Gapping in Nominals and Clauses is Deletion of a Prosodic Constituent

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Abstract

Orth & Yoshida (2023) show that a head noun can be missing in non-initial conjuncts of conjoined NPs, stranding an A-PP string (*I interviewed every candidate possible in this group and* ***promising in that group***). They analyze this as across-the-board (ATB) head movement of N to D, analogous to the ATB movement analysis of gapping (e.g., Johnson 2009). I show here that this phenomenon receives a much more satisfying analysis in terms of the prosodic deletion analysis proposed by Bruening (2015) for non-constituent coordination. I also extend this analysis to the verbal domain and show that canonical gapping (*Some moviegoers buy popcorn and others candy*) can also be analyzed in terms of deletion of prosodic constituents. All of the properties of gapping fall into place under this analysis, making it the most successful analysis of gapping to date.

1 Introduction

Orth & Yoshida (2023) note the existence of something that looks like gapping inside NPs, where the head noun can be missing in non-initial conjuncts, stranding an A-PP sequence:

(1) I interviewed every candidate possible in this group and **promising in that group**. (Orth & Yoshida 2023: (8a))

Orth & Yoshida (2023) propose to analyze this as across-the-board (ATB) movement of N to D, with coordination of NPs below a single D. As they show, the A must linearly follow the head noun in the first conjunct, which they analyze as movement of N to D across the A.

In their footnote 15, Orth & Yoshida (2023) dismiss a possible alternative analysis, one based on the prosodic deletion analysis proposed for non-constituent coordination in Bruening (2015). I show here that their dismissal is unwarranted, and in fact the prosodic deletion analysis extends very nicely to this phenomenon. Further, it makes different predictions from the ATB movement analysis, which I show are upheld. The prosodic deletion analysis is therefore a more successful analysis than the ATB movement analysis.

I further extend the prosodic deletion analysis to gapping in the verbal domain, and show that, with the rule stated slightly differently, it accounts very nicely for canonical gapping, as well. Viewing gapping as prosodic deletion has numerous desirable consequences, including allowing

determiner sharing and stranding of strings that are not constituents and cannot undergo movement. At the same time, it does not need any of the devices that are necessary in the ATB movement analysis of gapping, like low coordination with violations of the coordinate structure constraint, movement to feed the ATB movement, and a constraint on shape conservation. The prosodic deletion analysis only needs prosodic parsing (which is necessary anyway) and a simple deletion rule. All the properties of gapping follow without further assumptions or hypotheses, except for the strange scopal properties of gapping. I show that allowing ATB quantifier raising just when gapping applies accounts for the facts and is justifiable given how pronunciation in movement chains work.

Section 2 outlines the prosodic deletion analysis of non-constituent coordination proposed by Bruening (2015). Section 3 extends this to the A-PP strings in nominals discussed by Orth & Yoshida (2023). Section 4 then extends the analysis to canonical gapping, and shows that it accounts for all of the properties of gapping. As I show, it is the only analysis that does, and it is therefore the most likely to be correct.

2 The Prosodic Deletion Analysis of Non-Constituent Coordination

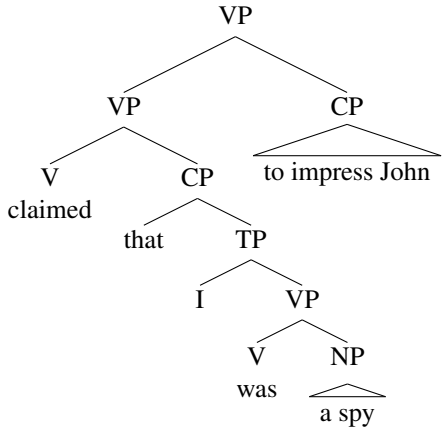
Bruening (2015) proposed the prosodic deletion analysis for what is called "non-constituent coordination," examples like the following:

(2) a. Mary caught a fish on Monday with a fly rod and on Tuesday with a spear. (Dowty 1988)

b. I claimed that I was a spy to impress John and an astronaut to impress Bill. (Sailor & Thoms 2013)

In (2b), what appears to be coordinated is *a spy to impress John* and *an astronaut to impress Bill*. However, the NP in each conjunct does not form a constituent with the non-finite rationale clause. The NP is the object of the embedded verb, while the rationale clause modifies the matrix VP:

(3)



This is why this phenomenon is referred to as "non-constituent coordination": What is coordinated is not a constituent. The phenomenon is obviously problematic for the common hypothesis that coordination can only target constituents.

Bruening (2015) notes that examples of non-constituent coordination have to be pronounced with heavy contrastive stress. For instance, the sentence in (2a) has to be pronounced with heavy stress on *Monday* in the first conjunct and *Tuesday* in the second conjunct. The example in (2b) requires contrastive stress on *spy* and *astronaut*. Bruening (2015) accordingly proposes that prosody is crucially involved in this type of coordination.

The proposal is that these types of examples always involve VP coordination, with ellipsis of shared material in the second conjunct (see Bruening 2015 for justification of the ellipsis analysis; "VP" can be vP, VoiceP, or whatever category one believes is involved). What is deleted is part of a prosodic constituent rather than a syntactic one.

Before stating the rule, it is necessary to give some background on prosody. Most researchers assume a Prosodic Hierarchy, where syllables are organized into feet and feet into prosodic words; prosodic words are themselves organized into phonological phrases (also sometimes called "major phrases" or "intermediate phrases"), and phonological phrases into intonational phrases. (Some analyses add a "clitic group" between prosodic word and phonological phrase; this will not be relevant here.) Each prosodic level consists of one or more units of the next level down, one of which serves as the head. For instance, the head of a phonological phrase will be a prosodic word (or clitic group, in some theories). Syntactic structure maps onto prosodic structure. At the most basic, syntactic heads map onto prosodic words, syntactic phrases like VP map onto phonological phrases, and clauses map onto intonational phrases. However, this mapping is not completely isomorphic, for instance many functional heads do not constitute prosodic words on their own but form prosodic words with material adjacent to them. Relevant references include Selkirk (1984, 1986, 2011), Beckman & Pierrehumbert (1986), Nespor & Vogel (1986), Pierrehumbert & Beckman (1988), Itô & Mester (2007).

Turning back to non-constituent coordination, Bruening (2015) proposes that the deletion rule targets the first phonological phrase in the second conjunct, and deletes all but the head of that phonological phrase. The rule can be stated as follows (I state it slightly differently from Bruening 2015):

(4) *The Non-Constituent Coordination Rule:*
Delete all but the head of the first phonological phrase following the coordinator.

Condition: Material to be deleted is identical segmentally and prosodically to material in the first phonological phrase in the preceding conjunct.

In example (2a), the two coordinated VPs are phrased as follows (with the stress that is necessary now indicated, and phonological phrases marked with "ϕ"):

(5) a. Mary caught a fish on MONday with a fly rod and on TUESday with a spear.

b. ($_\phi$ caught a fish (on MONday)) ($_\phi$ with a fly rod)
and
($_\phi$ ~~caught a fish~~ (on TUESday)) ($_\phi$ with a spear)

In the first conjunct, *caught a fish on Monday* forms a phonological phrase, while the string *with a fly rod* is parsed as a separate prosodic unit (probably also a phonological phrase). The head of the first phonological phrase is the string *on Monday*, which forms a prosodic unit immediately below phonological phrase on the prosodic hierarchy (prosodic word, in most theories, or clitic group in others).

Phrasing matches in the second conjunct, such that *caught a fish on Tuesday* forms a phonological phrase with head *on Tuesday*. As stated in (4), ellipsis targets the first phonological phrase in the second conjunct and deletes all but the head of that phonological phrase. In this example, it deletes all but *on Tuesday*. Since the rule only targets the first phonological phrase, subsequent phrases, here *with a spear*, are unaffected.

Example (2b) would be parsed as follows:

(6) a. I claimed that I was a spy to impress John and an astronaut to impress Bill.

b. ($_\phi$ claimed that I was (a SPY)) ($_\phi$ to impress John)
and
($_\phi$ ~~claimed that I was~~ (an AStronaut)) ($_\phi$ to impress Bill)

The deleted string is not a syntactic constituent, but it is a prosodic one, namely, all of a phonological phrase except its head.[1] At the same time, coordination does coordinate syntactic constituents, in this case VP.

The coordinator *and* seems to be grouped prosodically with the remnants in the second conjunct. Bruening (2015) proposes two possible ways of accounting for this. The first is to posit recursive ϕ-phrases as in Selkirk (2011), Itô & Mester (2012):

(7) ($_\phi$ claimed that I was (a SPY)) ($_\phi$ to impress John)
($_\phi$ and ($_\phi$ ~~claimed that I was~~ (an AStronaut))) ($_\phi$ to impress Bill)

On this analysis, the ellipsis rule would have to target the inner ϕ-phrase, matching it to an identical ϕ-phrase in the first conjunct (the rule as stated already targets the first ϕ-phrase *after* the coordinator). In the second possibility, *and* is unparsed initially, but gets incorporated into the remaining prosodic unit in the second conjunct following ellipsis. Bruening (2015) does not decide between these two possibilities. I will not, either, and will follow Bruening (2015) in leaving *and* unparsed in the representations.

Bruening (2015) contrasts the prosodic deletion theory with a movement-and-deletion theory proposed by Sailor & Thoms (2013). In this theory, the remnants in the second conjunct move independently as two different constituents; the phrase they vacate then deletes. Bruening (2015) shows that this makes incorrect predictions regarding islands to movement. For instance, reduced relative clauses inside NPs are strong islands to extraction but permit non-constituent coordination:

(8) a. I disproved theories held by Wittgenstein last year and Einstein this year.

b. * Einstein, I disproved theories held by this year.

Additionally, as pointed out by Dowty (1988), only the preposition of the *first* remnant can be deleted:

(9) a. Mary caught a fish with a spear and a rabbit with a snare.

b. * Mary caught a fish with a spear and a rabbit a snare.

[1] Bruening (2015) proposes that all deletion targets a unit and deletes everything except the most prominent member of that unit. If the unit is syntactic, the most prominent member is the highest specifier, if there is one, otherwise the highest head. So in sluicing, deletion targets CP and deletes everything except Spec-CP. In VP ellipsis, deletion targets AuxP and deletes everything except the head Aux. This proposal has the nice consequence of explaining why C is not deleted in sluicing, something that the typical TP-deletion analysis struggles to explain (e.g., Merchant 2001).

(10) a. Mary read a book about Nixon at the airport and Reagan at the train station.
b. * Mary read a book about Nixon at the airport and Reagan the train station.

In the movement theory, the two remnants in the second conjunct undergo independent instances of movement. Given that English allows preposition stranding, the preposition of the second remnant should be deletable. It should be able to be stranded and included in the ellipsis. Preposition stranding is perfectly grammatical from the position of the second remnant in the above examples:

(11) a. What did she catch a rabbit with?
b. Which train station did she read that book at?

The movement analysis fails to explain why deletion can only target the preposition of the leftmost remnant. In contrast, in the prosodic theory, this follows because deletion only targets the *first* ϕ-phrase:

(12) ($_\phi$ ~~caught~~ (a rabbit))($_\phi$ with a snare)

There is no way to delete *with*, since it does not fall under the scope of the deletion rule.

Bruening (2015) also contrasts the prosodic theory with an analysis that has deletion of a linear string starting from the left edge of the second conjunct (e.g., Wilder 1997, Beavers & Sag 2004, Hofmeister 2010). The prosodic theory explains the connection to prosody, whereas the linear string analysis does not. The prosodic theory also limits deletion to operating on constituents, without needing to allow deletion of a linear string. This is a conceptual advantage. (Constituents can be either syntactic ones, or prosodic ones.)

The prosodic deletion analysis is therefore the most successful account of non-constituent coordination. As I show in the next section, it also extends nicely to the data uncovered by Orth & Yoshida (2023).

3 A Prosodic Deletion Analysis of A-PP Strings in NP Coordination

Let us now return to the apparent gapping inside NPs discovered by Orth & Yoshida (2023). I repeat one of their examples below:

(13) I interviewed every candidate possible in this group and promising in that group. (Orth & Yoshida 2023: (8a))

As Orth & Yoshida (2023) point out, the pronounced conjuncts are not constituents, on most analyses of NPs: An adjective and a PP do not form a constituent to the exclusion of the head noun and the determiner. This type of coordination is therefore puzzling in the same way as non-constituent coordination.

3.1 Applying the Prosodic Deletion Analysis

Orth & Yoshida (2023: footnote 15) dismiss the prosodic deletion analysis as a possible account of this phenomenon. However, neither reason they give is a valid one. First, they state that there is no contrastive prosody in the examples they examine, like (13). Nothing could be further from the truth. The two As are clearly semantically contrastive, as are the two PPs. In English, semantic contrast is typically accompanied by prosodic prominence. In my judgment at least, heavy contrastive stress has to go on *possible* and *promising* in (13). It is possible that some speakers do not require emphatic stress, but the As still receive stress, even if this is not necessarily emphatic. So does a prosodic word in the PP. Some other speakers that I have consulted have also volunteered that examples of this sort are only acceptable "if the prosody is right." I take this as evidence that prosody is important to this pattern of deletion.

Second, Orth & Yoshida (2023) state that the examples of non-constituent coordination in Bruening (2015) involve deletion of all the non-head elements of the coordination, whereas in their examples, it is the head noun that would have to be deleted. This seems to be based on a confusion of syntactic and prosodic categories. As described above, the deletion rule in Bruening (2015) targets the first phonological phrase after *and* and deletes all but the head of that phonological phrase, where the head is a prosodic constituent (a prosodic word, typically). The head of a prosodic unit does not necessarily correspond to the head of a syntactic phrase; in fact it very often does not, in English.

The rule proposed for non-constituent coordination in Bruening (2015) would actually yield exactly the right result for an example like (13). It would be parsed as follows (I assume NP coordination and do not adopt the DP Hypothesis, but this is not important for purposes here):

(14) ($_\phi$ every candidate (possible)) ($_\phi$ in this group)
and
($_\phi$ ~~every candidate~~ (promising)) ($_\phi$ in that group)

The rule does target the non-head in prosodic terms, but in this case that includes the head in syntactic terms (the N). Subsequent phonological phrases are unaffected, exactly as in non-constituent coordination.

As can be seen, the rule gives exactly the right result for this example. It does for every example in Orth & Yoshida (2023). I reproduce another of their examples below:

(15) I interviewed someone old from New York and young from Chicago. (Orth & Yoshida 2023: (1))

This would have the following parse:

(16) ($_\phi$ someone (old)) ($_\phi$ from New York)
and
($_\phi$ ~~someone~~ (young)) ($_\phi$ from Chicago)

Once again, the deletion rule targets the non-head of the first phonological phrase, in this case deleting *someone*.

The prosodic deletion analysis also explains all of the facts discussed by Orth & Yoshida (2023). It also makes different predictions. I go through these in the following subsections.

3.2 Order Must Be N-A-PP

Orth & Yoshida (2023) show that the order in the first conjunct has to be N-A-PP, with the head noun before the adjective. The usual A-N order of English is not allowed:

(17) * I interviewed every possible candidate in this group and promising in that group. (Orth & Yoshida 2023: (8b))

In the prosodic deletion analysis, there are two possible sources for this. In the first, the order in the first conjunct is A-N-PP but the order in the second conjunct is N-A-PP:

(18) ($_\phi$($_\phi$ every (possible)) candidate) ($_\phi$ in this group)
and
($_\phi$ every candidate (promising)) ($_\phi$ in that group)

Since *possible* and *promising* are contrastive, they have to be the heads of their respective phonological phrases. I assume that the way this would work in the first conjunct is to append the head noun *candidate* to the phonological phrase to its left in an instance of phonological phrase recursion (prosodic units are generally right-headed in English). The deletion rule cannot apply to this parse, because the corresponding phonological phrases in the two conjuncts are not identical minus their heads.

The second possible source has the order A-N-PP in both conjuncts, with the N appended to the phonological phrase to its left again:

(19) ($_\phi$($_\phi$ every (possible)) candidate) ($_\phi$ in this group)
and
($_\phi$($_\phi$ every (promising)) candidate) ($_\phi$ in that group)

The deletion rule also cannot apply to this representation, because there is no unique first phonological phrase following *and*. What follows *and* is the left brackets of two phonological phrases coinciding. The rule cannot pick out just one of them, because they are equally "first." (In section 4, the rule for canonical gapping can apply to this configuration, because it applies to *every* phonological phrase.)

3.3 Limited to Coordination

Orth & Yoshida (2023) also show that this deletion is limited to coordination contexts, and is not permitted in subordination:

(20) * I interviewed every candidate possible in this group {before/with} promising in that group. (Orth & Yoshida 2023: (9))

Non-constituent coordination is also limited to coordination contexts:

(21) a. * Mary caught a fish on Tuesday with a fly rod after on Monday with a spear.
b. * Mary read a book about Nixon at the airport because Reagan at the train station.
c. * I said that I was an astronaut to impress Bill before a spy to impress Sam.

I do not have an explanation for why this is, but the particular deletion rule involved seems to be triggered specifically by the coordinator. This is also true of canonical gapping (section 4). For purposes here, I simply state the rule such that it refers to the coordinator (see 4); I will have to leave finding a deep explanation for this to future work.

3.4 NPI Licensing

The prosodic deletion analysis also explains NPI licensing:

(22) I met no one old from New York and young from any other city. (Orth & Yoshida 2023: (14))

Orth & Yoshida (2023) claim that NPI licensing shows that the D of the first conjunct c-commands the second conjunct, and this therefore justifies their analysis of NP coordination below a single D. However, the licensing falls out from the prosodic deletion analysis, regardless of the structure of coordination. The second conjunct includes *no one* which is just not pronounced; this second negative element is what licenses the NPI.

3.5 Differing Predictions

Importantly, the two analyses make different predictions about the co-occurrence of prenominal and postnominal adjectives. The ATB movement analysis predicts that an A-PP string will not be able to occur by itself in the second conjunct if there is a prenominal adjunct in the first conjunct. This is because, if there is a prenominal adjective, then the N has not moved to D; it therefore could not have undergone ATB movement. The prosodic deletion analysis, in contrast, predicts that this will be possible. In my judgment, it is possible, as in the examples in (23). To verify this judgment, I informally surveyed nine native speakers of English. Two rejected the base sentence in (13) and did not give judgments on the examples in (23). Two others also rejected the base sentence in (13), but then said that the examples in (23) were more acceptable. Only one of the nine accepted the base sentence in (13) but then rejected the sentences in (23) (that person was British while the others were all American, which may or may not be relevant). All of the others accepted at least some of the examples in (23). The most widely accepted one was (23e), with six people accepting it; the least accepted was (23c), with two accepting it and one saying it is borderline.

(23) a. I interviewed every available candidate possible in this group and promising in that group.

b. You need to push every red button reachable in the cockpit and unreachable behind the wall panel.

c. To get past this level, it helps to mark the location of every deep river two miles wide full of crocodiles and three miles wide full of piranhas.

d. You will need to pull every black lever 23 inches long with a button and 24 inches long with a switch.

e. I pointed out the few children taller than the teacher in the first grade and taller than the principal in the second grade.

Given that only one of nine native speakers rejected all of these, I expect these judgments to generalize to the general population. I therefore take examples of this sort to be grammatical. The prosodic deletion analysis permits them:

(24) ($_\phi$ every black lever (23 inches long)) ($_\phi$ with a button)
and
($_\phi$ ~~every black lever~~ (24 inches long)) ($_\phi$ with a switch)

What is deleted is everything but the head of the phonological phrase.

The acceptability of these examples shows that the prosodic deletion analysis is superior to the ATB movement analysis of Orth & Yoshida (2023).

3.6 Coordination of PP-PP Strings

The prosodic deletion analysis also extends to coordination of post-nominal PP-PP strings (not discussed by Orth & Yoshida 2023), as in the following examples:

(25) a. Richard's gift of the helicopter to the hospital and of the bus to the school (Adger 2003: 268, (118))

b. every girl with braces in the second grade and (with) eyeglasses in the third grade

In most analyses of NPs, two post-nominal PPs do not form a constituent to the exclusion of the head noun (or other NP material). Yet a PP-PP string can be coordinated. Note also that the first preposition can be missing in (25b), exactly as in non-constituent coordination. This follows if it can be (optionally) parsed as part of the non-head of the first phonological phrase:

(26) ($_\phi$ every girl with (braces)) ($_\phi$ in the second grade)
and
($_\phi$ ~~every girl with~~ (eyeglasses)) ($_\phi$ in the third grade)

Moreover, coordination of PP-PP strings is also possible in the presence of a shared prenominal adjective, showing that the head N has not undergone movement to D:[2]

(27) a. the irrational fear of every professor of his students and (of) every dean of his secretary

b. Audition every handsome man over six feet with a beer belly and over six-five with a six-pack!

The ATB-movement analysis could be modified to allow shorter ATB movement, of N to, say, Num or n (as Adger 2003 proposes), but this would not account for the optionality of certain prepositions. I conclude that the prosodic deletion analysis in Bruening (2015) is superior to the ATB movement analysis proposed by Orth & Yoshida (2023), or any head movement analysis.

[2]Example (27a) was provided by Masaya Yoshida, email correspondence.

3.7 Summary

The prosodic deletion analysis proposed by Bruening (2015) extends very naturally to the A-PP strings discovered by Orth & Yoshida (2023). Analyzing them this way treats them as instances of non-constituent coordination, only with coordination of NPs rather than VPs. This seems to be correct, since they behave alike in most ways, including deletion of a preposition.[3]

4 Extending the Analysis to Canonical Gapping

As noted, Orth & Yoshida (2023) analyze A-PP strings in coordinated NPs in the same way as the ATB movement analysis of gapping analyzes canonical gapping in the clausal domain. For instance, Johnson (2009: (44)) analyzes canonical gapping as in (28) as ATB movement of the phrase *eat poi* out of both conjuncts:

(28) Some will eat poi for breakfast and others — for lunch.

This analysis requires low coordination, below the auxiliary *will*. It also requires movement of the subject of the first conjunct out of the conjunction in an apparent violation of the coordinate structure constraint (CSC):

(29) Some will [eat poi] [[~~some~~ ~~[eat poi]~~ for breakfast] and [others ~~[eat poi]~~ for lunch]].

Additionally, pronounced remnants in either conjunct must often be moved out of the phrase that undergoes ATB movement, prior to it moving (not in this particular example, though, since *for breakfast* and *for lunch* are adjuncts). All of these proposed movements have to recreate the original order. (See Vicente 2010, Kubota & Levine 2016 for discussion of these issues.)

In this section, I suggest that a minor change to the prosodic deletion rule that produces non-constituent coordination will produce gapping. Thus, the prosodic deletion analysis connects canonical gapping with coordination of A-PP strings, just as the ATB movement analysis does. As we will see, the two constructions share many properties. More importantly, the prosodic deletion analysis has many virtues in accounting for canonical gapping. For one thing, it does not need all of the problematic ancillary hypotheses that the ATB movement analysis does, like low coordination, CSC-violating subject movement, and multiple movements that have to recreate the original order. All it needs is parsing into prosodic units, which is necessary anyway, and a deletion rule that targets prosodic units. As I will show, this is sufficient to account for more of the properties of gapping than any other analysis to date.

[3] Jackendoff (1971) and Culicover & Jackendoff (2005) treat examples like the following as gapping in the nominal domain:

(i) a. Bill's story about Sue and Max's about Kathy both amazed me. (Jackendoff 1971: (34a))
b. I bought three quarts of wine and two of Clorox. (Jackendoff 1971: (34b))

I view this as the generally recognized ellipsis process operative in NPs, as in examples like *Bill's story lasted longer than **Max's***. It is not limited to coordination, contra Jackendoff (1971). Yoshida et al. (2012) also show that this construction is not gapping. I will not address this construction here, as it does not appear to be an instance of prosodic deletion.

4.1 The Proposed Analysis

I identify canonical gapping (Ross 1970) as a case where material between a constituent at the left edge of a clause (typically a subject) and some other constituent at the right edge of the clause is missing. The missing material includes at least a verb. A simple example follows:

(30) Some prefer inkjets and others — laser printers. (attested example)

What is missing here is the verb *prefer* which would ordinarily occur between the subject and the object.

It is well-known that the two pronounced constituents in the second conjunct in gapping must be contrastively focused, as must the contrasting constituents in the first conjunct (Kuno 1976, Sag 1976; see especially Hartmann 2000, Fery & Hartmann 2005, Winkler 2005, 2019). Furthermore, according to Culicover & Jackendoff (2005: 276),"everything in the antecedent that follows the second focus has to be destressed." This points to a role for prosody, exactly as in non-constituent coordination. The difference is that, whereas in non-constituent coordination deletion removes material immediately after *and*, in gapping, the deleted material instead comes in between two remnants.

We can extend the prosodic deletion analysis to gapping if the rule for gapping targets not just the *first* phonological phrase in the second conjunct, but *all* phonological phrases in the second conjunct. It will delete everything that is not the head of a phonological phrase. I will make this more precise by noting that in gapping, each conjunct is its own intonational phrase (iP; Hartmann 2000: 165). Each intonational phrase consists of at least two phonological phrases. Each phonological phrase has a contrastively focused head. (Winkler 2019: Fig.15.1 gives a pitch track for a gapping sentence, and annotates it using TOBI.)

The gapping rule can then be stated as follows:[4]

(31) *Gapping Rule:* Delete the non-head of every phonological phrase in the first intonational phrase following the coordinator.

Condition 1, Prosodic Correspondence: The first intonational phrase after the coordinator (iP2) corresponds prosodically to the first intonational phrase in the preceding conjunct (iP1), such that iP1 consists of ordered phonological phrases $\phi 1\ \phi 2 \ldots \phi$x and iP2 consists of $\phi 1'\ \phi 2' \ldots \phi$x$'$; $\phi 1$ and $\phi 1'$ have contrasting heads and both either do or do not have non-head material; $\phi 2$ and $\phi 2'$ have contrasting heads and both either do or do not have non-head material; $\ldots \phi$x and ϕx$'$ have contrasting heads and both either do or do not have non-head material.

[4]The Segmental Identity Condition requires segmental identity, but, as in other instances of ellipsis, some very limited mismatches are allowed. In particular, agreement can vary (e.g., *He was drinking wine and the others ~~were drinking~~ beer*, Repp 2009: (9, (1.10a)). Tense, however, does not seem to be able to vary (Hankamer 1979: 228): *Cows eat grass, allosauruses meat* can only be understood to be a current characterization of allosauruses (which only existed in the past). I will have to leave full exploration of the exact identity condition to future work (but see also note 6). I should note, though, that it will not mistakenly allow homophones, due to independent principles. For instance, *Bill went to the bank on Friday and Brady on Thursday* cannot mean that Bill went to a financial institution while Brady went to the river. I assume that this is ruled out by a general "anti-pun ordinance" like that of Zaenen & Karttunen (1984). Note that this interpretation is ruled out even with no deletion: *Bill went to the bank on Friday and Brady went to the bank on Thursday.*

Condition 2, Segmental Identity: Material to be deleted in ϕn$'$ is identical segmentally to material in ϕn.

The example in (30) has only a single intonational phrase in each conjunct. I assume that what is coordinated syntactically is a clause, at least a TP/IP and possibly a CP (see section 4.5). What is relevant for the gapping rule is the prosodic parse. Each conjunct (each a clause) maps onto an intonational phrase, as follows (as before, I leave the coordinator unparsed):

(32) ($_{\text{iP}}$ ($_{\phi 1}$ (some))($_{\phi 2}$ prefer (inkjets)))
and
($_{\text{iP}}$ ($_{\phi 1'}$ (others))($_{\phi 2'}$ ~~prefer~~ (laser printers)))

The first phonological phrase in each conjunct, $\phi 1$ and $\phi 1'$, correspond. They have contrastive heads (prosodic words) and both have no non-head material. $\phi 2$ and $\phi 2'$ also correspond: They have contrastive heads and both include non-head material. The gapping rule applies, but has nothing to delete in the first phonological phrase, since it consists only of a head. The second phonological phrase includes both head and non-head material, so the non-head is deleted.

Example (28) receives an analogous analysis, but with a longer non-head that is deleted:

(33) ($_{\text{iP}}$ ($_{\phi 1}$ (some))($_{\phi 2}$ will eat poi (for breakfast)))
and
($_{\text{iP}}$ ($_{\phi 1'}$ (others))($_{\phi 2'}$ ~~will eat poi~~ (for lunch)))

The corresponding phonological phrases in each conjunct correspond, as required by the condition, and so the non-head of $\phi 2'$ can delete.

The deleted material can also fail to be a syntactic constituent, as in the following example, which also illustrates a case of more than one intonational phrase in each conjunct:

(34) Ice cream gives me brain-freeze if I eat it too fast and beans — indigestion if I eat them too slow. (Johnson 2009: (58))

This will be parsed as follows. I assume that the *if*-clause, as a full CP, constitutes its own intonational phrase.

(35) ($_{\text{iP}}$ ($_{\phi 1}$ (ice cream))($_{\phi 2}$ gives me (brain freeze))) ($_{\text{iP}}$ if I eat it too fast)
and
($_{\text{iP}}$ ($_{\phi 1'}$ (beans))($_{\phi 2'}$ ~~give me~~ (indigestion))) ($_{\text{iP}}$ if I eat them too slow)

Deletion targets all of the phonological phrases in the first intonational phrase in the second conjunct, but leaves subsequent intonational phrases intact. Importantly, the string that is deleted in this example is not a syntactic constituent, but it is a prosodic one: a phonological phrase minus its head. The ATB movement analysis of this type of example struggles to explain it; see the discussion in Johnson (2009: 314–318). It receives a very simple analysis in the prosodic deletion analysis.

As an example of a case where the conditions on gapping fail to be met, Johnson (2009) observes that the antecedent for gapping cannot itself have VP ellipsis:

(36) a. * John might bathe, but Sally can't because of her poison ivy or Mary get dressed because of her phobias, so we may as well give up. (Johnson 2009: (35))

b. * ($_{iP}$ ($_{\phi 1}$ (Sally))($_{\phi 2}$ can't (~~bathe~~))) ($_{iP}$ because of her poison ivy)
or
($_{iP}$ ($_{\phi 1'}$ (Mary))($_{\phi 2'}$ ~~can't~~ (get dressed))) ($_{iP}$ because of her phobias)

(I will assume without further discussion that the adjuncts constitute their own intonational phrases.) Prosodic Correspondence is violated here because $\phi 2'$ needs $\phi 2$ to have a head that contrasts with its own. The head of $\phi 2$ should be *bathe*, but this has been elided and so cannot serve as the head of $\phi 2$ or contrast with *get dressed*. Thus, the prosodic deletion hypothesis explains Johnson's observation: An elided VP cannot contrast with a gapping remnant. The antecedent for the elided VP cannot contrast with it, either, because it is not in the preceding conjunct.

The conditions on deletion can fail to be met in other ways, too, which account for some of the properties of gapping established in the literature. I go through these in the next subsections.

4.2 Antecedent May Not Be Embedded

Gapping is not possible when the antecedent is embedded (Hankamer 1979: 20):[5]

(37) It seems Peter has eaten his peas, and Sally her green beans, so now we can have dessert. (based on Johnson 2009: (16b))

This sentence can only be understood where the second conjunct is under the scope of *seems*. It cannot be understood to be conjoined with the matrix clause. Without gapping, it can be so understood:

(38) It seems Peter has eaten his peas, and Sally has eaten her green beans, ...

The representation where the first conjunct includes the matrix clause violates the Prosodic Correspondence Condition. The conjuncts would be parsed as follows:

(39) * ($_{iP}$ ($_{\phi 1}$ it seems (Peter))($_{\phi 2}$ has eaten (his peas)))
and
($_{iP}$ ($_{\phi 1'}$ (Sally))($_{\phi 2'}$ ~~has eaten~~ (her green beans)))

The problem here is that $\phi 1$ and $\phi 1'$ do not correspond as required: $\phi 1$ has non-head material but $\phi 1'$ does not. The Prosodic Correspondence Condition is violated, and the Gapping Rule cannot apply.

4.3 Gapping Not Possible in Embedded Clauses

Gapping is also not possible in embedded clauses (Hankamer 1979: 19):

(40) * Some had eaten mussels and she claims that others shrimp. (Johnson 2009: (15b))

[5] I have modified the example from Johnson (2009) so that the matrix clause is *it seems*, which can easily be deaccented and plausibly incorporated into a phonological phrase with the embedded subject. If it is not and constitutes its own phonological phrase, then there is a different kind of violation of Prosodic Correspondence.

This follows, because everything about the Gapping Rule has been violated: First, deletion has not applied properly, since not all non-head material in phonological phrases following *and* has been deleted. It is also not possible to delete the matrix clause after *and*, because there is no matching segmental string in the first conjunct (the Segmental Identity Condition would be violated). Additionally, the Prosodic Correspondence Condition has been violated, since the two intonational phrases do not correspond as required.

Weir (2014) claims that certain embedded clauses are allowed in gapping, so long as the complementizer does not appear:

(41) a. ? John ate oysters and I think Mary swordfish. (Weir 2014: 332, (679))
b. John ate oysters and I suspect Mary swordfish. (Weir 2014: 333, (680a))

My intuition says that these are parentheticals. The complementizer is not allowed because complementizers are not allowed in parentheticals (*That guy—I think (*that)—is a shoe-in for president*). The predicates that Weir (2014) shows do not work in gapping are all also unacceptable in parentheticals (e.g., **That guy—I am proud!—is a shoe-in for president*).

In support of this parenthetical analysis, variable binding is not possible:

(42) * The woman stole the town's rainy day fund and every widow$_1$ thinks the man her$_1$ savings.

It is well known that variable binding is not possible from a parenthetical to a main clause (e.g., Potts 2005). If this were simple embedding, then variable binding would be possible, so this strongly indicates that this is *not* simple embedding.

It is perhaps surprising that a parenthetical could follow *and* and not disrupt the gapping rule, either as its own intonational phrase or as part of the following material. I hypothesize that this is possible because parentheticals occupy a different syntactic and semantic plane from the main clause (see Potts 2005); this must make them occupy a different prosodic plane, as well, such that they can be ignored by the gapping rule.

As can be seen, the prosodic deletion analysis accounts for some of the key facts about gapping (namely, its resistance to embedding, and the impossibility of combining VP ellipsis and gapping). In fact, all of the facts of gapping fall into place under this analysis, as I show in the following subsections. I start with some where the analysis has very clear advantages.

4.4 "Determiner Sharing"

One advantage of this analysis is that it accounts immediately for the phenomenon of "determiner sharing," where a determiner is missing in the second conjunct (McCawley 1993, Lin 1999, Ackema & Szendröi 2002):

(43) a. Too many Irish setters are named Kelly and German shepherds Fritz. (modified from McCawley 1993: (1a))
b. ($_{iP}$ ($_{\phi 1}$ too many (Irish setters))($_{\phi 2}$ are named (Kelly)))
and
($_{iP}$ ($_{\phi 1'}$ ~~too many~~ (German shepherds))($_{\phi 2'}$ ~~are named~~ (Fritz)))

As stated above, the gapping rule deletes all non-head material in all phonological phrases in the first intonational phrase. Determiner sharing is just the case where there is material in the first phonological phrase besides the head. This material is deleted in the second conjunct. More than just determiners can be included, as well:

(44) a. Too many setters with long hair are called Kelly and with short hair Tony. (Ackema & Szendröi 2002: (45))

b. Pictures of Andre appeared in the *Times*, and of Belinda in the *Post*.

This is exactly as predicted by the prosodic account.

Additionally, just as the first phonological phrase could include no non-head material, so can the second. Then we get determiners deleting without the verb gapping:

(45) a. Some dog barked and donkey brayed last night. (Kubota & Levine 2016: (39a))

b. ($_{\text{iP}}$ ($_{\phi 1}$ some (dog))($_{\phi 2}$ (barked)))
and
($_{\text{iP}}$ ($_{\phi 1'}$ ~~some~~ (donkey))($_{\phi 2'}$ (brayed)))

Since the second phonological phrase includes only a head, nothing in it is deleted. This is entirely parallel to cases of gapping where nothing in the subject deletes.

Lin (1999) gives the following example as ungrammatical, where just the determiner of the subject is deleted:

(46) * That is Davenport College, the exterior of which is Gothic, and — interior of which — Georgian. (Lin 1999: (63b))

In the prosodic account, the deletion rule has to target *all* non-head material. In my judgment, the following variation is acceptable, where *of which* is also deleted:

(47) a. That is Davenport College, the exterior of which is Gothic, and — interior — Georgian.

b. ($_{\text{iP}}$ ($_{\phi 1}$($_{\phi 1}$ the (exterior)) of which)($_{\phi 2}$ is (Gothic))
and
($_{\text{iP}}$ ($_{\phi 1'}$($_{\phi 1'}$ ~~the~~ (interior)) ~~of which~~)($_{\phi 2'}$ ~~is~~ (Georgian))

I assume that *of which* is adjoined to the phonological phrase to its left, as shown. Since it is non-contrastive, it is not the head of the phonological phrase, and deletes if the rule applies. Lin's example in (46) cannot be produced because the rule has not applied correctly.

Note that the deletion rule can apply here, unlike in (19), because the rule targets *every* phonological phrase. The rule for non-constituent coordination targets the *first* phonological phrase. In a representation like that in (19), the first phonological phrase cannot be uniquely determined. This is not an issue when the rule refers to *every* phonological phrase: The rule will apply to all of them.

As can be seen, the prosodic deletion analysis captures determiner sharing as simple application of the deletion rule. There is no need to propose any particular (and very non-standard) syntax for determiners, as Lin (1999) does, and in any case this is belied by examples where more than determiners delete, like those in (44) and (47a).

4.5 Complementizers versus Wh-Phrases

Another advantage of the prosodic deletion analysis is that it explains why complementizers cannot appear in the second conjunct, but wh-phrases and relative pronouns can. Fiengo (1974) observes that the complementizer *that* is not allowed in the second conjunct, and Johnson (2019) shows that various other complementizers are also not allowed:

(48) a. Holmes deduced that Bartholomew smokes latakia, and (*that) Thaddeus trichinopoly. (Fiengo 1974: 121, (29))

b. Smith wanted for some to bring beans and (*for) others rice. (Johnson 2019: (122b))

c. If some bring beans and (*if) others rice, ... (Johnson 2019: (122c))

d. Smith stayed because some brought beans and (*because) others rice. (Johnson 2019: (122d))

e. This is the woman who some gave books and (*who) others magazines. (Johnson 2019: (122d))

This follows if complementizers and the non-contrastive relative pronoun in (48e) are obligatorily parsed as part of the non-head part of the first phonological phrase (unlike determiners and prepositions, which can optionally—depending on what they are—be parsed with the head):

(49) ($_{iP}$ ($_{\phi 1}$ that (Bartholomew))($_{\phi 2}$ smokes (latakia)))
and
($_{iP}$ ($_{\phi 1'}$ ~~that~~ (Thaddeus))($_{\phi 2'}$ ~~smokes~~ (trichinopoly)))

If the Gapping Rule applies to delete the verb, then it necessarily deletes the complementizer, too.

Wh-phrases which are presumably in Spec-CP in matrix and embedded wh-questions can appear in the second conjunct as well as the first:

(50) a. Who was the traitor and who the patriot? (attested example)

b. Who wants to invite Peter, and who Mary? (Neijt 1979: 25, (50a))

c. Smith asked which guest had brought rice and which beans. (Johnson 2019: (123a))

This follows, since the wh-phrase is the head of the first phonological phrase in each conjunct; it is one of the points of contrast between the two conjuncts (unlike in (48e)):

(51) ($_{iP}$ ($_{\phi 1}$ (which guest))($_{\phi 2}$ had brought (rice)))
and
($_{iP}$ ($_{\phi 1'}$ (which))($_{\phi 2'}$ ~~had brought~~ (beans)))

(Deletion of *guest* can either be an independent process of syntactic ellipsis in NP, which is independently available, or *guest* can be part of the non-head of the first phonological phrase and deleted by the gapping rule.)

Wh-phrases can also appear in the second conjunct in relative clauses, where the wh-part can delete in an instance of determiner sharing:

(52) The Temple of Dagon, for example, whose exterior is seen in act one and interior in act three, rivals a movie set. (McCawley 1993: (1b))

The *whose* is not contrastive here, and so, if it is parsed with the non-head part of the first phonological phrase, it is deleted.

The advantage of the present account is that it does not have to say that the conjuncts in declarative instances of gapping cannot be CPs, while they can be in interrogatives and relative clauses. Conjunction can uniformly be either CP or TP/IP. If CPs are conjoined, however, and material in Spec-CP or C is not contrastive, then it will necessarily be deleted in the second conjunct by the gapping rule.

4.6 Pronounced Remnants that are Incapable of Movement

Another advantage of the prosodic deletion analysis is that it accounts for cases where one of the pronounced remnants is not a constituent that is independently capable of undergoing movement. In the ATB movement analysis, pronounced material has to undergo movement out of the constituent that will undergo ATB movement. Remnants that are not capable of undergoing movement are then problematic. (They are also problematic for the sideward movement theory of Winkler 2005 and for theories that use ellipsis rather than ATB movement, e.g., Coppock 2001.) Consider the following example:

(53) a. I make too strong an espresso, and Fred too weak. (Coppock 2001: (35a))

b. ($_{\text{iP}}$ ($_{\phi 1}$ (I))($_{\phi 2}$($_{\phi 2}$ make (too strong)) an espresso))
and
($_{\text{iP}}$ ($_{\phi 1'}$ (Fred))($_{\phi 2'}$($_{\phi 2'}$ ~~makes~~ (too weak)) ~~an espresso~~))

The left branch *too strong/weak* cannot be extracted in English. Analyses that require movement of the remnants in order to produce gapping therefore cannot easily explain examples like this (see Johnson 2009: 318–320 for discussion). In the prosodic theory, *too strong/weak* just needs to be the head of a phonological phrase, while the other material is not. The clearly deaccented *an espresso* is appended to the phonological phrase before it, as shown in (53b). Since it is not the head of a phonological phrase, it deletes, along with *makes*, even though they do not constitute a contiguous string. They are a prosodic constituent, namely, a phonological phrase minus its head.

Yoshida (2005) argues in favor of a movement analysis of remnants in gapping. He states that, if the remnant is indeed moved, then it should be an island to further extraction. According to him, this is correct:

(54) * I wonder which topic John talked about and Mary about too. (Yoshida 2005: (10b))

However, the putative source for Yoshida's example is ungrammatical even without extraction:

(55) * John talked about this topic and Mary about this topic, too.

The problem here is that the two PPs do not contrast. Examples where contrast is observed are absolutely fine:

(56) What did Mathilda come up with an argument for and Janice an argument against?

I conclude that there is no evidence that remnants in gapping have moved (see also Culicover & Jackendoff 2005, Kubota & Levine 2016, and the next section), and examples like (53a) and (56) indicate that they have not.

4.7 Locality and Islands

Relatedly, the prosodic deletion analysis also raises particular expectations for locality. Different authors have presented different judgments regarding how long the span of deletion can be. All are agreed that sequences of non-finite clauses are acceptable, as in the following:

(57) I want to try to begin to write a novel, and Mary — a play. (Ross 1970: (2c))

Some authors state that finite clauses block gapping:

(58) a. * The first letter says that you should pay tax and the second letter V.A.T. (Neijt 1979: 143, (86b))
b. * John thinks that Bill will see Susan and Harry Mary. (Abe & Hoshi 1997: (8b))
c. * Jim claimed that Alan went to the ballgame and John to the movies. (Repp 2009: 12, (1.24))
d. ?? Lisa said that some visited Millhouse and Otto Bart. (Lechner 2019: (36a))

While others give examples crossing finite clause boundaries that seem perfectly acceptable:

(59) a. Robin thinks that the New York Times will endorse George W. Bush, and Leslie, the Washington Post. (Culicover & Jackendoff 2005: 273, (63a))
b. Robin believes that everyone pays attention to you when you speak French, and Leslie, German. (Culicover & Jackendoff 2005: 273, (62e))
c. Robin knows a lot of reasons why dogs are good pets, and Leslie, cats. (Culicover & Jackendoff 2005: 273, (63e))

Some of these even have a remnant inside an island to syntactic movement, such as the adjunct island in (59b) and complex NP island in (59c). Example (60a) is another example of a complex NP island, and (60b) is an example of a subject island:

(60) a. Robin is reading a book written by John Updike, and Leslie, Ann Tyler. (Culicover & Jackendoff 2005: 273, (63d))
b. (I don't think we need worry about John harrassing us.) Threats directed at me would offend his wife, and at you, everyone else! (Kubota & Levine 2016: (24e))

However, other authors have presented examples where the presence of an island is claimed to block gapping (in particular Hankamer 1979, Neijt 1979, Johnson 2019):

(61) a. * Alfonse ate the rice, and that Harry the beans is fantastic. (Hankamer 1979: 21, (25b))
b. * John asked which candidates to interview this morning and Peter this afternoon. (Neijt 1979: 138, (73b))
c. * Pete knows which boy bought a toy car and John a ball. (Repp 2009: 11, (1.17))
d. * Some noticed that eating seafood is dangerous and others bread. (Johnson 2019: (41d))
e. * Dr. Smith will be mad if Abby talks to the teacher and Dr. Miller to the headmaster. (Repp 2009: 12, (1.22))

In the prosodic deletion analysis, syntactic islands and syntactic clause boundaries should not be relevant, except insofar as they map onto prosodic constituents. Prosodic constituents are what is expected to be relevant. In particular, the span of deletion has to be part of a single intonational phrase, while deleted material must be the non-heads of phonological phrases in that intonational phrase. In (61e), for instance, we can assume that the *if*-clause introduces its own intonational phrase boundary (see the discussion of (34) above), which blocks deletion. In another very clear case, an initial adjunct clause has a very prominent prosodic boundary after it (indicated orthographically with the comma), which also blocks gapping:

(62) * After Melinda leaves, we'll confront Melvin, and Miranda Bertrand.

Non-restrictive relative clauses also introduce intonational phrase boundaries, and so we expect them to block gapping as well (where the string to be deleted crosses the intonational phrase boundary introduced by the non-restrictive relative):

(63) a. * Robin is reading two books, both of which were written by John Updike, and Leslie, Ann Tyler.

b. * I carved a statue, which caused tennis elbow, and you carpal tunnel syndrome. (intended: You carved a statue, which caused carpal tunnel syndrome.)

Finite clause boundaries also potentially map onto intonational phrase boundaries, depending on a variety of factors. This is probably what is behind the inconsistent reports in the literature (and different speakers may vary; for instance, I find (61d) perfectly acceptable). Since the factors involved here are complex, I will not attempt to explain all of the varying judgments that have been given in the literature. I will say that it is an advantage of the prosodic account that it does not expect islands or finite clause boundaries to be relevant, since it is thereby able to account for acceptable cases where deletion spans an island or a finite clause boundary (or both). Note also that other factors besides prosodic ones could be behind a judgment of unacceptability, for instance discourse or processing factors. These are often hypothesized to be relevant to islands; see, among many others, Hofmeister et al. (2014), Chaves & Dery (2019), Chaves & King (2019), Abeillé et al. (2020). The current analysis therefore expects some instances of long-distance gapping to be acceptable, even across island boundaries, while others might be unacceptable for various reasons (prosodic, discourse, processing).

4.8 Missing Negation and Adverbs

Another advantage of the prosodic deletion analysis is that it explains why the first conjunct can sometimes contain negation while the second conjunct is interpreted as positive. Repp (2009) observes two types of examples of this. The first has corrective *but*:

(64) a. Pete wasn't called by Vanessa but John by Jessie. (Repp 2009: 84, (3.2))

b. I've learned GOD did not walk away from me but I from him. (attested example cited by Kubota & Levine 2016: note 7, (ic))

The second type of sentence has an *only* or *even* in the second conjunct (Repp 2009):

(65) a. (Context: Discussing whether two women had any luck at the casino.)
Anna didn't win any money, and Bertha only ten bucks. (Tomioka 2011: 222)

b. John doesn't earn as much as Sue and Bill ?(even) less. (Repp 2009: 146, (3.122a))

Kubota & Levine (2016: note 25) suggest deriving this reading as an instance of discontinuous gapping, where (for example 64a) *was called* in the second conjunct is matched to that discontinuous string in the first conjunct, ignoring negation. But this would seem to require that negation contrast with something in the second conjunct, since a general condition on gapping is that anything that is not deleted must be contrastive. Indeed this is exactly what Repp (2009) proposes: There is a null positive morpheme in the second conjunct which contrasts with negation in the first. As Tomioka (2011) points out, this is a little worrisome, as a phonologically null element should not be able to bear contrast.

The prosodic deletion analysis as stated already allows these examples. The condition on deletion in (31) is the following: "Material to be deleted in ϕn$'$ is identical segmentally to material in ϕn." Consider example (64a), which is prosodified as follows:

(66) ($_{\text{iP}}$ ($_{\phi 1}$ (Pete))($_{\phi 2}$ was-n't called (by Vanessa)))
but
($_{\text{iP}}$ ($_{\phi 1'}$ (John))($_{\phi 2'}$ ~~was called~~ (by Jessie)))

Here, material to be deleted is *was called*. It is identical segmentally to material in the first conjunct, namely, *was- called*. Negation in this case is irrelevant. Given the formulation of the rule, it is possible for there to be more material in the first conjunct than is deleted in the second conjunct. It is important that the Prosodic Correspondence Condition be met, and it is here. $\phi 1$ and $\phi 1'$ correspond, since they have contrastive heads and neither has any non-head material. $\phi 2$ and $\phi 2'$ also correspond, since they have contrastive heads and both have non-head material. It does not matter that one has slightly less non-head material than the other.

The same is true for the examples with *only* and *even* (I assume these particles simply help to bring out this reading):

(67) ($_{\text{iP}}$ ($_{\phi 1}$ (Anna))($_{\phi 2}$ did-n't win (any money)))
and
($_{\text{iP}}$ ($_{\phi 1'}$ (Bertha))($_{\phi 2'}$ ~~did win~~ (only ten bucks)))

Again, the Prosodic Correspondence Condition is met, since $\phi 2$ and $\phi 2'$ both have non-head material. The material to be deleted in $\phi 2'$ is also identically segmentally to material in $\phi 2$.[6]

In this account, deleted material needs to be a subset of material in the first conjunct. In addition, it needs to meet all syntactic and semantic requirements, so it will not generally be possible to leave many things out. In particular, all selectional requirements must be met, so the only things that will ever be capable of being left out are non-selected things like adverbs. I treat English negation as an adverb (see especially Bruening 2024). It turns out that adverbs can also be left out of the second conjunct. Consider the following:

(68) The sailors went reluctantly back to the oars, and the captain to the wheel.

[6]The condition as stated ought to rule out an example like *Jane won't eat anything, and Janice only a few bites,...*, since *will* and *wo-* are not segmentally identical. I assume that allomorphy is irrelevant but will not attempt to build that into the formal condition. (Note that allomorphy being irrelevant will also explain why agreement can vary; see note 4.)

In my judgment, the captain does not have to be reluctant in this example. For instance, in a context where the captain has just berated the crew, they might reluctantly return to the oars, while the captain would presumably go back to the wheel with no reluctance whatsoever. The sentence in (68) can be used in this context. Hankamer (1979: 104–105) notes that adverbs can be left out of one conjunct in Turkish, Japanese, and Korean. Repp (2009: 69) notes that adverbs are not always included in the second conjunct (citing especially some work on Dutch). Repp's theory of gapping also allows the second conjunct to lack adverbs that are present in the first conjunct (including negation in German, but not in English; I essentially extend her analysis of German negation to English, but state it in very different terms).

I note that at the same time as negation and adverbs can be ignored, tense and aspect cannot be (as noted for tense by Hankamer 1979: 228):

(69) Anna isn't eating anything, and Bertha only a little, so we'll have to make dinner later.

The second conjunct must be interpreted as present progressive. This is because any subset of the material in the first clause would require the rest of it, other than negation: *is* is the progressive auxiliary and requires a form in *-ing*, and *eating* is the progressive form that requires a higher progressive auxiliary. *Ate* and *eats* are not segmentally identical to any substring of *is eating* (even modulo allomorphy, note 6: *eats* is not an allomorph of *eating*, *-s* is not an allomorph of *-ing*).

Thus, the prosodic deletion rule proposed for gapping allows the second conjunct to be missing material that is present in the first conjunct. This is quite limited, however, essentially allowing only non-required items like adverbs to be missing, and the missing elements must also not exhaust the non-head of the phonological phrase, or Prosodic Correspondence will not hold (compare example 39).[7]

4.9 Subjects Must Contrast

The prosodic deletion analysis also explains why gapping requires contrasting subjects (Levin 1979):

(70) * Patricia loves ice cream, and Patricia/she cookies.

[7]Repp (2009) says that the negative adverb *never* is not allowed in gapping in English, giving the following example:

(i) ?? Little Max never played the violin and little John the piano. (Repp 2009: 43, (2.4b))

I would find this example acceptable in a context, and other examples with *never* are perfect:

(ii) a. I've never tried natto, or you sashimi, so let's go to that new Japanese restaurant.
b. James has never been to Berlin, or Harold to Düsseldorf.

It is hard to see what would rule out *never* in gapping. Importantly, *never* can also be missing from the interpretation of the second conjunct under the right conditions, just like negation:

(iii) I've never tried Japanese food, and you only teriyaki, so let's go to that new Japanese restaurant.

This is as expected by the proposed analysis.

This follows from the analysis. If the subject in the second conjunct is not contrastive, then Prosodic Correspondence does not hold: The heads of the first phonological phrase in each conjunct do not contrast. I note that this is about prosody, though, and not reference. The two subjects can be coreferential so long as they contrast in lexical material:

(71) A hated rival took the gold yesterday, and the same stupid bastard the silver today.

This is exactly as predicted by the prosodic deletion theory.

Additionally, lexical material can match if the two NPs are not coreferential:

(72) Five people elected me and five people you. (Hartmann 2000: 163, note 9, (i))

The two NPs, even though lexically identical, are referentially distinct and suitably contrastive (in particular, the second one is not given and therefore not subject to deaccenting).

4.10 Deleted Material Can Be Non-Contiguous

Deleted material in gapping does not need to be contiguous (Jackendoff 1971, Sag 1976), as we have already seen. Here is another example:

(73) a. Jack begged Elsie to get married, and Wilfred, Phoebe. (Jackendoff 1971: (18e))

b. ($_{\text{iP}}$ ($_{\phi 1}$ (Jack))($_{\phi 2}$($_{\phi 2}$ begged (Elsie)) to get married))
and
($_{\text{iP}}$ ($_{\phi 1'}$ (Wilfred))($_{\phi 2'}$($_{\phi 2'}$ ~~begged~~ (Phoebe)) ~~to get married~~))

As Culicover & Jackendoff (2005) observe (quoted above), material following the second focus in the first conjunct needs to be deaccented. I assume that this means it is appended to the phonological phrase before it, as already discussed. It is then the non-head of a phonological phrase, and is accordingly deleted (subject to identity).

4.11 No Backwards Gapping

VP ellipsis can be cataphoric, but gapping may not be (Koutsoudas 1971, Jackendoff 1971):

(74) a. Even though she doesn't want to —, Cassandra will have to tell everyone her premonitions.

b. * Some — inkjets, and others prefer laser printers.

This follows from the statement of the rule: It targets the first intonational phrase *after* the coordinator, and there must be identical material in the *preceding* conjunct.

4.12 No Voice Mismatches

VP ellipsis tolerates voice mismatches (see Merchant 2013), but gapping does not (Koutsoudas 1971):

(75) a. That information could have been released by Gorbachev, but he chose not to. (Hardt 1993)

b. * The meat was eaten by John and Mary the fish. (Koutsoudas 1971: (122))

c. ($_{\text{iP}}$ ($_{\phi 1}$ (the meat))($_{\phi 2}$ was eaten (by John)))
and
($_{\text{iP}}$ ($_{\phi 1'}$ (Mary))($_{\phi 2'}$ ~~ate~~ (the fish)))

This follows from the prosodic deletion rule, since the material to be deleted (*ate*, in this example, or possibly *did eat*) is not identical segmentally to material in the first conjunct (*was eaten*). The two conjuncts also violate the Prosodic Correspondence Condition, since the heads of the respective phonological phrases do not contrast (the head of $\phi 1$ contrasts with the head of $\phi 2'$, and the head of $\phi 2$ with the head of $\phi 1'$).

4.13 Fronted Phrases (an Argument Against Low Coordination)

If the two conjuncts include a fronted phrase, that fronted phrase can be the first remnant rather than the subject (Sag 1976, Hudson 1976, Culicover & Jackendoff 2005):

(76) If at one time he insists on too much and **at another — on too little**, he does not thereby work any prejudice to the rights actually secured to him. (attested example)

With a fronted phrase, the first phonological phrase will include that, rather than the subject. In this particular case, the pronoun subject is parsed with the next phonological phrase and accordingly deleted:

(77) ($_{\text{iP}}$ ($_{\phi 1}$ (at one time))($_{\phi 2}$ he insists (on too much)))
and
($_{\text{iP}}$ ($_{\phi 1'}$ (at another))($_{\phi 2'}$ ~~he insists~~ (on too little)))

(The head noun *time* can independently delete outside of gapping; this can either be that independent deletion, or *time* could be part of the non-head material in the first phonological phrase and thereby deleted by the gapping rule. Either will work for this example, and the grammar might allow both. Also, as discussed in section 4.5, the complementizer *if* could be included in the coordination, in which case it is obligatorily deleted in the second conjunct.)

Kubota & Levine (2016) use such examples to argue against a low coordination analysis of gapping as in Johnson (2009), and for coordination of full clauses. I add the following kind of example to this argument:

(78) Out of the first door there stepped an ogre, and out of the second, a giant orc.

The string that is deleted in the second conjunct is *there stepped*. The expletive *there* is generally taken to occupy the surface subject position in English, Spec-TP/IP. The fronted PP in the first conjunct is clearly higher than that. By parallelism, we would expect the PP in the second conjunct to be equally high. But in the low coordination analysis, it would have to be adjoined to the left edge of VP, instead. This is not generally a place such a PP can adjoin:

(79) * There out of the second door stepped a giant orc.

I take this to justify the conjuncts being full clauses, as Kubota & Levine (2016) argue.

4.14 Limited to Coordination

Gapping is limited to coordination (Jackendoff 1971). So is non-constituent coordination. It appears that deletion targeting a prosodic unit rather than a syntactic one is limited to coordination. While I do not have a good explanation for this fact, it is the same fact as non-constituent coordination. The rules as stated have this effect, since they refer specifically to coordination and coordinators.[8]

4.15 Strange Scopal Properties

There is one property that does not follow automatically from the prosodic deletion hypothesis. This is the strange scopal properties of gapping. A quantifier as subject of the first conjunct can take scope over and bind into the second conjunct, while this is not possible without gapping (Oehrle 1987, McCawley 1993):

(80) a. No woman$_1$ can join the army and her$_1$ girlfriend the navy.
b. * No woman$_1$ can join the army and/but her$_1$ girlfriend can join the navy.

Negation and modals also take scope over the entire coordination (Siegel 1987). In (81a), what is not allowed is the entire coordination, John eating steak while Mary eats spam; John can eat steak and Mary can eat spam, they just can't do both at the same time. This is unlike the non-gapping case in (81b), where the two prohibitions are independent.

(81) a. John can't eat steak and Mary just spam, it's not fair. (Culicover & Jackendoff 2005: 278, (78a))
b. John can't eat steak and Mary can't eat spam.

The most straightforward application of the prosodic deletion analysis to (81a) would make it equivalent to (81b), with deletion of *can't eat* in the second conjunct. This would incorrectly predict (81a) to be semantically equivalent to (81b). Similarly for (80a): The second conjunct would have deletion of *can join*, and it should be equivalent to (80b). Leaving out negation in the second conjunct will not work, either (section 4.8); then negation would only be contentful in the first conjunct, it would not take scope over the entire coordination.

One possible approach to this would be to adopt what Johnson (2009) calls the "low coordination" analysis (proposed in various forms by Lin 1999, Coppock 2001, Winkler 2005, Johnson 2009, based on Siegel 1987). In this analysis, what is conjoined in gapping is smaller than a clause, it is VP (or vP or VoiceP, depending on the analysis). The coordination is lower than a modal and negation, and so those scope over the entire coordination. This analysis also includes asymmetric movement of the subject of the first VP to Spec-TP, in apparent violation of the coordinate structure constraint, and so the subject of the first conjunct also takes scope over the entire coordination.

The prosodic deletion analysis could not adopt this low coordination proposal without significant complication. The problem is that the two conjuncts do not correspond prosodically in this

[8] Jackendoff (1971) states that gapping is acceptable in comparatives. I personally find gapping unacceptable in comparatives, but Lechner (2004) provides extensive documentation of its appearance there. In the present analysis, all that needs to be said is that, for those speakers who accept and produce gapping in comparatives, the comparator *than* is in the class of coordinators referred to by the gapping rule.

analysis. As stated, the subject of the first conjunct moves out of the first conjunct. For (81a), the first conjunct is just *($_\phi$ eat steak)*, while the second is *($_\phi$ Mary) ($_\phi$ ~~eat~~ just spam)*. The second has two phonological phrases, while the first has just one. Prosodic Correspondence is violated. The analysis could be changed to have correspondence include material outside the coordination, but this would greatly complicate the analysis and would probably lead to undesired consequences (like losing the account of the inability of the antecedent to be embedded, section 4.2).

The low coordination analysis suffers from other drawbacks, as well (some of which have already been mentioned). A major one is that it forces wide scope for the first subject and for negation, but this is in fact not required. All such sentences with gapping also permit an interpretation where negation (and a modal, if present) take scope in each conjunct (Winkler 2005, Repp 2009, Kubota & Levine 2016):

(82) a. Max didn't read the book and Martha the magazine. (Repp 2009: 42, (2.2))

b. Amanda can't eat peanuts, and Jane shellfish, so we can't have either of those at the buffet.

c. No bus is available from Düsseldorf to Cologne, or train from Cologne to Frankfurt—in either case, we won't be able to get to Frankfurt in time. (Kubota & Levine 2016: note 4, (i))

The reading of (82a) is, 'Max didn't read the book and Martha didn't read the magazine.' In (82b), both Amanda and Jane can be understood to have dietary restrictions. Similarly for (82c. The fact is that both the exceptional wide scope, and the expected scope in each conjunct, are both available.

I therefore reject the low coordination analysis and pursue a different one. I propose that in all of these examples, full IPs/TPs (or even CPs) are coordinated, and shared material is deleted in the second conjunct, exactly as has been assumed up until now. The example in (81a) is analyzed as follows, with syntactic IPs/TPs mapped to intonational phrases:

(83) a. [[$_{\text{TP}}$ John can't eat steak] and [$_{\text{TP}}$ Mary just spam]].

b. ($_{\text{iP}}$ ($_{\phi 1}$ (John))($_{\phi 2}$ can't eat (steak)))
and
($_{\text{iP}}$ ($_{\phi 1'}$ (Mary))($_{\phi 2'}$ ~~can't eat~~ (just spam)))

The modal and negation are both present in both conjuncts, as shown. This straightforwardly derives the reading where they are interpreted in both, as in (82b). As for the reading where the modal and negation take scope over the whole coordination, I propose that they are undergoing across-the-board covert quantifier raising to a higher position:

(84) ~~can't~~t$_1$ [[$_{\text{IP}}$ John can't$_1$ eat steak] and [$_{\text{IP}}$ Mary ~~can't~~t$_1$ ~~eat~~ just spam]].

Since the point of quantifier raising is to give a quantifier higher scope, *can't* is interpreted at LF in the moved position. The two copies inside the conjuncts are not interpreted at LF. This gives us the wide scope interpretation. Quantifier raising is optional; if it does not apply, *can't* is interpreted in each conjunct, as in (82b).

Now we must explain why across the board quantifier raising is not possible in (81b), repeated as (85):

(85) John can't eat steak and Mary can't eat spam.

If it were, this should be able to have the same interpretation, with a single modal and a single negation both taking scope over the coordination. It cannot have this interpretation. The reason is that, in movement chains in general and in ATB movement chains in particular, only one copy of the moving element can be pronounced. In (85), two instances of *can't* are pronounced. They both must therefore be contentful, and cannot be part of a movement chain. This is why covert ATB movement generally does not exist (Bošković & Franks 2000). Gapping, on the other hand, independently deletes one instance of *can't*. Only one instance of *can't* is pronounced, and so it can be interpreted as part of a movement chain. This is why the interpretation is particular to gapping.

Let us now consider the examples in (80), repeated in (86). Here it appears that gapping is specifically enabling a subject quantifier in the first conjunct to bind into the second conjunct:

(86) a. No woman$_1$ can join the army and her$_1$ girlfriend the navy.
b. * No woman$_1$ can join the army and/but her$_1$ girlfriend can join the navy.

I propose to analyze (86a) exactly like the example in (81a). Negative quantifiers like *no woman* are actually a combination of a negative operator and an existential (Jacobs 1980; see Penka 2012). The negative operator is abstract, call it NEG. This abstract NEG can also merge in the second conjunct, but then it and *can* both undergo covert ATB quantifier raising from both conjuncts in (86a). NEG and *can* are then interpreted in the higher position, and not in each individual conjunct. NEG is also able to bind a variable in both subjects from this higher position outside the coordination.

As for (86b), gapping has not applied. The modal *can* is pronounced twice and so cannot be taken to have undergone covert ATB movement. The abstract negative NEG is not pronounced at all, and so it could, in principle, undergo covert ATB movement. I propose that it not being able to is essentially a strong garden path effect. The second conjunct has no gapping and is therefore a complete tensed clause. The parser has no reason to posit an abstract NEG within it, and it therefore does not. I suggest that this preference is so strong that the parser simply does not even consider the option.

Kubota & Levine (2016) note that determiner sharing without verb gapping (see section 4.4) also allows exceptional wide scope:

(87) No dog barked or donkey brayed last night. (Kubota & Levine 2016: (39b))

This is expected given what has been said so far: The fact that the determiner is deleted in the second conjunct indicates that the gapping rule has applied. This is enough for the parser to allow (and even prefer) the parse where the abstract NEG has undergone covert ATB movement.

In this analysis, gapping does not allow exceptional scope for a subject quantifier, as the low coordination analysis does. In agreement with this analysis, an anonymous reviewer cited by Johnson (2009: note 5) notes that gapping does not always allow the first subject to bind a variable in the second conjunct:

(88) * Every boy$_1$ will eat his$_1$ packed lunch and a girl will his$_1$ chocolate.

In fact, binding of a pronoun in one conjunct by a quantifier in another depends on many factors, and is in no way dependent on gapping. Barker (2012) notes examples like the following:

(89) a. After unthreading each$_1$ screw, but before removing it$_1$, make sure to... (Barker 2012: (31a))

b. ... after fetching each$_1$ pointer, but before dereferencing it$_1$. (Barker 2012: (31c))

One factor is the quantifier: *each* is able to take quite wide scope and so can do this binding fairly easily, with or without gapping, but negative quantifiers are generally confined in their scope to the tensed clause. This is why we get the appearance of gapping extending scope in (86): Gapping enables covert ATB movement (of the abstract NEG, not the subject).

As can be seen, the hypothesis of optional covert ATB movement in addition to the prosodic deletion of gapping is able to account for all the scope facts of gapping, including the distributed scope that is problematic for the low coordination analysis. The proposal is also minimal in what it adds to the basic analysis of gapping, and does without low coordination and CSC-violating movement.[9]

Another proposal, the "hypothetical reasoning" proposal in Kubota & Levine (2016), does successfully explain wide scope and distributed scoope, but it does not explain cases where negation is missing from the second conjunct (see section 4.8). Kubota & Levine (2016) also fail to explain why gapping cannot be embedded (section 4.3) and why the antecedent cannot be embedded (section 4.2). In their note 22, Kubota & Levine (2016) try to explain both facts by limiting gapping to matrix verbs, but gapping is clearly not so limited. Many examples throughout this paper have illustrated gapping in embedded clauses; another example is, *If Olga wins silver and Ilya bronze, then*.... Given these deficiencies, the current proposal is more successful than any made so far.

4.16 More than One Conjunct

Gapping can of course take place in more than one conjunct:

(90) Ivan plays krummhorn, Boris fluegelhorn, and Schwarz bassethorn. (Jackendoff 1971: 1b)

In the current analysis, the first conjunct is in prosodic correspondence with the second, and the second is in prosodic correspondence with the third. Note that the second and third conjuncts do correspond: They have contrasting heads for each phonological phrase, and the second phonological phrase in each has an (unpronounced) non-head. (I assume that there is a null coordinator when a non-initial conjunct lacks a pronounced one.)

As the conditions on gapping are stated, they refer to the preceding conjunct. This predicts that the third conjunct does not need to have gapping, but the second must (there can be no skipping):

(91) a. Ivan plays krummhorn, Boris fluegelhorn, and Schwarz drives the van.

b. * Ivan plays krummhorn, Boris drives the van, and Schwarz bassethorn.

[9] Winkler (2005: 196–203) claims that when negation and modals take scope over the entire coordination, a gapping sentence is pronounced as a single intonational phrase rather than two intonational phrases. This is incompatible with the prosodic conditions proposed here, which require two corresponding intonational phrases in order for deletion to apply. While it is true that the wide scope reading has much less of a pause between the two conjuncts, I am not convinced from Winkler's pitch tracks (Figures 1–6, pp.199–203) that there is no intonational phrase boundary in the wide scope readings. I also note that *and* cannot be reduced to [ən] in the wide scope reading, although it can in some instances of clausal coordination (*We're gonna go out 'n we're gonna have fun*). I take this to support the existence of an intonational phrase boundary between the two conjuncts even in the wide scope reading.

The ATB movement account also rules out (91b), since movement has to proceed across-the-board. It can allow (91a), if the third conjunct is adjoined higher, above the height of the landing position of the ATB-moved phrase. The current analysis needs no such structure for coordination; the facts follow regardless.

4.17 Prepositions

The literature has been unclear on whether prepositions can delete along with the rest of the deleted material in gapping. Jayaseelan (1990), Lasnik & Saito (1991), Abe & Hoshi (1997) state that prepositions cannot delete:

(92) John talked about Bill and Mary ?*(about) Susan. (Abe & Hoshi 1997: (3a))

On the other hand, Steedman (1990) and Johnson (2019) state that prepositions can be deleted:

(93) Harry went to London and Barry, Detroit. (Johnson 2019: (44))

My native speaker intuitions indicate variability. I find contrasts like the following:

(94) a. Josh was looking for the dean's office and Maria (for) the president's mansion.
b. I'll hit it with the hammer and you (with) the mallet.
c. Some climb up boulders and others (up) sheer cliffs.

(95) a. Some rely on family and others *(on) friends.
b. Some complained to the chair and others *(to) the dean.
c. The host poured a drink for me and the hostess *(for) you.

The prosodic deletion analysis has the means to explain this variability. In this analysis, the ability of a preposition to delete should correlate with its ability to be parsed prosodically with the material to its left, rather than to its right. If it can be parsed as part of the non-head, it can delete:

(96) ($_{iP}$ ($_{\phi 1}$ (Josh))($_{\phi 2}$ was looking for (the dean's office)))
and
($_{iP}$ ($_{\phi 1'}$ (Maria))($_{\phi 2'}$ ~~was looking for~~ (the president's mansion)))

If the P instead forms a prosodic word with its complement, then it will not delete:

(97) ($_{iP}$ ($_{\phi 1}$ (Some))($_{\phi 2}$ rely (on family)))
and
($_{iP}$ ($_{\phi 1'}$ (others))($_{\phi 2'}$ ~~rely~~ (on friends)))

Apparently, some prepositions obligatorily form prosodic units with their complement, while others can optionally be parsed with the material to their left. Ideally, there should be independent evidence showing that the ability to delete correlates with the prosodic parse, but I will leave finding that evidence to the future. The prosodic deletion analysis is already superior to every other analysis, because it has an explanation for which prepositions can delete and which cannot.

4.18 Scope Freezing and Pronoun Interpretation

Finally, there are two properties which gapping shares with VP ellipsis. One is that gapping freezes scope in the same way as VP ellipsis (Coppock 2001), and the other is that it obeys the same constraint as VP ellipsis on the interpretation of pronouns as strict versus sloppy (Coppock 2001; see Johnson 2009 for discussion of both). I will not have much to say about these two properties, except to say that they seem to be common to deletion processes. Under the prosodic deletion analysis, gapping involves a deletion process, and so it has these two properties.

4.19 Summary

It has always seemed to me that, if a proposed analysis is the *right* analysis of some phenomenon, then all of its properties should just fall into place. This is exactly what happens when we analyze gapping as prosodic deletion: All of the properties of gapping just fall into place. Everything follows from a simple deletion rule operating over prosodic constituents, subject to correspondence and identity. The only thing that needs an ancillary hypothesis is the unexpected wide scope of negation and modals, and there the hypothesis of covert ATB movement is a very reasonable addition. It also accords with a natural account of why covert ATB movement otherwise does not exist.

One of the most prominent accounts of gapping proposed in the literature is low coordination plus ATB movement (e.g., Johnson 2009). Throughout this section, I have listed various problems with this analysis. Kubota & Levine (2016) also give many problems for this analysis. The prosodic deletion analysis is certainly superior. Kubota and Levine's (2016) own analysis is probably the most successful to date, but, as mentioned in section 4.15, it does not have an account of embedding (sections 4.2–4.3) or cases where negation and adverbs are missing from the second conjunct (section 4.8). As far as I can see, it also has nothing to say about prepositions (section 4.17). Only the prosodic deletion analysis explains all of the facts of gapping. It is therefore most likely to be the right analysis.

I also note that other accounts have to have prosodic conditions in addition to their various syntactic proposals; usually these are mentioned in passing but never discussed in detail (with some exceptions; for instance Winkler 2005: 192, (22) has a "Contrastive Focus Principle"). This means that every analysis needs prosodic conditions. The current analysis is therefore minimal in that it *only* has the necessary prosodic conditions, and does without all of the syntactic hypotheses that other proposals have to make.

5 Conclusion

In this paper, I have shown that the prosodic deletion hypothesis proposed for non-constituent coordination in Bruening (2015) extends nicely to the coordination of A-PP strings discussed by Orth & Yoshida (2023). A slightly different statement of the rule extends it to canonical gapping. All of the properties of gapping fall into place under this analysis.

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