



# The interplay between case-drop and parallelism in Korean gapping<sup>\*</sup>

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**Kim, Jeong-Seok. 2024. The interplay between case-drop and parallelism in Korean gapping.** *Linguistic Research* 41(3): 493-515. This experimental study examines two syntactic analyses of dative or accusative case-drop in Korean gapping (*aka* right-node-raising or right-peripheral ellipsis): LF copying (Abe and Hoshi 1997) and PF deletion (Kim 1997). We employ an online acceptability rating experiment to investigate to what extent the acceptability of Korean gapping is modulated by case-drop of a remnant and word order between remnants. The experimental findings suggest that linear non-parallelism elicits a processing cost for gapping and case-drop is a costly operation. We argue that the parallelism effect follows from the parser's general preference to keep the structure of each conjunct maximally parallel in a coordination structure (Kim et al. 2020). Given this, we conclude that case-drop phenomena in Korean gapping are better explained by a PF deletion analysis, supplemented with extra deletion (An 2019; Erschler 2022) and ellipsis parallelism (Frazier et al. 2000; Frazier and Clifton 2001), rather than by an LF copying analysis. (Korea University)

**Keywords** ellipsis parallelism, extra deletion, gapping, case-drop, processing

## 1. Introduction

Although gapping has received considerable attention in modern linguistics, some of its properties remain mysterious. This study explores the influence of dative or accusative case-drop on the acceptability of Korean gapping.

In English gapping, the second occurrence of the verb *spoke* can be missing:

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- (1) John spoke to Mary, and Bill to Jane.  
 cf. \*John spoke to Mary, and John to Jane.  
 cf. \*John spoke to Mary, and Bill to Mary.

In (1) the materials left in the gapped conjunct, called remnants, are in a contrastive relation to the correlates in the antecedent conjunct. Let us consider the contrast between (1) and (2).<sup>1</sup>

- (2) ?\*John spoke to Mary, and Bill Jane. (based on Abe and Hoshi 1997: 102)

The remnant PP *to Jane* in (1) is acceptable, whereas the remnant NP *Jane* (without the head *to*) in (2) is not. By contrast, the Korean counterparts of (1) and (2) are both allowed:

- (3) a. John-i Mary-eykey, Bill-i Jane-eykey malhayssta.  
 John-Nom Mary-Dat Bill-Nom Jane-Dat spoke  
 ‘John spoke to Mary, and Bill spoke to Jane.’  
 b. John-i Mary, Bill-i Jane-eykey malhayssta.  
 John-Nom Mary Bill-Nom Jane-Dat spoke  
 ‘John spoke to Mary, and Bill spoke to Jane.’

The question is then where this difference between English and Korean gapping arises.

Regarding case-drop in Korean gapping, Abe and Hoshi (1997) provided an LF copying analysis of (3b), in which the copying site was created in LF as follows:<sup>2</sup>

- (4) [<sub>TP</sub> John-Nom [<sub>TP</sub> Mary [<sub>TP</sub> e ]]]

1 The grammaticality (or acceptability) of (2) has been a matter of debate. For example, Hudson (1989) note that the following examples are considered grammatical:

- (i) a. John thought about Jane and Bill Betsy. (Hudson 1989: 59)  
 b. Fred sat on a chair, Mary a stool, and Bill a bench. (Hudson 1989: 64)

We remain agnostic regarding the controversial status of P-stranding with right-side remnants in English gapping. We would like to thank a reviewer for bringing this issue to our attention.

2 Abe and Hoshi (1997) focus exclusively on Japanese gapping. In this paper, we use Korean data instead, based on the assumption that Korean and Japanese exhibit similar patterns concerning gapping.

[<sub>TP</sub> Bill-Nom [<sub>T'</sub> Jane<sub>i</sub> [<sub>T'</sub> t<sub>1</sub>-Dat spoke]]]

With this analysis, the LF movement of the second correlate *Jane* does not cause a problem since postpositions or case-markers can be stranded for leftward movement in LF (Huang 1982).

However, Sohn (1994) and Kim (1997, 2023) pointed out that the LF copying analysis cannot explain the unacceptability of the following case-drop in Korean gapping:

- (5) a. Mary-eykey John-i, Bill-i Jane-eykey malhayssta.  
 Mary-Dat John-Nom Bill-Nom Jane-Dat spoke  
 ‘To Mary, John spoke, and Bill spoke to Jane.’  
 b. \*Mary John-i, Bill-i Jane-eykey malhayssta.  
 Mary John-Nom Bill-Nom Jane-Dat spoke  
 ‘Mary, John spoke-to, and Bill spoke to Jane.’

The case-drop of the left remnant seems to make (5b) less acceptable. Note that in (5) the word order parallelism between remnants and correlates is broken in that the canonical word order of subject-complement is scrambled only in the gapped clause. According to Abe and Hoshi’s (1997) proposal, (5b) will be derived as in (6).

(6) [<sub>TP</sub> Mary [<sub>TP</sub> John-Nom [<sub>T'</sub> e ]]]  
 [<sub>TP</sub> Jane<sub>i</sub> [<sub>TP</sub> Bill-Nom [<sub>T'</sub> t<sub>1</sub>-Dat spoke]]]

If the second correlate *Jane* in the full clause is adjoined to TP in order to create a copying site and the antecedent T’ is copied into the gapped T’, (6) is predicted to be well-formed. Thus, the example in (5b) with case-drop should be acceptable.

Abe and Hoshi (1997) might claim that the deviancy with (5b) originates independently from the non-parallelism between the two conjuncts. Compared with the baseline data in (3a), they might state that there is a non-parallelism penalty, which degrades the acceptability of (5a) and that there is also a case-drop penalty, which further degrades the acceptability of (5b). At this point, a question may be raised on whether (5b) faces an additional penalty that cannot be explained by the

sum of the two individual penalties: the non-parallelism penalty and the case-drop penalty.

If the acceptability of (5b) is lower than that of (5a) only to the degree of the sum of the two penalties, it may not undermine Abe and Hoshi's (1997) LF copying analysis. In this case, we can consider the further deviancy of (5b) to be caused originally by the potential deviancy of (5a), merely under the sway of the two individual processing penalties. However, if the acceptability of (5b) is judged to be far less than the sum of the two penalties, there might be further explanation needed for the difference between (5a) and (5b).

In order to explain the case-drop contrast between (3b) and (5b), Kim (1997, 2023) proposed, following Sohn (1994), the generalization in (7) and claimed that Korean gapping is a PF phenomenon.

(7) The case-drop generalization

The case-marker of a remnant in Korean gapping may drop only if the remnant is immediately adjacent to an ellipsis site.

In addition to dative drop, accusative drop is also possible in Korean gapping under the case-drop generalization in (7). This is as illustrated below:

- (8) a. John-i kisa(-lul), Bill-i taypon\*(-ul) ssessta.  
 John-Nom article(-Acc) Bill-Nom script\*(-Acc) wrote  
 'John wrote an article, and Bill wrote a script.'  
 b. Kisa\*(-lul) John-i, Bill-i taypon\*(-ul) ssessta.  
 article\*(-Acc) John-Nom Bill-Nom script\*(-Acc) wrote  
 'An article John wrote, and Bill wrote a script.'

As shown in (8), the accusative marker of remnants (including correlates) may drop only when immediately adjacent to an ellipsis site.

In this light, we investigate whether there is an acceptability difference between case-marked gapping and case-less gapping and whether parallelism affects acceptability with respect to case-drop in Korean gapping.<sup>3</sup> The rest of this study

<sup>3</sup> Kim and Park (2021) argue that violating parallelism induced by case and/or order mismatches decreases acceptability of Korean gapping via acceptability judgment experiments.

proceeds as follows: in Section 2, we offer a brief history of gapping analyses regarding case-drop. We lay out the data that motivate our theoretical proposals. In Section 3, we report a formal experiment of Korean gapping in terms of case-drop and present experimental findings. In Section 4, we present a syntactic analysis to derive the specific conditions of case-drop in Korean gapping. More precisely, we give an account of case-drop under gapping in terms of PF deletion-plus-extra deletion and ellipsis parallelism. Finally, we conclude in Section 5.

## 2. Ellipsis approach to Korean gapping

### 2.1 LF copying analysis

In order to explain the acceptability of case-marked or case-less gapping in (3), Abe and Hoshi (1997) propose that Japanese (and possibly Korean) gapping involves leftward movement and that case-drop is allowed for leftward movement in LF (cf. Huang 1982). The structures they provide for (3) are the following:

- (9) a. [<sub>TP</sub> John-i [<sub>T'</sub> Mary-eykey [<sub>T'</sub> e ]]]  
       John-Nom    Mary-Dat
- [<sub>TP</sub> Bill-i [<sub>T'</sub> Jane-eykey<sub>1</sub> [<sub>T'</sub> t<sub>1</sub> malhayssta ]]]  
       Bill-Nom    Jane-Dat                   spoke
- b. [<sub>TP</sub> John-i [<sub>T'</sub> Mary [<sub>T'</sub> e ]]]  
       John-Nom    Mary
- [<sub>TP</sub> Bill-i [<sub>T'</sub> Jane<sub>1</sub> [<sub>T'</sub> t<sub>1</sub>-eykey malhayssta ]]]  
       Bill-Nom    Jane                               Dat spoke

In the antecedent conjunct of (9a), the subject *Bill-i* is already outside T' and the remnant *Jane-eykey* undergoes leftward movement by some LF operation and adjoins to T', thus making a lower T' a copying site for the gapped conjunct. In the antecedent conjunct of (9b), the subject *Bill-i* is outside T' and the complement *Jane* adjoins to T' to make the lower T' a copying site, leaving the dative marker *eykey* behind. This account assumes that case-stranding is allowed at LF, which in fact is not allowed overtly in Korean:

- (10) \*Mary<sub>1</sub>, John-i t<sub>1</sub>-eykey malhayssta.  
 Mary John-Nom Dat spoke  
 ‘Mary, John spoke to.’

However, their proposal cannot explain the following case-drop:

- (11) a. John-i Bill, Mary-ka Jane-eykey malhayssta.  
 John-Nom Bill Mary-Nom Jane-Dat spoke  
 ‘John ~~spoke to~~ Bill, and Mary spoke to Jane.’  
 b. \*Bill John-i, Mary-ka Jane-eykey malhayssta.  
 Bill John-Nom Mary-Nom Jane-Dat spoke  
 ‘Bill, John ~~spoke to~~, and Mary spoke to Jane.’

If the order of the remnants in (11a) is changed to that of (11b), the case-drop effect disappears. The relevant structure of (11b) would be as follows:

- (12) [<sub>TP</sub> Bill [<sub>TP</sub> John-Nom [<sub>T</sub> e ]]]  
 [<sub>TP</sub> Jane<sub>1</sub> [<sub>TP</sub> Mary-Nom [<sub>T</sub> t<sub>1</sub>-Dat spoke ]]]

In the gapped conjunct, the ellipsis site, which is T' according to Abe and Hoshi's assumption, is generated as null. In the antecedent conjunct, some LF operation fronts *Jane*, thus making a copying site, leaving the dative *eykey* stranded. If the antecedent T' copies into the gapped T', the prediction is that (11b) should be acceptable, although in fact it is not. This thus suggests that the operation related to case-stranding may be overt rather than covert.

## 2.2 PF deletion analysis

Under the movement-plus-deletion analysis, the baseline data in (3a) would be analyzed as in (13).

- (13) [<sub>TP</sub> [<sub>FP</sub> John<sub>1</sub>-Nom Mary<sub>2</sub>-Dat [<sub>VP</sub> ~~t<sub>1</sub> t<sub>2</sub> speak~~]]  
 [<sub>FP</sub> Bill<sub>1</sub>-Nom Jane<sub>2</sub>-Dat [<sub>VP</sub> t<sub>1</sub> t<sub>2</sub> speak]] [Past]]

We assume that the gapped materials of the first conjunct are derived by PF deletion of VP preceded by focus movement of the remnants and their correlates to multiple specifiers (Kuroda 1988) of FP in each conjunct. The focus movement of remnants and their correlates may be motivated by the fact that they are contrastively focused (Kuno 1978), as illustrated below (cf. (1)).<sup>4</sup>

- (14) a. John-i        Mary-eykey, Bill-i        Jane-eykey    malhayssta.  
           John-Nom Mary-Dat    Bill-Nom Jane-Dat    spoke  
           ‘John ~~spoke~~ to Mary, and Bill spoke to Jane.’
- b. \*John-i        Mary-eykey, Bill-i        Mary-eykey    malhayssta.  
           John-Nom Mary-Dat    Bill-Nom Mary-Dat    spoke  
           ‘John ~~spoke~~ to Mary, and Bill spoke to Mary.’
- c. \*John-i        Mary-eykey, John-i        Jane-eykey    malhayssta.  
           John-Nom Mary-Dat    John-Nom Jane-Dat    spoke  
           ‘John ~~spoke~~ to Mary, and John spoke to Jane.’

Under the small conjunct (here, FP which is between TP and VP) approach to gapping, it is crucial that Korean verbs do not move overtly. Otherwise, PF deletion of VP cannot accommodate the verb. This assumption is not required under Kim’s (1997) large conjunct (specifically, FP which is higher than TP) approach which involves PF deletion of TP. Nevertheless, we adopt the small conjunct approach because the tense in the first conjunct is always determined by the overt tense marking in the second conjunct, which c-commands over both coordinated conjuncts (Kim et al. 2024):<sup>5</sup>

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4 Kuroda’s (1988) proposal of multiple specifiers and Kuno’s (1978) contrastive requirement of gapping are developed using data from Japanese. We observe that these concepts can also be applied to Korean, supported by corresponding data from the Korean language.

5 A reviewer questioned whether the current small conjunct approach to Korean gapping implies that Korean could have a focus both inside and outside TP. Kim (1997) adopted the large conjunct approach to Korean gapping, where a focus moves to Spec of FP, positioned above TP. In contrast, when the small conjunct approach is adopted, a focus moves to Spec of FP, located below TP but above vP. The current proposal for the small conjunct approach does not necessarily suggest that Korean has two distinct locations for FP.

- (15) a. John-i           caknyenyey,  
           John-Nom   last.year  
           Mary-ka    caycaknyenyey   yuhak-ul                   ka-essta.  
           Mary-Nom   two.years.ago   studying.abroad-Acc   go-Past  
           ‘John ~~studied~~ ~~abroad~~ last year, and Mary studied abroad two years ago.’
- b. \*John-i           naynyenyey,  
           John-Nom   next.year  
           Mary-ka    caycaknyenyey   yuhak-ul                   ka-essta.  
           Mary-Nom   two.years.ago   studying.abroad-Acc   go-Past  
           ‘John ~~will~~ ~~study~~ ~~abroad~~ next year, and Mary studied abroad two years ago.’

The contrast in (15) shows that the gapped clause must be conjoined to a category which is c-commanded by the tense marker of the second clause, indicating that the gapped clause is actually a VP or some other sub-IP constituent large enough to contain the external argument (Johnson 2009, among others). If the first conjunct VP is deleted under PF identity with the second conjunct VP, (3a) will be derived.

For the derivation of (3b), a PF deletion analysis may produce the following output:

- (16) [<sub>TP</sub> [<sub>FP</sub> John<sub>1</sub>-Nom   Mary<sub>2</sub>-Dat [<sub>VP</sub> t<sub>1</sub> t<sub>2</sub> ~~Speak~~]]  
           [<sub>FP</sub> Bill<sub>1</sub>-Nom   Jane<sub>2</sub>-Dat   [<sub>VP</sub> t<sub>1</sub> t<sub>2</sub> speak]] [Past]]

Along the lines of Mukai (2003), we may simply claim that a non-constituent string can be deleted in PF. Alternatively, adopting the case-drop generalization in (7), we may claim that after PF deletion of VP, case can optionally drop when it is adjacent to an ellipsis site. This idea was fleshed out from a theoretical perspective by An (2019) as extra deletion, which is parasitic on the constituent deletion operation in PF.

### 2.3 Processing of parallelism and case-drop in gapping

The aim of this study is to systematically evaluate the contribution of case-drop and (word order) parallelism to the acceptability of gapping. In this light, we briefly



consider the parallelism effect of coordination, a crucial property of gapping (Johnson 2009).

Frazier et al. (2000) argue that the reader prefers for each conjunct to be parallel while processing coordination. Consider the following:

- (17) a. Hilda noticed *a strange man* and *a tall woman* when she entered the house.  
b. Hilda noticed *a man* and *a tall woman* when she entered the house.  
c. Hilda noticed *a strange man with a dog* and *a tall woman* when she entered the house.  
d. Hilda noticed *a man with a dog* and *a tall woman* when she entered the house. (based on Frazier et al. 2000: 2)

The four examples in (17) are fully acceptable, and do not violate any grammatical constraints. Frazier et al., nevertheless, found that the NP *a tall woman* was read more quickly in (17a) than in the other examples in (17); i.e., the parallel structure of each conjunct is preferred by the parser. This preference of parallelism seems to be extra-grammatical as all the examples in (17) are grammatical.

According to Kim et al. (2020), English gapping in (18) stems from the parser's preference for maintaining the structure of each conjunct maximally parallel in coordination.

- (18) The guitarist hid behind the curtain, and the singer behind the stage. (based on Kim et al. 2020: 781)

While reaching to the end of the string in (18), the parser may expect either a verb to follow or the string to just end with the PP, as shown in (19).

- (19) The guitarist hid behind the curtain, and the singer behind the stage ...  
a. ... and [<sub>NP</sub> the singer [<sub>PP</sub> behind the stage]] hid  
b. ... and [<sub>IP</sub> the singer [<sub>VP</sub> hid [<sub>PP</sub> behind the stage]]] (based on Kim et al. 2020: 781)

If a verb follows the PP, the PP should be analyzed as the modifier of the NP as

in (19a). However, if the string in the second conjunct ends with the PP, the gapping example should be derived as in (19b). Importantly, the gapping structure, rather than the NP-attachment structure, is more parallel to the structure of the first conjunct. That is, the gapping structure is an option to meet preference for parallelism.

Moreover, Frazier and Clifton (2001) claim that copying information of the antecedent to the gapped site is cost-free. According to them, this cost-free mechanism is preferred over building an extra structure in the gapped site. When a verb appears after the string-final PP in (19), it may produce an unexpected effect in that the parser should be reactivated from the gapping structure to the NP-attachment structure. When the parser meets coordination, it prefers to employ a variety of parallelism between conjuncts (Frazier et al. 2000, among others). When the coordinated conjuncts are not parallel, coordination pushes up some processing cost. The well-known generalization that gapping is tolerated only under coordination is congruous with the parallelism preference.

Returning to Korean gapping, we note that case-drop in the gapped conjunct is permitted when the remnant appears at the end of the clause, adjacent to either a covert coordinator or an overt coordinator like *kuliko* ‘and,’ as shown in (20a).

- (20) a. John-i        Mary(-eykey), (kuliko) Bill-i        Jane-eykey malhayssta.  
           John-Nom Mary(-Dat)    (and)        Bill-Nom Jane-Dat    spoke  
           ‘John spoke (to) Mary, and Bill spoke to Jane.’
- b. Mary\*(-eykey) John-i,        (kuliko) Bill-i        Jane-eykey malhayssta.  
           Mary\*(-Dat)    John-Nom (and)        Bill-Nom Jane-Dat    spoke  
           ‘(To) Mary John spoke, and Bill spoke to Jane.’

While word order parallelism might have some influence, the presence of the dative marker in the first conjunct, *Mary-eykey*, does not significantly reduce the acceptability of (20b). In this context, the licensing of case-drop in gapping can be seen as the interplay between the case-drop generalization (7) and word order parallelism.

In the following section, we demonstrate that the PF deletion approach to Korean gapping with case-drop is empirically supported by a formal experiment.

### 3. Experiment

We hypothesize that Korean gapping is sensitive to word order parallelism and that the case-marker of remnants facilitates processing in ellipsis. From this hypothesis, we predict that there will be a significant difference in acceptability ratings between parallel and nonparallel conditions. We also predict that there will be a significant acceptability difference between case-marked and case-less conditions. In addition, we will examine whether there is a difference between dative case and accusative case with respect to case-drop. Specifically, we examine the difference in acceptability between gapping with case-marked remnants and gapping with case-less remnants with respect to ellipsis parallelism.

#### 3.1 Participants, materials, and design

Eighty-three self-reported native Korean speakers (age *mean*: 21.7) were recruited. All were undergraduate students at Korea University. All participants provided informed consent and earned credit in one of the introductory linguistics classes. Participants generally completed the online experiment within 15 minutes. Three participants were excluded because they did not pay attention during the task. Accordingly, only the responses from 80 participants were included in the analysis.

The experiment employed a  $2 \times 2 \times 2$  design, crossing ORDER (Parallel vs. Nonparallel), MARKER (Nondrop vs. Drop), and CASE (Dat(ative) vs. Acc(usative)). Sixteen lexically matched sets of the eight conditions were constructed, as sampled below:

- (21) a. [Parallel | Nondrop | Dat]  
 John-i Mary-eykey, Bill-i Jane-eykey malhayssta.  
 John-Nom Mary-Dat Bill-Nom Jane-Dat spoke  
 ‘John *spoke* to Mary, and Bill spoke to Jane.’
- b. [Nonparallel | Nondrop | Dat]  
 Mary-eykey John-i, Bill-i Jane-eykey malhayssta.  
 Mary-Dat John-Nom Bill-Nom Jane-Dat spoke  
 ‘To Mary, John *spoke*, and Bill spoke to Jane.’
- c. [Parallel | Drop | Dat]

John-i Mary, Bill-i Jane-eykey malhayssta.  
 John-Nom Mary Bill-Nom Jane-Dat spoke  
 'John ~~spoke to~~ Mary, and Bill spoke to Jane.'

## d. [Nonparallel | Drop | Dat]

Mary John-i, Bill-i Jane-eykey malhayssta.  
 Mary John-Nom Bill-Nom Jane-Dat spoke  
 'Mary, John ~~spoke to~~, and Bill spoke to Jane.'

## e. [Parallel | Nondrop | Acc]

John-i kisa-lul, Bill-i taypon-ul ssessta.  
 John-Nom article-Acc Bill-Nom script-Acc wrote  
 'John ~~wrote~~ an article, and Bill wrote a script.'

## f. [Nonparallel | Nondrop | Acc]

Kisa-lul John-i, Bill-i taypon-ul ssessta.  
 article-Acc John-Nom Bill-Nom script-Acc wrote  
 'An article John ~~wrote~~, and Bill wrote a script.'

## g. [Parallel | Drop | Acc]

John-i kisa, Bill-i taypon-ul ssessta.  
 John-Nom article Bill-Nom script-Acc wrote  
 'John ~~wrote~~ an article, and Bill wrote a script.'

## h. [Nonparallel | Drop | Acc]

Kisa John-i, Bill-i taypon-ul ssessta.  
 article John-Nom Bill-Nom script-Acc wrote  
 'An article John ~~wrote~~, and Bill wrote a script.'

The first four conditions were dative conditions, and the latter four conditions accusative conditions. In the [Parallel | Nondrop | Dat] condition, the dative remnant adjacent to an ellipsis site kept its dative marker, and the parallelism of word order between remnants and correlates was preserved. In the [Nonparallel | Nondrop | Dat] condition, the sentence-initial remnant kept its dative marker, but the parallelism of word order between remnants and correlates was not preserved. In the [Parallel | Drop | Dat] condition, the dative remnant adjacent to an ellipsis site dropped its dative marker, while maintaining the word order parallelism. In the [Nonparallel | Drop | Dat] condition, the sentence-initial remnant dropped its dative marker, and the word order parallelism was violated. The latter four conditions were distributed

in the same manner as the first four conditions. The difference was that the remnants concerned were accusative instead of dative. The full list of experimental items is available on-line.<sup>6</sup>

The experimental conditions were counterbalanced across four lists using a Latin square design. Each list consisted of 32 experimental items, along with 64 filler items. Overall, each list contained 96 sentences.

### 3.2 Procedure and data analysis

The experiment was conducted using the web-based experiment platform PCIBex (Zehr and Schwarz 2018). Participants were instructed to rate the acceptability of sentences presented on a computer screen using a 1-7 Likert scale (1 = fully unnatural; 7 = fully natural). Sentences were presented one at a time in a pseudo-randomized order generated by PCIBex. To ensure participant attentiveness, 16 filler items served as “gold standard” items, including eight good and eight bad fillers, with expected values calculated based on previous tests. The sum-of-the-squared-differences value for each participant was calculated, and participants with values exceeding two standard deviations from the mean were excluded.

Before conducting the data analysis, raw judgment ratings for both experimental items and fillers were transformed into z-scores to mitigate potential scale biases between participants (Schütze and Sprouse 2013). Linear mixed-effects models were employed for data analysis, allowing for the simultaneous inclusion of random participant and item variables (Baayen et al. 2008). Each model was fitted using the maximal random effects structure that converged (Barr et al. 2013). These models were implemented in the R environment (R Core Team 2020) using the *lme4* package (Bates et al. 2015). *P*-value estimates for the fixed and random effects were computed using Satterthwaite’s approximation, with the *lmerTest* package (Kuznetsova et al. 2017).

### 3.3 Results

Figure 1 presents the mean acceptability of the experimental conditions split by CASE.

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6 [https://www.researchgate.net/publication/383953170\\_Appendix](https://www.researchgate.net/publication/383953170_Appendix)

The downward slope of the lines illustrates the ORDER effect. The MARKER effect is portrayed by vertical gaps between the lines.

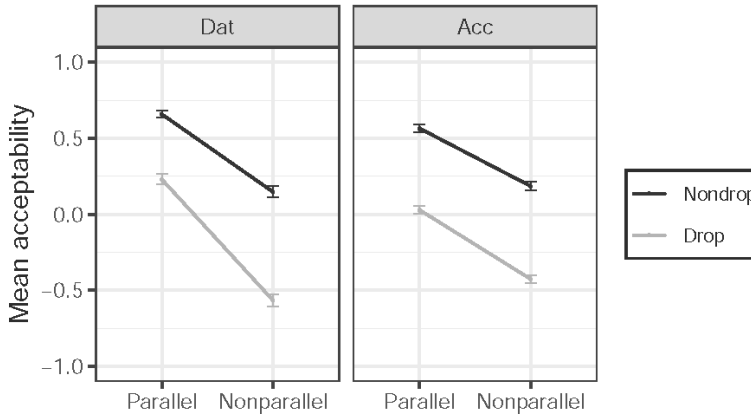


Figure 1. Mean acceptability of [Dat] sets (left panel) and [Acc] sets (right panel) of experimental conditions. Error bars reflect *SE*.

We conducted two mixed-effects regression analyses, each with ORDER and MARKER as fixed effects along with the interaction between the two, and the maximal random effect structure for items and subjects. Table 1 presents a fixed effects summary for the [Dat] conditions.

Table 1. Fixed effects summary for the [Dat] conditions

	<i>Estimate</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	0.659	0.049	13.392	< 0.001
ORDER	-0.512	0.088	-5.818	< 0.001
MARKER	-0.429	0.075	-5.734	< 0.001
ORDER:MARKER	-0.284	0.108	-2.632	< 0.05

There was a significant effect of ORDER such that the parallel condition was significantly more acceptable than the nonparallel condition. There was also a significant effect of MARKER such that the dative-marked condition was significantly more acceptable than the dative-less condition. An interaction between the factors was also observed, indicating that the difference in acceptability between dative-marked

and dative-less cases in the nonparallel conditions was greater than that in the parallel conditions. Post-hoc tests with Bonferroni correction using the *emmeans()* function (Lenth et al. 2018) further confirmed a distinct penalty for the [Nonparallel | Drop | Dat] condition: [Parallel | Nondrop | Dat] vs. [Parallel | Drop | Dat] (*mean*: 0.659 vs. 0.230;  $\beta = 0.429$ ,  $SE = 0.075$ ,  $t = 5.734$ ,  $p < 0.001$ ) and [Nonparallel | Nondrop | Dat] vs. [Nonparallel | Drop | Dat] (*mean*: 0.147 vs.  $-0.566$ ;  $\beta = 0.713$ ,  $SE = 0.078$ ,  $t = 9.128$ ,  $p < 0.001$ ).

Table 2 presents a summary of the mixed-effects model with ORDER and accusative MARKER as fixed effects, and their interaction, as well as random intercepts and slopes for participants and items.

The results from the mixed-effects model confirmed that the effect of ORDER was significant and that of accusative MARKER proved significant as well. Statistically, there was one difference between the two sub experiments. The significant interaction between the two factors was found in the dative condition, but not in the accusative condition.

Another goal of this study was to examine whether CASE types affected the amount of penalty on acceptability due to the drop of markers in nondrop and drop conditions. Figure 2 presents the mean acceptability of the experimental conditions split by MARKER.

Table 2. Fixed effects summary for the [Acc] conditions

	<i>Estimate</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	0.565	0.045	12.518	< 0.001
ORDER	-0.380	0.051	-7.389	< 0.001
MARKER	-0.537	0.063	-8.504	< 0.001
ORDER:MARKER	-0.075	0.076	-0.988	0.327

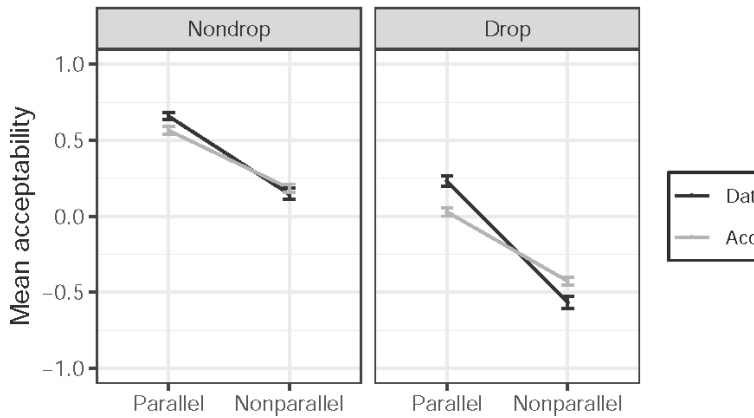


Figure 2. Mean acceptability of [Nondrop] sets (left panel) and [Drop] sets (right panel) of experimental conditions. Error bars reflect *SE*.

In order to examine the role of CASE types through statistical modeling, we ran two additional sets of a  $2 \times 2$  mixed-effects model for the effect of CASE on the drop penalty in the experimental conditions. Tables 3 and 4 summarize the  $2 \times 2$  mixed-effects models for the [Nondrop] and [Drop] conditions, respectively.

Table 3. Fixed effects summary for the [Nondrop] conditions

	<i>Estimate</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	0.659	0.039	16.953	< 0.001
ORDER	-0.512	0.076	-6.713	< 0.001
CASE	-0.093	0.066	-1.421	0.159
ORDER:CASE	0.132	0.089	1.481	0.142

Table 4. Fixed effects summary for the [Drop] conditions

	<i>Estimate</i>	<i>SE</i>	<i>t</i>	<i>p</i>
(Intercept)	0.230	0.062	3.725	< 0.001
ORDER	-0.796	0.079	-10.081	< 0.001
CASE	-0.201	0.085	-2.362	< 0.05
ORDER:CASE	0.341	0.112	3.055	< 0.01

In the [Nondrop] conditions, the effect of ORDER was significant, but the effect of



CASE was not. Also, the effect of the two-way interaction ORDER  $\times$  CASE did not reach significance. In the [Drop] conditions, the effects of both ORDER and CASE were significant. In addition, the effect of the two-way interaction ORDER  $\times$  CASE was significant. Together, the results confirmed that only the [Drop] conditions were affected by CASE types.

#### 4. General discussion

The main goal of this study was to investigate the effect of case-drop and word-order parallelism on the acceptability of gapping in Korean. Results from the experiments revealed three findings. First, acceptability was higher when the case-marker of a remnant appears in the ellipsis clause than when it does not. It suggests that the case-drop of a remnant, which creates processing problems (Nykiel and Hawkins 2020), affects the acceptability in ellipsis. Second, there was an acceptability difference between the word-order-parallel gapping and the word-order-nonparallel gapping. It suggests that clauses that are parallel in form and meaning show processing advantages in ellipsis and coordination structures, as attested by Frazier et al. (2000) and others. That is, parallelism influences ellipsis and sentence processing. Third, the two factors ORDER and MARKER were interacted in dative conditions ( $p < 0.05$ ), but were not in accusative conditions ( $p = 0.327$ ). This suggests that semantic case-drop (e.g., dative drop) leads to a greater degradation in acceptability than structural case-drop (e.g., accusative drop) does, especially when the drop is not adjacent to an ellipsis site. A question is then what adds an additional degree of degradation.

In what follows, we will launch an analysis into the experimental findings. First of all, consider again the case-drop generalization in (7): The case-marker of a remnant in Korean gapping may drop only if the remnant is immediately adjacent to an ellipsis site. This generalization can be unpacked as two instantiations. First, the dative marker that heads an NP in Korean gapping can be omitted only if the dative NP is immediately adjacent to an ellipsis site. Second, the accusative marker of a nominal NP in Korean gapping can be omitted only if the NP is immediately adjacent to an ellipsis site. Since the validity of the case-drop generalization was attested by the experiment, the next question is whether the generalization can be deduced from a deeper principle.

From a processing perspective, we could claim that gapping allows case-drop only in easy-to-process environments. When case-drop operates within the domain immediately adjacent to an ellipsis site, gapping allows case-drop. By contrast, when case-drop operates within the scrambled domain (i.e., non-canonical position), gapping disfavors case-drop.

Taking into account the preceding discussion in mind, we propose that the experimental stimuli in (21) are derived in the following way:

- (22) a. [Parallel | Nondrop | Dat]  
 [TP [FP John<sub>1</sub>-Nom Mary<sub>2</sub>-Dat [~~v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> speak~~]]  
 [FP Bill<sub>1</sub>-Nom Jane<sub>2</sub>-Dat [v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> speak]] [Past]]
- b. [Nonparallel | Nondrop | Dat]  
 [TP [FP Mary<sub>2</sub>-Dat John<sub>1</sub>-Nom [~~v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> speak~~]]  
 [FP Bill<sub>1</sub>-Nom Jane<sub>2</sub>-Dat [v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> speak]] [Past]]
- c. [Parallel | Drop | Dat]  
 [TP [FP John<sub>1</sub>-Nom Mary<sub>2</sub>-~~Dat~~ [~~v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> speak~~]]  
 [FP Bill<sub>1</sub>-Nom Jane<sub>2</sub>-Dat [v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> speak]] [Past]]
- d. [Nonparallel | Drop | Dat]  
 [TP [FP Mary<sub>2</sub>-~~Dat~~ John<sub>1</sub>-Nom [~~v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> speak~~]]  
 [FP Bill<sub>1</sub>-Nom Jane<sub>2</sub>-Dat [v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> speak]] [Past]]
- e. [Parallel | Nondrop | Acc]  
 [TP [FP John<sub>1</sub>-Nom article<sub>2</sub>-Acc [~~v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> write~~]]  
 [FP Bill<sub>1</sub>-Nom script<sub>2</sub>-Acc [v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> write]] [Past]]
- f. [Nonparallel | Nondrop | Acc]  
 [TP [FP article<sub>2</sub>-Acc John<sub>1</sub>-Nom [~~v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> write~~]]  
 [FP Bill<sub>1</sub>-Nom script<sub>2</sub>-Acc [v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> write]] [Past]]
- g. [Parallel | Drop | Acc]  
 [TP [FP John<sub>1</sub>-Nom article<sub>2</sub>-~~Acc~~ [~~v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> write~~]]  
 [FP Bill<sub>1</sub>-Nom script<sub>2</sub>-Acc [v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> write]] [Past]]
- h. [Nonparallel | Drop | Acc]  
 [TP [FP article<sub>2</sub>-~~Acc~~ John<sub>1</sub>-Nom [~~v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> write~~]]  
 [FP Bill<sub>1</sub>-Nom script<sub>2</sub>-Acc [v<sub>VP</sub> t<sub>i</sub> t<sub>2</sub> write]] [Past]]

As mentioned before, we assume that the remnants in the gapped clause overtly move

to multiple specifiers of FP in that gapping remnants and their correlates should be contrastively focused (cf. (1) and (14)). Additionally, we take a PF deletion-plus-extra deletion (An 2019; Erschler 2022) approach to case-drop in Korean gapping.

As for the good acceptability of the [Parallel | Nondrop] condition in (22a) and (22e), we propose that the VP-internal subject moves to the outer Spec of FP and the NP complement moves to the inner Spec of FP in both conjuncts. If the first conjunct VP is deleted in PF under identity with the antecedent conjunct VP, (22a) and (22e) are derived.

As for the relatively good acceptability of the [Nonparallel | Nondrop] condition in (22b) and (22f), notice that the NP complement is raised to the outer Spec of FP in the first conjunct, whereas it is raised to the inner Spec of FP in the second conjunct. Such different landing sites lead the condition to violate the word order parallelism, consequently slightly degrading the acceptability of the gapped output in (22b) and (22f).<sup>7</sup>

As for the relatively good acceptability of the [Parallel | Drop] condition in (22c) and (22g), we adopt An's (2019) extra deletion approach. Observing that case-markers on ellipsis remnants can be missing adjacent to an ellipsis site, An argues that PF deletion extends into the part of ellipsis remnant as far as recoverability and adjacency are satisfied. This extra deletion process is dependent upon the PF deletion operation. Although syntax decides what to be deleted, PF deletion also has its own tenacity; i.e., to be elided is to be continuous. Under An's proposal, PF deletion can thus ignore syntactic constituency (cf. Mukai 2003). Given this extra deletion proposal, (22c) and (22g) can be derived.

The acceptability in gapping becomes worse if the case-marker of NP complements disappears in the fronted position. In the [Nonparallel | Drop] conditions in (22d) and (22h), the NP complements are not adjacent to the ellipsis site so that their case-marker cannot be dropped by the extra deletion operation. This ill-formed drop effect would thus be understood as the result of violating a grammatical constraint.

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<sup>7</sup> A reviewer suggested an alternative perspective to the current proposal. The nonparallel gapping conditions in (22) begin with either dative or accusative arguments. From a parsing perspective, this violates the agent-before-patient heuristic processing, which imposes a cognitive burden on sentence processing. This may explain why the acceptability of these nonparallel conditions (22b, f) is lower compared to the parallel conditions (22a, e) that adhere to the agent-before-patient heuristic processing (Ferreira 2003). However, as the reviewer pointed out, this parsing-based explanation does not account for the dative-accusative asymmetry observed in the experimental results of this study.

A main difference between dative drop and accusative drop in Korean gapping is that dative drop, when distanced from the ellipsis site, has a more significant impact on acceptability ratings compared to accusative drop. We suggest that this is because dative drop is more costly in processing terms, as dative markers carry semantic meaning, whereas accusative markers do not. Specifically, the dative marker *eykey* lexically means ‘to’ or ‘toward’ to indicate the recipient or beneficiary of an action, while the accusative marker (*l*)*ul* is semantically null. On this kind of approach, the case-drop effect adjacent to an ellipsis site would have to be understood as some kind of processing load on grammatical sentences. By contrast, the case-drop effect not adjacent to an ellipsis site would have to be understood as something that distinguishes between a grammatical sentence and an ungrammatical sentence.<sup>8</sup>

To summarize, we have suggested that the availability of case-drop in Korean gapping depends on the operation deletion which may include a contiguous part of the adjacent string.

## 5. Conclusion

This study examined the influence of dative or accusative case-marker drop on the acceptability of Korean gapping. Particularly, we investigated the role of case-markers in Korean gapping in relation to syntactically parallel vs. nonparallel antecedent clauses via an acceptability judgment experiment. We argued that if the canonical word order of correlates in antecedent clauses is disrupted in ellipsis clauses, gapping necessitates more computation at the ellipsis site before the remnants are linked to their correlates in antecedent clauses.

As a theoretical implication, we suggest that ellipsis like gapping generally increases processing load, which would invite the use of an explicit post-nominal particle such as case-markers for interpreting nominals. We specifically suggest that case-drop incurs a processing cost that is responsible for its degraded acceptability. Under the purview of this processing approach, the case-drop effect adjacent to an ellipsis site would

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8 Because the current experiment did not include a control group with non-gapping conditions, a reviewer expressed uncertainty about whether the findings from this experiment are specific to gapping or if they can be extended to coordinate sentences without ellipsis. We acknowledge that the results of this single experiment alone may not be sufficient to fully support the current claim of the case-drop generalization.

pose a relatively lower processing burden on grammatical sentences. On the contrary, the case-drop effect not adjacent to an ellipsis site would have to be understood as something that distinguishes between a grammatical sentence and an ungrammatical sentence.

Finally, we would like to discuss the Korean case system briefly. Kim (2015) classifies Korean case values into structural (or grammatical) and semantic cases. The former includes nominative (*i/ka*), accusative (*ul/lul*), and genitive (*uy*) while the latter has dative (*eykey*), goal (*ey/lo*), source (*lopwuthe*), benefactive (*wihayse*), and so forth. The structural case-marking is typically assigned in structural configurations or by grammar rules, while the semantic case-marking is licensed by a predicate. As a follow-up to Kim (2023), we showed that dative markers align more closely with postpositions than with accusative markers in Korean gapping.

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