

In defense of cyclic coordination structures: The view from German*

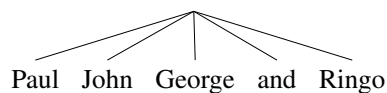
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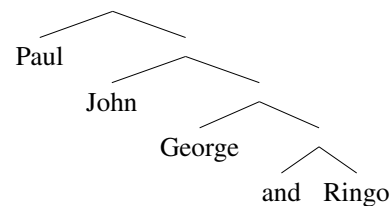
1. Two structures for coordination

The literature on the syntactic structure of coordination contains a long-standing discussion about the question as to whether coordination is symmetrical/flat or asymmetric/hierarchical in nature. A flat structure such as the one below in (1) has been argued for by i.a. Chomsky (1965), Dik (1968), Borsley (2005), whereas a hierarchical structure has been proposed by Munn (1993), Zoerner (1995), Johannessen (1998), Zhang (2010), Weisser (2015).¹

(1)



(2)



And while most works within the Minimalist Program seemed to converge on the asymmetric, binary branching structure in (2), a number of recent developments have cast some doubt on the empirical validity of the arguments put forward for it. Johannessen (1998), for example, argues based on numerous facts from case marking and agreement asymmetries that there is an asymmetric c-command relation between the conjuncts. However, many of her arguments were subsequently shown to be the result of allomorphy or ellipsis rather than due to a structural asymmetry (Weisser 2020).

*We would like to thank the audience of NELS 54 and the editors of the proceedings of that meeting. All omissions and mistakes are our own.

¹There is of course a wide variety of asymmetric proposals not all of which agree with the structure in (2). For overviews, see Progovac (1998a,b), Nevins and Weisser (2019).

In a recent paper, Ke et al. (2023) revisit Munn's (1993) binding examples (3) and argue that the the alleged binding asymmetries are not indicative of a structural asymmetry but are rather due to instances of logophoricity.

- (3) a. every man_i and his_i dog
b. *his_i dog and every man_i (Munn 1993)

The arguments put forward by Ke et al. (2023) rest on two observations: first, they observe that the alleged binding relation only holds between the first and all immediately following conjuncts. The first conjunct can, for example, not bind a pronoun in the third conjunct if a second conjunct intervenes that is not involved in the binding relation, (4b). In a structure like (2), the first conjunct should c-command the second one and the third one alike and thus, binding should be possible.

- (4) a. The board is discussing each tutor_i, their_i students and the textbook.
b. *The board is discussing each tutor_i, the textbook and their_i students
(Ke et al. 2023)

The second observation is that examples parallel to (3) with an inanimate binder are ungrammatical, (5).

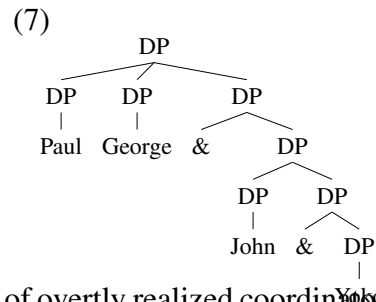
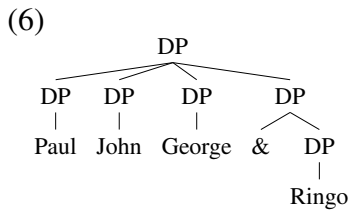
- (5) *They couldn't stop thinking about the castle_i and the pictures of itself_i.
(Ke et al. 2023)

As Ke et al. (2023) argue, proper binding relations with inanimate binders are perfectly fine (*'Every picture_i goes in its_i frame'*) but since inanimate elements cannot function as logophoric centres (see Charnavel 2021), examples like (5) are ungrammatical. This in turn indicates that the alleged binding asymmetries in coordination are due to logophoricity rather than binding and since logophoricity does not require c-command, Munn's data are not indicative of a syntactic asymmetry.

2. Neeleman et al. (2023)

The second paper that recently questioned the assumption about structural asymmetry in coordination constructions is Neeleman et al. (2023). Neeleman et al. (2023) assume that coordination is an instance of mutual adjunction of coordinands and as such flat and not necessarily binary. Slightly modifying the flat approach discussed above, they assume further that the coordinator is a functional head attached to the last coordinand in the flat coordination sequence as shown in (6). Crucially, however, Neeleman et al. (2023) propose that, since syntax is inherently recursive, nothing prohibits the generation a subgrouping structure in (7) in addition to (6):

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The structures (6) and (7) differ in the number of overtly realized coordinators. Since Neeleman et al. (2023) assume that a coordinator attaches to the final conjunct in each level of embedding, the subgrouping structure (7) can be diagnosed by having more than one overt coordinator. These structures also differ in that the top level coordination consists of three conjuncts in (7) and of four conjuncts in (6). This means that processes referencing the number of conjuncts should distinguish between the flat and recursive, hierarchical structures. Neeleman et al. (2023) use data from Borsley (2005) in (8) and (9) to argue that this is borne out. The element *both* for example requires exactly two conjuncts and thus, it is only compatible with a three-conjunct configuration if it is a subgrouping structure, i.e., when the top level coordination actually only contains two conjuncts, as (8a,b). True three-conjunct structures, identifiable by having only one overt coordinator, are incompatible with *both*, (8c).

- (8)
- a. both [Tom and [Dick and Harry]]
 - b. both [[Tom and Dick] and Harry]
 - c. *both Tom, Dick and Harry
- (Borsley 2005)

Similarly, an element like *respectively* requires a one-to-one mapping of the agent and the patient in examples like (9). And since there are *two girls* as the patient of the event, the agent argument must consist of two parties, which is only possible in a subgrouping structure in (9a) but not in (9b).

- (9)
- a. The two girls were seen by Hobbs and Rhodes and Barnes, respectively.
 - b. *The two girls were seen by Hobbs, Rhodes and Barnes, respectively.
- (Borsley 2005)

Crucially, in a flat coordination structure with optional subgrouping, such a difference can be expressed, but in an asymmetric structure where subgrouping is, in a sense, the standard case, it is much harder or even impossible to express that difference.

A second argument that Neeleman et al. (2023) provide comes from adverbial and adjectival modification with three-conjunct coordinations to show that, with only one coordinator present (and hence no structural subgrouping), no non-trivial proper subset of conjuncts can be in the scope of the adjective. In a binary branching, asymmetric structure like (2), it should be possible to adjoin the adjective to an intermediate subconstituent. This subgroup could be the initial conjunct, as tested in (10), or the final one, as tested in (11).

(10) Mary will buy yellow crocuses, pansies and tulips.

- a. [[yellow crocuses] pansies and tulips]
- b. [[yellow crocuses, pansies and tulips]]
- c. *[[yellow crocuses, pansies] and tulips]

(Neeleman et al. 2023:72)

(11) Mary will buy crocuses, yellow pansies and tulips.

- a. [[crocuses, [yellow pansies] and tulips]
- b. *[crocuses, [yellow pansies and tulips]]

(Neeleman et al. 2023:71)

The unavailability of the readings where the adjective scopes over a subgroup in (10c) and (11b) suggests that there is no constituent that includes two of the DPs but excluded the third, which goes directly against the asymmetric structure in (2).

Following the argumentation by Ke et al. (2023) and Neeleman et al. (2023), we have now arrive at the following corollary:

(12) *Corollary of flat coordination (Coflac):*

A n-ary coordination structure that involves only one overt coordinator must have a flat structure and thus does not allow for subgrouping.

In what follows, we will present four arguments from two aspects of coordination that indicate that (12) does not hold for German.

3. Arguments against Coflac in German

3.1 Ellipsis in Compounding

The first argument comes from Suspended Affixation (SA) in compounds, a phenomenon where a morpheme can take scope over a coordination despite surfacing only in one conjunct. We take SA to be a type of ellipsis, but remain agnostic regarding its details (see e.g., Booij 1985, Pounder 2006, Kenesei 2007, Müller in prep. for discussion). As a starting point, the examples in (13) illustrate that deletion of part of a compound is possible in the initial or non-initial conjunct in German.

- (13) a. [Apfel-bäume und Kirsch-bäume]
apple-trees and cherry-trees
'apple trees and cherry trees'
- b. [Herren-gürtel und Herren-schuhe]
gentlemen-belts and gentlemen-shoes
'belts and shoes for men'

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In coordinations with three conjuncts and only one overt coordinator, this type of deletion can affect all three conjuncts, (14a), or, crucially, only two of them. This is unexpected under (12). In a flat coordination, a deletion process should affect either all or none of the conjuncts. However, SA can successfully apply only on the rightmost two nouns in (14b,c), contrasting with the impossible subgrouping in (11b) above.²

- (14) a. [Apfel-bäume, Kirsch-bäume und Birn-bäume]
apple-trees cherry-trees and pear-trees
'apple trees, cherry trees and pear trees'
- b. Holunderbüsche, [Kirsch-bäume und Birn-bäume]
elder.bushes cherry-trees and pear-trees
'elder bushes, cherry trees and pear trees'
- c. Damenhandtaschen, [Herren-gürtel und Herren-schuhe]
lady.handbags gentlemen-belts and gentlemen-shoes
'women's handbags, men's belts and men's shoes'

This suggests that this type of ellipsis can pick out a subconstituent in the coordinate structure.³ Note that mere linear adjacency of the conjuncts is not enough to license SA. SA cannot apply on the leftmost two conjuncts, (15).

- (15) a. *[Apfel-bäume, Kirsch-bäume] und Holunderbüsche
apple-trees cherry-trees and elder.bushes
- b. *[Herren-gürtel, Herren-schuhe] und andere Lederwaren
gentlemen-belts gentlemen-shoes and other leather.goods

²If a subgrouping reading is in principle available in German, we predict the German equivalent of (11b) modifying a subconstituent to be grammatical. We have the impression that this is correct, (i).

- (i) *Context: Antonia is very specific about drinks. At her wedding, she will only allow three types of drinks on the menu.*

Auf der Hochzeit gibt es lediglich schwedischen Schnaps, bayrische Biere und Weine.
at the wedding will.be EXPL exclusively Swedish liquor Bavarian beers and wines
'At the wedding they will only serve Swedish liquor, Bavarian beers and Bavarian wines.'

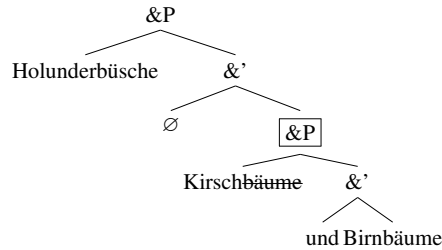
³Neeleman et al. (2023:fn. 13) note that it is possible to parse structures like (11b), (14) as asyndetic conjunctions, which they claim are associated with a meaning of incompleteness or open-endedness and have a distinct prosodic profile. Neither of these properties are necessary for the examples of SA above. Even if a context controls for incompleteness, the modification of a subconstituent is possible, (i).

- (i) *Our garden designer insisted that we have a maximum of three different kinds of plants in our garden:*

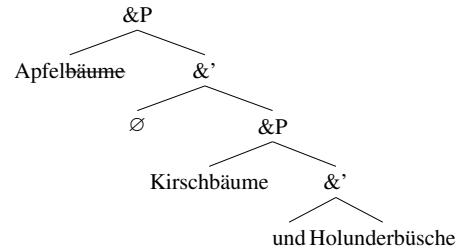
Wir haben uns für Holunderbüsche, Apfel- und Kirschbäume entschieden.
we have us for elder.bushes, apple- and cherry.trees decided
'We opted for elder bushes, apple trees and cherry trees.'

The contrast between (14) and (15) can be accounted for if the underlying structure of the coordination is complex and binary branching: Suspended Affixation applies cyclically to a constituent (&P in (16), from the bottom up, but cannot apply to a non-constituent, (17).⁴ A flat adjunction structure where no constituent c-commands another (Neeleman et al. 2023:59) would provide us with no handle to explain why (18) is grammatical but (19) is not.

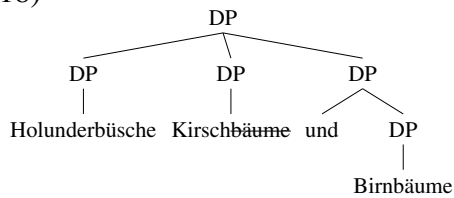
(16) ✓Ellipsis inside an XP



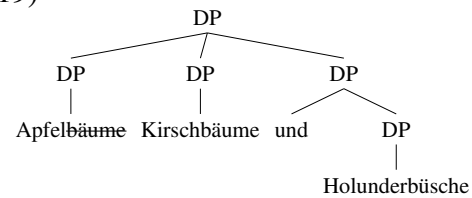
(17) ✗Ellipsis in a non-XP



(18)



(19) *



In sum, Suspended Affixation in three-conjunct coordinations of German compounds reveals internal hierarchy in the coordinate structures, even though there is only one overt coordinator, and thereby goes directly against *Coflac* in (12).

3.2 Interactions between *and* and *but*

Our second set of arguments come from the prosody and interpretation of adversative coordination (i.e., coordination with *but*) with three conjuncts. First, note that a non-overt coordinator must generally be semantically identical to an overt coordinator, (20).

- (20) a. Ringo \emptyset Paul or George
 \neq Ringo *and* Paul or George
- b. Ringo \emptyset Paul and George
 \neq Ringo *or* Paul and George

In a flat coordinate structure this follows directly (Neeleman et al. 2023:66): there is only one coordination, marked by one overt coordinator, which naturally has a uniform interpretation (either conjunctive or disjunctive). Mixing of conjunction and disjunction is only possible with a complex recursive structure like (7), which is marked by multiple overt coordinators, e.g., *[[Ringo or Paul] and George]*.

⁴See section 4 for more on the ungrammaticality of (15).

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Interestingly, German adversative coordinate structures with one overt coordinator do not adhere to this generalization⁵ Instead, they show the opposite pattern: the non-overt coordinator must not be semantically identical to *but*, but can only be interpreted as a conjunction, (21).⁶

- (21) Ich habe Ringo \emptyset Paul \emptyset John aber nicht George getroffen.
I have Ringo Paul John but not George met
'I met Ringo, Paul, John but not George.
*Ringo *but* Paul *but* John but not George
✓Ringo *and* Paul *and* John but not George

Thus, (21) does not show a uniform single-structure interpretation, but instead suggests that a conjunctive coordination is combined with an adversative coordination.

The second argument comes from the distribution of negation with corrective *but*. Horn (1989), Vicente (2010) note that corrective *but* requires sentential negation in the first conjunct, (22). The distribution of this negation in three-conjunct coordinations follows straightforwardly from a cyclic derivation.

- (22) a. This is not probable but merely possible.
b. *This is improbable but merely possible. (Vicente 2010:384)

The German examples in (23) illustrate that the sentential-negation requirement holds here as well. Note that corrective *but* is lexicalized as *sondern* in German, while *aber* lexicalizes the counterexpectational reading.

- (23) a. Es ist nicht wahrscheinlich sondern lediglich vorstellbar.
It is not likely but merely imaginable.
b. *Es ist unwahrscheinlich sondern lediglich vorstellbar.
It is unlikely but merely imaginable.

With three or more conjuncts, the pattern of where negation surfaces is exactly as we would expect it from a cyclic approach. The negation requirement is introduced by the subconstituent that is headed by the corrective coordinator (*sondern*). Within this *sondern*P, the

⁵This is similar to what Wagner (2008) found for disjunctions under negation, (i). Since a polarity contrast is also involved in (20) but not (19), negation seems to play some role here. We leave this issue for future research.

- (i) No weapons, no drugs or any money were found there.
≠ No weapons, or no drugs or any money were found there. (Wagner 2008:12)

⁶Note that (20) and (21) involve the *counterexpectational* flavor of *aber* 'but' (Vicente 2010). Counterexpectational *but* introduces an implicature that the second conjunct is unexpected given the first conjunct. For instance, in (21) it is unexpected that I haven't met George, given that I have met all the other Beatles. This is relevant since only counterexpectational *but* allows coordination of DPs, while corrective *but* involves CP-coordination and ellipsis (Vicente 2010).

first conjunct must contain a negation, parallel to (22) and (23). In a cyclic approach, we would expect that the requirement for a negation falls on the penultimate conjunct in a three-conjunct configuration, since this conjunct is the first one within the &P headed by *sondern*. This is indeed what we find, (24).

- (24) a. Es ist [[etwas unplausibel], [*sondern*_P [nicht wahrscheinlich] sondern
It is somewhat implausible, not likely but
[lediglich vorstellbar]]].
merely imaginable.
- b. *Es ist [[nicht wahrscheinlich], [*sondern*_P [etwas unplausibel], sondern
It is not likely, somewhat implausible but
[lediglich vorstellbar]]].
merely imaginable.

In a flat approach, one would have to stipulate that the conjunct immediately to the left of *sondern* must contain a negation. It is unclear why linear adjacency should play a crucial role here, especially because it is the conjunct to the right of the coordinator that forms a constituent with it.

Third, the prosodic profile of ternary adversative coordination indicates that there is a subgrouping of two conjuncts. Consider first conjunctions as in (25). Wagner (2010) shows that coordinations with one overt coordinator can have a flat prosody, i.e., the breaks between the conjuncts are equally long, (25a). If there is a second overt coordinator, there is a stronger prosodic boundary, i.e., a longer break, indicating embedding, (25b).

- (25) a. A | (and) B | and C = [A and B and C]
b. A || and B | and C = [A and [B and C]] (Wagner 2010:186)

The flat prosodic structure in (25a) is incompatible with German adversative coordination, see (26).

- (26) a. Ich habe Ringo ∅ Paul aber nicht George getroffen.
I have Ringo Paul but not George met
'I met Ringo and Paul but not George.'
- b. ✗Ringo | Paul | aber nicht George [R P ¬G]
c. ✓?Ringo | Paul || aber nicht George [[R P] ¬G]

One of the breaks needs to be longer than the other. However, judgments here are very subtle. We have the impression that the longer break is situated between conjuncts 2 and 3, as in (26c), rather than between 1 and 2, but an in-depth analysis of the prosodic profile is beyond the scope of this paper. The important point here is that while conjunctions with one overt coordinator are associated with a flat prosody, we observe exactly the opposite for adversative coordination: the flat profile is not possible, going directly against (12).

3.3 Interim summary

In sum, four novel observations from two aspects of coordination in German suggest that subgrouping structures of three-conjunct coordinations are available. We have seen that (i) subword deletion in compounds can pick out a subconstituent, suggesting internal complexity of the coordinate structure, (ii) the interpretation of a covert coordinator is not identical to an overt one in adversative coordination which again indicates a complex internal structure, (iii) the distribution of negation with corrective *sondern* ‘but’ indicates a cyclic, bottom-up derivation, and (iv) the only possible prosody (or prosodies) of adversative coordination suggests a hierarchical, non-flat syntax. We argue that the Coflac (12) does not hold for German. This leaves us with two possible conclusions (A) we could take our argumentation to indicate that Neeleman et al.’s (2023) approach is wrong, and that coordinate structures are uniformly binary. On the other hand, (B), our observations actually only show that subgrouping is possible without a second overt coordinator, i.e., that Neeleman et al.’s diagnostic for flat structures does not work for German. The German data are still compatible with an approach in which coordinations can be either flat or hierarchical. In the final section, we will explore the stronger claim (A) and aim to demonstrate that properties associated with flat structures can be accounted for in a uniformly binary branching, cyclic analysis inspired by Wagner (2010).

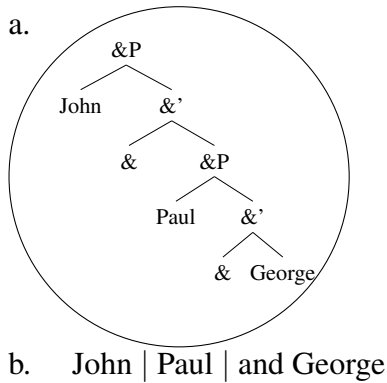
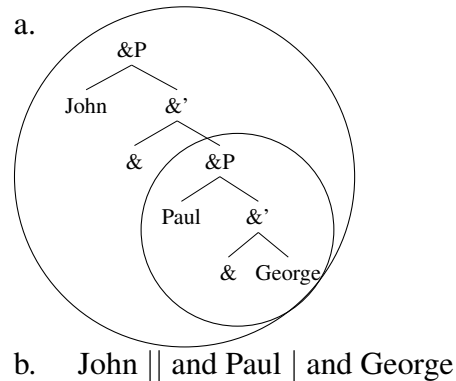
4. Analysis: Derivational cycles

In a nutshell, we propose that subgrouping properties are derived by derivational cycles rather than by syntactic hierarchy directly.

Recall Wagner’s (2010) observations about the prosodic profiles of coordinate structures in (25b): coordinations with one overt coordinator are associated with equal intonational breaks, whereas coordinations with multiple overt coordinators are associated with stronger prosodic boundaries. Wagner (2010) argues that a flat prosody does not necessarily stem from a flat syntax. He proposes an analysis in which coordinate structures are obligatorily binary branching, and in which derivational cycles differentiate between flat/non-flat properties. (27) illustrates a single-cycle derivation in which the &P gets a prosodic structure as a whole, resulting in the flat profile. (28) shows a two-cycle derivation: &P_i is created in a first cycle and merged with &P_{ii} in a second one. The prosody mirrors the syntactic cycles with a longer break, see Wagner (2010).⁷

(27) *Single-cycle derivation*

⁷Wagner (2010) has nothing to say about the link of the prosody with the number of overt coordinators.

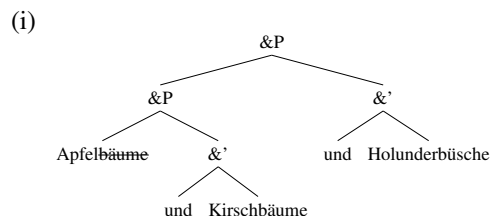
(28) *Two-cycle derivation*

We adapt and extend his proposal in the following way: to account for the syntactic properties of flatness, we propose that some but not all coordination heads are cyclic (marked as $\&^*$), i.e., they trigger Spell-out of the entire $\&P$ that they head. The most interesting and most difficult question concerns the link between flatness and the number of overt coordinators. In English, the generalization seems to be that the lowest $\&$ within a cycle is pronounced. In a configuration with multiple stacked $\&P$ s within the same cycle, all non-lowest $\&$ s remain unpronounced. We can formally model this with a simple allomorphy rule in (29): It deletes a coordinator head whose sister is another $\&P$.

(29) $\& \rightarrow \emptyset / \&P$

(30) shows a single cycle derivation. Spell-out of $\&P_2$ is triggered by the cyclic $\&^*$ head. According to (29), this $\&^*$ will not be pronounced overtly, since its sister is another $\&P$, resulting in the string *John, Paul and George*. (31) shows a structure in which both coordinators are cyclic. Since $\&P_1$ is Spelled-out in its own cycle, it will not be visible to the higher $\&^*$ head, thereby bleeding application of (29). The resulting string contains both overt coordinators: *John and Paul and George*.⁸

⁸This mechanism derives a direct connection between the number of cycles and the number of coordinators. Recall that German differed from English here: it allows subgrouping, i.e., double-cycle readings, with a covert higher $\&$. To account for the variation between German and English we have to assume that $\&P$ s may remain accessible in German. However, (29) correctly forces subgrouping in the leftmost conjunct to be derived in two cycles even in German. To illustrate, recall ex. (14b). It could in principle have a left-subgrouping structure like (i). In such structures, the rule in (29) cannot apply, since no $\&$ head has a $\&P$ as its sister. Indeed, subword deletion is only possible if both coordinators are overt, (ii).



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