

Remarks on “Gapping” in DP

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We argue that the gapping-like constructions in the nominal domain (nominal gapping: NG) and regular gapping constructions seen in clauses (verbal gapping: VG) show quite different properties. First, VG obeys the Coordination Constraint but NG does not. Second, in terms of locality, NG allows free embedding but VG does not. Third, the scope properties exhibited in VG are not seen in NG. Fourth, so-called cross-conjunct binding, which is sometimes taken as strong evidence for the across-the-board movement analysis of VG, is not seen in NG in the same way as in VG, even in the environments where locality requirements for across-the-board movement are met. We argue that the derivation of NG does not involve across-the-board movement. Instead, NG is best analyzed as involving ellipsis.

Keywords: gapping, verbal gapping, nominal gapping, NP-ellipsis, across-the-board movement

It has been observed that there are gapping-like constructions in the Determiner Phrase (Abney 1987) in which the head noun is omitted (Chaves 2005, Jackendoff 1971, Johnson 1994, 2006, Lobeck 2007, Neijt 1979, Nerbonne, Iida, and Ladusaw 1989, Nerbonne and Mullen 2000, Postal 2004, Yoshida 2005).¹ One of these cases is exemplified by (1a). In the second conjunct of (1a), the head of the noun phrase, *book*, is omitted, while two other constituents in the DP are left intact, and these two constituents are contrastively focused. Despite the missing head noun in (1a), the basic interpretation of this sentence is the same as that of (1b), where all the elements in the DP of the second conjunct are present.

- (1) a. John read [_{DP} Bill's *book* of poems] and [_{DP} Mary's of music].
 b. John read Bill's *book* of poems and Mary's *book* of music.

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¹ There are studies on similar constructions in other languages; see, for example, Demonte 1999, Ticio 2005, and Vicente 2007 on Spanish. However, to the best of our knowledge, the literature contains no thorough investigation of NG in English.

The type of construction in (1a) shows a surface resemblance to the so-called gapping construction in the clausal domain (first discussed in Ross 1967). Exemplified in (2), gapping constructions omit the head of the VP in the second conjunct, while leaving the two arguments intact.

- (2) a. John *wrote* this book and Mary, that book.
 b. John *wrote* this book and Mary *wrote* that book.

Let us call the construction in (1a) *nominal gapping* (NG)—that is, gapping in nominal phrases (Chaves 2005, Postal 2004, Yoshida 2005). The construction in (2), traditionally called gapping, we refer to as *verbal gapping* (VG)—that is, gapping in verbal phrases. For the sake of exposition, we call the second conjunct of (1a) or (2a), where the noun *book* or the verb *wrote* is gapped, the *gapped constituent*, and the first conjunct, which serves as the antecedent of the gapped constituent, the *antecedent constituent*. In addition, the elements left in the gapped constituent, which are called the *remnants*, contrast with the corresponding constituents (typically marked by emphatic stress) in the antecedent constituent, which are called the *correlates*.

Following Jackendoff (1971), NG is standardly analyzed as a variant of gapping (Culicover and Jackendoff 2005, Jackendoff 1971, Lobeck 2007). This raises the possibility that both NG and VG are derived through across-the-board (ATB) movement, as proposed for VG by Johnson (1994, 1996/2004, 2000, 2006, 2009). The plausibility of an ATB movement analysis of NG is supported by several similarities between the two constructions, as reported by Jackendoff (see section 4 for a detailed discussion). Furthermore, the ATB analysis of VG predicts that gapping should be possible in environments where ATB movement is licit. The coordination of NPs within the DP is one such environment, suggesting that an ATB analysis might be warranted.

The central goal of this article is to demonstrate that in contrast to any superficial similarity, the basic properties of NG differ substantially from those of VG. An investigation into the characteristics of NG leads us to claim that NG must be distinguished from VG and that it cannot result from any sort of typical ATB movement. Instead, we claim that NG is derived through the ellipsis of a Noun Phrase (NP) or Number Phrase (NumP), following movement of the remnant.²

1 Differences between Verbal Gapping and Nominal Gapping

1.1 The Across-the-Board Movement Analysis of Verbal Gapping

VG is distinguished from other elliptical constructions by a number of characteristics. Here, we will focus on four prominent characteristics by comparing it with Verb Phrase ellipsis (VPE). We contrast VG with VPE instead of other similarly comparable constructions because the properties of VPE make it an informative foil to VG. The first distinguishing characteristic of VG is

² Although we show that NG is not gapping, especially in Johnson's (1994, 1996/2004, 2000, 2006, 2009) sense, we use this terminology for expository consistency following Chaves (2005), Postal (2004), and Yoshida (2005). The differences between VG and NG have also been touched on by Chaves (2005) and Yoshida (2005).

that it is applied across a restricted class of sentential connectives. While VG is most acceptable with coordinators like *and* and *or*, it is less acceptable when appearing with subordinators like *that*, *because*, *though*, and *while* (Jackendoff 1971, Johnson 1996/2004, Neijt 1978, 1979, Ross 1967). This restriction is sometimes called the *Coordination Constraint* (Kennedy 2001). The following examples illustrate this point (throughout this article, we use overstrikes to indicate the gapped elements):

- (3) a. John ate pizza and/or Mary ~~ate~~ pasta.
 b. *John ate pizza because/while/if Mary ~~ate~~ pasta.

In contrast, VPE freely occurs both in coordinate constructions, as in (4), and in subordinate constructions, as in (5).

- (4) a. John ate pizza and/or Mary did too.
 b. John ate pizza but Mary didn't.
 (5) a. John ate pizza before/while/if Mary did.
 b. Some will eat nattoo today, because others did yesterday.

Second, neither the gap nor the antecedent constituents may be embedded within finite clauses within their conjuncts, as in (6a) and (6b) (Johnson 1994, 2006, 2009, Neijt 1979). However, as long as the antecedent and the gapped constituents are not separated by a finite clause boundary, they may be freely embedded, as in (7). We call this constraint the *Nonembedding Constraint*.

- (6) a. *John read those books and Sally claims that others ~~read~~ these magazines.
 b. *John said Peter read those books, and Sally ~~read~~ these books.
 (7) a. John is sure that Mary eats beans and Peter meat.
 b. John wants Bill to give Pat flowers and James ~~wants Bill to give~~ Sam flowers.

In contrast, VPE is not subject to this constraint. The examples in (8) demonstrate that either the antecedent or the elided VP can be inside an embedded clause.

- (8) a. Mittie ate nattoo, and I thought that Sam did ~~eat nattoo~~ too.
 b. Chuck thought that either Mittie had eaten nattoo or Liz had ~~eaten nattoo~~.

Third, negation and modals that appear in the antecedent constituent in VG take scope over the gapped constituent (Lin 2000, McCawley 1993, Oehrle 1987, Siegel 1984, 1987). For example, modals in VG can take scope over the entire coordinate structure: (9a) may be interpreted as (9b). Similarly, (10a), where the negation and the verb are gapped, is interpreted as in (10b), where the negation takes wide scope over both conjuncts.

- (9) a. James must finish his paper and Sally ~~must finish~~ her book.
 b. It must be the case both that James finishes his paper and that Sally finishes her book.
 c. James must finish his paper and Sally must ~~finish her paper~~ too.

- (10) a. Ward can't eat caviar and Sue ~~can't eat~~ beans.
 b. It's not the case that [Ward can eat caviar and Sue can eat beans].
 c. Ward can't eat caviar and Sue can't ~~eat caviar~~ either.

The wide scope of negation in the VG context can be further supported by the interaction of negation and the interpretation of *or*. As has been reported in the literature, when the negation and the verb are gapped in the gapped constituent and coordinated by the connective *or*, the negation takes scope over *or*. As a result, *or* is interpreted conjunctively in the VG context (Johnson 1994, 2009, Van Oirsouw 1987, Schwarz 1999). Thus, (11a) is interpreted conjunctively, and the disjunctive interpretation is degraded.

- (11) a. John hasn't seen Harry or Bill Sue.
 b. John has not seen Harry *and/??or* Bill has not seen Sue.
 (Schwarz 1999:362)

However, in the nongapped counterparts of (9a), (10a), and (11a) as well as the VPE examples in (9c) and (10c), such wide scope negation/modal interpretations are not found, as these operators take scope within each conjunct.

Finally, VG allows so-called cross-conjunct binding (Johnson 1996/2004, Kennedy 2001, Lin 2000): the subject in the antecedent constituent can bind (and thus c-command) the subject in the gapped constituent but not the subject of a nongapped conjunct.

- (12) a. Not every girl₁ ate a green banana, and her₁ mother (*ate) a ripe one.
 b. *Not every girl₁ ate a green banana, and her₁ mother did too.

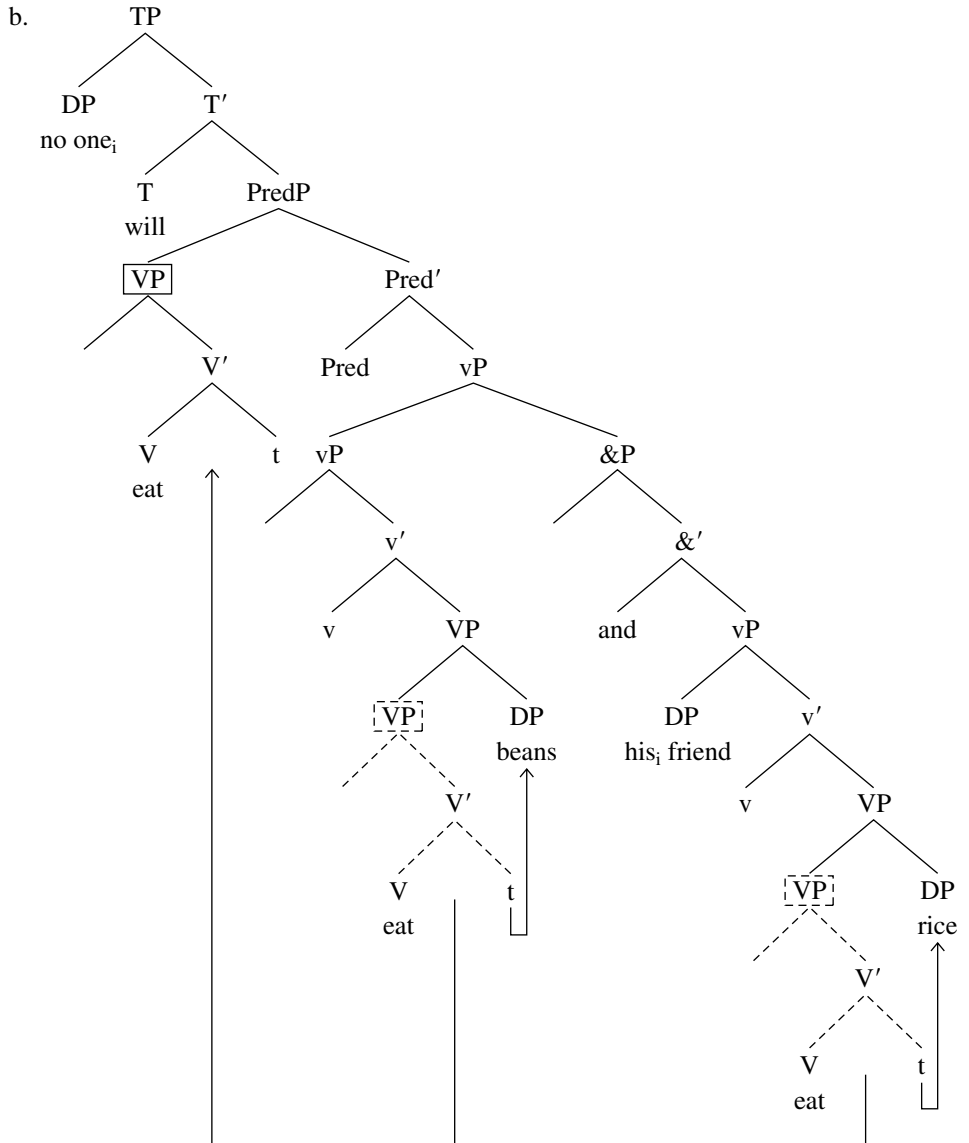
These properties have motivated the ATB movement analysis initially proposed by Johnson (1996/2004). The contrasts between VPE and VG strongly suggest that VG is not a variant of VPE; if VG had the derivation of VPE, we would not expect the differences between VG and VPE that we have described so far.³ These properties of VG do not follow from a clausal ellipsis analysis, either. It is well-known that the clausal ellipsis (e.g., in sluicing) and its antecedent can be separated by a clause boundary (Ross 1969). As Coppock (2001) and Kennedy (2001) argue, it is possible to assume that conjunct size is restricted to VP or vP in the case of VG, as VP/vP cannot be embedded and can presumably be connected only by coordinating connectives. However, it is not clear whether such a construction-specific stipulation should be granted or not. So

³ We must point out that the ATB movement analysis is not free from problems. For example, Siegel (1984, 1987) notes that examples like (12a) can have an interpretation in which the coordination is taking wide scope (i.e., $[\neg \diamond p] \wedge [\neg \diamond q]$). Both Lin (2000) and Repp (2009) note that for this interpretation, clausal coordination is required, and this is not expected under the ATB movement analysis (see Repp 2009 for the details).

far, the most successful analysis that can capture all these properties of VG is the ATB movement analysis proposed by Johnson (1994, 1996/2004, 2000, 2006, 2009). Thus, we adopt the ATB movement analysis of VG in this article.

(13b) is the derivation of VG under the ATB (VP-movement) analysis.

(13) a. No one will eat beans and his friend eat rice.



Under this analysis, VG does not involve an ellipsis process. Instead, the gap arises from the ATB movement of the VPs out of the conjoined vPs to the specifier of a higher functional projection, PredP. Prior to the ATB movement, the second remnant *rice* and the second correlate *beans* have raised rightward from their respective VPs (*evacuating movement* in Vicente's (2010) terms; see Jayaseelan 1990 for related discussion), thereby remaining in their respective conjuncts. In addition, the subject of the antecedent constituent moves to Spec,TP, and the subject in the gapped constituent remains in Spec,vP.⁴ As Johnson (2009) notes, this analysis is able to explain several aspects of VG. The Coordination Constraint follows because ATB movement is only possible in coordination structures (Bošković and Franks 2000, Hornstein and Nunes 2002, Munn 1993, 1999, Williams 1978). Cross-conjunct binding follows as well. The subject of the antecedent constituent moves to Spec,TP, a position from which it c-commands the coordinate structure, including the remnant subject in the gapped constituent. Finally, modals and negation are predicted to be able to take wide scope, as they would c-command the entire coordinate structure as well as the ATB-moved VP, which lands in Spec,PredP.

Even though the ATB VP-movement analysis can capture many of the key properties of VG discussed so far, the Nonembedding Constraint does not seem to follow. VG structures are derived by ATB movement of the VP from a position within each conjunct to a higher landing site, Spec,PredP. However, as discussed by Huang (1993:107) and Takano (1995), the movement of VP in English can be long-distance.

- (14) a. [_{VP} Criticize himself], John thought Bill would not t_{VP}.
 b. [_{VP} Talk to friends of each other], they said we should not t_{VP}.

Thus, the ATB VG analysis predicts that it is possible for a VP from an embedded clause to feed ATB VP-movement and that VG can be applied across subordinated clauses, contrary to fact. Note that the ATB head movement analysis, which is an earlier implementation of the ATB movement analysis (Johnson 1994, 2000), captures the Nonembedding Constraint quite elegantly: head movement is bounded to a finite clause in English owing to the Head Movement Constraint (Baker 1988, Travis 1984) or Relativized Minimality (Rizzi 1990), and thus VG, which is assumed to involve head movement, is also bounded to a finite clause. Johnson's most recent analysis (2009) does not have a clear solution to this problem. However, because the landing site of VP-movement is PredP, we speculate that this locality effect of gapping may follow from the distribution of PredP and the properties of remnant VP-movement.

2 Nominal Gapping Is Different from Verbal Gapping

In this section, we show that NG presents characteristics markedly distinct from the four characteristics of VG discussed above.

⁴ This violates the Coordinate Structure Constraint (Ross 1967). However, Johnson (1996/2004) and Lin (2000) show that A-movement is permitted to violate this constraint.

First, in contrast to VG, NG does not respect the Coordination Constraint. NG can be applied freely across coordinators and subordinators.⁵ For example, the gapped DP is acceptable inside complement clauses and adverbial clauses.

- (15) a. John will read Bill's book of music and/or Mary's ~~book~~ of poems.
 b. John's book of music will be published because/if Mary's ~~book~~ of poems is successful.

The acceptability of NG in noncoordinate constructions is problematic for an ATB analysis in that, in general, constructions purported to involve ATB movement obey the Coordination Constraint. For example, in the canonical case of ATB movement, ATB *wh*-fronting in noncoordinate conjunctions is unacceptable, as illustrated in (16). An ATB movement analysis of NG must therefore provide an explanation for this apparent exception to the Coordination Constraint.

- (16) a. Which car did Peter buy $t_{\text{which car}}$ and James sell $t_{\text{which car}}$?
 b. *Which car did Peter buy $t_{\text{which car}}$ because/if James sold $t_{\text{which car}}$?⁶
 c. *Who t_{who} buys a new car because/if t_{who} sold the old one?

Second, the types of movement that would be required in an ATB movement analysis of NG are generally illicit in English. An ATB movement analysis of (17a) is given in (17b).

- (17) a. John read Bill's book of poems and Mary's ~~book~~ of music.
 b. [_{TP} John read [_{XP} Bill's₁ [_{YP}[_{NP} book]₂ [_{DP} t_1 t_2 of poems] and [_{DP} Mary's t_2 of music]]]].

As (17b) shows, the NP, *book*, undergoes ATB movement out of the conjoined DPs to the specifier of some functional projection, YP, above the coordinated DPs. In addition, *Bill's* is moved to the specifier of the functional projection XP, which is generated higher than the YP. However, the movement required in the derivation in (17b) is problematic for two reasons. The genitive *Bill's* has raised from the specifier of a DP, a type of movement known as left branch extraction, which

⁵ Jackendoff (1971) reports that NG is not acceptable in embedded clauses. To check the generality of the acceptability of embedded NGs, we consulted 15 native speakers of English, and they all accepted the examples in (15) and (19). Therefore, we conclude that NG in embedded contexts is generally acceptable, but this may be subject to individual or generational variability.

⁶ Example (16b) could be construed as containing a parasitic gap (PG), which would then be unacceptable owing to the independent constraint on PGs that tensed *because*-clauses and *if*-clauses are low in the hierarchy of the environment where PGs are licensed (see Engdahl 1983). However, examples like (16c), where a PG analysis is impossible, because of an Anti-C-Command Condition violation (e.g., Engdahl 1983), are still unacceptable. If ATB movement were possible in these environments, examples like (16c) should still be acceptable, but they are not. Thus, ATB movement is not possible in these environments.

is considered illicit in English (Ross 1967). Additionally, NP-movement that strands a DP specifier does not appear to be licit in English. As illustrated in (18), the NP *books of poems* cannot be the focus of *it*-clefting, nor can it be *wh*-moved to the exclusion of the DP specifier *Mary's*. Thus, the types of movement required in an ATB movement analysis of NG are not licensed in English.

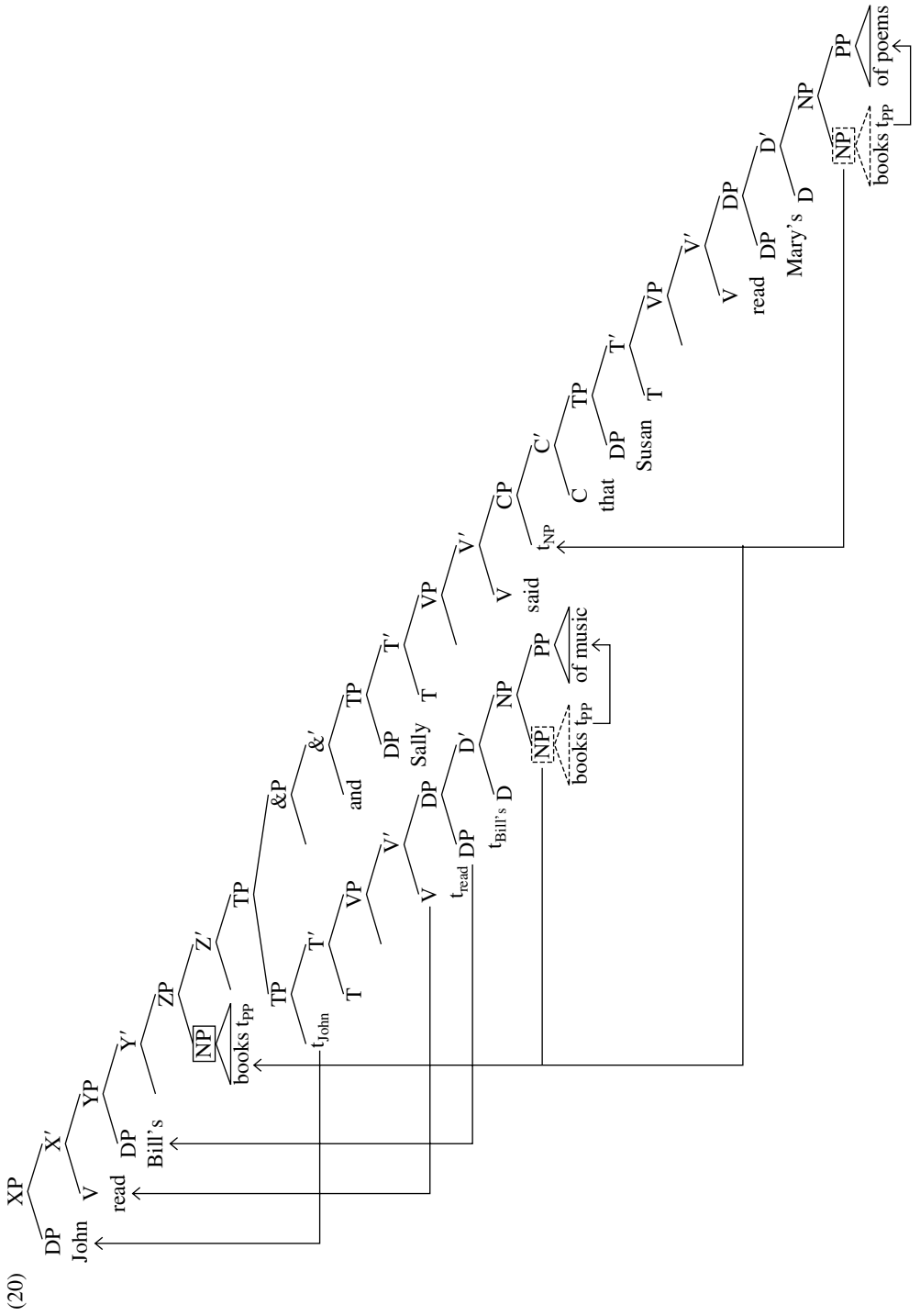
- (18) a. John read Mary's books of poems.
 b. *It was books of poems that John read Mary's.
 c. *Books of which poems did John read Mary's?

The same point can be made with the examples in (19).

- (19) a. [John read Bill's books of music] and
 [Sally says [_{CP} that Susan read Mary's books of poems]].
 b. [John met [a man [who read Bill's books of music]]] and
 [Sally met [_{DP} a girl [_{CP} who read Mary's books of poems]]].
 c. [John read [Mary's books about [Sue's proof of this theorem]]] and
 [Sally read [_{DP} Bill's books about [David's proof of that theorem]]].

In these NG constructions, the gap and the antecedent have been embedded in a variety of constructions: verbal complement clauses, embedded coordinated clauses, relative clauses, and DPs.⁷ In these constructions, the DP-coordination analysis demonstrated in (17b) clearly is unavailable. Instead, it appears that it must be TPs that are coordinated, from which *Bill's* in Spec,DP and the NP *books* have raised out. This entails that the matrix subject and the verb in the antecedent constituent must also raise out of the TP coordinate structure to precede *Bill's* and *books*. Just as with (17a–b), it is not clear where the landing sites of the ATB-moved NP and other accompanying movements would be in (19a–c). Taking (19a) as an example, the analysis of NG under ATB NP-movement must be as shown in (20). The NP *books* must undergo ATB raising from the coordinate structure to some higher functional projection; consequently, other elements—including *Bill's* in Spec,DP, the matrix subject, and the verb of the antecedent constituent—must also raise from the coordinate structure. Again, as with (17a), the ATB movement of *Bill's* requires left branch extraction of *Bill's* and NP-extraction from under the DP specifier, both disallowed movements in English.

⁷ Examples like (19b) and (19c) are particularly problematic for an ATB head movement analysis. Johnson (1994, 2000) proposes that VG results from ATB movement of the head verb but not of the VP. Applied to NG, this ATB head movement analysis predicts examples like (19a–c) to be unacceptable, as the movement of the head noun in such configurations must violate the Head Movement Constraint (Baker 1988, Travis 1984) or Relativized Minimality (Rizzi 1990).



The derivation of examples like (19b) and (19c) raises a further issue for an ATB movement analysis. These examples require that the NPs *books* and *proof* escape the relative clause and adjunct islands in the course of moving out of the coordinate structure. As we showed above, leftward movement of these NPs appears to be impossible, even in scenarios in which the movement would not violate island constraints. The point here is to simply note that the ATB movement analysis of NG would also require that this movement violate island constraints in certain cases, an operation that is not possible for other types of ATB movement—for example, for ATB *wh*-questions, which respect island constraints (Munn 1993, Ross 1967).

A third point that argues against the ATB movement analysis of NG is that the scope of quantifiers interacts with NG and VG in different manners. As we have shown with the examples in (9) and (10), negation and modals in the antecedent constituent of VG can take scope over the gapped constituent. These facts follow from the structural position that the modals and negation take within the ATB movement analysis: c-commanding both the antecedent constituent and the gapped constituent. It is difficult to find exactly the parallel structure in DP because in many cases the nominal domain does not involve modals or negation. However, if we assume that numerals are generated above the core NP projection (Lobeck 1995, Ritter 1991) in the same way as negation and modals in clausal projections, and if VG and NG have the same ATB movement derivation, it is expected that numerals can be shared by the two conjuncts in NG. Constructing the right test case, however, requires some consideration of the semantics of the coordinated nominals. For instance, in an example like (21), each conjunct refers to a distinct set of individuals: the books of music and the books of poems both belong to Mary, and it is rather difficult to understand that there are three things that are simultaneously books of music and books of poems.

(21) Mary's three books of music and books of poems⁸

Consequently, it is more plausible to assume that an example like (21) involves the coordination of DPs. Interestingly, in this type of example, a salient interpretation is that the numeral *three* modifies only the first conjunct; thus, the total number of books is four or more.⁹ Such an interpretation suggests that this type of example indeed involves DP-coordination, with the numeral trapped inside the first conjunct DP. Therefore, examples like (21) do not serve as a good testing ground for the ATB NG hypothesis, which requires small conjuncts.

On the other hand, in an example like (22), the most salient interpretation is that there is a set of three things (e.g., Mary's son's involvement with car theft, drug dealing, and criminal gangs) that serve both as the problems that Mary has with her son and the reasons for her depression.

(22) Mary's three problems with her son and reasons for her depression¹⁰

⁸ We thank an anonymous *LI* reviewer for raising this important point.

⁹ Note that there are also speakers who have an interpretation where the numeral is interpreted within each of the conjuncts, yielding a 'six in total' interpretation.

¹⁰ This example was provided by an anonymous *LI* reviewer.

This interpretation is most likely to be associated with the coordination of the predicates denoted by the NPs. Thus, the ‘gapping’ counterpart of an example like (22) is just the kind of example for testing the ATB NG hypothesis. To achieve a canonical gapping-like string, we need an example where the head noun is omitted and two remnants remain in the second conjunct—that is, something like (23a–b). In such examples, if an ATB derivation is available, it should be associated with the NP-coordination structure, and, consequently, the numeral should be able to take scope over both of the conjuncts.

- (23) a. Mary’s three reasons for anger and her husband’s reasons for depression
 b. Mary’s three strongest reasons for disagreeing and weakest reasons for concurring

In (23a), the genitive phrase and the object PP are remnants, and in (23b), the superlative adjective and the object PP are remnants. In both of the examples, the ‘three in total’ interpretation is not available (e.g., one in which there are three things that serve both as Mary’s reasons for anger and as her husband’s reasons for depression, such as their credit card debt, their mortgage, and their failing marriage), whether the head noun is gapped or not. That is, the numeral *three* applies only to the first conjunct or applies to both of the conjuncts separately. Instead, either the ‘more than three reasons’ interpretation or the ‘six reasons in total’ interpretation is available. (We consulted 13 native speakers of English and they all agreed with this judgment.) While NP-coordination is clearly possible in general, as illustrated in (22), the available interpretation of sentences like (23a–b) suggests that NP-coordination, the very structural configuration instrumental to an ATB movement analysis, is not available in the context of NG.

Fourth, although NG does exhibit cross-conjunct binding, there are reasons to suspect that this is not due to a small-conjunct coordination configuration but instead is due to independent factors. The examples in (12) illustrate that in VG, cross-conjunct binding is possible only when the verb in the second conjunct is gapped (Johnson 1996/2004). However, as (24) shows, cross-conjunct binding is possible in DP regardless of whether the head noun in the second conjunct is gapped or not. Although such examples are complex, their acceptability seems to be clear.

- (24) Not every doctor₁’s knowledge of tax law or his₁ accountant’s (knowledge) of medicine is reliable.

Furthermore, cross-conjunct binding is available even if the head noun in the second conjunct is embedded inside another DP, as in (25), or even in noncoordination contexts, as in (26). Again, the examples are complicated, but many speakers do not report an acceptability difference between the gapped and the nongapped cases.¹¹

- (25) a. Not every doctor₁’s knowledge of tax law or his₁ accountant’s comments about the doctor’s (knowledge) of medicine are useful.
 b. No semanticist₁’s opinion of syntacticians’ attitudes toward morphology and his₁ students’ opinion of phonologists’ (attitudes) toward sociolinguistics were both expressed inappropriately.

¹¹ We consulted 10 native speakers of English regarding their judgment of (25a–b) and (26). For (25a), 7 out of 10 native speakers accepted it and 3 did not. For (25b) and (26), 8 accepted the example and 2 did not.

- (26) [No parent]₁'s attitude toward politics should bias [_{DP} his₁ children's (attitude) toward religion].

If the explanation for cross-conjunct binding in NG were that a c-command relation between the binder and the bindee exists only when the head noun in the second conjunct is gapped, the cross-conjunct binding in nongapped DP-coordination would remain a mystery. Instead, the "cross-conjunct binding" facts in NG can be explained by appealing to the well-known exception to the c-command condition on binding: the so-called *specifier-binding effects* (Hornstein 1995, Reinhart 1987). That is, when a quantified DP appears in the specifier of a DP, it is allowed to bind a pronoun outside the DP even though the Spec,DP does not c-command the constituent outside the DP, as in (27).

- (27) a. Every boy₁'s mother thinks he₁ is a genius.
(Reinhart 1987:155)
b. Every senator₁'s portrait is on his₁ desk.
(Hornstein 1995:108)

The cross-conjunct binding cases in NG can be understood as one of these cases of specifier-binding phenomena. Therefore, as far as NG is concerned, cross-conjunct binding does not provide a good piece of evidence for the ATB movement analysis (or the size of the conjuncts); that is, the cross-conjunct binding facts do not support the analysis that smaller constituents such as NPs are coordinated in NG.

In sum, NG contrasts with VG in terms of the Coordination Constraint, the Nonembedding Constraint, scope properties, and cross-conjunct binding. Given that the ATB movement analysis of VG is motivated by these four properties, it is not plausible to extend the same analysis to NG. Therefore, it is most reasonable to assume that NG has a different derivation from VG.

3 Toward an Analysis of Nominal Gapping

The striking differences between NG and VG point to the conclusion that NG and VG have different derivations. We argue that NG arises from movement of the remnant followed by ellipsis. Specifically, we argue that the complement prepositional phrase (PP) undergoes movement and adjoins to NP, NumP, or another functional projection in DP,¹² and the ellipsis process targets a segment (Chomsky 1986, May 1985) of the category to which the moved phrase is adjoined. Similar analyses, utilizing ellipsis of the segment of the category, have been proposed by Hornstein

¹² If we assume that NG involves ellipsis after the movement of the complement PP, the complement PP can move rightward and adjoin to NumP, as demonstrated in (36). It is also possible that the complement PP moves rightward and adjoins to DP, as evidenced by the interpretation of the following phrase:

- (i) John's three books each about music and about poems

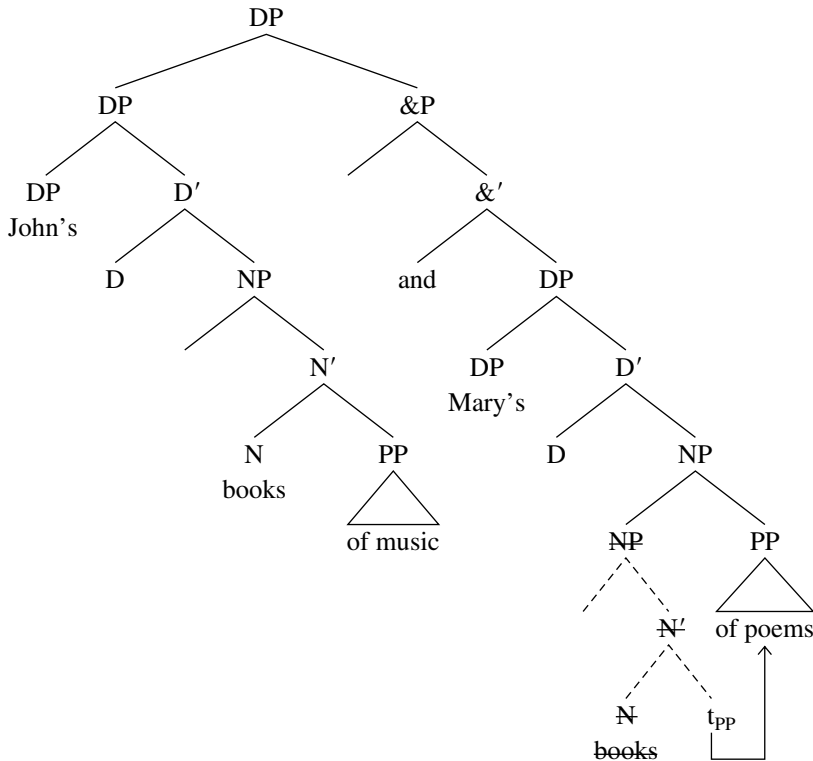
This example can mean 'six books, three about music and another three about poems'. This interpretation supports the following derivation:

- (ii) [_{DP} John's [_{NumP} three [_{NP} books each [_{PP} about music]]]] and [_{DP}[_{DP} Mary's [_{NumP} three [_{NP} books [<sub>t_i]]]]]
[_{PP} about poems]_i]</sub>

(1994) and Merchant (2000) for antecedent-contained deletion in VPE contexts. A sample derivation is given in (28).

(28) a. John's books of music and Mary's ~~books~~ of poems

b.



In this analysis, the PP moves rightward and adjoins to NP.¹³ Johnson's (2009) ATB VP-movement analysis of VG also involves moving the object out of the ATB-moved VPs (*evacuation movement* in Vicente's (2010) terms). Evidence for rightward movement of the complement PP comes from the observation that the preposition cannot be omitted under NG.

(29) John read Bill's book of music and Mary's ~~book~~ *(of) poems.

As Jayaseelan (1990) points out in discussing the similar restriction on VG, the ban on omitting the preposition can easily be captured if the remnant in the gapped constituent undergoes rightward movement, as rightward movement in general (as in the examples of heavy NP shift in (30)) does not allow preposition stranding (Pesetsky 1995, Ross 1967).

(30) a. I talked t_1 yesterday [_{PP} *about* the man I recently met]₁.

b. *I talked *about* t_1 yesterday [_{DP} the man I recently met]₁.

¹³ A similar analysis incorporating rightward movement is employed by Johnson (2009) for the analysis of pseudogapping. Indeed, the distribution of pseudogapping is very similar to that of NG (they can be embedded freely, etc.).

- c. [_{DP} A student t_1] came to see me yesterday [_{PP} with long outrageous hair]₁.
 d. *_{[DP} A student with t_1] came to see me yesterday [_{DP} long outrageous hair]₁.

If, on the other hand, the remnant PP in NG undergoes leftward movement, which generally allows preposition stranding in English, as the examples in (31) show, it would be unclear why the preposition cannot be omitted under NG; that is, the PP containing the trace of the moved NP could be elided together with the larger NP.

- (31) a. [_{DP} Which man]₁ did you talk about t_1 ?
 b. [_{DP} What branch of physics]₁ are you a student of t_1 ?

On the basis of these observations, we conclude that NG involves NP-ellipsis (NPE) following rightward movement of the remnant PP.

The ellipsis analysis of NG predicts that NG and NPE, which both involve ellipsis of NP, should have similar distributions. Indeed, these two constructions show a strong parallelism. For example, both NG and NPE can be applied across coordinators and subordinators and can be freely embedded, as we have shown in (15) and (19). Furthermore, their licensing conditions overlap perfectly. The following examples indicate that where NPE is legitimate, NG is legitimate as well:

- (32) a. *The quantifier all*
 The books are new, and *all* ~~books~~ (of music) are on sale.
 b. *Demonstratives*
 Mary likes those books of poems, but I like *these* ~~books~~ (of music).
 c. *Numerals*
 Mary bought some new books of poems and I like these *six* ~~books~~ (of music) the best.
 d. *Genitives*
 John read Mary's book of poems, and *Bill's* ~~book~~ (of music) as well.

On the other hand, where NPE is not licensed, NG is not licensed, either. Typical examples involve determiners and attributive adjectives.

- (33) a. *Determiners*
 *John read *the/a/every* book of music and Mary read *the/a/every* ~~book~~ (of poems).
 b. *Adjectives*
 *John read Mary's long book of poems and *Bill's* *short* ~~book~~ (of music).

Additionally, if the attributive adjectives are in the superlative form, both NPE (Panagiotidis 2003) and NG can be licensed, as in (34).

- (34) *Superlative adjectives*
 a. John read Mary's longest book of poems and *Bill's* *shortest* ~~book~~ (of music).
 b. John read Mary's most interesting book of poems and *Bill's* *most boring* ~~book~~ (of music).

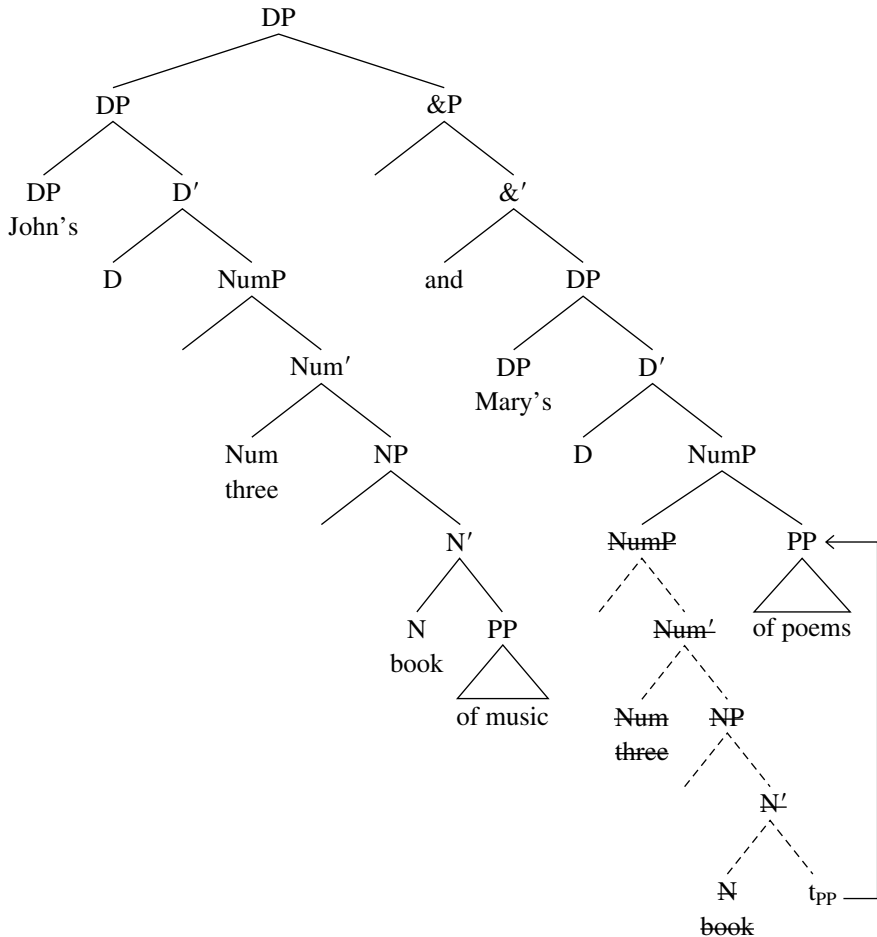
The third parallelism has to do with the distribution of numerals in the context of NG and NPE. That is, exactly like NPE, the ellipsis in NG can contain numerals.

(35) John read David's three books of music and Mary's (three) ~~books~~ of poems.

In such cases, we assume that the ellipsis targets functional projections such as NumP (Lobeck 1995, Ritter 1991) within DP. In the case of (35), we further assume that the remnant PP is adjoined to the NumP and the lower NumP segment is elided. The derivation is as in (36b).

(36) a. John's three books of music and Mary's ~~three books~~ of poems

b.



Support for this NumP-ellipsis derivation, as we have discussed earlier, comes from the interpretation of the numerals (see footnote 9). As we have shown, in these NumP-ellipsis examples, numerals can apply to each conjunct separately. Thus, even though the numeral is elided together with the NP, it is interpreted in the gapped constituent.

Given these striking parallelisms between NG and NPE, the simplest conclusion is that NG is a type of NPE, involving NPE following the rightward movement of a remnant PP.

4 Conclusions

On the basis of detailed comparisons between NG and VG and between NG and NPE, we have argued that NG does not involve ATB movement of NP (or of the noun head). This conclusion is supported by the sharp contrast between NG and VG in terms of the Coordination Constraint, the Nonembedding Constraint, scope properties, and the possibility of cross-conjunct binding. The striking similarities between NG and NPE, on the other hand, indicate that NG involves ellipsis that follows the rightward movement of the complement. This conclusion immediately raises two questions. First, where do the similarities between NG and VG come from? (See Jackendoff 1971 on the similarities between NG and VG.) As has been noted in the literature, both VG and NG seem to show the following properties: the gapped constituent must follow the antecedent constituent (37), and these constructions are less acceptable with more than two remnants (38).

- (37) a. John read Bill's *(book) of music and Mary's ^{OK}(book) of poems.
 b. John *(read) this book and Mary ^{OK}(read) that book.
- (38) a. John's present of towels to Susan and Bill's ~~present of towels~~ to Diana
 b. *John's present of towels to Susan and Bill's ~~present~~ of flowers to Diana
 c. John gave towels to Susan and Bill ~~gave towels~~ to Diana.
 d. *John gave towels to Susan and Bill ~~gave~~ towels to Diana.

These similarities originally motivated the position that NG is an instance of gapping constructions and that it has the same derivation as VG (Jackendoff 1971). From what we have shown so far, we do not expect such similarities. It is, however, well-known that backward ellipsis is tightly constrained in English. It is sometimes argued that backward ellipsis follows a constraint like the so-called Backward Anaphora Constraint (e.g., Langacker 1969, Ross 1969, Sag 1976). The constraint can be stated roughly as follows: the constituent that contains the ellipsis site (the ellipsis constituent) may not c-command the antecedent constituent. Thus, this constraint predicts that if the ellipsis constituent does not c-command the antecedent constituent, it may precede the antecedent constituent. This is exactly the case for NPE, as illustrated in (39).

- (39) a. John's *(book) was successful while Mary's ^{OK}(book) was not.
 b. While John's ^{OK}(book) was successful, Mary's ^{OK}(book) was not.

If NG involves NPE, this predicts backward NG to be acceptable provided that the gapped constituent does not c-command the antecedent constituent; see (40).

- (40) a. John's *(book) of music was successful while Mary's ^{OK}(book) of poems was not.
 b. While John's ^{OK}(book) of music was successful, Mary's ^{OK}(book) of poems was not.¹⁴

¹⁴ Note that this example is intended to indicate that dropping either, but not both, of the Ns is acceptable.

Thus, under an NPE analysis of NG, the restricted distribution of backward NG can be attributed to a general constraint on backward ellipsis. On the other hand, an ATB movement analysis of NG cannot accommodate this distribution, as a backward-gapped constituent must c-command the antecedent constituent in this analysis. The ban on backward VG naturally follows from the ATB movement analysis as long as the Coordination Constraint and the Nonembedding Constraint follow from the ATB movement analysis.

The other similarity between NG and VG, that no more than two remnants are allowed in the gapped constituent, can be understood as a tendency in English focus and ellipsis constructions: as the number of foci increases, the examples become more difficult. This can be illustrated with multiple sluicing in English. While two focused constituents are allowed, three focused constituents are degraded.

- (41) a. John gave something to someone, but I don't know what to whom.
 b. *Someone gave something to someone, but I don't know who, what, to whom.

It is not clear what principle lies behind this restriction (see Culicover and Jackendoff 2005 for relevant discussion); we can understand it as one of the general properties of focus constructions and not specific to gapping. Thus, restrictions on the number of remnants do not support the position that VG and NG have the same derivation.

The other question is about the analysis of gapping-like constructions in general: does NG (among other gapping-like constructions) have the ATB movement derivation in a coordination structure where all the locality conditions are met? If we adopt the ATB head movement analysis of VG, one possible explanation for the impossibility of an ATB movement derivation of NG is as follows. Even though verbs in English move (Johnson 1991, Koizumi 1995, Koopman and Szabolcsi 2000, Runner 1995, Zwart 2001), nouns do not, and thus the N-raising derivation for NG is not possible. It has long been argued that English does not have overt N-raising, unlike Romance languages (Cinque 1995, Longobardi 1994). Although N-raising in English is proposed for semantically light nouns (e.g., *thing* or *one*; Kishimoto 2000), full lexical nouns still remain in their base N position. Furthermore, the properties of adjectives in light noun constructions indicate that there is no N-movement even for light nouns in English (Larson and Marušič 2004). If we adopt this conclusion, it naturally follows that it is impossible to derive NG through ATB movement of head nouns. If N does not move in the English DP, it does not move in the coordination environment, either. Therefore, the only possible way to derive NG is via ellipsis following the movement of the remnant.¹⁵ It is not clear, however, whether this reasoning can be extended to ATB phrasal movement, as it is not clear whether movement of NP inside DP can be independently motivated or not.

¹⁵ This conclusion implies that if the availability of overt N-raising is the crucial factor for the possibility of the ATB movement analysis of NG, it is expected that a language that has overt N-raising (e.g., Spanish, Italian, French, and other Romance languages) may have NG derived through ATB movement.

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