing cost in turn leads to faster resolution of the temporary ambiguity. Therefore, this study's results support the constraint-based approach's explanation for how the comprehension system resolves processing difficulties, by employing non-syntactic information.

The current study has some limitations. First, the degree of ambiguity in Korean sentences caused by the interaction between disjunction and negation is not high. Hence, while the sentence in (9a) is preferentially given a conjunctive interpretation, it received the disjunctive interpretation a third of the time.[14]

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14) A reviewer cautiously pointed out that Korean -(i)na under negation might not receive the disjunctive interpretation, in that the negated disjunction preferentially received a conjunctive interpretation, despite the fact that it received the disjunctive interpretation a third of the time. The disjunctive interpretation of Korean negated disjunction might be caused by the contextual information or scalar implicature in a sentence, but not the interaction between disjunction and negation in this study. Although I acknowledge this as a potential limitation in this study, this issue will be discussed in the future study.

Nonetheless, the sentence (9a) received the disjunctive interpretation a third of the time, as confirmed in O'Grady et al. (2011)'s study, so readers will experience the temporary ambiguity in choosing either of the interpretation. Second, the self-paced reading paradigm used in this experiment does not provide specific information about where the temporary difficulty appears. A more fine-grained method such as eye-movement tracking might clearly show where readers resolve ambiguity in the course of processing ambiguous sentences such as those in this study.

5. Concluding Remarks

This paper reported on an experiment examining the semantic effect of the Korean topic marker -*(n)un* on the resolution of ambiguity caused by the interaction of -*(i)na* 'or' and a negated verb during real-time sentence processing. The findings show that Korean adults use the semantic information of -*(n)un* to resolve temporary ambiguity. The topic marker encourages the contrastive focus reading by semantically forming a contrastive set of two or more elements within a sentence. This evidence is consistent with the proposal of Han (1996), and furthermore, supports the predictions of the constraint-based approach. However, the findings should not be generalized without further support. Therefore, the semantic effect should continue to be examined in future research so as to fully explore the role of semantic information on the resolution of temporary syntactic ambiguity.

References

Bornkessel-Schlesewsky I., & Schlesewsky, M. (2009). The role of prominence information in the real time comprehension of transitive constructions: a cross-linguistic approach. *Language and Linguistics Compass,* 3(1), 19-58.

Chierchia, G., Crain, S., Guasti, G.T., Gualmini, A., & Meroni, M. (2001). The acquisition of disjunction: Evidence for a grammatical view of scalar implicatures. *Proceedings of the 25th Boston University Conference on Language*

Development, 157-68. Somerville, MA: Cascadilla Press.

Choi, H.-W. (1999). *Optimizing structure in context: Scrambling and information structure*. Stanford: CSLI.

Cowles, H. W., Walenski, M., & Kluender, R. (2007). Linguistic and cognitive prominence in anaphor resolution: Topic, contrastive focus and pronouns. *Topoi, 26*(1), 3-18.

Crain, S., & McKee, C. (1985). The acquisition of structural restrictions on anaphora. In *Proceedings of NELS 16,* 94-110.

Crain, S., & Thornton, R. (1998). *Investigations in universal grammar: A guide to experiments on the acquisition of syntax and semantics*. Cambridge, MA: MIT Press.

Fromkin, V., Rodman, R., & Hyams, N. (2011). *An introduction to language*. Boston, MA: Wadsworth

Goro, T., & Akiba, S. (2004). The acquisition of disjunction and positive polarity in Japanese. In *Proceeding of the 23th West Coast Conference Formal Linguistics,* 101-14.

Han, C. (1996). Asymmetric quantification: the case of the Korean topic marker-*(n)un*. In *Proceedings of ConSOLE IV,* 97-111.

Han, C. (1998). Asymmetry in the interpretation of *-(n)un* in Korean. In *Proceedings of Japanese and Korean Linguistics 7,* 1-15.

Kuno, S. (1973). *The structure of the Japanese language*. Cambridge, MA: The MIT Press.

Kuroda, S.-Y. (2005). Focusing on the matter of topic: A study of *wa* and *ga* in Japanese. *Journal of East Asian Linguistics,* 14, 1-58.

Laleko, O., & Polinsky, M. (2013). Marking topic or marking case: A comparative investigation of heritage Japanese and heritage Korean. *Heritage Language Journal, 10,* 40-64.

Laleko, O., & Polinsky, M. (2016). Between syntax and discourse: Topic and case marking in heritage speakers and L2 learners of Japanese and Korean. *Linguistic Approaches to Bilingualism, 6*(4), 396-439.

MacDonald, M. (1994). Probabilistic constraints and syntactic ambiguity resolution. *Language and Cognitive Processes, 9*(2), 157-201.

MacDonald, M. C., Pearlmutter, N. J., & Seidenberg, M. S. (1994). The lexical nature of syntactic ambiguity resolution. *Psychological Review*, 101, 676–703.

McRae, K., Spivey-Knowlton, M. J., & Tanenhaus, M. K. (1998). Modeling the influence of thematic fit (and other constraints) in on-line sentence comprehension. *Journal of Memory and Language*, *38*, 283-312.

O'Grady, W., Lee, O.-S., & Lee, J. (2011). Practical and theoretical issues in the study of heritage language acquisition. *Heritage Language Journal, 8*(3), 23-40.

Spivey-Knowlton, M., & Sedivy, J. (1995). Resolving attachment ambiguities with multiple constraints. *Cognition*, *55*, 227-267.

Taraban, R., & McClelland, J. R. (1988). Constituent attachment and thematic role assignment in sentence processing: Influence of content-based expectations. *Journal of Memory and Language*, *27*, 597-632.

Trueswell, J. (1996). The role of lexical frequency in syntactic ambiguity resolution. *Journal of Memory and Language*, *35*, 566-585.

Trueswell, J., Tanenhaus, M. K., & Garnsey, S. (1994). Semantic influences on parsing: Use of thematic role information in syntactic disambiguation. *Journal of Memory and Language*, *33*, 285–318.

Trueswell, J., Tanenhaus, M. K., & Kello, C. (1993). Verb specific constraints in sentence processing: Separating effects of lexical preference from garden-paths. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *19*, 528-553.

Van Gompel, R. P. G., Pickering, M. J., & Traxler, M. J. (2001). Reanalysis in sentence processing: Evidence against current constraint-based and two-stage models. *Journal of Memory and Language, 45*, 225-258.

On—Soon Lee
College of General Education
Dong-A University
37 550bun-gil, Nakdongdae-ro, Saha-gu, Busan, South Korea, 49315
Phone: 051-200-0924
Email: oslee@dau.ac.kr