Modal adverbs, conjunction reduction, and the structure of coordination*

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1   Introduction

The earliest generative analyses of coordination (Chomsky 1957:113; Gleitman 1965:273–274) took noun phrase coordination (1a) to be derived from clausal coordination via conjunction reduction (CR) (1b):

(1)   a.   John and Mary went to the store.
       b.   John ~~went to the store~~ and Mary went to the store.

This derivation is problematic in the case of so-called symmetric predicates (or non-Boolean coordination, cf. Schmitt 2021), where the distributive reading inherent to the underlying clausal conjunction is not available (*pace* Schein 2017):

(2)   a.   John and Mary went to the store together.
       b. * John went to the store together and Mary went to the store together.

This led Lakoff and Peters (1969:114) to propose an additional mechanism of straightforward noun phrase coordination (also Jackendoff 1977:51). But as Schmitt (2021:14) notes, this is unsatisfactory in view

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of the fact that languages invariably use the same conjunction for the two types of coordination (sentential *cum* CR and phrasal *sans* CR).

Moreover, as shown by Dougherty (1970/1971) and Lasersohn (1995), a sentential coordination *cum* CR analysis can be dispensed with for coordination with non-symmetric predicates as well. What needs to be explained, in that case, is the availability of a distributive reading (3b), in which John and Mary went to different stores or to the same store on different occasions:

(3)   John and Mary went to the store *can mean*

        a.   John and Mary went to the store together. (collective)
        b.   John went to the store and Mary went to the store.
                                                                (distributive)

As Lasersohn (1995) argues, the distributive reading of (3) can be analysed as residing in the semantics of the verb phrase. This is because predicates with plural (or conjoined) subjects can be taken to ambiguously predicate over groups or the individuals making up those groups (Lasersohn 1995:85). With symmetric predicates, only predication over groups is available (Lasersohn 1995:86). The distributive reading, then, can be accounted for without resorting to underlying sentential coordination.

The feasibility of a CR-analysis of coordination comes up in the analysis of conjunctions featuring a modal adverb, as discussed in Collins (1988) (hence called 'Collins conjunctions'):

(4)   John and perhaps Mary went to the store.

Since *perhaps* is a clausal modifier, an analysis involving reduction of underlying clausal coordination suggests itself (though Collins 1988:17f rejects it — rightly, as we will see). In this connection, it may be seen as relevant that (4) disallows symmetric predicates:

(5)   * John and perhaps Mary went to the store together.
        (cf. *John went to the store together and perhaps Mary went to the store together.)

On the assumption that (4) is derived via CR, the ungrammaticality of (5) could be explained through the absence of an underlying clausal

coordination source. But a CR-analysis is called into question again by cases like (6):

(6)   John, Bill and perhaps Mary went to the store together.

In this article I adduce additional arguments against a CR-analysis of examples like (4), supporting Collins (1988), though not necessarily his conclusion that *perhaps* modifies the conjunction *and* (Collins 1988:12). The analysis leads to a better understanding of the distribution of modal adverbs (Section 3), and casts doubt on the common conception of coordinate structures as being headed by the conjunction (Section 4).

2   Against conjunction reduction with Collins conjunctions

The following arguments intend to show that a conjunction reduction (CR) analysis of sentences like (4) is not just unnecessary, but in fact impossible, or at least very problematic. We will switch back and forth between English and Dutch, guided by the question of which language allows for a better exposition of the problem.

2.1   Word order problems

Consider the example in (7) of a Collins conjunction case from Dutch.

(7)   Jan   en   misschien   Marie   kom-en ook.
        John and   perhaps   Mary   come-PL also
        'John and perhaps Mary will also be there.'

If (7) were to be derived via clausal coordination and CR, the underlying structure would be (8). (The argumentation abstracts away from the verb morphology, which we assume is adjusted postsyntactically.)

(8)   Jan   kom-t   ook en Marie   kom-t   misschien ook.
        John come-3SG also and Mary come-3SG perhaps   also

But applying CR to (8) yields (9), not (7).

(9)   Jan   ~~kom-t   ook~~ en Marie kom-en   misschien ook.
        John come-3SG also and Mary   come-PL   perhaps   also

In (9), *misschien* 'perhaps' is in the wrong position. To make sure *misschien* precedes *Marie*, *misschien* would have to be fronted. But Dutch being a 'verb second' language, fronting of *misschien* would also trigger verb movement, yielding (10), also unsuitable.

(10) * Jan   ~~kom-t   ook~~ en misschien kom-en   Marie ook.
       John come-3SG also and perhaps   come-PL Mary also

One might suppose (with Chomsky 2000:37) that verb movement, like deletion, is a postsyntactic process, and that it takes place after CR. This would lead us to think that CR gives us the intermediate stage in (11), with verb placement and agreement adjusted subsequently to yield (7).

(11) * Jan   ~~ook   komt~~   en misschien Marie ook kom-en.
       John also come-3SG and perpaps   Mary   also come-PL

There are at least two problems with that idea.

First, verb second places the finite verb to the right of the first constituent (*misschien* in (11)), so even if verb placement is a postsyntactic operation, it would turn (11) into (10), not (7).

Second, the analysis would have to assume that verb movement follows ellipsis (now both considered to be postsyntactic operations), but this is not generally the case. Right Node Raising, for instance, can only take place when the verb has vacated its original clause-final position, as in (12a):

(12) a.   Jan   kook-t ~~de   groente~~   en Marie stoom-t
           John boil-3SG the   vegetables and Mary steam-3SG
                  de   groente.
                  the vegetables
           'John boils and Mary steams the vegetables.'

      b. *... dat   Jan   ~~de   groente~~   kook-t   en   Marie
            COMP John   the   vegetables boil-3SG and   Mary
                  de groente   stoom-t.
                  the vegetables steam-3SG
            Intended: '... that John boils and Mary steams the vegetables.'

Verb movement, then, may be postsyntactic, but it cannot be strictly ordered after ellipsis.

2.2   No clausal source

Dutch has a number of exceptive particles (*behalve* 'except', *uitgezonderd* 'with the exception of') acting like coordinating conjunctions (Klein 1985; Komen 1993):

(13)   Iedereen   behalve Jan   kwam   naar het   feest.
       everybody except John come:PAST.SG to   the   party
       'Everyone except John came to the party.'

As noted by Van der Heijden (1999:128), these exceptive expressions lack a clausal source on which CR could operate to yield sentences like (13).

(14) * Iedereen kwam naar het feest behalve Jan kwam naar het feest.

The correct expression would involve an embedded clause (which works with *behalve* but not with other expressions like *uitgezonderd*).

(15)   Behalve dat   Jan   naar het   feest kwam.
       except COMP John to   the   party come:PAST.SG
       'Except that John came to the party.'

Interestingly, these exceptive conjunctions can be modified by *perhaps*:

(16)   Iedereen behalve misschien Jan   kwam   naar het
       everybody except perhaps   John come:PAST.SG to   the
           feest.
           party
       'Everyone except perhaps John came to the party.'

This shows that expressions like *perhaps* can modify conjunctions in the absence of a potential underlying clausal source.

    Other elements modifying conjunctions also lack a clausal source for CR to operate on, either because the underlying clause would have to be an embedded clause, as with *behalve*, or because an underlying source is unavailable, as with *uitgezonderd*. The first category includes expressions like *ik sluit niet uit* 'I won't exclude [sc. the possibility]' and *alles wijst erop* 'all indications are', the second includes expressions like *met een kleine slag om de arm* 'with some hedging' and *wat helemaal leuk zou zijn* 'what would be especially good'. Space prevents me from

illustrating these here, but the problem for a CR-analysis of noun phrase coordination is clearly not an isolated case.

2.3 Obligatory narrow scope

Many observations indicate that *perhaps* in (4) has a narrower scope than would be expected if it were to modify an underlying clause in a CR-analysis. Consider the following real-life example.

(17)   This twelve point lead and perhaps victory for Ohio State is going to be in large part due to the play of Cotie McMahon.
                (Rebecca Lobo, ESPN, March 25, 2023 with 1:10 left to play
                    in the NCAA Women's Basketball Championship Sweet
                        Sixteen matchup between Ohio State and Connecticut)

Here *perhaps* narrowly modifies *victory*, in keeping with commentators' tradition of allowing for spectacular turns of events with just seconds left in the game (as noted by Rullmann, p.c.). On a CR-derivation, *perhaps* would wrongly modify the attribution of the victory to McMahon's play:

(18) # This victory for Ohio State is perhaps going to be in large part due to the play of Cotie McMahon.

Here's another example, from Dutch:

(19)   Jan   en   misschien Marie krijg-en zeker   een beurs.
       John   and   perhaps   Mary   get-PL   certainly a   grant
       'John and perhaps Mary will certainly get a grant.'

This sentence can be used to describe a situation where there are various stages in the selection process for a particular grant, and it is certain that Jan has reached the final, decisive stage, where applicants are certain to obtain their grant, but it is not yet certain, though by no means excluded, that Mary will reach that stage. The source sentence for the CR-derivation would be the anomalous (20).

(20) # Misschien   krijg-t   Marie   zeker   een   beurs.
       perhaps   get-3SG   Mary   certainly a   grant
       'Mary will perhaps certainly get a grant.'

In (20), *misschien* 'perhaps' and *zeker* 'certainly' provide conflicting modifications of the clausal predication 'Mary gets a grant'. This conflict is absent in (19), indicating that *misschien* in (19) does not have sentential scope. Rather, what (19) conveys is that Mary is perhaps a member of the group that will certainly get a grant (see Section 3).

A similar scope discrepancy is apparent with hendiadys coordinations like (21), which can be modified by a conjunction adverb.

(21) a.   My friend and future colleague will also attend.
      b.   My friend and perhaps future colleague will also attend.

In (21b), it is possible to think that the person indicated by the hendiadys coordination will at some point in the future be my colleague. But the underlying clause in a CR-analysis (22) would have a different reading, namely that it is possible to think that a specific future colleague of mine will also attend.

(22) #My friend will also attend and perhaps my future colleague will also attend.

So the hedging brought on by *perhaps* has a narrower scope than the CR-analysis would allow for.

Consider also the interaction of *perhaps* with modal verbs and negation. Doherty (1987:52) observes that the modal element of *perhaps* ('it is possible to think') in sentences like (23) has scope over negation:

(23)   Alice has perhaps not won. $\Diamond > \neg$
       (i.e., It is possible to think that it is not the case [that Alice has won].)

When *perhaps* is not present, negation takes scope over the modal element expressed by verbs like *can*:

(24)   Alice cannot succeed. $\neg > \Diamond$
       (i.e., It is not the case that it is possible [for Alice to succeed].)

When *perhaps*, modal verbs, and negation are combined, negation appears to take intermediate scope between the modal element of *perhaps* and the modal element of *can*:

(25) Alice perhaps cannot succeed. $\lozenge > \neg > \lozenge$
       (i.e., It is possible to think that it is not the case that it is possible
       [for Alice to succeed].)

But now consider (26):

(26) Baylor and perhaps UConn cannot advance to the Elite Eight.
       $\neg > \lozenge$

This sentence can be used in a situation where Baylor has already been
eliminated, and UConn is trailing in the match in which to qualify for the
Elite Eight. As in (24), *not* takes scope over the modal *can*:

(27) It is not the case that it is possible [for Baylor and perhaps UConn
       to advance].

However, the CR-source sentences for the derivation of (26) would
include (28), where *perhaps* takes scope over *not*.

(28) UConn perhaps cannot advance to the Elite Eight $\lozenge > \neg > \lozenge$
       (i.e., It is possible to think that it is not the case that it is possible
       [for UConn to advance].)

Again, *perhaps* when used as a conjunction adverb has a narrower scope
than when used as a sentence adverb.

3   The status of adverbs in Collins conjunctions

The arguments in the previous section against a conjunction reduction
analysis of coordinate structures like *John and perhaps Mary* in (4) call
for an alternative analysis of the ungrammaticality of (5). Here we may
follow Lasersohn's (1995:85) analysis of predicates with conjoined
subjects as predicating over groups or the individuals making up the
group — only the former being relevant in the case of symmetric
predicates. The contribution of *perhaps* in (4) now appears to be that it
renders the composition of the group uncertain: it can be either John or
John and Mary (cf. Collins 1988:13). Example (5) then tells us that
symmetric predicates must be compatible with either scenario.
    In (6), there is a similar uncertainty about group composition, but here
the two options are (i) John and Bill and (ii) John and Bill and Mary;

symmetric predication is compatible with both scenarios, hence (6) is not ungrammatical.

Interestingly, the effect of *perhaps* on group composition is the same with disjunctive subjects as in (29):

(29)   John or perhaps Mary went to the store.

Disjunction differs from conjunction in that with conjunction, the predicate applies to the entire group (the composition of which may be in question in the case of Collins conjunctions), whereas with disjunction, the predicate applies to only a subset of the group. But this does not affect the group composition, and *perhaps* qualifies the possibility of Mary being part of the group in the same way with conjunctive and disjunctive coordination.

If this is on the right track, we may not have to conclude, as Collins (1988:12) does, that *perhaps* in (4) modifies the conjunction *and*. Rather, what seems to be the case is that *perhaps* modifies the inclusion of (the denotation of) Mary in the (denotation of the) coordinate noun phrase. The process of set inclusion referred to here is perhaps sufficiently similar to the process of set inclusion that joins the (denotation of the) subject and the (denotation of the) predicate in standard subject-predicate combination (cf. Lasersohn 1995:85). If it is this process of set inclusion that makes the addition of a modal adverb possible, we can explain the appearance of adverbials in coordinate structures without having to resort to a questionable derivation involving conjunction reduction, or to an analysis in which the adverb is adjoined to the conjunction itself, as in Collins (1988:§4).

At the same time, we can now also understand why *perhaps* cannot normally (i.e., outside the context of coordinate structures) modify noun phrases:

(30)   Perhaps Mary went to the store.

In (30), *perhaps* can only be interpreted as modifying the clausal predication — there is no narrow reading possible in which *perhaps* modifies only *Mary*. But this is because outside the context of coordinate structures, noun phrases do not give rise to a process of set inclusion that adverbs like *perhaps* can qualify.

If this is the correct analysis of modal adverbs in coordinate structures, we predict that all propositional modifiers, such as negation markers, adverbs like *probably*, evidential markers like *I hear*, and focus

markers like *also* and *only*, should be able to appear inside coordinate structures. This prediction is confirmed:

(31) a. John and not Mary went to the store.
      b. John and probably Mary went to the store.
      c. John and I hear Mary went to the store.
      d. John and also/only Mary went to the store.

In all these cases, the element preceding *Mary* modifies the inclusion of (the denotation of) Mary in (the denotation of) the subject group, underscoring the proposed similarity of coordination and predication.

4   Conclusion: the structure of coordination

Collins (1988) discusses the nature and position of modal adverbs in coordinate structures in the context of an analysis of the phrase structure of coordinations. The idea that *perhaps* in (4) modifies the conjunction *and* leads him to conclude that *and* is the head of the coordinate structure, and that the coordinate structure as a whole has the standard X'-structure in (32) (see Progovac 2003:260ff for further discussion).

(32) [$_{ConjP}$ John [$_{Conj'}$ [$_{Conj}$ and] Mary]]

The ConjP analysis is motivated empirically by the observation of asymmetries between the two conjuncts (Johannessen 1993; Haspelmath 2007:9), and conceptually by the conformity it brings with the general X'-theory of phrase structure (e.g., Kayne 1994:57). In light of minimalist thinking about the derivation of phrase structure, neither argument is compelling (see Zwart, to appear, for more discussion).

Crucially, the only structure building operation available in the minimalist model of grammar is Merge, which creates a pair of sisters. This is in fact an asymmetric pair, either automatically, because that is the way Merge operates (Zwart 2009:163), or indirectly, because of a labeling algorithm turning an unordered set into an ordered pair (Chomsky 2000:133). Either way, the simplest structure is a pair of sisters, and the asymmetries between the conjuncts that have been observed in the literature may be accounted for if the sister pair is asymmetric. Any further elaboration upon that simplest (headless) structure would have to be explicitly motivated.

If I am correct in this article, the distribution of modal adverbs like *perhaps* inside coordinate noun phrases should not be interpreted to yield

the required explicit motivation for the head status of the conjunction. This leaves open the possibility that coordinated phrases are just pairs of sisters, the second of which may be marked by a coordinating element in a variety of ways, and may be modified by a modal adverb to qualify the inclusion in the group denoted by the coordinate structure.

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