Category Mismatches in Coordination Revisited[*]

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Abstract

Non-initial conjuncts may violate selectional restrictions in coordination. To account for these violations, researchers have typically posited a special status for the first conjunct in a coordinate structure, such that it alone can determine the category of the coordinated phrase as a whole. We show that such accounts are untenable, for two reasons. First, the *final* conjunct can be what matters for selection, if it is closest to the selecting or selected element. Second, category mismatches are not free, but are extremely limited and exactly match those that are observed in ellipsis and displacement. This calls for a uniform account of these mismatches, not one specific to coordination. We spell out such an analysis, in which displacement, ellipsis, and coordination permit certain categories to behave as other categories through their effects on null syntactic heads.

1 Introduction

Sag *et al.* (1985) showed that selectional requirements can be violated by non-initial conjuncts in coordination. For example, prepositions select NP complements and do not permit CP complements:

(1) a. You can depend on my assistant.

  b. * You can depend on that he will be on time. (Sag *et al.* 1985, 165, (125b))

However, a CP and an NP can be coordinated as the object of a preposition, so long as the NP comes first:

(2) a. You can depend on [[NP my assistant] and [CP that he will be on time]]. (Sag *et al.* 1985, 165, (124b))

  b. * You can depend on [[CP that my assistant will be on time] and [NP his intelligence]].

All accounts of this pattern that we are aware of propose that the first conjunct enjoys special prominence within a coordinate structure. This generally takes the form of positing a hierarchically more prominent position for the first conjunct. This prominence permits the first conjunct to percolate its own features to the coordination as a whole (Munn 1993, 1999; Johannessen 1996, 1998; Progovac 1998; Zhang 2010; Larson 2013; and many others).

We show here that accounts like this are untenable, for two reasons. First, the final conjunct can be what satisfies selectional restrictions, if it is closest to the selecting or selected item. That is, it is the conjunct that is closest to the selecting/selected element that matters, not uniformly the first conjunct. Second, selectional violations in coordination are actually quite limited and exactly match those observed in displacement and ellipsis. Specifically, the only mismatches that are possible are (a) that a CP can act as though it is an NP, as in (2a) above, and (b) a non-*ly* adverb can act as though it is an AP when it is conjoined with an AP:

(3) a. The Once and Future King (book title)

  b. * the once king

CPs have been shown to be able to behave as NPs in both displacement (e.g., Higgins 1973, Kuno 1973, Kaplan and Bresnan 1982, Postal 1994, Alrenga 2005, Takahashi 2010) and ellipsis (Merchant 2004, Arregi 2010). We show that non-*ly* adverbs like *once* are acceptable in prenominal position if they undergo short displacement to the left (or right). This means that all and only the category mismatches that are observed in ellipsis and displacement are observed also in coordination. This calls for a unified account, not an account that is specific to coordination.

We propose that coordination of arguments can only coordinate like categories. CPs can sometimes be NPs, by virtue of being the complement of a null N head. So, in (2a) above, the CP coordinated with the NP is actually also an NP. CPs cannot be dominated by a null-headed NP when

the CP occupies an argument position directly (1b), but this becomes grammatical when the CP is removed from a direct relation with its selector through displacement, ellipsis, or coordination. We spell out an account of this phenomenon, which also accounts for why coordination patterns with ellipsis and not with displacement (CPs are only optionally NPs in ellipsis and coordination, but are obligatorily NPs in leftward displacement). We also explain the directionality effect that we document with a constraint requiring that all features of a coordinated phrase XP match those of the conjunct that is linearly adjacent to the category that XP merges with. As for non-*ly* adverbs, we propose a similar explanation based on the presence of a null Adv head that can effectively be removed in displacement and coordinate ellipsis, leaving an adjective. The two cases (CPs and AdvPs) are related in that they involve null syntactic heads that interact with displacement, ellipsis, and coordination.

We begin in section 2 by documenting the directionality effect. We show that final as well as initial conjuncts can be relevant to selection, depending on linear order. In section 3, we show that the only selectional violations that are permitted are those that are also allowed in displacement and ellipsis. We further show that conjuncts must be the same syntactic category in coordination of arguments, even where selectional restrictions are met. Section 4 outlines our approach to CPs being treated as NPs in displacement, ellipsis, and coordination. Section 5 presents our analysis of non-*ly* adverbs. The conclusion discusses further implications of the facts presented here, including the need to refer to linear order in the syntax.

2   Directionality

We begin with the first issue raised in the introduction, the fact that the final conjunct can also apparently determine the category of the coordinate phrase as a whole. This is incompatible with theoretical accounts that have a uniformly prominent position for the first conjunct.

In coordination, two coordinated phrases YP and ZP may enter into a relation with some element X. They may occur either after X or before X:

(4)   a.   X [YP & ZP]

b.   [YP & ZP] X

The existing literature has only looked at the first case, where the coordinated phrases follow X. Such examples were first introduced by Sag *et al.* (1985), and further discussed in Johannessen (1996, 1998), Zhang (2010), and numerous others. As we saw in (2), in pattern (4a), only the first conjunct (YP) must satisfy the selectional requirements of the head X. Another example follows:

(5)   a.   We talked about [[NP Mr. Colson] and [CP that he had worked at the White House]]. (Sag *et al.* 1985, 165, (124a))

      b.   We talked about [NP Mr. Colson].

      c.   * We talked about [CP that he had worked at the White House]. (Sag *et al.* 1985, 165, (125a))

      d.   * We talked about [[CP that Mr. Colson had worked at the White House] and [NP his numerous ties to Wall Street]].

Examples of pattern (4b) have not, to our knowledge, been noted before. Subjects in English make a good test case, since they precede the selecting predicate. There are some predicates that select NP subjects and do not permit CP subjects:

(6)   a.   * [CP That he was late all the time] resulted in his being dismissed. (based on Pollard and Sag (1987, 131))

      b.   [NP His constant harassment of co-workers] resulted in his being dismissed.

Some speakers of English may find the CP subject in (6a) acceptable. They are not relevant here. Speakers who do find (6a) degraded compared to (6b) nevertheless find a CP acceptable as the first member of a coordinate subject, if the second member is an NP:

(7)   a.   [[CP That he was late all the time] and [NP his constant harassment of co-workers]] resulted in his being dismissed.

      b.   * [[NP His constant harassment of co-workers] and [CP that he was late all the time]] resulted in his being dismissed.

The same pattern can be found with other predicates that do not permit CP subjects, for instance the predicate *be incoherent*, which for many speakers also does not allow a CP subject:

(8) a. [[_CP That images are waterproof] and [_NP the claim made by the Redactionist sect]] are both incoherent.

b. * That images are waterproof is incoherent. (Pollard and Sag 1987, 131)

c. The claim made by the Redactionist sect is incoherent.

d. * [[_NP The claim made by the Redactionist sect] and [_CP that images are waterproof]] are both incoherent.

This pattern can also be found when the selector is a postposition. For instance, a coordinated phrase consisting of an NP and a CP is a possible dependent of *notwithstanding* as long as the *final* conjunct is an NP:

(9) a. That she got third place and her injury in the final round notwithstanding, she felt good about her performance in the Olympics.

b. Her injury notwithstanding,...

c. * That she got third place notwithstanding,...

(Again, some speakers may find a CP acceptable as the complement of *notwithstanding*; the important fact is that some speakers do not allow one by itself but do allow it when it is coordinated with an NP.)

As can be seen from these examples, when the coordinate phrase precedes the selecting head, it is the *final* conjunct that matters for categorial selection, not the initial one. This is incompatible with the class of analysis that posits a special prominence for the first conjunct, such that it alone can determine the category of the coordinated phrase as a whole.

Another possible source of data for this pattern involves adjectives and adverbs. As adjuncts, these categories are typically not thought of as entering into selectional relations (but see Pollard and Sag 1994; Bruening 2010, 2013). However, there are clear categorial restrictions on adjectives and adverbs. Only APs may occur as prenominal modifiers, while adverbs modify other categories. Given this, examples like the well-known book title below become relevant to the issue of categorial mismatches in coordination:

(10) a. The Once and Future King (novel by T. H. White, published 1958)

b. * the once king

     c.   the future king

     d.   * the future and once king

This is an example of pattern (4b): two coordinated elements, here an AP and an AdvP, occur in a relation with a category that follows them (call it $\overline{\text{N}}$). In this example, only *future* is compatible with the $\overline{\text{N}}$ headed by *king*. *Once* is not an adjective and may not appear by itself in prenominal position. It is an adverb, and can in general only modify VPs (or other clausal constituents), as for instance *he was once king* or *he was king once*. The book title is grammatical and in fact unremarkable because only the coordinated element that is closest to $\overline{\text{N}}$ needs to match that phrase in category. Here, the closest element, *future*, is an AP, which can combine with an $\overline{\text{N}}$.

    One might object to the above example as a fixed expression, not representative of a general pattern in the language. However, investigation reveals that it is in fact representative of a larger pattern in the language. The pattern *Det Adv and Adj N*, where *Det Adv N* is ungrammatical, is actually common, with different choices for Adv, Adj, and N (and Det), so long as the Adv is not marked with *-ly*. Some attested examples follow:

(11)   a.   . . . in the once and future world. . . [1] (*the once world)

        b.   The Once and Future Library[2] (*the once library)

(12)   a.   the twice and future caesar[3] (*the twice Caesar)

        b.   the twice and future president[4] (*the twice president)

        c.   the twice and future prime minister[5] (*the twice prime minister)

        d.   . . . that expression can be applied to the thrice-and-future prime minister of Israel. . . [6] (*the thrice prime minister)

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[1] https://books.google.com/books

[2] http://www.hermanmiller.com/research/research-summaries/ the-once-and-future-library.html

[3] http://www.risingshadow.net/library/book/47397-the-twice-and-future-Caesar

[4] http://www.heritage.org/constitution/#!/amendments/22/essays/184/ presidential-term-limit

[5] http://www.csmonitor.com/World/Asia-South-Central/2013/0512/ The-twice-and-future-prime-minister-Nawaz-Sharif-garners-big-Pakistan-vote

[6] http://www.lobelog.com/too-clever-by-half-netanyahu-strengthens-obamas-hand/

Some more examples of *the Adv and Adj* pattern are listed below, with adverbs other than *once, twice, thrice*. Attested examples are numerous.

(13)   a.   . . . cataclysmic events were pointing to the soon and coming return of the Lord for His church.[7] (*the soon return)

   b.   The Soon and Coming King[8] (*the soon king)

   c.   A Soon and Distant Christmas[9] (*a soon Christmas)

(14)   a.   The Now and Future Kingdom (book title)[10]

   b.   The Now and Future Caliphate[11]

   c.   The now and future world of restricted work hours for surgeons[12]

   d.   the now and future winners[13]

   e.   Hillary: The now and future democrat[14]

   f.   * the now kingdom/caliphate/world/winners/democrat

It therefore appears that examples like *the once and future king* are common. A non-*ly* adverb can productively be conjoined with an AP in prenominal position, if the AP comes last. (-*ly* adverbs may not: *the efficiently and clever worker*.) This is a pattern in the synchronic grammar that needs to be captured by any adequate analysis.[15]

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[7] https://books.google.com/books?isbn=1602661790

[8] https://www.youtube.com/watch?v=mVj7D1Ic3D4

[9] http://www.nature.com/nature/journal/v504/n7480/full/504476a.html

[10] http://www.americancatholic.org/Newsletters/JHP/aq0506.asp

[11] http://townhall.com/columnists/carterandress/2014/12/31/the-now-and-future-caliphate-n1937283/page/full

[12] http://www.ncbi.nlm.nih.gov/pubmed/12874571

[13] http://mocoloco.com/a-design-awards-competition-the-now-and-future-winners/

[14] http://www.chicagotribune.com/news/opinion/commentary/ct-perspec-hillary-0916-20140915-story.html

[15] Anecdotal support for the same conclusion comes from one author showing the book *The Once and Future King* to a 10-year-old who had never seen it before, and asking if there was anything odd about the title. The answer was no (and puzzlement at even being asked). This shows that accepting the phrase does not depend on having seen it before, as it would if it were a synchronically unacceptable but fixed phrase (like *til death do us part*).

To sum up this section, it is not the case that only the first conjunct of a coordinated phrase must meet selectional requirements. Linear order is what matters. Whichever conjunct is *closest* in linear order to the element the coordinate phrase as a whole combines with is the one that must meet selectional or categorial requirements.

3   Categorial Violations are Limited

The second issue for theories that posit a distinguished role for the first conjunct is the fact that categorial violations in coordination are actually quite limited. Moreover, they precisely match those observed in displacement and ellipsis. Specifically, the only mismatches that are possible are the two that we have seen above: a CP can be coordinated with an NP where only NPs are allowed, and a non-*ly* adverb can be coordinated with an AP where only APs are allowed. Other selectional violations are not permitted. Verbs like *think*, *hope*, and *boast* that only permit CPs do not permit an NP as the second conjunct (15):

(15)   a.   * She thinks [[$_{CP}$ that the world is flat] and [$_{NP}$ another discredited thing]].

   b.   * She hopes [[$_{CP}$ that the defending champs will win] and [$_{NP}$ a good result for the host country]].

   c.   * She boasted [[$_{CP}$ that she had won the Pulitzer Prize] and [$_{NP}$ her other accomplishments]].

Similarly, a PP is not permitted as a second conjunct with a verb that only allows NPs (16):

(16)   a.   * The Spartans ate [[$_{NP}$ wheat] and [$_{PP}$ on parched corn]]. (cf. The Spartans dined on parched corn.)

   b.   * She idolizes [[$_{NP}$ her mother] and [$_{PP}$ to her father]]. (cf. She looks up to her father.)

   c.   * The Persians destroyed [[$_{NP}$ Babylon] and [$_{PP}$ of Ninevah]]. (semantically contentless P)

Both of these patterns should be acceptable if what determined the category of the whole coordinated phrase were simply the first conjunct. In both cases, the first conjunct does satisfy selectional

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requirements. The examples in (15) are a particularly striking contrast to the converse case, where a CP can be coordinated with an NP where only NPs are allowed.

Additionally, a verb that selects an adverb does not allow an adjective as a second conjunct,[16] and a verb that selects an adjective does not permit an adverb as a second conjunct:

(17) a. * She was behaving [[AdvP naturally] and [AP nonchalant]].

  b. * She became [[AP unnerved] and [AdvP distractedly]].

It is clear that it is not good enough for the first (or closest) conjunct to satisfy selectional requirements of the selecting element. The only mismatches that are actually grammatical are those documented in the previous section.

Moreover, the two documented mismatches are exactly those that are found in displacement and ellipsis. First, CPs have long been known to be able to behave as NPs in displacement (e.g., Higgins 1973, Kuno 1973, Kaplan and Bresnan 1982, Postal 1994, Bresnan 1995, Alrenga 2005, Takahashi 2010). For example, CPs may not be complements of prepositions, as we saw above, but they can be if they are topicalized:

(18) (Postal 1994, 70)

  a. I convinced Frank (*of) that Sonia was very competent.

  b. That Sonia was very competent, I couldn't convince Frank *(of).

(19) a. This assumption accounts for *(the fact) that these nouns behave differently. (Alrenga 2005, 185, (35c))

  b. That these nouns behave differently, this assumption accounts for.

In fact, CPs can only be related to NP positions when they topicalize, so that the above examples *require* the preposition.

CPs can also behave as NPs in ellipsis. Merchant (2004) showed this for fragment answers, and Arregi (2010) showed it for split questions:

(20) *Fragment Answers*

  a. Q: What is she ashamed of? A: That she left him in the lurch.

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[16]For many speakers *behave* does permit adjectives, but even so adverbs and APs cannot be coordinated together.

b. * She is ashamed of that she left him in the lurch.

(21) *Split Questions*

a. What is she ashamed of, that she left him in the lurch?

b. * She is ashamed of that she left him in the lurch.

Hence, one of the two mismatches that we observe in coordination, CPs behaving as NPs, is also well-documented in displacement and ellipsis.

The other mismatch that we observed, non-*ly* adverbs being able to coordinate with APs in prenominal position, has not been noted in the literature on displacement or ellipsis. However, we can observe that non-*ly* adverbs are acceptable in prenominal position if they undergo short displacement to the left (longer displacement is impossible in English):

(22) a. * I was expecting a soon visit.

b. How soon a visit are you expecting?

c. I wasn't expecting that soon a visit.

Adverbs with *-ly* do not permit this:

(23) a. * We want to hire an efficiently worker.

b. * How efficiently a worker do you want to hire?

c. * We weren't expecting that efficiently a worker.

Non-*ly* adverbs are also significantly improved if they are displaced to a postnominal position, in contrast with an *-ly* adverb:

(24) a. A visit so soon would be wonderful.

b. A sneer so condescending(*ly) would be insulting.

Our two observed mismatches in coordination are therefore both also observed in displacement. One is also observed in ellipsis, but it does not appear to be possible to construct examples that would strand non-*ly* adverbs in prenominal position with ellipsis, so we cannot tell if they would also be well-formed in ellipsis contexts.

Furthermore, the same mismatches that we found to be unacceptable in coordination are also unacceptable in displacement and ellipsis. For instance, while CPs may be related to NP positions, NPs may not be related to CP positions:

(25) a. * A totally discredited thing, she thinks.

     b. * Her many accomplishments, she boasted.

     c. * A good result, she is hoping.

(26) a. * What does she think, a totally discredited thing?

     b. * What is she boasting, her many accomplishments?

     c. * What is she hoping, a good result?

PPs may not be related to NP positions, nor may NPs be related to PP positions:

(27) a. * It was on parched corn that the Spartans ate. (PP where only NP allowed)

     b. * It was parched corn that the Spartans dined. (NP where only PP allowed)

(28) a. Q: What did the Spartans eat? A: *On parched corn.

     b. Q: What did the Persians destroy? A: *Of Babylon.

Adverbs may not be related to adjective positions:

(29) a. * Distractedly is what she became.

     b. * What did she become, distractedly?

All of these data indicate that there are exactly two category mismatches that are allowed in coordination, and both of them are also allowed in displacement and ellipsis. Category mismatches that are not allowed in displacement and ellipsis are also not allowed in coordination.

All of the examples of mismatching categories in coordination so far have involved a conjunct that does not meet the category requirements of its context. We can further observe that different categories are not allowed in coordination, even when the verb subcategorizes for both:

(30) a. * She met Bill and with Sarah.

     b. * She's speaking nonsense and with Sarah.

     c. * She agreed to leave and with Sarah.

d. * She splashed wine and on Sarah.

    e. * He believes that Santa exists and in fairy creatures.

    f. * He believes her claim and in fairy creatures.

    g. * She fights tyranny and against injustice.

    h. * I've never heard his stories or of him.

    i. * She lost the match and to an underdog.

The only mismatch that is allowed is CPs and NPs, the same mismatch that we saw above:

(31)   Pat remembered [[NP the appointment] and [CP that it was important to be on time]].
        (Sag *et al.* 1985, 165, (123a))

Here, *remember* can take both NP and CP complements. However, note that a variant of this example with the NP and CP reversed is not acceptable:

(32)   * Pat remembered [[CP that it was important to be on time] and [NP his resume]].

These data show that it is not simply good enough for each conjunct to be a selected category (contra Bayer 1996), in fact all conjuncts have to be the same category.[17] We take the contrast between (31) and (32) to indicate that CPs are allowed to be treated as NPs *only when they are a conjunct that is separated from the selecting element by another conjunct that is category NP*. The CP in (32) cannot be treated as an NP because it is the one that is adjacent to the selecting verb (see section 2). This is an important generalization that we will attempt to capture here.

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[17]This is true only of arguments. Coordinated predicates and modifiers seem to be able to consist of mismatching categories, as the following examples from Sag *et al.* (1985) show:

(i) a. Pat is a Republican and proud of it. (NP and AP)

    b. Pat is healthy and of sound mind. (AP and PP)

    c. That was a rude remark and in very bad taste. (NP and PP)

    d. Pat has become a banker and very conservative. (NP and AP)

(ii) a. We walked slowly and with great care. (AdvP and PP)

    b. They wanted to leave tomorrow or on Thursday. (NP and PP)

We only address coordinated arguments in the text.

To sum up this section, the only category mismatches and selectional violations that we see in coordination are exactly the two that are found in displacement and ellipsis. This leads us to conclude that we need a unified analysis of selectional violations in coordination and displacement/ellipsis. Moreover, directionality matters, such that CPs and non-*ly* adverbs can behave as other categories only when they are separated from the phrase they combine with by another conjunct. Finally, in argument position, all conjuncts must be the same category. We attempt to construct an analysis that captures these facts in the next two sections.

4   CPs as NPs

Our analysis will unit the two cases by positing a crucial role for null syntactic heads. We begin with the phenomenon of CPs being able to act as NPs in certain contexts, and discuss non-*ly* adverbs in section 5.

4.1   The Distribution of CPs in Displacement, Ellipsis, Coordination

Let us start by looking at the full distribution of CPs when they are displaced, stranded by ellipsis, or coordinated. The following is what we find:

(33)   *The Distribution of CPs*

      a.   CPs in argument position must be CPs and may not be NPs.

      b.   CPs that are stranded in ellipsis may be either CPs or NPs.

      c.   CPs that are in a conjoined phrase such that another conjunct separates them from their selector may be NPs or CPs.

      d.   CPs that are displaced to the left can only be NPs.

      e.   CPs that are displaced to the right must be CPs and may not be NPs.

Regarding displacement, previous literature has shown that CPs displaced to the left can only be related to positions where NPs are allowed. For example, they are ungrammatical with verbs that only permit CPs like *boast* and *hope*, but are grammatical with verbs or prepositions that only permit NPs:

(34) a. * That she won the Pulitzer Prize, she is boasting.

      (cf. She is boasting (*the fact) that she will win the Pulitzer Prize.)

    b. * That she will win, she is hoping.

      (cf. She is hoping (*the fact) that she will win.)

(35) a. That nouns and verbs are not distinct, we absolutely reject.

      (cf. We absolutely reject *(the claim) that nouns and verbs are not distinct.)

    b. That she will win, we are all hoping for.

Displacement to the right shows a very different pattern. It appears that in such cases, CPs can only be related to CP positions, and not to NP positions:

(36) a. She was boasting over and over again that she would win the Pulitzer Prize.

    b. She hopes for all our sakes that she can defeat them.

(37) a. * We can attribute to magic that CPs can behave as NPs.

    b. * We reject without equivocation that nouns and verbs are not distinct.

We suggest that displacement to the right is actual displacement of the CP, and will explain the facts below. As for displacement to the left, we suggest that CPs displaced to the left have to be base-generated in an A-bar position and are related to a null operator of category NP that is what actually moves, as in Alrenga (2005) and Moulton (2013). This is why CPs dislocated to the left can only be related to positions that allow NPs.[18] We will not attempt to explain here why CPs dislocated to the left must be base-generated. We will leave that to future research (see some of the works cited for some ideas, but note that the fact that displacement to the right behaves very differently is problematic for existing proposals). Instead, our focus will be on ellipsis and coordination, since they pattern alike in showing optionality. Previous literature has shown that, in ellipsis, CPs *may* be related to NP positions (Merchant 2004, Arregi 2010):

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[18]Regarding sentential subjects, we side with Davies and Dubinsky (2009) in holding that CPs can occur in subject position, but they must be NPs with a null N head when they do (see section 4.2). Otherwise, we see no way of accounting for the fact that some predicates do not allow CP subjects (section 2, above). We account for such predicates by saying that they have selectional requirements in addition to category, which the null N head cannot satisfy (see section 4.2). Other predicates only require category N, and so are satisfied by the null N that combines with CPs.

(38) a. Q: What is she ashamed of?

A: That she left him in the lurch. (fragment answer)

b. What is she ashamed of, that she left him in the lurch? (split question)

We note that, unlike leftward displacement, when CPs are stranded in ellipsis they can still be related to positions that only permit CPs:

(39) a. Q: Is she boasting that she won an Olympic medal?

A: No, that she was nominated for a Pulitzer Prize. (fragment answer)

b. What does she think, that she can play basketball against professional players? (split question)

The analyses of fragment answers and split questions in Merchant (2004) and Arregi (2010) posit leftward movement of the remnant CP, followed by ellipsis of the category moved out of. If this were correct, then we would expect that CPs could only be related to NP positions, since this is what we observe with leftward displacement of CPs outside of ellipsis. We will therefore pursue a different account, one that does without movement.[19] Importantly for our topic of concern here, CPs in coordination that are separated from the selector by another conjunct can also be related to positions that only permit CPs:
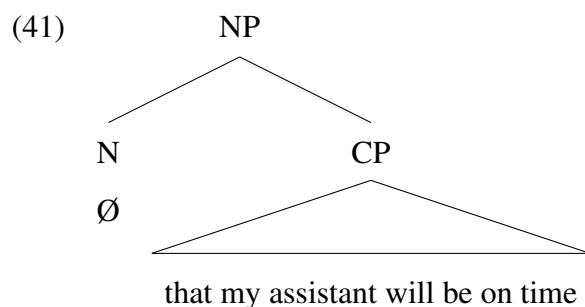
(40) a. She is boasting that she won an Olympic medal and that she won the Pulitzer Prize.

b. She is hoping that the defending champions will win and that the home team will place second.

The main focus of our analysis will therefore be explaining the optionality of NP status for CPs in conjuncts separated from the selector and in ellipsis. We will also explain the facts of rightward displacement of CPs, but will have nothing more to say about leftward displacement here.

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[19]If one posited rightward movement instead, one would expect that CPs could only be related to CP positions, contrary to fact. If one wished to maintain a movement analysis of fragment answers and split questions, then one would have to permit either leftward or rightward movement, which would have the desired result of category optionality. We will not pursue this approach, because we believe there are independent reasons to prefer ellipsis without movement (see, e.g., Bruening 2015).

4.2 A Null N Head

We propose that CPs can optionally combine with a null N head that turns them into NPs (cf. Davies and Dubinsky 1998, 2009):

(41)

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              NP
            /    \
          N       CP
          Ø      /    \
               /        \
      that my assistant will be on time
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This must not be possible in argument position, or CPs would always be able to appear in NP positions:

(42)   * You can depend on that my assistant will be on time. (Sag *et al.* 1985, 165, (125b))

We propose that this is because selecting heads (verbs and prepositions, primarily) have selectional A-features that need to be checked against the category that merges with them. These are not features like person, number, gender, and category—which the null N does have—, but are instead semantic features that are typically relevant in semantic selection (animacy, sentience, moral reasoning, etc.). The null N head is not able to check these features, because it is semantically contentless and is therefore incapable of bearing any of these types of features. The sentence in (42) is therefore ungrammatical because the selecting P (or V + P) has unchecked selectional A-features.

We further propose that the selectional A-features on the selecting head are PF features, that is, features that are uninterpretable at PF (Chomsky 1993). They must be checked off before spellout. However, if the selecting head is deleted at PF by an ellipsis process, then the features are no longer visible and do not cause the derivation to crash. This is what we suggest happens in fragment answers and split questions. We propose that the CP does not move anywhere, instead a prosodic constituent is deleted at PF (see Bruening 2015). This allows the CP to be either a CP, or an NP headed by the null N:

(43)   a.   Q: Is she boasting that she won an Olympic medal?

              A: No, ~~she is boasting~~ [CP that she was nominated for a Pulitzer Prize].

b. Q: What is she ashamed of?

A: ~~She is ashamed of~~ [$_{NP}$ Ø [$_{CP}$ that she left him in the lurch]].

In (43b), the selecting predicate *ashamed of* has unchecked A-features, but since they are deleted at PF, all grammatical constraints are satisfied. (In (43a), the CP is capable of checking A-features of the verb *boast*, which selects CPs.)

We also conceive of category selection (c-selection) as feature checking. However, in this case, the selectional features are not PF features, instead they are visible throughout the derivation, and deleting the selecting category cannot remedy a violation. This is why the only selectional violations we see in ellipsis involve CPs being treated as NPs:

(44) Q: What did the Spartans eat?

A: *~~The Spartans ate~~ [$_{PP}$ on parched corn].

In (44), the PP is incapable of checking the c-selectional feature of *ate*, and eliding *ate* does not fix the problem.

4.3 Coordination

Turning to coordination, if one conjunct can check the A-features of the selecting element, then it will not matter if other conjuncts have null N heads, because the conjunct that has a contentful N head will be able to pass its features to the coordinate as a whole. That is, so long as one conjunct is headed by a contentful N head, then other conjuncts can be headed by the null N head.
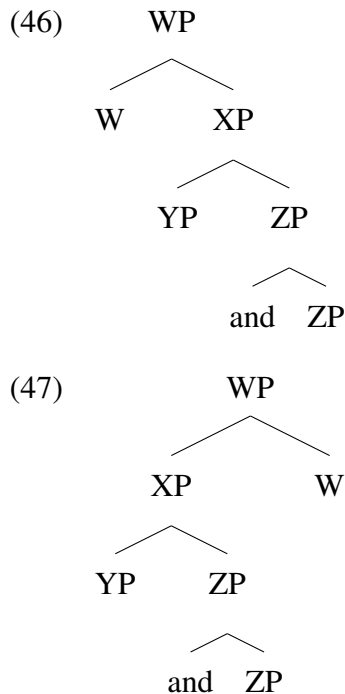
Now, matters are slightly more complicated, because of the directionality effect noted in section 2. We propose a principle of *Coincidence of Edges in Coordination*, as follows:

(45) *Coincidence of Edges in Coordination*

Modulo person, number, and gender resolution, the features of a coordinate phrase XP must strictly match the features of the conjunct YP that it dominates such that the edge of YP is adjacent to the category that XP is merged with.

The exact analysis of coordination does not matter here, but we will make some assumptions simply to be concrete. We will assume that coordinators adjoin to non-initial conjuncts and do not

17

affect their category (see, e.g., Al Khalaf 2015). We then have the following two representations for a conjoined phrase XP merged with some category W, depending on the directionality of merge:

(46)

```
              WP
            /    \
          W       XP
                /    \
              YP      ZP
                    /    \
                  and    ZP
```

(47)

```
              WP
            /    \
          XP      W
        /    \
      YP      ZP
            /    \
          and     ZP
```

Given the principle of Coincidence of Edges in Coordination in (45), the features of XP in (46) must match the features of the leftmost conjunct YP. In (47), the features of XP must instead match the features of the rightmost conjunct, ZP. Furthermore, as we noted in section 3, there is a constraint on the coordination of arguments such that all conjuncts have to be the same category.

Turning to concrete examples, (48a) is ungrammatical because, as explained above, either the CP is a CP and selectional restrictions are violated, or it is an NP headed by the null N, but this null N cannot check the A-features of *depend on*. In (48b), however, the entire coordinated phrase inherits its features from the NP *my assistant*, and the coordinated phrase is capable of checking the features of *depend on*. All constraints are satisfied. In contrast, in (48c), the features of the coordinated phrase have to match those of the null-N-headed conjunct, and the coordinated phrase is incapable of checking the features of *depend on*.

(48) a. * You can depend on that my assistant will be on time.

      b. You can depend on [[NP my assistant] and [NP Ø [CP that he will be on time]]]. (Sag
          et al. 1985, 165, (124b))

18

c. * You can depend on [[$_{NP}$ Ø [$_{CP}$ that my assistant will be on time]] and [$_{NP}$ his intelligence]].

In both (48b) and (48c), if the CP is instead a CP and not an NP, then the constraint that conjuncts must be the same category is violated.

In (49a), again either the CP is a CP and selectional restrictions are violated, or the CP is an NP headed by a null N. In this case, the null-N-headed NP cannot check the features of *be incoherent*, and the sentence crashes at PF. In (49b), the coordinated phrase inherits its features from the NP headed by *claim*, since this is the conjunct that is adjacent to the category it is merged with, *are both incoherent*. The coordinated phrase can therefore check the features of the selecting element.

(49) a. * That images are waterproof is incoherent. (Pollard and Sag 1987, 131)

b. [[$_{NP}$ Ø [$_{CP}$ That images are waterproof]] and [$_{NP}$ the claim made by the Redactionist sect]] are both incoherent.

c. * [[$_{NP}$ The claim made by the Redactionist sect] and [$_{NP}$ Ø [$_{CP}$ that images are waterproof]]] are both incoherent.

In contrast, in (49c), the features of the coordinated phrase must be inherited from the null-N-headed NP, and it is incapable of checking the features of the selecting element. Alternatively, the CP is just a CP, and the constraint against coordinating mismatching categories is violated.

As can be seen, the proposed null-N-headed NP, along with the principle of Coincidence of Edges in Coordination, successfully accounts for all of the data where CPs may and may not occupy NP positions in coordination. It also accounts for the directionality effect that we have documented.

We should note that the principle of Coincidence of Edges in Coordination is at this point a stipulation. We will leave it as such for the moment, but hold out the hope that it will follow from deeper principles of grammar (or possibly processing, or both).

4.4 Against a Coordinate Ellipsis Alternative

Rather than the analysis we have proposed, one could instead posit coordinate ellipsis. This would reduce category mismatches in coordination to category mismatches in ellipsis. The idea is that coordination might be of larger categories, say CPs or VPs, with ellipsis of shared material:

19

(50) You can [$_{VP}$ depend on my assistant] and [$_{VP}$ ~~depend on~~ that he will be on time].

This would be allowed, in the same way that fragment answers and split questions allow CPs in NP positions. (For some recent analyses involving coordinate ellipsis, see Chaves 2008 and Hofmeister 2010.)

Directionality would then follow from whatever ensures that ellipsis in the right conjunct targets material that is initial in the conjunct, while ellipsis in the left conjunct targest material that is final in the conjunct. One would not need to stipulate the Coincidence of Edges in Coordination principle (45).

Unfortunately, we see no way for a coordinate ellipsis analysis to explain agreement and floating quantifiers in examples like (51):

(51) [[That images are waterproof ~~is incoherent~~] and [the claim made by the Redactionist sect are both incoherent]].

On a coordinate ellipsis analysis, each conjunct would only have a singular subject, as shown. The predicate would be elided in the first conjunct. The plural agreement and the floating quantifier *both* would not be licensed in the second conjunct, because the subject of the second conjunct is a singular NP.

We conclude that there is no way to reduce all examples of mismatching categories in coordination to coordinate ellipsis. There must be examples of CPs conjoined with NPs that are not part of larger categories. We therefore need an analysis of the type we have proposed here, with the Coincidence of Edges in Coordination principle.

Note furthermore that our null-N-headed NP dominating a CP must be computed in number resolution in coordination. This means that the null N head is not incapable of bearing features in general. We suppose that it bears third person singular non-human features by default. Two singulars in coordination resolve to a plural (in English, which lacks a dual). This is why we proposed above that the features the null N head is incapable of bearing are actually of a different type (semantically contentful features).

4.5 Rightward Displacement of CPs

We showed above that CPs that are displaced to the left can only be related to NP positions, and proposed that this is because what actually occupies the argument position is a null operator of category NP. Rightward displacement behaves differently: a CP displaced to the right can only be associated with a CP position. This follows in our analysis, if rightward-displaced CPs are actually moved from the argument position. Take an example with a verb that only permits a CP, like *boast*:

(52)   She was boasting over and over again that she would win the Pulitzer Prize.

    a.   She was boasting [CP ~~that she would win the Pulitzer Prize~~] over and over again [CP that she would win the Pulitzer Prize].

    b.   * She was boasting [NP ~~Ø~~ [CP ~~that she would win the Pulitzer Prize~~]] over and over again [NP Ø [CP that she would win the Pulitzer Prize]].

If the CP really is a CP, as in (52a), with a null lower copy, all constraints are satisfied. The c-selectional requirements of *boast* are satisfied. The CP cannot instead be an NP, as in (52b), because *boast* only c-selects CPs.

    Now consider a verb that only allows NPs, like *reject*.

(53)   * We reject without equivocation that nouns and verbs are not distinct.

    a.   * We reject [CP ~~that nouns and verbs are not distinct~~] without equivocation [CP that nouns and verbs are not distinct].

    b.   * We reject [NP ~~Ø~~ [CP ~~that nouns and verbs are not distinct~~]] without equivocation [NP Ø [CP that nouns and verbs are not distinct]].

If the CP really is a CP, as in (53a), the c-selectional requirements of *reject* are not met. If it is instead an NP, as in (53b), the c-selectional features of *reject* are checked off, but the selectional A-features are not. The null N head is incapable of checking those features, by hypothesis. The predicate is not elided, only the lower copy of the null-N-headed NP is, so the unchecked features remain. Note also that leaving the null N out of the lower copy, as we suggest below for adverbs, also will not help: what would be in argument position would then be a CP, but *reject* requires NPs and does not allow CPs.

Thus, our analysis explains why rightward dislocation of CPs can only take place from CP positions, if it is actual movement. We suggested that leftward dislocation of NPs is actually base-generation plus a null operator of category NP. Unfortunately, we do not have a good explanation at this point for why rightward and leftward dislocation differ in this way.

4.6   Summary

We have proposed that CPs can be NPs by virtue of merging with a null N head. This is not allowed in argument position, but is allowed when what selects the CP is elided, or when the CP is coordinated with an NP. A principle of Coincidence of Edges in Coordination explains the directionality effect. As for displacement, we suggested that CPs that are displaced to the left are base-generated and are related to null operators that are uniformly of category NP. In contrast, rightward displacement of a CP is movement of the CP itself, and our theory then explains why it cannot be related to an NP position.

5   Adverbs as APs

We turn now to examples like *The Once and Future King*, where an adverb is grammatical when it is coordinated with an AP.

5.1   Displacement

As shown above, non-*ly* adverbs are grammatical modifying Ns so long as they are displaced, to either the left or the right:

(54)   a.   * I was expecting a soon visit.

      b.   How soon a visit are you expecting?

      c.   I wasn't expecting that soon a visit.

      d.   A visit so soon would be wonderful.

We propose that adverbs in general are derived from adjectives by merging them with an Adv head. This is clearly visible with most adverbs, which are adjectives plus the overt suffix *-ly*.

Adverbs like *once*, *soon*, *now* have the same structure, but with a null Adv head:

(55)   Adv

Adj   Adv

soon   Ø
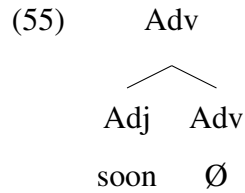
Semantically, the Adv head is contentless. There is in general no difference between an adjective and the corresponding adverb:

(56)   a.   She brilliantly discussed the issue of snake locomotion.

b.   her brilliant discussion of snake locomotion

Therefore, the fact that only adjectives are allowed in prenominal position, and the fact that only adverbs are allowed with other categories, must be a purely morphosyntactic restriction. We propose that there is a constraint against adverbs modifying $\overline{N}$ constituents:

(57)   * [$_{\overline{N}}$ Adv $\overline{N}$]

(There is also a converse requirement that modifiers of VP and other categories include the Adv head, but this will not concern us here.)

We suggest that in displacement, the null Adv head can simply be left out of the null copy of the adverb in the position adjoined to $\overline{N}$:

(58)   How [$_{Adv}$ [$_{Adj}$ soon] Ø] a ~~how~~ [$_{Adj}$ ~~soon~~] visit are you expecting?

The constraint against adverbs modifying $\overline{N}$ constituents is not violated here. We assume that in the surface position of *how soon*, the adverbial phrase is adjoined to NP. This does not violate the constraint in (57).

Leaving out the null Adv head is only allowed because the null adverb head is both phonologically contentless (it is null) and semantically contentless. The overt *-ly* head cannot be so left out, so this pattern only obtains with adverbs that lack *-ly*:

(59)   a.   * She is an efficiently worker.

b.   * How efficiently a worker is she?

c. * I wasn't expecting her to be that efficiently a worker.

d. * A worker as efficiently as her would be wonderful.

The null Adv head is part of the lexical content of adverbs like *soon* and *once*, so it must be present in at least one copy. This rules out such adverbs in immediately prenominal position, which we assume is the base position for a nominal modifier (**a soon visit*).

5.2 Coordination

As for coordination, although we ruled out a coordinate ellipsis analysis for many cases of CPs conjoined with NPs, in this case we do propose coordinate ellipsis. Specifically, $\overline{\text{N}}$ categories are coordinated:

(60) the [$_{\overline{\text{N}}}$ [$_{\overline{\text{N}}}$ once ~~king~~] and [$_{\overline{\text{N}}}$ future king]]

The reason this is grammatical is that the null Adv head can be elided along with the head noun in the first conjunct:

(61) the [$_{\overline{\text{N}}}$ [$_{\overline{\text{N}}}$ [once ~~Ø]~~ king] and [$_{\overline{\text{N}}}$ future king]]

Again, this is only allowed because the null Adv head is both phonologically and semantically contentless. An overt *-ly* cannot be so elided.

We propose that the morphosyntactic constraint against adverbs modifying nominal categories in (57) is a PF constraint. Once gain, removing offending material at PF by ellipsis removes any indication that the constraint has been violated. Without any constraint violation being registered, the structure is grammatical. In contrast, with an *-ly* adverb (**the wisely and benevolent king*), although the head noun is elided in the first conjunct, the Adv head is not. There is still an adverb modifying a nominal category, and the constraint is violated.

5.3 Summary

We have proposed that non-*ly* adverbs have a null Adv head. This is similar to the null N head that combines with CPs, in that semantically and phonologically contentless elements behave unusually in ellipsis, displacement, and coordination. In this case, the null head can simply be left out of a

lower copy in displacement, and it can also be elided in coordinate ellipsis, obviating a constraint violation.

6 Conclusion and Consequences

We have shown that category mismatches in coordination are not free but are limited to those that occur in ellipsis and dislocation. We have proposed accounts of these mismatches. Our accounts rely on the presence of unpronounced heads, specifically null N and Adv heads. These behave unusually in coordination, ellipsis, and dislocation, precisely because they are phonologically and semantically contentless. To the extent that our analysis is successful, then, it argues for the presence of null elements in syntax, and against approaches to syntax that eschew null elements.

Additionally, we showed that linear order plays an important role in category mismatches in coordination. A consequence of this finding is that the syntax proper must include linear order. Attempts to relegate linear order to the phonological interface as in Kayne (1994), Chomsky (1995, 334-340), Fox and Pesetsky (2005), Reinhart (2006), Berwick and Chomsky (2011), Bobaljik and Wurmbrand (2012), Idsardi and Raimy (2013), are then untenable.

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