

Accounting for the Absence of Coreferential Subjects in TP Coordination*

Bronwyn M. Bjorkman, University of Toronto
bronwyn.bjorkman@utoronto.ca

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1 Introduction

This talk is about **coordination**

- Specifically, a curious restriction on the availability of backwards-referring pronominal subjects in (clausal) coordination.

Background: Since Ross (1967), much work on the syntax of coordination has been concerned with the conditions in which elements can be “shared” between two conjuncts – but in general we know that such “sharing” is optional, so that identical or similar elements can be repeated between conjuncts, as in (1a-b).

- (1) a. [Scott has made a fool of himself], and [he has faced the consequences].
b. Scott [has made a fool of himself] and [has faced the consequences].
c. Scott has [made a fool of himself] and [faced the consequences].

The Puzzle: When sentences like those in (1) are turned into questions, coreferential subjects are suddenly ungrammatical, and coordination must involve smaller constituents:

- (2) a. *Has [Scott_i made a fool of himself] and [he_i faced the consequences]?
b. Has Scott [made a fool of himself] and [faced the consequences]?
(3) a. *Who has [Scott_i met] and [he_i invited out for coffee]?
b. Who has Scott [met] and [invited out for coffee]?

Known restrictions on coordinate structures do not explain why (2a) and (3a) are ungrammatical:

- (1) shows that coreference between subjects is generally possible in coordination.
- Movement out of these conjuncts is also possible, as in (2b) and (3b).

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All that seems to be wrong with (2a) and (3a) is that we have *both* coreference and ATB movement. . .

But grammaticality is not generally *additive* in this way.

Claims to be made in this talk:

1. The relevant generalization concerns coreference between subjects of coordinated **TPs** (and not CPs)
2. This restriction on coreference in (2) and (3) is best explained by the status of TPs as **non-phases**, within a cyclic theory of linearization.
3. Specifically, coreferential DPs are **too similar** (in a way to be made precise) to be linearized on a single phase.

Roadmap:

- §2: Establishing the generalization
- §3: Analysis
- §4: Implications for SLF coordination
- §5: Conclusion.

2 The Facts

(4) and (5) illustrate the same pattern of unacceptability we saw in the introduction:¹

- (4) Kim_i visited her parents_j and she_i unexpectedly moved back in with them_j.
- a. *Who did [Kim_i visit] and [she_i unexpectedly move back in with]?
 - b. Who did Kim_i [visit] and [unexpectedly move back in with]?
- (5) The butler_i entered the front hall at 10 o'clock and he_i locked the door then.
- a. *At what time did [the butler_i enter the front hall] and [he_i lock the door]?
 - b. At what time did the butler_i [enter the front hall] and [lock the door]?

Proposed generalization: the problem for these sentences is that the subject of the second conjunct is not only a pronoun, but a pronoun that is coreferent with the subject of the first conjunct.

- Need to distinguish this from the many other things that are going on in these examples:
 - The subject of the second conjunct is a pronoun
 - The subject of the second conjunct refers back to something from the first conjunct
 - The conjuncts contain factorable / potentially sharable material
 - ATB movement has taken place
- Remainder of this section explores factors these one by one.

¹Throughout this talk I refer to such sentences as ungrammatical, and mark them with '*'. Some speakers I have consulted report more subtle judgments – but in every case speakers have nonetheless agreed with the *direction* of contrasts reported here.

2.1 No general ban on pronominal / backwards referring subjects

- We might imagine that the ungrammatical pronominal subjects are problematic simply because they are pronominal, or because they refer back to some element from the first conjunct (not necessarily the subject).
 - With this possibility in mind, consider the data in (6) and (7).
- (6)
- a. Alice_i's father always wanted a bike and she_i finally got him one last year.
 - b. The audience requested a song_i and it_i got played.
 - c. The queen gave the king_i a small estate and he_i bequeathed it to the princess.
- (7)
- a. What did Alice_i's father always want and she_i finally get him last year?
 - b. Did the audience request a song_i and it_i get played?
 - c. What did the queen give the king_i and he_i bequeath to the princess?
- The sentences in (7) are parallel to ungrammatical examples we have seen so far → only difference is that their subjects refer back to a non-subject DP in the first clause.
 - These pronouns can be reduced, and do not appear to bear anything like contrastive focus.
 - This demonstrates that there is no general ban on backwards-referring pronominal subjects in the relevant environment – it is specifically coreference **between subjects** that is problematic.

2.2 No general requirement for small conjuncts

- We might imagine instead that these data reveal a general preference for smaller conjuncts: if any material is shared between two conjuncts (e.g. because of ATB movement), as much material as possible must be shared.
 - This recalls the principle of MaxElide in work on VP ellipsis (Takahashi and Fox, 2005; Merchant, 2008), requiring that ellipsis target the largest possible constituent (subject to constraints).
 - This would predict that in the relevant examples it is not possible to repeat *any* material between the two conjuncts.
 - But this prediction is not borne out: (8) and (9) demonstrate that verbs and auxiliaries can be repeated between conjuncts even when coreferential subjects are ungrammatical:
- (8)
- a. *What did [Scott_i eat for breakfast] and [he_i eat again for dinner]?
 - b. What did Scott [eat for breakfast] and [eat again for dinner]?
- (9)
- a. *Have [the gang_i been arrested] and [they_i been charged]?
 - b. Have the gang [been arrested] and [been charged]?
- The grammaticality of (8b) and (9b) demonstrates that it is possible for identical elements to be repeated between conjuncts – even when it would be possible not to do so.

- The ungrammaticality of (8a) and (9a) therefore does not illustrate some more general principle, but a restriction that applies specifically to the subjects.

2.3 Not about ATB movement

- All examples discussed so far involve ATB movement of a *Wh*-element to Spec-CP or of T^0 to C^0 .
- This lends itself to a hypothesis that the restriction might be driven by properties of ATB movement.
- Questions share another property besides movement, however: they involve *unambiguous TP coordination* – coordination that excludes a single visible C^0 .
- (10) demonstrates that we find the same restriction on coreferential subjects in embedded coordination below a single complementizer:

- (10) a. *The TSA asks that [passengers_i remove their shoes] and [they_i move quickly through security].
 b. The TSA asks that passengers [remove their shoes] and [move quickly through security].
 c. The TSA asks [that passengers_i remove their shoes] and [that they move quickly through security].
- (11) a. *I expect Emily to visit her father and her to be glad to see him.
 b. I expect Emily to visit her father and him to be glad to see her.

- The example in (10c) is particularly interesting, showing that repeating the complementizer – coordinating CPs rather than TPs – lifts the restriction on coreferential subjects.
- This further supports the conclusion that it is coordination of TPs – not questionhood or ATB movement – that gives rise to the restriction.

Aside: Finite Complements

- The sentences in (10) and (11) involve non-finite embedding. The embedded clause in (10) is subjunctive; in (11) it is an ECM infinitive.
- In principle the same facts should arise with finite embedded clauses.
- In English, however, optionally silent complementizers mean that we cannot always clearly distinguish TP and CP coordination.
- While there are verbs that require a complementizer with finite complements, these tend to be factive, making it difficult to distinguish embedded from matrix coordination.
- We can force embedded coordination, but it is somewhat more involved: having a variable in the second conjunct be bound from the matrix clause.
- We can also create a strong preference for TP coordination (as opposed to CP coordination) with an asymmetric semantic relationship between the conjuncts (Bjorkman 2010, to appear).

- (12) a. No criminal_i believes that [they will one day make a mistake] and [(**they*_I) will get caught].

- b. No criminal_i believes [that they will one day make a mistake] and [that they will get caught].

2.4 Both more and less than “coreference”

- So far I have framed the restriction as one of “coreference” – but nonetheless treated non-referential bound pronouns as in (12) as relevant for the generalization.
- “Coreference” is thus too restrictive to describe the relevant relation – something like “coindexation” would be more appropriate.²
- But “coreference” is also *not restrictive enough*: the ungrammatical cases are improved when either of the two subjects is supplemented by an emphatic reflexive, as in (13), or when the second subject is replaced by a pronominal epithet, as in (14).

- (13) a. * What did the queen commission and she never see finished?
 b. (?) What did the queen commission and she herself never see finished?
 c. (?) What did the queen herself commission and she never see finished?

- (14) a. * Has [Scott made a fool of himself] and [he faced the consequences]?
 b. (?) Has [Scott made a fool of himself] and [the bastard faced the consequences]?

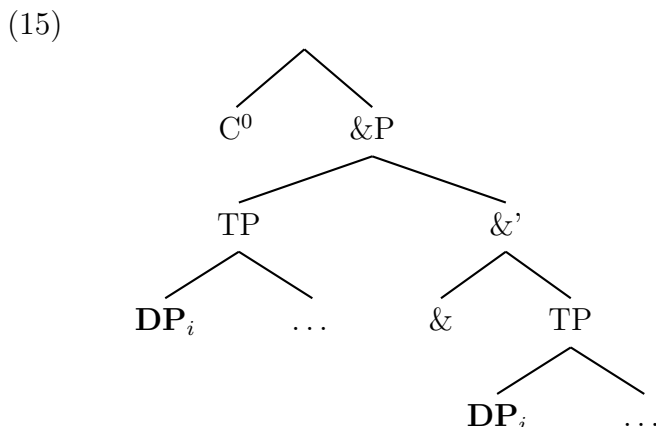
- For the moment I will continue to refer to the relationship between the two subjects as “coreference”, but (13) and (14) show that what seems to be relevant is some broader identity between the two subjects.

2.5 Interim Summary

- We are now in a position to more precisely describe the restriction:

Coordination of TPs below a shared element in C⁰ disallows coreference between the subject of the first clause and a (simple) pronominal subject in the second clause.

- In other terms, the configuration in (15) is banned:³



²Given proposals that referential indices are not present in the syntax, I return later to the question of whether the generalization can be stated in other terms.

³For concreteness I adopt Johannessen (1998)’s asymmetrical &P representation for coordination, but nothing hinges on the details of this structure.

- What we do not yet have is any explanation for why this configuration would be problematic.
- That further question is what we turn to next.

3 Analysis

We have seen that coreferential subjects are impossible only in coordinated **TPs**.

- The next question: Why TPs?

Proposal: What is special about TPs is that T^0 is not a phase head.

The subjects of coordinated TPs (unlike the subjects of coordinated CPs) are therefore spelled out on the **same phase**.

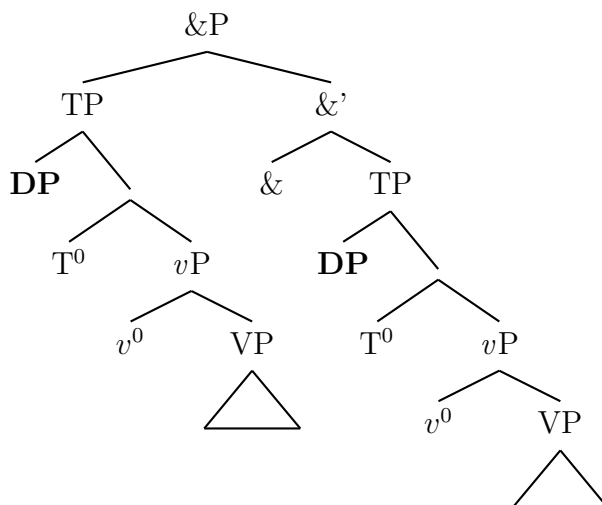
The result is ungrammatical if the subject DPs are **too similar**.

The remainder of this section develops this proposal, making precise what the relevant standard of similarity is, and investigating why it would matter that two phase-mate DPs were similar.

3.1 Why phases?

- We have seen that coreference is impossible:
 - between two subjects (but not between other arguments)
 - in TP coordination (but not in CP coordination)
- Appealing to cyclic spell-out allows us to account for both these properties, given a particular view of the Phase Impenetrability Condition (Chomsky, 2000).
- Consider first the structure of TP coordination:

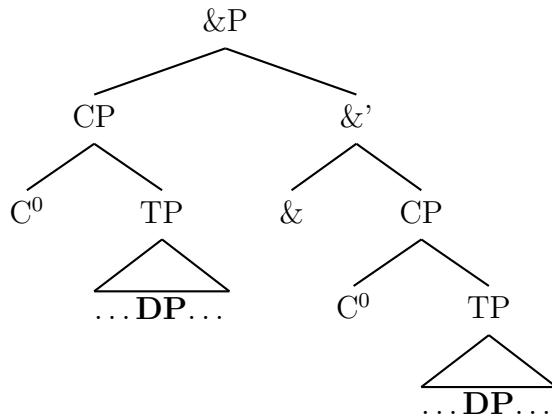
(16) *Coordination of TPs:*



- Subject DPs will not have been spelled out before the creation of &P.
- Object DPs (if any) will have been spelled out on vP phase⁴– subsequently inaccessible to syntax.
- Only subjects spelled out together on higher cycle.

⁴For concreteness I label the complement of v^0 “VP” – it could just as easily be a lower functional head in the vP domain, or a category-neutral root.

(17) *Coordination of CPs:*



- Complement of C^0 spelled out prior to creation of $\&P$.
- Subject DPs never visible within the same cycle.

- The cyclic view of spell-out thus gives us a way in which the subjects of TPs should be able to “see” one another, while the subjects of CPs cannot.
- What remains is to explain why, once they can “see” each other, DPs cannot corefer.

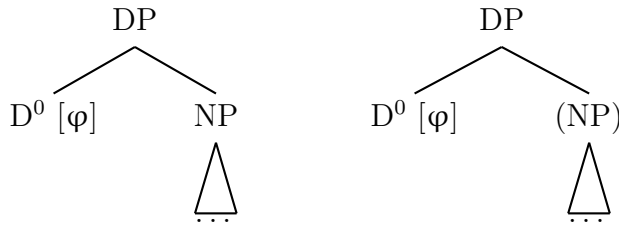
3.2 What kind of similarity matters?

- I propose that the notion of “similarity” that gives rise to all the cases of ungrammaticality discussed here is actually (syntactic) **identity**.
- **A strong but justified assumption:** there is no morphological or phonological content in the syntactic component.
 - As a hypothesis, can be traced back to the Principle of Phonology-Free Syntax (Zwicky, 1969; Pullum and Zwicky, 1986)
 - Also instantiated by post-syntactic theories of morphology, such as DM (Halle and Marantz, 1993, 1994, et seq.)⁵
- Given these assumptions, syntax should only be able to tell two DPs apart on the basis of their structure or formal properties.
- So could syntax distinguish a DP from a coreferential pronoun?
 - A referential DP would consist of a D^0 with some set of φ -features, with an already-spelled out complement, as in (18a)
 - A referential pronoun would similarly consist of a D^0 (Abney, 1987) – possibly also with an already-spelled out (but silent) nominal complement (Panagiotidis, 2002)⁶, as in (18b)

⁵Within a cyclic (phase-based) approach to spell-out like the one I adopt here, post-syntactic morphology does not guarantee morphology/phonology-free syntax without the additional assumption that the syntax *also* does not have access to morpho-phonological material inserted on earlier phases.

⁶Elbourne (2005) makes a similar claim, specifically for donkey anaphora.

- (18) a. Referential DP b. Referential Pronoun



- ... these trees are identical
- If the two DPs bore all the same features, there would be no way to tell them apart (aside from a numeration index, perhaps)

But wait: we have seen that it is not merely that two subjects cannot have the same φ -features
 → a sentence is only ungrammatical if they also corefer:

- (19) What did Kim_{*i*} give Ramona_{*j*} and she_{**i/j*} read immediately?

- Referential indices have been argued not to occur in the syntax (Chomsky, 1995, a.o.)
- But this would give us no way to describe the identity restriction we see here.
- For the purposes of this talk I assume that referential indices are actually present in the syntax.⁷

Conclusion: referential pronouns are syntactically identical to their non-pronominal counterparts

→ differences are morpho-phonological and thus syntactically irrelevant.

Further Support: We have already seen that coreference is not *enough* to trigger ungrammaticality.

If one of the coreferring DPs bears an emphatic reflexive, or is an epithet, grammaticality improves:

- (20) a. (?) What did the queen commission and she herself never see finished?
 b. (?) What did the queen herself commission and she never see finished?
 (= (13))

- (21) (?) Has [Scott made a fool of himself] and [the bastard faced the consequences]?
 (= (14b))

- These are precisely cases where it seems reasonable to suppose that the coreferring DPs bear different features: differ in focus or emotive content.

⁷There are other options available. McGinnis (2004) proposes that numeration indices can be repurposed in the course of a derivation to indicate syntactic binding; we could extend this idea and use numeration indices to indicate reference more generally. In a different vein, we could represent reference through a syntactic feature rather than an index, as in Hicks (2009).

3.3 Why would identity matter?

The remaining question: Why would it matter if two DPs were formally identical?

We know that the narrow syntax can distinguish two identical heads – i.e. identical instances of *the* – so why would anything go wrong here?

A recurring idea: Many people have proposed that natural language isn't actually very good at telling similar or identical things apart.

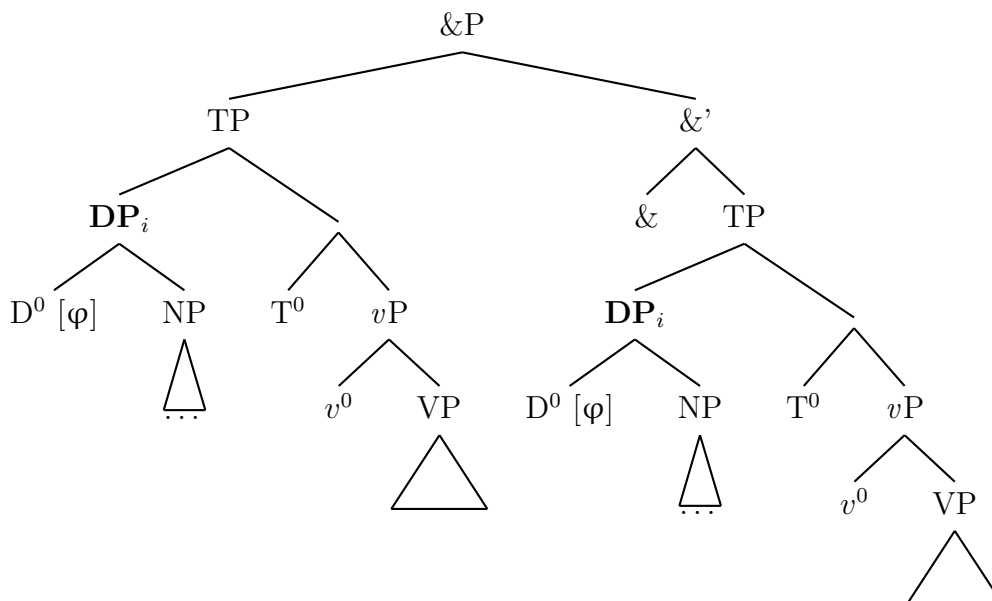
Or rather, narrow syntax can distinguish identical or near-identical objects, but post-syntactic components cannot.

- Both Copy and Internal Merge views of movement require that we be able to distinguish two tokens of the same type from one token that happens to occur in two places.

The idea of a numeration index is one way of capturing this distinction.

- But there is a body of work suggesting that beyond the narrow syntax, confusion arises when elements (particularly DPs) are similar or identical:
- A few representative examples:
 - McGinnis (2004) “Lethal Ambiguity”: when a trace / lower copy has two potential antecedents, one c-commanding the other (no identity at LF)
 - Reuland (2011) “Impossibility to Distinguish Indistinguishables”: a transitive predicate cannot be saturated by two identical variables (no identity at LF)
 - Richards (2010) “Distinctness”: Linearization cannot order an element with respect to itself – and linearization is very bad at telling things apart (no identity at PF)
- With this in mind, consider again the structure underlying the ungrammatical sentences of interest:

(22)



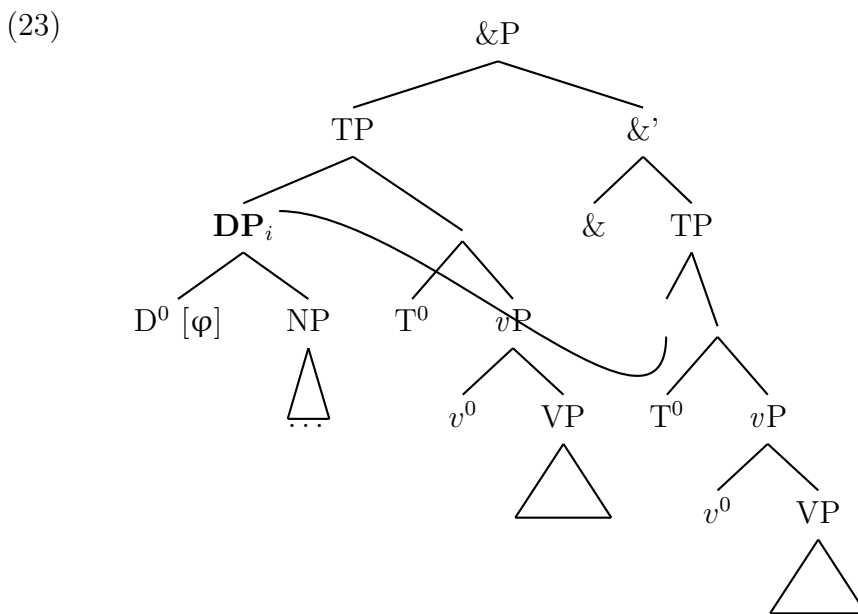
- There is every reason to think that the syntactic component has the resources to deal with this representation (i.e. via different numeration indices on the two subject DPs)⁸

⁸A more radical idea, and one that I do not pursue here, is that these DPs cannot be distinguished in the

- There is also every reason to think that this structure is semantically interpretable, especially as the identical DPs do not c-command one another.
- What about morphological/phonological interpretability?
 - Several authors have proposed that a key step (perhaps the first step) at the PF interface is **linearization** – and that this linearization is crucially cyclic (Fox and Pesetsky, 2005; Richards, 2010)
 - A general theme of this work is that a derivation will crash if linearization creates any statements of the form $\langle \alpha, \alpha \rangle$, ordering an element with itself.
 - Richards (2010) articulates a particularly strong restriction on linearization, suggesting that it fails if it has to order any two elements with the same *label*.

This is too strong to account for the data in this paper – would potentially rule out all coordination of TPs, not only those with coreferent subjects.

- Pursuing the idea that it is linearization that encounters a problem with the configuration in (22), however, consider that coordinate structures have also been claimed to allow multidominant representations (Citko, 2005; Gracanin-Yuksek, 2007, as well as earlier work)
- (23) is therefore in principle possible alongside (22):



- I assume that the narrow syntax can tell these two structures apart.
- But can a post-syntactic linearization component? **Maybe not.**

Proposal: Linearization is unable to (unambiguously) distinguish two structurally identical DPs.

- This could simply lead to indecision between the structures in (22) and (23)– in which case this might be a Lethal Ambiguity (as in McGinnis, 2004)

narrow syntax – in which case we could suggest that any given sub-numeration in fact *cannot* contain truly identical elements. Any apparently identical objects must instead be featurally or referentially distinct in some way.

- Alternatively, linearization might uniformly resolve the ambiguity in favour of the multidominant structure in (23)

Such a structure would itself be unlinearizable, due to the impossibility of linearizing multiply-dominated phrases *in situ* (Citko, 2005, 2011)

- The basic idea, though, is that if we consider linearization to occur *outside* the narrow syntax, we expect that it might be blind to distinctions visible in the narrow syntax.

3.4 Other non-phase conjuncts

- If the ungrammaticality we've seen is due to the status of certain conjuncts as non-phases, we should find its effects elsewhere.
- One candidate: *vP*-internal coordination.
- To test the prediction we need conjuncts that are unambiguously smaller than *vP* (i.e. do not contain a verb).
- The candidate: coordinated double objects.

- (24) a. Sue [gave Petunia_{*i*} a minivan] and [gave her_{*i*} the key (as well)]
 b. *Sue gave [Petunia_{*i*} a minivan] and [her_{*i*} the key (as well)]
 c. Sue gave Petunia [a minivan] and [the key]

- The prediction seems to be borne out – at least pending a conclusion on which head in the *vP* domain is a phase head.

3.5 Summary of the Analysis

This section has proposed that **cyclic linearization** lies at the heart of this restriction on TP coordination.

Several parts of the analysis:

- The subjects of coordinated TPs are not spelled out prior to the creation of &P.
- Referential pronouns are structurally indistinguishable from full DPs with which they corefer.
- Though narrow syntax can potentially tell identical tokens apart, post-syntactic linearization cannot.
- When two such DPs occur in a single phase – as is the case in TP coordination – the derivation crashes.

What we're going to see next: Potential interactions with other properties of TP coordination, motivating some odd properties of so-called "SLF" coordination.

4 Extension: SLF Coordination

- The proposal in section 3 has implications for what has been called the SLF (*Subjektücke in finiten Sätzen/Subject Gap in Finite*) coordination construction (Höhle, 1983, 1990)
- In SLF coordination, the first conjunct is V2 with a non-subject topic, while the second conjunct is verb-initial and contains a subject gap:

(25) In den Wald ging der Jäger und fing einen Hasen.
in the wood went the hunter and caught a hare
“The hunter went into the woods and caught a hare.”

(26) Das Gepäck ließ er fallen und rannte zum Hinterausgang.
the.ACC luggage let he fall and ran to-the rear-exit
“He dropped the luggage and ran to the rear exit.” (Heycock and Kroch, 1994)

- Despite no longer being V2, English also exhibits a fossilized version of this construction in the nursery rhyme *The Itsy-Bitsy Spider* (David Pesetsky, p.c.):

(27) [Down came **the rain**] and [*e* washed the spider out]
[Out came **the sun**] and [*e* dried up all the rain]

- Key properties of SLF coordination:
 - It is used to express semantically asymmetric meanings
 - It requires coreferential subjects, but the second cannot be overt
- I argue that these are **both** properties of TP coordination.
- Independent properties of languages with SLF coordination (i.e. V2 requirements) mean that there’s essentially no option but for it to exhibit odd properties.

4.1 Existing approaches

- The puzzle of SLF coordination is what Johnson (2002) calls the **size paradox**:
 - The conjuncts must be small enough to exclude the subject, to explain why it is not overt in the second clause.
 - The conjuncts must be large enough to contain the subject, because it lacks reconstructed readings generally available to ATB-extracted subjects (Johnson, 2002, citing Buring and Hartmann 1998).
 - The conjuncts must be small enough that the second does not exhibit V2.
 - The conjuncts must be large enough that the first does exhibit V2.

- Existing analyses of this construction all resolve this paradox in variously odd ways:
 - Heycock and Kroch (1994):** In SLF coordination, the first conjunct is an I' and the second conjunct is a C'.
 - Büring and Hartmann (1998):** Conjuncts in SLF coordination are CPs, though the second must have a subject topic and this topic must undergo topic drop.
 - Johnson (2002):** Conjuncts in SLF coordination are smaller than TP, and a curious account of the Coordinate Structure Constraint allows some (but not all) non-ATB extraction.
- My goal here is not to decide among these analyses, or to offer a better one.
- Instead: explain why SLF coordination would exhibit odd properties in the first place.

In outline:

- The asymmetric interpretations characteristic of SLF coordination requires TP – or at least smaller – conjuncts (Bjorkman, 2010, to appear-)
- Following the proposals in section 3, however, TP coordination does not allow coreferent subjects.
- Unlike English, V2 languages do not always have the option of retreating to VP coordination: a non-subject topic will necessarily violate the CSC.

4.2 The link between clause size and asymmetric coordination

- As is well known, coordination allows temporally and causally asymmetric interpretations:

- (28)
- I turned off the lights and the room went dark.
 - The horse threw Alan and he broke his arm.
 - We sat down and the movie started.

- In (28), the relationships between the conjuncts are semantically asymmetric.
- There is also a syntactic asymmetry: unlike logical/symmetric coordination, meaning is not preserved when the conjuncts are reversed:

- (29)
- The room went dark and I turned off the lights.
 - Alan broke his arm and the horse threw him.
 - The movie started and we sat down.

- These facts have traditionally received a pragmatic analysis (Grice, 1975; Schmerling, 1975; Bar Lev and Palacas, 1980; Carston, 1993, a.o.)
- However, in embedded contexts we can see that asymmetric interpretations have a syntactic correlate: TP coordination (Bjorkman, 2010, to appear-)
- The sentences in (30) (with TP coordination) are not equivalent, while the sentences in (31) (with CP coordination) are.

- (30) *TP coordination: non-equivalent under reversal*
- a. Wallace reported that [the subway broke down] and [he was unable to get to work].
 - b. Wallace reported that [he was unable to get to work] and [the subway broke down]
- (31) *CP coordination: equivalent under reversal*
- a. Wallace claimed [that the subway broke down] and [that he was unable to get to work].
 - b. Wallace claimed [that he was unable to get to work] and [that the subway broke down]

Conclusion: the interpretation of *and* depends on the semantic type of its arguments.

- It is TP coordination that is required for asymmetric interpretations – not only in embedded contexts, but also in matrix coordination.

4.3 Back to SLF coordination

- If asymmetric interpretations really do require smaller conjuncts: given its interpretation, this requirement would apply to SLF coordination
- This creates a conflict in requirements:
 - to preserve coreference, need to insulate subjects within larger (CP) conjuncts
 - to preserve an asymmetric interpretation, need to maintain smaller (TP) conjuncts

Suggestion: SLF coordination has the odd properties it does because there is no other way to express desired meanings.

CP conjuncts: Large enough to allow subject coreference, but too large for asymmetric interpretations.

TP conjuncts: Small enough for asymmetric interpretations, but too small for coreference, and also require non-ATB movement of both a topic XP (OK) and an X^0 (!) to satisfy V2 requirements.

VP conjuncts: Small enough for asymmetric interpretations, but require *both* non-ATB movement of a topic XP *and* ATB movement of the subject to Spec-TP.

Though asymmetric coordination generally allows violations of the CSC (Goldsmith, 1985; Lakoff, 1986), coordination never appears to allow *both* ATB and non-ATB movement out of a single conjunct (Postal, 1998)

So what to do? One way of framing the puzzle posed by SLF coordination is that we find what looks like an obligatory null subject in a language otherwise lacking null subjects.

Within the approach developed in this paper, we can motivate this *pro*-drop / topic-drop provides a repair mechanism for the linearization conflict posited in section 3

5 Conclusion

What We've Seen

- A previously unnoticed ban on coreferential subjects in TP coordination
- An explanation framed in terms of cyclic linearization:
 - Co-referential DPs (including referential pronouns) are formally identical in the narrow syntax
 - Two such DPs cannot be linearized on the same phase, because the linearization mechanism cannot distinguish them from one another
 - The subjects of coordinated TPs are spelled out (and thus linearized) on the same phase
 - The subjects of coordinated CPs are already spelled out prior to the construction of &P, and so can corefer without any issues
- A further suggestion that this account might bear on the analysis of SLF constructions, given an association between asymmetric interpretations for coordination and TP conjuncts (Bjorkman, 2010, to appear-).

Implications:

- Support for absence of certain information outside the narrow syntax: linearization is easily confused
- Reference visible in the syntax *and* at linearization
- Cyclic spell-out, including cyclic linearization

Remaining Questions:

- Matrix TPs
- Finite embedding
- Quirky subjects

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