



On the nature of CNPC effects in Korean scrambling constructions*

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Kim, Ilkyu and Yunjoo Ji. 2023. On the nature of CNPC effects in Korean scrambling constructions. *Linguistic Research* 40(2): 151-181. There are two main approaches to the nature of island effects: syntactic and functional approaches. The former attributes the nature of island effects to the violation of syntactic constraints, whereas the latter claims that island effects arise due to non-syntactic factors such as processing difficulty and semantic/pragmatic infelicity. This paper aims to investigate the nature of Complex NP Constraint (CNPC) effects in Korean scrambling constructions based on two acceptability judgment experiments. The first experiment examines the role of three functional factors, namely plausibility, definiteness, and coherence, which have been claimed to have significant effects on island phenomena by previous studies. The second experiment, which is based on a factorial definition of island effects, tries to figure out whether functionally felicitous CNPC-violating scrambling constructions show island effects. The results of the two experiments strongly support the view that the nature of CNPC effects in Korean scrambling constructions is functional, not syntactic. (Kangwon National University · Hankuk University of Foreign Studies)

Keywords island effects, CNPC, scrambling constructions, experimental syntax, Korean

1. Introduction

With recent popularity of experimental approach to island effects, the number of experimental studies on the nature of island effects in Korean has been also increasing for the last decade or so. Since Korean is a *wh*-in-situ language, scrambling constructions

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have particularly attracted Korean experimental linguists' attention due to its characteristic of involving explicit "extraction" of an element out of its base position. Despite the growing interest in the experimental approach to island effects in the Korean scrambling construction, however, previous experimental studies are not enough to get reliable and conclusive answers to many important questions.

The purpose of this paper is to contribute to our understanding of the nature of island effects in Korean scrambling constructions. To be more specific, we focus on the role of functional (i.e. processing and pragmatic) factors because they have never been systematically examined. As for the type of island constraints, we deal with the Complex NP Constraint (CNPC) because it is the only constraint that has been claimed to induce island effects by previous experimental works. In a nutshell, the current study tries to find out whether CNPC effects shown in Korean scrambling constructions are "real" island effects or only spurious phenomena that can be explained away by non-syntactic factors.

The structure of the paper is as follows. Section 2 introduces previous experimental works and discusses the motivation for our study. Section 3 reports the design and results of our first experiment, in which we tested whether three functional factors, namely plausibility, definiteness, and coherence affect the acceptability of CNPC-violating scrambling constructions. In the second experiment, which is discussed in section 4, we examine whether CNPC effects do exist in Korean scrambling constructions, based on a factorial definition of island effects (Sprouse 2007, 2018). For this purpose, we used sentences that were found to be most acceptable in the first experiment as the target items and tested whether they showed "real" island effects. Our hypothesis is that if CNPC effects in the Korean scrambling construction were real, even the functionally felicitous constructions should show island effects due to the violation of the syntactic constraint, that is, CNPC. Section 5 provides general discussion of the results of the two experiments. Finally, section 6 concludes the paper.

2. Previous studies

Although island effects in Korean scrambling constructions have been discussed extensively from theoretical perspectives, experimental works on this issue are rare. To the best of our knowledge, the number of experimental studies that directly deal with the

issue is just 5.¹ The following table summarizes the main findings of the 5 previous studies:

Table 1. Findings of previous experimental works on island effects in Korean scrambling constructions

	Existence of island effects for each island constraint			
	<i>Wh</i> -island	CNPC 1: Noun Complement	CNPC 2: Relative Clause	Adjunct Constraint
Hahn (2015a)	Not found			
Hahn (2015b)	Not found			
Jung et al. (2017)	Not found	Found		Not found
Cho (2018)	Not found			
Ko et al. (2019)	Not found		Not found	Not found

As shown in Table 1, all the previous works dealt with *wh*-island effects and concluded that they do not exist in the Korean scrambling construction. Two studies reported no adjunct island effect, and one reported no relative clause constraint effect. The only effect claimed to exist is the CNPC effect, with complex NPs made up of a noun complement (Jung et al. 2017).

A natural question that arises is why only one type of island constraint shows island effects. To this question, two answers are possible. First, a complex NP with noun complements is special and it acts as a true syntactic island. Second, the seeming island effects are only spurious and Complex NPs with a noun complement are not true syntactic islands. Our goal is to find out which answer is correct, and for that purpose let us examine Jung et al.'s study in more detail and see if there is any room for improvement in terms of experimental design.

Jung et al. conducted an acceptability judgment experiment based on a factorial definition of island effects first proposed by Sprouse (2007). They formulated a $2 \times 2 \times 2$ factorial design with three factors: STRUCTURE (island vs. non-island), GAP-POSITION (matrix vs. embedded), and TYPE (*wh*-element “*wh*” vs. non-*wh*-element “nonwh”). The 8 conditions were matched with a context to control the potential effect of D(iscourse)-linkedness of the *wh*-element. Among the 8 conditions, only the CNPC-violating conditions, that is, ISLAND | EMBEDDED | NONWH and ISLAND | EMBEDDED

¹ Yoon (2013) also provides an experimental work directly dealing with the issue, but the experiment is not properly designed. For instance, there are only two target items in the experiment. Thus, her work will not be discussed here.

| WH are provided in (1) below, together with the context.

(1) a. Context

[Situation: During the summer vacation, Chelswu and Yenghuy took a trip to Busan. Upon arrival, not paying any attention to the beach, they went directly to a famous seafood restaurant, and ordered sashimi as well as broiled shellfish and shrimps. Yenghuy loves shrimps, so she ate all of the shrimps they ordered. At that night, Chelswu brought Yenghuy to an emergency room because of her terrible pain in the stomach. Chelswu told the doctor that Yenghuy ate lots of shrimps.] (Jung et al. 2017: 7)

b. ISLAND | EMBEDDED | WH

mwues-ul Chelswu-nun uysa-eykey [Yenghuy-ka ___ mekessta-nun
what-Acc Chelswu-Top doctor-Dat Yenghuy-Nom ___ ate-Adn
sasil-ul] iyakihay-ess-ni
fact-Acc tell-Past-Q

‘What did Chelswu tell the doctor the fact that Yenghuy ate?’

(Jung et al. 2017: 7)

c. ISLAND | EMBEDDED | NONWH

Saywu-lul Chelswu-nun uysa-eykey [Yenghuy-ka ___ mekessta-nun
shrimp-Acc Chelswu-Top doctor-Dat Yenghuy-Nom ___ ate-Adn
sasil-ul] iyakiha-ess-ni
fact-Acc tell-Past-Q

‘Did Chelswu tell the doctor the fact that Yenghuy ate shrimps?’

(Jung et al. 2017: 8)

According to Jung et al., both conditions showed island effects. It is important to note, however, that although *wh*-scrambling showed a significant interaction between STRUCTURE and GAP-POSITION ($p = 0.0003$), non-*wh*-scrambling showed no significant interaction ($p = 0.0507$), which they claimed to be “marginally significant”.

What is the source of the difference between the two conditions? One plausible explanation is the discourse constraint in (2).

(2) Focus-background conflict (FBC) constraint (Abeillé et al. 2020: 3):

A focused element should not be part of a backgrounded constituent.

The difference between the two conditions is that in the WH condition the scrambled NP is guaranteed to be informational focus by the fact that it is a *wh*-element, while in the NONWH condition the preposed element is guaranteed to be part of backgrounded information due to the context provided in (1a) and the fact its base position is within the NP complement headed by *sasil* ‘fact’, a well-known presupposition trigger. Thus, only the former violates the FBC while the latter does not.

Given that the lower acceptability of *wh*-scrambling may well be explained by the FBC constraint, the remaining question is whether the close-to-significant effect caused by non-*wh*-scrambling is really due to the syntactic constraint, that is, CNPC. We have every reason to believe that it is not the case. First, it has been widely shown that as the distance between a filler and its gap gets longer, it gets harder to construct the filler-gap dependency due to a retrieval difficulty at the gap position (e.g. Gibson 1998, 2000; Lewis and Vasishth 2005). Both in (1b) and (1c), as many as three NPs (i.e. *Chelswu*, *uysa*, and *Yenghuy*) occur in a consecutive way between the filler and the gap, which means that the hearer must store three referents in her working memory while trying to find out the gap position of the filler. According to previous studies (e.g. Makuuchi et al. 2013; Liu et al. 2022b), three intervening NPs make the distance of the filler-gap dependency long enough to cause processing difficulty.

Second, the low acceptability of (1c) can also be attributed to the low prominence of the scrambled element. According to Previous studies (Choi 1999, 2004; Hwang 2008), a scrambled element should be prominent enough to be (contrastive) focus/topic. However, according to the context, the scrambled element, that is, *saywu* ‘shrimp’, tends to be just part of the backgrounded (and thus not prominent) information rather than being (contrastive) focus/topic.²

Given that the almost significant CNPC effect found in Jung et al.’s non-*wh*-scrambling might have been due to the two confounding factors discussed above, it is necessary to control for them in order to better understand the nature of CNPC effects in Korean scrambling constructions. In addition, it would be better if we could control for other functional factors that have been argued to be the source of island effects by previous studies, when we test whether CNPC-violation really gives rise to island effects.

Our logic is that the nature of any island effect can be safely argued to be syntactic

2 The topic of the sentence should be *Yenghuy*, who is in the center of attention by being sick and examined by a doctor.

only if those effects still arise even after every potential non-syntactic, or functional constraint is satisfied. On the other hand, if the seeming “syntactic” island effects disappear with the satisfaction of the functional constraints, then it would be more reasonable to conclude that the nature of the island effects are functional rather than syntactic. In this study, we will try to show that at least in Korean, scrambling out of CNPC does not yield island effects as long as it conforms to functional constraints.

For our purposes, we conducted two acceptability judgment experiments. The goal of the first experiment (Experiment 1) was to prepare experimental items for the second experiment (Experiment 2), in which we tried to figure out whether island effects do exist even when potential confounding functional factors are controlled for. In order to provide ideal experimental items for Experiment 2, we investigated in Experiment 1 the role of three functional factors that have been argued to be the source of island effects by previous experimental studies: plausibility, definiteness, and coherence, while controlling for the two functional factors discussed above (i.e. the distance between a filler and its gap and the prominence of the scrambled element). Our hypothesis was that 1) since the two confounding functional factors were controlled for, the acceptability of the experimental items would be higher than that of Jung et al.’s experimental items, and that 2) if the three functional factors did have significant effects on island phenomena (as previous works claimed), they would also play a significant role on accounting for CNPC effects in Korean scrambling constructions.

For experimental items in Experiment 2, which was based on the factorial definition of island effects (Sprouse 2007, 2018), we used the experimental items that got the highest acceptability in Experiment 1, that is, the items with the least processing difficulty and the biggest pragmatic felicity. In this way, we were able to control for potential confounding functional factors as best we could, so that if island effects were shown to exist at all their nature could be claimed to be syntactic more safely.

3. Experiment 1

3.1 Design and materials

In order to reduce processing difficulty caused by the long distance between a filler and a gap in Jung et al.’s (2017) experiment, we used a syntactic structure in which the

dependency is intervened by just two (not three) referents, as shown in (3a).

- (3) a. NP_{Obj} NP_{Subj} [[NP_{Subj} ___ ...]_{Clause} NP_{Acc}]_{CNP} V
 b. NP_{Subj} NP_{Subj} [[___ ...]_{Clause} NP_{Acc}]_{CNP} V

One might argue that the distance between the filler and the gap can even be shortened by extracting the subject rather than the object of the embedded clause as shown in (3b). However, this structure gives rise to structural ambiguity which leads participants to a much simpler but wrong analysis, where no extraction occurs and the first NP is analyzed as the matrix subject and the second NP as the embedded subject. Thus, the structure of the type of (3b) is excluded from our consideration.

Rather than employing a context which makes the information status of the extracted element inappropriate for scrambling, we decided not to use any context. Of course, it would be better if we could provide participants with context that favors or motivates scrambling constructions, but we decided not to provide any context in our experiment for two reasons. First, it would be too tiring for participants to read a context for every experimental and filler item. Second, it is not unreasonable to expect that participants would treat the scrambled element to be a prominent element by default based on their previous experience of speaking and hearing scrambling constructions, just like one tends to interpret the subject argument of a sentence to be the topic (rather than a focus) unless they are given a context that prohibits the subject-as-topic interpretation.

In addition to adjusting Jung et al.'s experimental design, we employed three new functional independent factors. Before introducing them one by one, however, let us discuss the core idea that motivates those three factors. In the structure we are interested in (i.e. (3a)), the extracted object NP is separated from the rest of the embedded clause by the matrix subject. Our hypothesis is that this separation (but not CNPC violation) is the main cause for decreased acceptability, because from a functional point of view there is no reason for inserting the matrix subject between the object and the subject of the embedded clause, which would only block information flow without any communicative benefit. Thus, we predict that the low acceptability will be ameliorated by either weakening the semantic weight (and thus the processing load) of the intervening matrix subject or strengthening the semantic/pragmatic relation between what is scrambled and the rest of the embedded clause. Let us introduce the independent factors

that we used to test this hypothesis.

First, according to Kluender (2004), cost of referential processing (of NPs and verbs) “is especially acute and therefore critical at clause boundaries” (Kluender 2004: 105). And one way of reducing this processing cost is to make the NP non-definite, that is, indefinite (e.g. *someone*) or indexical (e.g. *I, you*), because “the necessity of accessing the relevant discourse referent is drastically reduced relative to definite NPs” (Kluender 2004: 105). In our experiment, we used this factor as a way of differentiating the semantic weight of the intervening matrix subject.

- (4) a. i nolay-lul **Sangswu**-nun ku kaswu-ka ___ palphyohayssta-nun
 this song-Acc Sangswu-Top the singer-Nom ___ released-Adn
 sasil-ul a-ni
 fact-Acc know-Int
 ‘Does Sangswu know the fact that the singer released this song?’
- b. i nolay-lul **ne**-nun ku kaswu-ka ___ palphyohayssta-nun
 this song-Acc you-Top the singer-Nom ___ released-Adn
 sasil-ul a-ni
 fact-Acc know-Int
 ‘Do you know the fact that the singer released this song?’

For instance, in (4a), the matrix subject is a proper noun, which is necessarily definite, whereas in (4b), it is an indexical noun, which, according to Kluender, imposes less processing load. Since it is well known that processing cost is inversely proportional to acceptability (e.g. Gibson 1998, 2000), it is predicted that (4b) is more acceptable than (4a) because the intervening element is less difficult to process, which in turn strengthens the connection between the scrambled NP and the clause from which it is extracted.

The second independent factor is plausibility of the embedded clause. Our hypothesis is that as the situation denoted by the embedded clause is more plausible, the scrambling is more acceptable due to the stronger pragmatic connection between the filler and its clause. Here, plausibility is understood based on the notion of frame, which can be roughly defined as “conventionalized general knowledge related to a concept” (Chaves and King 2019). For instance, the event of a singer’s releasing a song is very plausible in that such events happen so many times in the real world to the extent that the whole event is conventionalized in our brain. So every time we hear words like *singer* and *song*,

the conventionalized knowledge is activated as a chunk. On the other hand, the state of a nurse's disliking a song is not something that naturally occurs to one's mind when she thinks of the notion of song or singer.

- (5) a. i nolay-lul ne-nun ku **kaswu-ka** ___ **palphyohayssta-nun**
 this song-Acc you-Top the singer-Nom ___ released-Adn
 sasil-ul a-ni
 fact-Acc know-Int
 'Do you know the fact that the singer released this song?'
- b. i nolay-lul ne-nun ku **kanhosa-ka** ___ **silhehanta-nun**
 this song-Acc you-Top the nurse-Nom ___ dislike-Adn
 sasil-ul a-ni
 fact-Acc know-Int
 'Do you know the fact that the nurse dislikes this song?'

Thus, the extracted NP is more closely related to the embedded clause in (5a) than in (5b). Note that our hypothesis is empirically supported by Chaves and King (2019), who convincingly showed through their experiments that "the more coherent the semantic components and the more prototypical their relations are, the more acceptable extraction of one of those components is" (Chaves and King 2019: 27).

Lastly, the connection between the extracted NP and the embedded clause can even get stronger by modifying the extracted NP and the embedded VP in a way that the two are coherently related to each other. An example is shown in (6a).

- (6) a. **yocum hanchang yuhayngga-nun** i nolay-lul ne-nun ku
 recently at.the.peak popular-Adn this song-Acc you-Top the
 kaswu-ka **imi sip nyen cen-ey** ___ **palphyohayssta-nun**
 singer-Nom already ten year before-Dat ___ released-Adn
 sasil-ul a-ni
 fact-Acc know-Int
 'Do you know the fact that the singer released this song ten years ago
 when its popularity is now at the peak?'

- b. **yocum hanchang yuhaynggha-nun** i nolay-lul ne-nun ku
 recently at.the.peak popular-Adn this song-Acc you-Top the
 kanhosa-ka thi-ka na-l cengto-lo __ silhehanta-nun
 nurse-Nom look-Nom seen-Adn extent-to __ dislike-Adn
 sasil-ul a-ni
 fact-Acc know-Int
 ‘Do you know the fact that the nurse dislikes the song to the extent that
 one can notice it?’

In (6a), not only plausibility is satisfied but also the filler and the rest of the embedded clause are coherently related by the unexpectedness relation, one of the coherence relations suggested by Kehler (2002). That is, the meaning of the extracted NP (i.e. that the popularity of the song is now at the peak) is unexpected given the meaning of the embedded clause (i.e. the song was released ten years ago), and this unexpectedness is expected to make the ties between the extracted NP and the embedded clause much closer than when they are connected just by plausibility as in (5a). In contrast, no such relation (or any other coherence relations) exists between the filler and the rest of the embedded sentence in (6b), let alone plausibility.

Because coherence has been argued to be one of the main sources of island effects in other constructions in Korean and English (Kim 2013, 2016, 2017, 2019; Kim and Ji 2020), it is expected that CNPC effects in scrambling constructions can also disappear by making the extracted element and the clause from which it is extracted coherently related to each other. With the three independent factors (i.e. PLAUSIBILITY, DEFINITENESS, COHERENCE), we formulated a $2 \times 2 \times 3$ factorial design with 8 conditions, as shown in (7). For our study, we formulated 8 sets of 8 conditions, thus making the total number of experimental items 64.

- (7) a. PLAUSIBLE | INDEXICAL | COHERENT

yocum hanchang yuhaynggha-nun i nolay-lul ne-nun ku kaswu-ka
 recently at.the.peak popular-Adn this song-Acc you-Top the singer-Nom
imi sip nyen cen-ey __ palphyohayssta-nun sasil-ul
 already ten year before-Dat __ released-Adn fact-Acc
 a-ni
 know-Int

‘Do you know the fact that the singer released this song 10 years ago when its popularity is now at the peak?’

b. PLAUSIBLE | PROPER | COHERENT

yocum hanchang yuhaynggha-nun i nolay-lul Sangswu-nun
 recently at.the.peak popular-Adn this song-Acc Sangswu-Top
 ku kaswu-ka **imi sip nyen cen-ey** ___ palphyohayssta-nun
 the singer-Nom already ten year before-Dat ___ released-Adn
 sasil-ul a-ni
 fact-Acc know-Int

‘Does Sangswu know the fact that the singer released this song 10 years ago when its popularity is now at the peak?’

c. PLAUSIBLE | INDEXICAL | NONE

i nolay-lul ne-nun ku **kaswu-ka** ___ **palphyohayssta-nun**
 this song-Acc you-Top the singer-Nom ___ released-Adn
 sasil-ul a-ni
 fact-Acc know-Int

‘Do you know the fact that the singer released this song?’

d. PLAUSIBLE | PROPER | NONE

i nolay-lul Sangswu-nun ku **kaswu-ka** ___ **palphyohayssta-nun**
 this song-Acc Sangswu-Top the singer-Nom ___ released-Adn
 sasil-ul a-ni
 fact-Acc know-Int

‘Does Sangswu know the fact that the singer released this song?’

e. IMPLAUSIBLE | INDEXICAL | NONE

i nolay-lul ne-nun ku **kanhosa-ka** ___ **silhehanta-nun**
 this song-Acc you-Top the nurse-Nom ___ dislike-Adn
 sasil-ul a-ni
 fact-Acc know-Int

‘Do you know the fact that the nurse dislikes this song?’

f. IMPLAUSIBLE | PROPER | NONE

i nolay-lul Sangswu-nun ku **kanhosa-ka** ___ **silhehanta-nun**
 this song-Acc Sangswu-Top the nurse-Nom ___ dislike-Adn
 sasil-ul a-ni
 fact-Acc know-Int

‘Does Sangswu know the fact that the nurse dislikes this song?’

g. IMPLAUSIBLE | INDEXICAL | INCOHERENT

yocum hanchang yuhaynggha-nun i nolay-lul ne-nun
 recently at.the.peak popular-Adn this song-Acc you-Top
 ku kanhosa-ka **thi-ka na-l cengto-lo** __ silhehanta-nun
 the nurse-Nom look-Nom seen-Adn extent-to __ islike-Adn
 sasil-ul a-ni
 fact-Acc know-Int

‘Do you know the fact that the nurse dislikes the song to the extent that one can notice it?’

h. IMPLAUSIBLE | PROPER | INCOHERENT

yocum hanchang yuhaynggha-nun i nolay-lul Sangswu-nun
 recently at.the.peak popular-Adn this song-Acc Sangswu-Top
 ku kanhosa-ka **thi-ka na-l cengto-lo** __ silhehanta-nun
 the nurse-Nom look-Nom seen-Adn extent-to __ dislike-Adn
 sasil-ul a-ni
 fact-Acc know-Int

‘Does Sangswu know the fact that the nurse dislikes the song to the extent that one can notice it?’

Here, it is important to note that the value for the coherence variable is absent (which we termed ‘none’) for four conditions (i.e. (7c-f)), where the extracted element and the embedded clause are not modified at all. Also, note that we have only 8 conditions instead of 12, missing the four conditions, namely PLAUSIBLE | PROPER | INCOHERENT, PLAUSIBLE | INDEXICAL | INCOHERENT, IMPLAUSIBLE | PROPER | COHERENT, and IMPLAUSIBLE | INDEXICAL | COHERENT. The latter two conditions are absent because it is logically impossible to provide coherent relation between the extracted NP and the rest of the embedded clause when the situation denoted by the embedded clause is implausible. And we did not provide INCOHERENT conditions for PLAUSIBLE conditions in order to keep balance between PLAUSIBLE and IMPLAUSIBLE conditions.

Also, note that we restricted the head noun of noun complements to *sasil* ‘fact’. Given that nouns that take a noun complement differ from one another in terms of the degree of backgroundedness of the noun complement and that this might affect the results of the experiment, we tried to control for the degree of backgroundedness by using the

same head noun for both experimental and filler items. For the same reason, instead of making use of multiple coherence relations, we stuck to the unexpectedness relation.

As for filler items, we used 22 grammatical and 22 ungrammatical sentences that are similar to experimental items in terms of syntactic structure but do not violate any island constraint. An example of grammatical fillers is shown in (8).

- (8) a. ne-nun ku weyithe-ka cepsi-lul dakka-ss-ta-nun sasil-ul a-ni
 you-Top the waiter-Nom dish-Acc wash-Past-Dec-Adn fact-Acc know-Int
 ‘Do you the fact that the waiter washed the dishes?’
- b. Sangho-nun ku ai-lul tamimkyosa-ka honnay-ss-ta-nun
 Sangho-Top the child-Acc homeroom.teacher-Nom scold-Past-Dec-Adn
 sasil-ul a-ni
 fact-Acc know-Int
 ‘Does Sangho know the fact that the homeroom teacher scolded the child?’

(8a) is an example that involves no scrambling, and (8b) is an example of grammatical fillers that involve scrambling (without violating CNPC).

Ungrammatical fillers are constructed by manipulating case markers. An example is shown in (9) below, where the sentence is ungrammatical because the subject argument of the embedded clause is marked by the accusative case instead of the nominative case.

- (9) Swuhyen-i-nun ku kamcengphyengkasa-**lul** pang cengli-lul
 Syuhyen-~~Æ~~-Top the certified.public.appraiser-Acc room cleaning-Acc
 cal han-ta-nun sasil-ul a-ni
 well do-Dec-Adn fact-Acc know-Int
 ‘Does Swuhyen know the fact that the certified public appraiser cleans her room well?’

In addition to the target and filler items, 5 practice items were added to the beginning of each list to allow participants to familiarize themselves with the rating scale before rating target items. The practice items were not marked as practice items, so from the perspective of the participants they were simply part of the survey. Also, during the experiment, a simple comprehension question followed 6 grammatical fillers in order to

make sure that participants focus on the experiment.

3.2 Prediction

Our prediction is that the condition that are functionally most appropriate, that is, PLAUSIBLE | INDEXICAL | COHERENT is most acceptable and the condition that are functionally least appropriate, that is, IMPLAUSIBLE | PROPER | INCOHERENT, least acceptable.

3.3 Participants and procedure

A total of 82 undergraduate students (48 females) from two universities in South Korea participated in the online experiment for their course credit. All of them were in their 20s, native speakers of Korean, and had no background in linguistics.

They were asked to conduct acceptability judgment. The acceptability ratings were presented as seven choices from 1 (extremely unnatural) to 7 (extremely natural). The experiment took approximately 20 minutes to complete.

In order to prevent participants from noticing experimental items, instead of showing a participant the whole 56 experimental items (7 sets × 8 conditions), we constructed four different lists of stimuli using a Latin square design. In each list, we included 14 experimental items by choosing two conditions from each set that were least similar to each other. For example, among the 8 conditions in the set in (7), (7a) and (7f), which are repeated below, share only *i nolay* ‘this song’.

(7) a. PLAUSIBLE | INDEXICAL | COHERENT

yocum hanchang yuhaynggha-nun i nolay-lul ne-nun
 recently at.the.peak popular-Adn this song-Acc you-Top
 ku kaswu-ka **imi sip nyen cen-ey** ___ palphyohayssta-nun
 the singer-Nom already ten year before-D ___ released-Adn
 sasil-ul a-ni
 fact-Acc know-Int

‘Do you know the fact that the singer released this song 10 years ago when its popularity is now at the peak?’

f. IMPLAUSIBLE | PROPER | NONE

I nolay-lul Sangswu-nun ku **kanhosa-ka** ___ **silhehanta-nun**
 this song-Acc Sangswu-Top the nurse-Nom ___ dislike-Adn
 sasil-ul a-ni
 fact-Acc know-Int
 ‘Does Sangswu know the fact that the nurse dislikes this song?’

A set of two conditions that are least similar to each other by sharing only part of the scrambled NP is shown in (10) below.

- (10) a. PLAUSIBLE | INDEXICAL | COHERENT - IMPLAUSIBLE | PROPER | NONE
 b. PLAUSIBLE | PROPER | COHERENT - IMPLAUSIBLE | INDEXICAL | NONE
 c. PLAUSIBLE | INDEXICAL | NONE - IMPLAUSIBLE | PROPER | INCOHERENT
 d. PLAUSIBLE | PROPER | NONE - IMPLAUSIBLE | INDEXICAL | INCOHERENT

By choosing two conditions in each set this way, each list had 14 experimental items (2 items × 7 sets), and the Latin square design guaranteed that the experimental items were distributed evenly among the four lists.

3.4 Results

Among 55 items (22 grammatical fillers + 22 ungrammatical fillers + 6 comprehension questions + 5 practice items), if a participant got at least 15% of the acceptability/answers wrong, their data were excluded from the analysis. As a result, the number of participants whose data were analyzed was 69.

First, let us check the descriptive statistics. The medians of the experimental and filler items are shown in Table 2.

Table 2. Central tendency of experimental and filler items

	Condition		Median
Experimental items	1	PLAUSIBLE INDEXICAL COHERENT	6
	2	PLAUSIBLE PROPER COHERENT	6
	3	PLAUSIBLE INDEXICAL NONE	6
	4	PLAUSIBLE PROPER NONE	5.5
	5	IMPLAUSIBLE INDEXICAL INCOHERENT	6
	6	IMPLAUSIBLE PROPER INCOHERENT	6
	7	IMPLAUSIBLE INDEXICAL NONE	6
	8	IMPLAUSIBLE PROPER NONE	5
Filler items	Grammatical		7
	Ungrammatical		1

As shown in Table 2, every condition shows quite high acceptability. Notably, this is contrary to Jung et al.'s results (2017), who reported very low acceptability of CNPC-violating scrambling constructions. Not surprisingly, the medians of acceptability for the grammatical and ungrammatical fillers were 7 and 1, respectively.

The data from the eight conditions were z-transformed, and the locality, spread and skewness of the data are demonstrated by the boxplot in Figure 1 below.

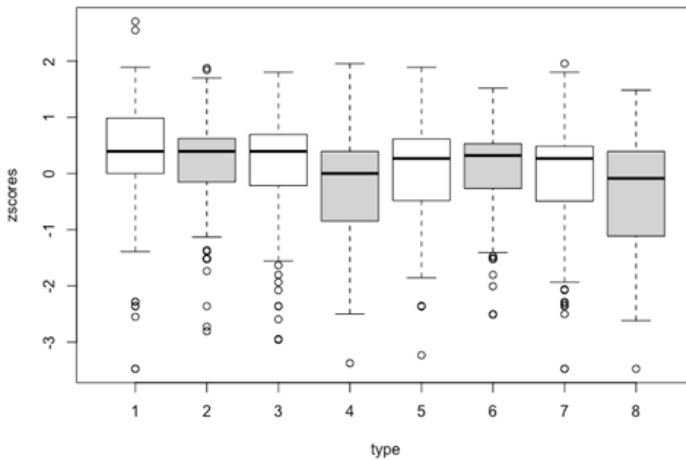


Figure 1. Mean z-scores for each condition

Although visual inspection of the data did not reveal any obvious deviations from

homoscedasticity or normality, in order to make sure that our data is homoscedastic we conducted the Breusch-Pagan test. The test statistic (BP) was small and the p-value was not significant (BP = 1.2729, df = 1, p-value = 0.2592), thus guaranteeing the homoscedasticity of the residuals.

For the inferential statistics, we used R (R Core Team 2012) and *lme4* (Bates Maechler and Bolker, 2012) to perform a linear mixed effects analysis of the relationship between acceptability and the three factors: PLAUSIBILITY, DEFINITENESS, and COHERENCE. As fixed effects, we entered PLAUSIBILITY, DEFINITENESS, and COHERENCE (without interaction term) into the model. As random effects, we had intercepts for subjects and items. The fitted regression model predicts that Condition 1, (i.e. PLAUSIBLE | INDEXICAL | COHERENT) gets the highest acceptability (mean z-score = 0.29679) as predicted. IMPLAUSIBLE lowers the mean z-score by 0.08, PROPER by 0.27, INCOHERENT by 0.19, and NONE by 0.13.

We then calculated p-values for the three main effects using likelihood ratio tests. As expected from the descriptive statistics discussed above, the three factors showed no statistically significant effect (PLAUSIBILITY: $\chi^2(1) = 0.35$, $p = 0.50384$, DEFINITENESS: $\chi^2(1) = 2.98$, $p = 0.05853$, COHERENCE: $\chi^2(2) = 0.98$, $p = 0.53664$). In addition, all the interaction terms also showed no significant effect ($p > 0.05$).

3.5 Discussion

Our findings are interesting for two reasons. First, the three independent factors that have been claimed to have significant effect on island phenomena (e.g. Kluender 2004; Kim 2013, 2016; Chaves and King 2019) were shown not to be significant in this experiment. There are so many possible explanations for the lack of significance that it is impossible to discuss those possibilities one by one in this paper. But one thing to note is that the prediction made by the regression model above shows that the effects of the three factors are all as expected (although not as much as to be statistically significant). Furthermore, note that the effect size of DEFINITENESS is almost significant ($p = 0.05853$).

Second, as shown in Table 2 above, the acceptability of every condition is quite high, which seems hard to explain if CNPC is truly syntactic in nature. Particularly, there is a big gap between the acceptability of the experimental items and that of the

ungrammatical fillers. As to why even the items that are predicted to have low acceptability, that is, items of Condition 6 (i.e. IMPLAUSIBLE | PROPER | INCOHERENT) and Condition 8 (i.e. IMPLAUSIBLE | PROPER | NONE), one possible (and we believe the most plausible) explanation seems to be that controlling for the two confounding factors in Jung et al.'s experiment increased acceptability so much that even if the three independent factors did have a significant effect, it had been hidden due to a ceiling effect.

4. Experiment 2

In the previous section, we have seen that CNPC-violation in Korean scrambling does not lead to sheer unacceptability. Nevertheless, even the items of Condition 1 (i.e. PLAUSIBLE | INDEXICAL | COHERENT) did not get the highest acceptability as the grammatical fillers did; the median of the former was 6 while that of the latter got 7. One might attribute this imperfect acceptability to the CNPC effect. In order to figure out whether this hypothesis is on the right track, we conducted another experiment based on the factorial definition of island effects (e.g. Sprouse 2007, 2018).

4.1 Design and materials

A factorial definition of island effects first proposed by Sprouse (2007) is now widely used in experimental research on island phenomena. It has become so popular among those working on island effects mainly due to its ability to isolate and quantify island effects by controlling for non-grammatical confounding factors. An example of this design is shown in (11) below.

(11) A factorial design for measuring island effects:	STRUCTURE	DEPENDENCY
a. Who _i e _i thinks that Tom hit it?	non-island	short
b. What _i do you think that Tom hit e _i ?	non-island	long
c. Who _i e _i wonders whether Tom hit it?	island	short
d.*What _i do you wonder whether Tom hit e _i ?	island	long

By subtracting the acceptability of (11b) from that of (11d) we get the effect of

structure and island violation, as shown in (12).

$$\begin{array}{rcl}
 (12) \text{ Acceptability}_{(11d)} & = & \text{violation} + \text{long} + \text{island} \\
 - \text{Acceptability}_{(11b)} & = & \phantom{\text{violation}} + \text{long} + \text{non-island} \\
 \hline
 \text{Acceptability}_{(11d)-(11b)} & = & \text{violation} + (\text{island} - \text{non-island})
 \end{array}$$

Then, by subtracting the acceptability of (11a) from that of (11c), we get the effect of structure, as shown in (13).

$$\begin{array}{rcl}
 (13) \text{ Acceptability}_{(11c)} & = & \text{short} + \text{island} \\
 - \text{Acceptability}_{(11a)} & = & \text{short} + \text{non-island} \\
 \hline
 \text{Acceptability}_{(11c)-(11a)} & = & (\text{island} - \text{non-island})
 \end{array}$$

Finally, we can isolate the effect of island violation by subtracting the difference in (12) from the difference in (13), which is called differences-in-differences score (henceforth, DD score), as shown in (14).

$$\begin{array}{rcl}
 (14) \text{ Acceptability}_{(11d)-(11b)} & = & \text{violation} + (\text{island} - \text{non-island}) \\
 - \text{Acceptability}_{(11c)-(11a)} & = & (\text{island} - \text{non-island}) \\
 \hline
 \text{Acceptability}_{DD} & = & \text{violation}
 \end{array}$$

According to Sprouse (2007), if the difference in acceptability between (11b) and (11d) is bigger than that between (11a) and (11c), that difference, or the super-additive effect, is the island effect, and its size is the size of the island effect. In other words, if the DD score is positive and its size is significantly big enough, it can be concluded that (11d) shows a real island effect, which cannot be attributed to the sum of the processing costs caused by STRUCTURE and DEPENDENCY.

For our factorial definition of island effects, we employed a 2 x 2 design, crossing two factors, STRUCTURE and DISTANCE, each having two levels. STRUCTURE manipulates the presence of an island configuration, a complex NP with a noun complement in this case. ISLAND condition contains a complex NP, whereas NON-ISLAND condition does not contain one. DISTANCE determines the position of the scrambled element. In SHORT condition the position of the scrambled element falls in the embedded clause, where its

base position is located. In LONG condition the position of the scrambled element is located outside the embedded constituent. The factorial design is illustrated in (15) with actual items used in the experiment.

(15) a. NON-ISLAND | LONG

youcum hanchang yuhayngha-nun i nolay-lul ne-nun
 recently at.the.peak popular-Adn this song-Acc you-Top
 ku kaswu-ka imi sip nyen cen-ey ___ palphyohayssta-ko
 the singer-Nom already ten year before-Dat ___ released-Comp
 mit-ni
 believe-Int

‘Do you believe that the singer released this song 10 years ago whose popularity is now at the peak?’

b. NON-ISLAND | SHORT

ne-nun youcum hanchang yuhayngha-nun i nolay-lul
 you-Top recently at.the.peak popular-Adn this song-Acc
 ku kaswu-ka imi sip nyen cen-ey ___ palphyohayssta-ko
 the singer-Nom already ten year before-Dat ___ released-Comp
 mit-ni
 believe-Int

‘Do you believe that the singer released this song 10 years ago when its popularity is now at the peak?’

c. ISLAND | LONG

youcum hanchang yuhayngha-nun i nolay-lul ne-nun
 recently at.the.peak popular-Adn this song-Acc you-Top
 ku kaswu-ka imi sip nyen cen-ey ___ palphyohayssta-nun
 the singer-Nom already ten year before-Dat ___ released-Adn
 sasil-ul a-ni
 fact-Acc know-Int

‘Do you know the fact that the singer released this song 10 years ago whose popularity is now at the peak?’

d. ISLAND | SHORT

ne-nun yocum hanchang yuhayngha-nun i nolay-lul
 you-Top recently at.the.peak popular-Adn this song-Acc
 ku kaswu-ka imi sip nyen cen-ey ___ palphyohayssta-nun
 the singer-Nom already ten year before-Dat ___ released-Adn
 sasil-ul a-ni
 fact-Acc know-Int
 ‘Do you know the fact that the singer released this song 10 years ago
 whose popularity is now at the peak?’

For experimental items, we used the 8 sentences from Condition 1 (i.e. PLAUSIBLE | INDEXICAL | COHERENT) in Experiment 1, which got the highest acceptability scores. The reason for choosing those sentences is that it would make sense to argue for the syntactic nature of the CNPC effect only if island effects are shown to exist even when all the potential functional factors are properly controlled for. The total number of the target items was 32 (8 sentences x 4 conditions).

As for filler items, we had 10 grammatical sentences, 10 ungrammatical sentences, and 12 island-violating sentences. Both grammatical and ungrammatical fillers were borrowed from Experiment 1 with slight modifications. Among the island-violating fillers, 6 contained so-called “double relative clause” constructions, thus violating the relative clause constraint, and the other 6 were made up of a complex NP with very low degree of plausibility and a head noun that is not *sasil* ‘fact’. Examples of each type of the island-violating fillers are shown in (16a) and (16b).

- (16) a. ne-nun [[e_i e_j wuncen ha-n] salam_i-ul] Wucin-i-ka
 you-Top drive do-Adn person-Acc Wucin-Ø-Nom
 salhay sha-n] catongcha_j-ka i catongcha-lako mit-ni
 murder do-Adn car-Nom this car-Comp believe-Int
 ‘Do you believe that it is this car whose driver was murdered by
 Wucin?’

- b. [sunim-i ___ mek-ess-ta-nun] cungke-ka iss-nun
 Buddhist.monk-Nom ___ eat-Past-Dec-Adn evidence-Nom exist-Adn
 sathang-i i sathang-i-lako ne-nun mit-ni
 candy-Nom this candy-be-Comp you-Top believe-Int
 ‘Do you believe that it is this candy that there is evidence that the
 Buddhist monk ate it?’

The filler items varied in terms of whether scrambling is involved or not. For instance, in (16a) no scrambling is involved, whereas in (16b) the matrix subject (i.e. *ne-nun*) and the complement of the matrix verb *mit* ‘to believe’ are scrambled.

4.2 Prediction

Our prediction is that there will be no super-additive effect since the important functional constraints are all satisfied. If island effects do occur, they should be attributed to CNPC, the syntactic constraint, unless we can provide any functional factors that are responsible for the island effects.

4.3 Participants and procedure

Participants were recruited through online flyers, and the total number of participants was 47 (21 females). The age range was from 23 to 47. Each participant was paid 3,000 won (approximately \$3) for their participation.

Instead of showing every target item to participants, we distributed the 8 tokens per condition into 4 lists using a Latin Square design such that each list contains 2 tokens of each condition, and none of the tokens of the target conditions were lexically related. The 8 target items in each list were then combined with the 32 filler items for a total of 40 items per list. The 40 items in each list were then pseudo-randomized in a way that the target items from the same condition never appeared in immediate succession.

As in Experiment 1, we added 5 practice items at the beginning of each list and participants had to answer 5 simple comprehension questions during the experiment. Both practice items and comprehension questions were also borrowed from Experiment 1.

The experiment was conducted online. It took about 20 minutes to complete the

experiment. As in Experiment 1, we used a 7-point Likert scale task, with 1 at the low end and 7 at the high end of acceptability.

4.4 Results

As in Experiment 1, we excluded data from analysis if they had wrong acceptability/answers more than 15% of 30 items/questions (10 grammatical fillers + 10 ungrammatical fillers + 5 practice items + 5 comprehension questions). In this way data from 7 participants were excluded and the number of participants whose data were analyzed was 40.

First, let us check the descriptive statistics. The medians of the filler and experimental items are shown in Table 3.

Table 3. Central tendency of experimental and filler items

type	Condition	Median
Experimental items	NON-ISLAND LONG	6
	ISLAND LONG	6
	NON-ISLAND SHORT	6
	ISLAND SHORT	6
Filler items	Grammatical	6
	Island-violating	2
	Ungrammatical	1

Note that all the four conditions got the same median of 6. The medians of the grammatical and ungrammatical fillers, which are 6 and 1 respectively, are not surprising. The low acceptability of the island-violating fillers is also expected because they were constructed in a way such that they were functionally hard to process and interpret.

The data from the target items were z-transformed for inferential statistics. Then, we constructed the interaction plot in order to better understand the effect of the two factors and their interaction on acceptability.

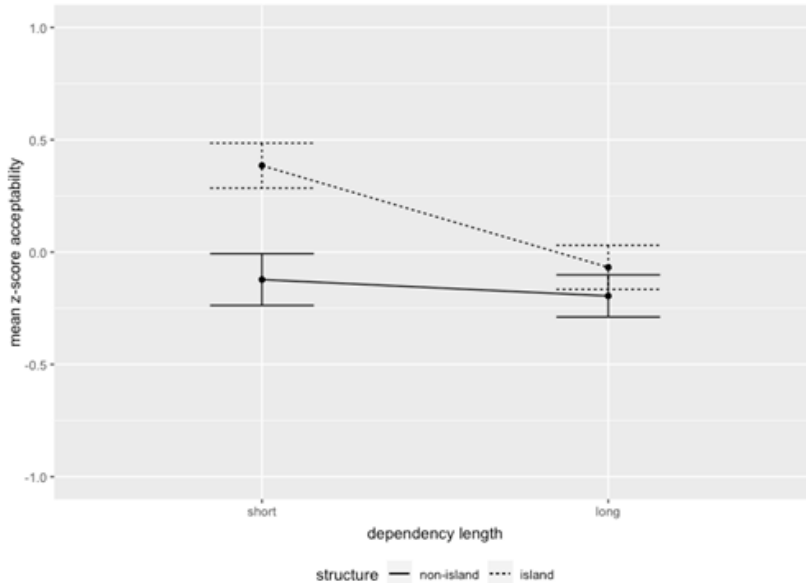


Figure 2. Interaction plot

Surprisingly, the means for ISLAND conditions is higher than those for NON-ISLAND conditions, which is unexpected if a complex NP with a noun complement was a “real” syntactic island in Korean. The fact that LONG conditions got lower acceptability than SHORT ones is understandable given that the former impose more processing load than the latter due to the longer distance between the filler and the gap.

In order to check the inferential statistics, we constructed linear mixed effects models with items and participants included as random factors on each of the island types using STRUCTURE and DEPENDENCY as fixed factors. The fitted regression model predicts that ISLAND | LONG condition gets -0.09 for the mean z-score. NON-ISLAND condition lowers the score by 0.09, and SHORT condition increases it by 0.47. However, when NON-ISLAND and SHORT are combined, the mean z-score is lowered by 0.38.

We then calculated p-values for the two main effects and the interaction term using likelihood ratio tests. There were no significant super-additive interactions for the two factors (STRUCTURE: $\chi^2(1) = 0.65$, $p = 0.2740$, DEPENDENCY: $\chi^2(1) = 0.64$, $p = 0.2786$, STRUCTURE X DEPENDENCY: $\chi^2(1) = 0.30$, $p = 0.4498$), thus no island effect.

4.5 Discussion

We have seen above that CNPC-violating constructions were just as much acceptable as their non-CNPC-violating counterparts as long as they satisfy the functional constraints. Thus, our findings strongly support the view that seeming “syntactic” CNPC effects in Korean scrambling constructions are only spurious and functional in nature.

Note that the results and implications of our second experiment are contrary to those of Jung et al. (2017), who did find clear island effects (at least for *wh*-scrambling) and argued for the syntactic nature of CNPC effects in Korean scrambling constructions.³ First, we claimed in Section 2 that the source of the clear island effects for *wh*-scrambling condition in Jung et al.’s experiment is likely to be the violation of FBC, and our results could be taken to be an important piece of evidence that supports this claim at least indirectly. Second, if one has to choose between “significant” and “nonsignificant” about the results for Jung et al.’s non-*wh*-scrambling condition ($p = 0.0507$), the choice must be “nonsignificant”. Because that conclusion is also consistent with our results, we believe that it was too generous for Jung et al. to interpret their results as “marginally significant”.

5. General discussion

Let us summarize the main findings of the two experiments. First, from Experiment 1 we have seen that the three functional factors (i.e. PLAUSIBILITY, DEFINITENESS, and COHERENCE) played no significant role in affecting island effects caused by CNPC violation. The insignificance might be closely related to our second main finding that all the target items got quite high acceptability. That is, even if the three factors did have a significant effect, that effect might be hidden due to a ceiling effect; acceptability of the items that violate the functional constraints is already too high to be distinguished from that of the items conforming to those constraints. The high acceptability of all the experimental items may well be due to the fact that the two confounding factors that are assumed to decrease acceptability in Jung et al.’s (2017) experiment, that is, 1) the far

³ However, note that Kim (2021) pointed out that Jung et al.’s claim is not valid because there was no evidence that the island effects shown in their experiment were really due to the syntactic island (i.e. CNPC). According to Kim (2021), Jung et al.’s attributing the island effects to CNPC is due to their unjustified bias favoring the syntactic approach over the functional approach.

distance between the filler and its gap and 2) the low prominence of the scrambled element, are controlled for in Experiment 1.

In fact, it has been repeatedly reported that sentences that violate both CNPC and functional constraints are far from unacceptable in Korean (although their acceptability might be significantly lower than the acceptability of the sentences that violate CNPC but observe the functional constraints) (Kim 2016, 2017; Kim and Ji 2020). This study replicates the findings of those previous studies, further supporting the view that CNPC-violating sentences may not be ungrammatical and their (slightly) lowered acceptability is due to the processing load caused by the complex structure. Note that structural complexity (including long-distance dependency) decreases acceptability to a certain extent even though it does not involve ungrammaticality (e.g. Gibson 1998, 2000)

As for Experiment 2, the most important finding is that CNPC violation did not cause island effects at all for the items that observed the functional constraints. This result strongly supports the view that CNPC effects in Korean scrambling constructions, if they exist at all, are not syntactic but functional in nature. Also note that this result is consistent with the findings of the previous experimental works that found no island effects for *wh*-islands, adjunct islands, and relative clause islands in the Korean scrambling construction, as shown in Table 1 above.

Compared to Scandinavian languages, which are widely known to be less sensitive to island constraints than Indo-European languages, East Asian languages like Japanese and Korean do not seem to have gotten enough attention from researchers around the world (especially researchers in favor of the syntactic nature of island effects), although the functional nature of island effects in these languages has been reported continuously (e.g. Sakai 1994; Shimojo 2002 for Japanese, Na and Huck 1993; Kim 2013, 2016, 2017, 2018; Kim and Ji 2020 for Korean).

It is important to note that if island effects are syntactic in nature, the “syntactic islands” must be innate, or part of Universal Grammar (UG). Otherwise, it would be hard to explain how children come to get those constraints in their head (e.g. Boeckx 2012; Phillips 2013). If the island constraints are innate, they must be universal, which means that they must be found not only in Indo-European languages but also in every non-Indo-European languages, including Scandinavian and East Asian languages. The current study and other previous studies that have argued for the functional nature of island effects in non-Indo-European languages, if they are on the right track, thus not only support the view that there is no syntactic islands in the given languages but also

indirectly deny the existence of syntactic islands in Indo-European languages.

Recall that even the syntactic nature of island effects in English, one of the most studied Indo-European languages, has been questioned since as early as 1970s (e.g. Erteschik-Shir 1973, Erteschik-Shir and Lappin 1979; Deane 1991; Kluender 1991, 1992, 1998, 2004; Kluender and Kutas 1993; Van Valin 1995; Goldberg 2006; Truswell 2007), and a growing number of recent experimental works has been showing that various types of island effects in English are indeed non-syntactic in nature (e.g. Sag et al. 2007; Ambridge and Goldberg 2008; Hofmeister and Sag 2010; Chaves and Kin 2019; Abeillé et al. 2020; Cuneo and Goldberg 2022; Liu et al. 2022a; Namboodiripad et al. 2022). Furthermore, to the best of our knowledge, there has been no single island constraint in any language whose nature have been proven to be purely syntactic.

Until quite recently, island effects often have been assumed to be syntactic in nature by default. That is, without clear counterevidence, any island effect has been taken to be a syntactic phenomenon by many researchers. However, given the results of this study and recent experimental works that convincingly claim for the functional nature of various types of island constraints in different languages, we strongly believe that our basic assumption should be the other way around. That is, every island effect should be taken to be functional in nature by default, and syntactic islands must be taken not to exist unless there is clear evidence to believe so. Therefore, from the functional perspective, what is important is not to ask whether certain island effects are syntactic or functional anymore. What is really important is to figure out all the functional factors that play a significant role in accounting for island effects and investigate which factors are universal and which are not, and why. After all this work, if there are still effects left unexplained, then those effects could possibly be considered purely syntactic.

6. Conclusion

In this study, we have investigated the nature of CNPC effects in Korean scrambling constructions based on two acceptability judgment experiments. The first experiment showed that CNPC-violating sentences, whether or not they satisfy the three functional factors (i.e. PLAUSIBILITY, DEFINITENESS, COHERENCE), were quite acceptable, and that all three factors had no significant effect on acceptability possibly due to ceiling effect. The second experiment, which was based on the factorial definition of island effects, showed

that CNPC-violating sentences, if they are functionally felicitous enough, did not cause island effects at all. The results of both experiments strongly support the view that the nature of CNPC effects in Korean scrambling constructions is functional rather than syntactic.

In future research, the exact role of the three functional factors (i.e. PLAUSIBILITY, DEFINITENESS, COHERENCE) need to be investigated through a more elaborated experimental design, so that we can better understand why the three factors had no significant effect in our first experiment. It has to be reemphasized that all of them had been shown to play a significant role in affecting island effects by previous experimental works.

In addition, as briefly discussed in Section 5, it is important to understand whether which functional factors have significant effects cross-linguistically and which do not and why, so that we can have a deeper understanding on the nature of island effects. Although the number of cross-linguistic experimental studies has been growing recently, most of them do not deal with the role of functional factors but just focus on determining (non-)existence of island effects (e.g. Kush et al. 2013; Sprouse et al. 2016). Thus, cross-linguistic experimental studies from functional approaches are urgently needed.

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