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From phases to "across the board movement"

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1 Introduction

As we know from the work of John Ross (see Ross, 1967), coordinate structures behave quite restrictively when it comes to extraction; see (1).

(1) In a coordinate structure, no conjunct may be moved, nor may any element contained in a conjunct be moved out of that conjunct. (CSC)

Ross (1967) dubs the generalization in (1) "Coordinate Structure Constraint (CSC)", and cites, amongst others, the following examples to substantiate his claim:

(2) a. *Which trombone$_i$ did the nurse polish t_i and the plumber computed my tax.
b. *Whose tax$_i$ did the nurse polish the trombone and the plumber computed t_i.

(3) a. *What sofa$_i$ will be put the chair between some table and t_i?
b. *What table$_i$ will be put the chair between t_i and some sofa?

Whereas (3) illustrates that neither a left nor a right conjunct may by moved out of a coordinate structure, the examples in (2) are taken to show that a similar restriction holds for arguments that relate to only one of the conjuncts.

However, as Ross notes himself, there is an exception to the CSC. Extraction is systematically licensed under very special circumstances: The extractee just has to be moved "across the board" (ATB); see the informal paraphrase in (4).

(4) If an element is moved out of one of the conjuncts of a coordinate structure, 'it' has to be moved out of all other conjuncts 'at the same time'. (ATB)

(5) a. What$_i$ did [[the nurse polish t_i] and [the plumber play t_i]].
b. Which car$_i$ did [[John buy t_i] and [Mary crash t_i]].

ATB movement in the sense of (4) is illustrated in (5): The extracted *wh*-pronominal *what*$_i$ in (5a), for example, does not only relate to a trace t_i in the first conjunct, but also to a corresponding (and identically indexed) trace t_i in the second conjunct —and the resulting structure is perfectly fine. Similarly for (5b).

Since ATB movement does not conform to the usual requirements on chain formation (e.g., the foot of the chain is not uniquely determined), its existence has been called into question every now and then (see, e.g., Wilder, 1997, for discussion). Though it is perfectly possible to give precise and well-founded definitions of ATB movement within multidimensional models of syntax (see, e.g., Williams, 1978, Goodall, 1987) or within approaches that rely on the notion of multidominance (see, e.g., Bachrach & Katzir, 2007, Wilder, 2007, for recent proposals), it seems nevertheless advisable to stick to a more conservative and simpler syntax as long as there is no compelling empirical evidence to the contrary.

The purpose of this paper is to show that the move to more complex models of syntax is in fact not warranted, for ATB movement turns out to be just a special case of a much more general syntactic process: movement out of a phase.

2 A trichotomie of extraction types

But before presenting my own proposal, let me first note that there are, of course, already several approaches on the market that try to tackle the phenomenon of ATB movement from quite different angles. Apart from the above mentioned option of switching to a somewhat different model of syntax, there are, as far as I can see, at least three other major approaches that need to be distinguished here.

One possible strategy is to show that ATB movement is just an epiphenomenon of two or more syntactic processes that jointly interact. Following this strategy, Munn (1992, 1993) argues that ATB movement is simply the result of (i) asymmetric extraction out of the first conjunct together with (ii) an internally licensed parasitic gap in the second (or, more generally, in all non-initial) conjunct(s). The appeal of this kind of strategy is evident: It reduces ATB movement to other, well-known phenomena. But there are also non-trivial problems with some of Munn's specific assumptions. First, German does not allow for parasitic gap constructions, see (6a), but ATB movement is perfectly fine, see (6b).

(6) a. *Welche Zeitung hat Hans aufgeräumt, bevor Maria las
   which paper did Hans file, before Mary read
b. Welche Zeitung hat Hans aufgeräumt und Maria gelesen?
   which paper did Hans file and Maria read?

Second, Munn's analysis, as it stands, seems not to predict the possibility of asymmetric extraction out of coordinate structures. However, as Goldsmith (1985) and others argue, asymmetric extraction does occur in English after all, see (7).

(7) a. How many courses$_i$ can we expect our graduate students to teach t_i and (still) finish a dissertation on time?
b. How much$_i$ can you drink and still stay sober?

Taking examples like (7a) and (7b) as a starting point, another strategy is to deny the existence of the CSC as a syntactic constraint altogether, and to try to trace back syntactic (a)symmetry to some kind of semantic and/or pragmatic (a)symmetry (e.g. Culicover & Jackendoff, 1997, Kehler, 2002). This typically predicts a dichotomie of extraction types: Semantic/pragmatic asymmetry enables asymmetric extraction and rules out ATB movement; see (7). Semantic/pragmatic symmetry, on the other hand, is to be made responsible for the inverse; see (5).

This may be correct for English, but it isn't for German. In Reich (2007a), I argue in detail that we need to distinguish three types of coordination in German,

	COORDINATION TYPE	ATB-MOVEMENT	ASYMMETRIC EXTRACTION
1.	symmetric (type I)	yes	no
2.	symmmetric (type II)	yes	yes
3.	asymmetric	no	yes

Table 1: Extraction types in German

see table 1: First, there is asymmetric coordination (including SLF coordination) in the sense of Höhle (1983, 1990), which only allows for asymmetric extraction. Second, there is symmetric coordination (of type I), which only allows for ATB movement; this class comprises all those examples that are structurally (and up to a certain point also semantically) parallel to Ross's original examples in (5). And finally, there is a third, hitherto unrecognized class of coordinate structures, which allow for both asymmetric coordination and ATB movement, see the contrast in (8), modelled having an example from Heycock & Kroch (1994) in mind (which in turn seems to have been inspired by an example from Höhle, 1983).

(8) a. Diesen Vorschlag$_i$ will die Kommission [[t_i prüfen] und
this suggestion$_i$ wants the committee [[t_i check] and
[möglichst bald dem Bundestag t_i vorlegen]]
[ASAP the Bundestag t_i submit]]

b. Diesen Vorschlag$_i$ will die Kommission [[t_i prüfen] und
this suggestion$_i$ wants the committee [[t_i check] and
[möglichst bald dem Bundestag *einen Entwurf* vorlegen]]
[ASAP the Bundestag *a draft* submit]]

(8a) and (8b) structurally differ in only one respect: Whereas in (8a) the noun phrase *diesen Vorschlag* ("this suggestion") is moved ATB, it is asymmetrically extracted from the first conjunct in (8b), and the corresponding argument position in the second conjunct is filled by the noun phrase *einen Entwurf* ("a draft"). This minimal contrast shows that there are in fact linguistic structures, which allow, in principle, for both options, ATB movement and (closest) asymmetric extraction.

This suggests to me that, as far as German is concerned, a "hybrid" approach to extraction out of coordinate structures is called for, one of the two conditions being syntactic, the other one being semantic in nature (see also Postal, 1998, for a quite similar, though not identical strategy with respect to English). Syntax then draws a line between coordinate structures that allow for ATB movement —i.e., symmetric coordination (of type I and II)—, and coordinate structures that do not —i.e., asymmetric coordination in the sense of Höhle (1983, 1990), see (9).

(9) SYMMETRIC VS. ASYMMETRIC COORDINATION
a. Symmetric coordinations are boolean phrases ("&P").
b. Asymmetric coordinations are adjunct structures.

Given that in asymmetric coordinations the second conjunct attaches to the first one (see Büring & Hartmann, 1998), it is evident why ATB movement is ruled out: The ‘extractee’ is simply trapped in an adjunct island. Why and in what way a boolean phrase &P should enable ATB movement is, however, not evident at all. It is the purpose of this paper to give a precise answer to this very question.

What can only be hinted at in this paper, is the semantic condition that (together with the syntax of symmetric coordination) gives rise to a tripartite classification of coordinate structures (in German). The basic idea is that asymmetric extraction out of coordinate structures is licensed just in case the coordination is understood as a description of a complex event rather than a conjunction of two (loosely connected) event descriptions; see Reich (2007a, b) for an elaborate proposal.

(10) ASYMMETRIC EXTRACTION
Asymmetric extraction out of a coordinate structure is licensed if and only if the coordination is understood as a description of a complex event.

Given this semantic conditon on asymmetric extraction out of coordinate structures, symmetric coordination (&P) is predicted to come in two shapes: symmetric coordinations that do comply with the semantic condition and, thus, allow in addition to ATB movement for asymmetric extraction (type II); and symmetric coordinations that do not (type I). This correctly describes the situation in German.

3 From phases to ATB movement

Given that what I sketched briefly in the last section is basically on the right track, the natural question to pose then is the following: Why is it that &Ps license ATB movement? And what kind of movement is ATB movement to begin with?

Suppose the CSC is ‘real’, i.e., in a coordinate structure no conjunct may be moved, nor may any element contained in a conjunct be moved out of that conjunct. In minimalist terms this is essentially equivalent to say that &P is a phase.

(11) CSC in minimalist terms: “&P is a phase.”

If this is a licit paraphrase of the CSC, then all questions related to ATB movement should reduce to general considerations concerning the extraction out of phases. Therefore, a somewhat closer look at the notion “phase” itself and the process of moving some constituent out of a phase seems indicated here.

3.1 Extraction out of a phase

A “phase” as introduced into linguistic theory by Chomsky (2000, 2001) is, roughly speaking, any (probably minimal) syntactic constituent corresponding to a “closed sense unit” in semantics. But then again, what is a “closed sense unit” in semantics? Chomsky is not fully explicit here, but good candidates are semantic objects of type e (individual), of type t (truth value), and of type $\langle s, t\rangle$ (proposition): All these semantic objects are ‘closed’ in the sense that their semantic type can not be reduced to a simpler type by combining them with another semantic object.[1] If we suppose

[1]This is strictly speaking not true of propositions which are typically construed as functions from possible worlds to truth values (type $\langle s, t\rangle$). There is, however, good evidence that there is more to propositions than just relating possible worlds to truth values.

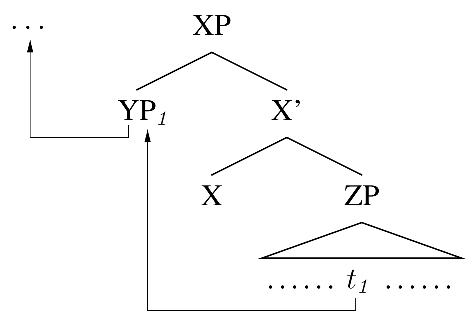
that the (minimal) constituents corresponding to the semantic objects of type e, t, and $\langle s, t \rangle$ are DP, vP, and CP, then these are to be conceived of as phases according to the general characterization in Chomsky (2000, 2001).

Given that the semantic objects that correspond to phases are "closed units", it is straightforward to assume that phases are "closed units", too. With respect to syntax, this is essentially equivalent to say that no syntactic process may relate a phase internal constituent to a constituent external to the phase —in especially there is no movement out of a phase. This is, in a nutshell, what the "phase impenetrability condition (PIC)" introduced in Chomsky (2000) is all about.

(12) PHASE IMPENETRABILITY CONDITION (PIC)
In phase α with head H, the domain of H is not accessible
to operations outside α, only H and its edge are.

There is, however, a loophole in this constraint, which takes into account that movement out of phases does occur after all: Movement out of a phase is possible, but it needs to proceed via the specifier or the head of the phase. Typically, the situation is thus as follows: In a first step, the constituent YP is moved from its base position to the edge (the specifier) of the phase XP; in a second step YP is moved further on, see the rough sketch in (13). This way a violation of the PIC can be avoided.

(13)



The obvious question to ask here, I think, is the following: Why are there "escape hatches" like the specifier and the head position of the phase in the first place? If we take the intuition underlying the notion "phase" seriously, then movement from the head X or from its specifier should be ruled out, since XP is a phase, a phase is a closed unit, and X and its specifier are internal to the phase. According to the PIC, however, the head X and its specifier (being "escape hatches") have to be both phase internal and phase external: As targets of movement, they have to be phase internal; as starting points of movement, they have to be phase external.

3.2 Phases and "traceless movement"

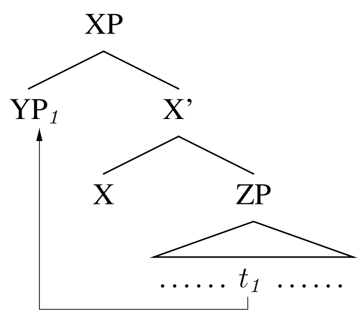
This is, I think, a somewhat worrying result, and it may give reason to rethink the way the closure condition on phases is defined in the PIC. Since it is the notion of "escape hatches" that causes all the trouble here, the most straightforward way to modify the PIC is to simply drop the idea of "escape hatches", and to state that there are no syntactic processes crossing the phase boundary. Period. See (14).

(14) MODIFIED PHASE IMPENETRABILITY CONDITION (MPIC)
In phase α constituents within α are not accessible to operations outside α.

This way, we end up with a very nice and elegant definition of the closure condition on phases, but we also end up with a serious problem: The MPIC now rules out any movement out of vP, CP, and DP, contrary to fact. The next question therefore is: How to 'move' out of a phase without moving out of the phase?

To approach the problem step by step, let's first move YP (as we did before) phase internally to the specifier position of XP, see the schema in (15).

(15) Step 0: Move YP to the edge of XP.



Now YP seems to be stuck within the phase XP. But what exactly is the reasoning behind this? Moving YP_1 from the specifier position of XP to some position external to the phase creates a coindexed trace t_1' in the specifier of XP that allows us to reconstruct what moved from where (and where to interpret YP). But coindexation is a syntactic process that now relates a phase external constituent, YP_1, with a phase internal constituent, the trace t_1'. And this is ruled out by the MPIC.

The only way to move out of a phase and not to violate the MPIC thus is to not leave a coindexed trace. Let's call this kind of movement 'traceless movement'. The 'trick', then, is that traceless movement does not establish any grammatical relations that cross the boundary of the phase XP. This way we can move (tracelessly) out of a phase without moving (in the traditional sense) out of the phase.

But how exactly do we conceive of traceless movement, and what properties does it have? Within the framework of the minimalist program, traceless movement can be defined as a two-stage process: First, we take a copy of YP, and merge it with an 'accessible node' WP. Then we delete all copies of YP within the phase XP, see the definition of tracelessly moving maximal constituents in (16). The definition of traceless head movement is, of course, completely parallel.

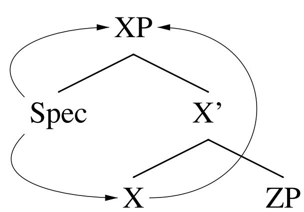
(16) TRACELESS MOVEMENT
Suppose that YP is in the specifier position of the phase XP. If we
1. merge (a copy of) YP with an 'accessible node' WP, and
2. delete (= erase) all copies of YP within WP, this is

equivalent to say that YP is "moved tracelessly" out of XP (to WP).

Since traceless movement deletes all copies of YP within the phase XP, the only way to constrain traceless movement is to put restrictions on possible targets of movement (or, more precisely, on the arguments of the merge operation). This is where the notion of being an 'accessible node' comes in. The general idea behind it is that traceless movement —in contrast to traditional movement— has to be strictly local, for the moved constituent is not any more linked to its base position, and thus (semantic) reconstruction needs to proceed in a much more indirect way. Here, I want to propose that accessibility is defined along the lines of (17), see also the schematic representation of the accessibility relations in (18).

(17) ACCESSIBILITY
  a. X is accessible from [Spec, X] (spec/head relation)
  b. XP is accessible from X (projection property)
  c. accessibility is closed under transitivity (logical property)

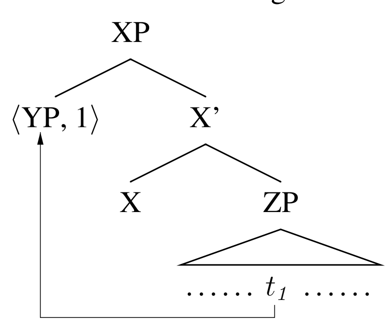
(18)



Starting from the specifier position [spec, X] the corresponding head position X is accessible via the spec/head-relation, see (17a). From the head position X we then have access to the maximal projection XP, since X projects to XP, see (17b). And since, by assumption, the accessibility relation is closed under transitivity, see (17c), we finally conclude that XP is accessible from its specifier position [spec, X]. To cut a long story short: Starting from a specifier position [spec, X] we always have access to the mother node XP. And given that movement is always upwards, the mother node XP is the only accessible node in the case of tracelessly moving from a specifier position. In especially, a tracelessly moved constituent YP never moves across another lexical node. This surely is a strictly local relation.

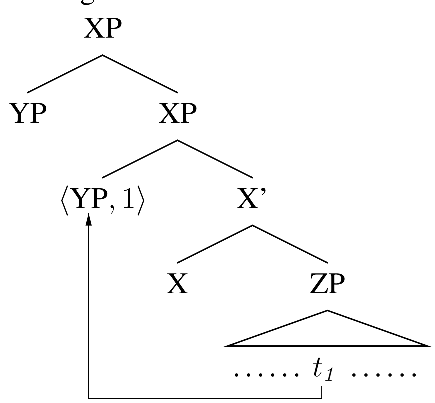
Let's go back now to the schema in (15), repeated here as (19) for convenience, and let's see what traceless movement looks like in a concrete derivation.

(19) Step 0: Move YP to the edge of XP.

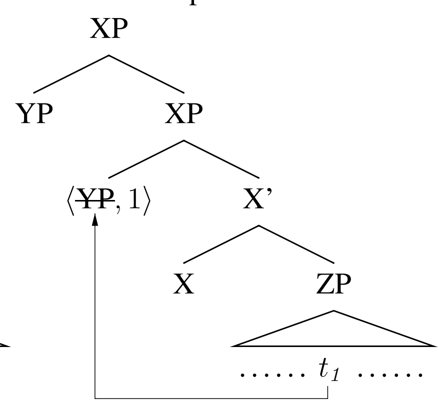


Having moved YP to the edge of the phase XP, we now have to 'escape' from the phase by tracelessly moving YP. The first step in tracelessly moving YP is to merge a copy of YP with an accessible node. Since the only accessible node is the mother node XP, we need to merge YP with XP, see (20a). In a second step, we erase all copies of YP within the phase XP, see (20b). Here it is important to note that an indexed constituent YP_i can be modelled as an ordered pair $\langle \text{YP}, i \rangle$ consisting of YP itself, and a (binder) index i. This reasonable assumption enables us to delete YP while not deleting the (binder) index i at the same time.[2]

(20) a. Merge YP with XP:



b. Delete all copies of YP in XP:



Two comments are in order here. First, the deletion operation presupposes that the copy of YP which sits in the specifier position of XP is phase internal, whereas the copy of YP we merged with XP is phase external (otherwise both copies would be deleted by the deletion operation). It follows then that specifiers have a somewhat special status compared to 'simple' adjuncts. Second, it is relatively easy to see that the deletion operation is consistent with the copy theory of movement: If we delete the copy of YP in XP that is part of the trace $\langle \text{YP}, i \rangle$, we are left with a bound index i in argument position, quite like deleting the copy of the moved YP leaves us with a binder index i. This is all we need for semantic interpretation.

Having tracelessly moved YP out of XP, we have avoided a violation of the MPIC. And since YP is in a position external to XP, it can be moved now (in the traditional sense) to some position higher up in the tree, leaving a differently indexed trace in its new 'base' position, see the sketch in (21) on the following page. This completes the syntactic part.

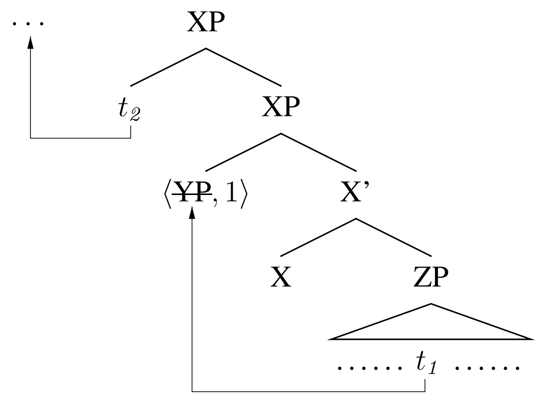
What still needs to be shown, is whether syntactic structures like (21), which are the result of traceless movement, can be interpreted semantically. As a matter of fact, this turns out to be absolutely straightforward. To see this, consider the annotated representation of (21) in (22), where XP is instantiated by CP, and, to keep things simple, CP is taken to denote a semantic object of type t.[3]

We derive the interpretation of (22) bottom up. First note that the trace t_1, left by YP when moving to the edge of XP, is interpreted as a variable x of type e.

[2]As an alternative, one could imagine that the (binder) index i is treated as an adjunct to YP.

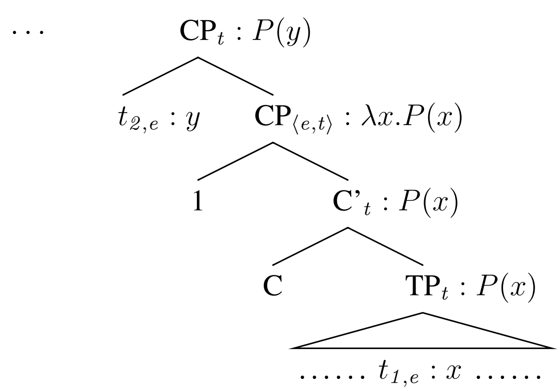
[3]Note also that in (22) the unneccessary complex notation $\langle$~~YP~~, 1$\rangle$ is simplified by dropping ~~YP~~.

(21)



The complement of the complementizer C thus denotes an open proposition of the form $P(x)$. Given that the semantics of the complementizer is vacuous (another, unproblematic simplification), the next step is to interpret the specifier position of CP. Having tracelessly moved YP out of CP (which includes erasing all copies of YP within CP), the only syntactic object being left in SpecCP is the binder index 1 which stems from the (traditional) movement of YP to the edge of CP.

(22)



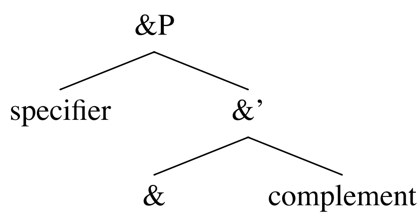
As usual, this index is interpreted as a binder of the variable x. This has the effect that CP now denotes a property rather than a proposition. This property then can be applied to YP itself (given that YP is of type e), or to the interpretation of the trace it left behind when moving higher up in the tree. Either way, interpretation is absolutely straightforward, and does not require any special mechanisms.

In this section, I argued that we can in fact maintain the conceptually simple and attractive closure condition MPIC on phases, as long as we are willing to accept the existence of traceless movement. However, since traceless movement needs to be stipulated alongside traditional movement, it certainly would be (even) more convincing, if we could adduce further independent empirical evidence in favor of traceless movement. In fact, we can. Having a somewhat closer look at the way traceless movement is interpreted semantically, it becomes apparent that it is structurally similar, if not identical, to the "predicate abstraction rule" (PAR) in Heim & Kratzer (1998, 186), which is indispensable for the correct interpretation of quantifier raising and *wh*-movement. Though traceless movement in the sense introduced above is far more restrictive than the PAR (for one thing it only allows short movement out of a specifier (or head) position), it is not implausibel that it turns out to be a special instance of a much more general phenomenon.[4] In any case, we can be sure that it does not add further complexity to the grammar.

3.3 ATB movement

In (11), the CSC has been restated in minimalist terms as follows: “&P is a phase.” This way of restating the CSC presupposes that symmetric coordination (in the sense of section 2) is to be analysed along the lines of Johannessen (1998) as a functional projection headed by boolean &, see (23).

(23)



I will furthermore assume that (symmetric as well as asymmetric) coordination is subject to what I’d like to call the “axiom of semantic symmetry”, see (24).

(24) AXIOM OF SEMANTIC SYMMETRY (SEMSYM)
Any two conjuncts in a given coordination are semantically symmetric.

Though it is not altogether clear exactly how to define ‘semantic symmetry’ (but see Munn, 1993, Reich, 2007a, for discussion), identity in semantic type is certainly a good first approximation, and it will be sufficient for the following considerations. I won’t address this question therefore here in any further detail.

The axiom of semantic symmetry, the &P-structure of (symmetric) coordination, and the CSC are, all of them, very basic assumptions about the syntax and semantics of coordinate structures. Since ATB movement is specific to coordinate structures, we expect ATB movement to be a theorem of these basic assumptions. The purpose of this section is to show that this is in fact the case —given that we accept the existence of traceless movement as introduced above.

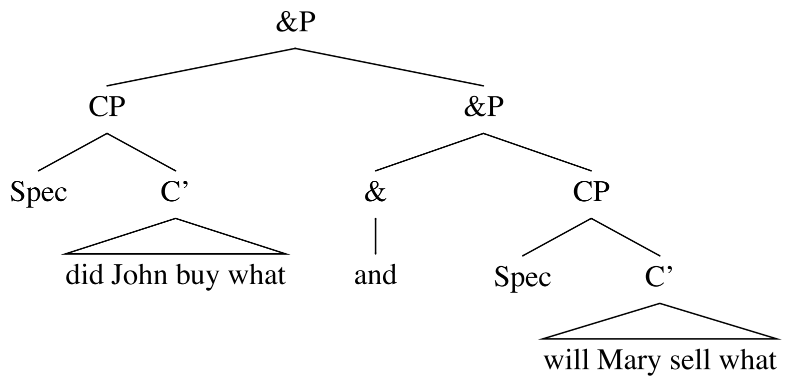
Too see this, consider the ‘real life’ example in (25). (Native speakers of English informed me that examples like (25) are a bit odd, and that VP/vP-coordination is generally preferred over CP/C’-coordination. Corresponding examples in German, however, are perfectly fine, and I therefore feel entitled to stick to CP-coordination, not least for expository reasons. All relevant claims that are being made with respect to CP-coordination carry over to vP-coordination without any difficulty.)

(25) What did John buy and will Mary sell?

Suppose that (25) is an instance of CP-coordination, and that its syntactic structure, before moving *what* to the front of the sentence, is the one sketched in (26).

[4]Similar observations and proposals have been made independently in Frampton (1990) and Nissenbaum (1998). A thorough comparison, however, has to wait for another occasion.

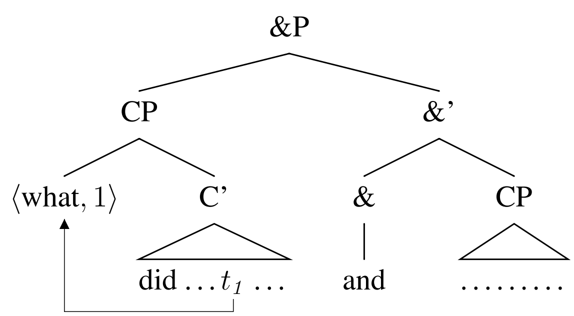
(26)



What does *wh*-movement in a coordinate structure like (25) look like? For reasons that will be clear in a moment, we first focus on the initial conjunct.

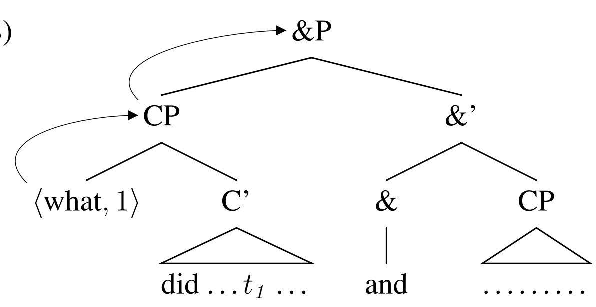
By assumption, (25) is a coordination of two CPs. Since CP is a phase, *what* can not be moved out of CP in the traditional sense. What we can do, however, is to move *what* phase internally to the specifier position of CP, see (27).

(27)



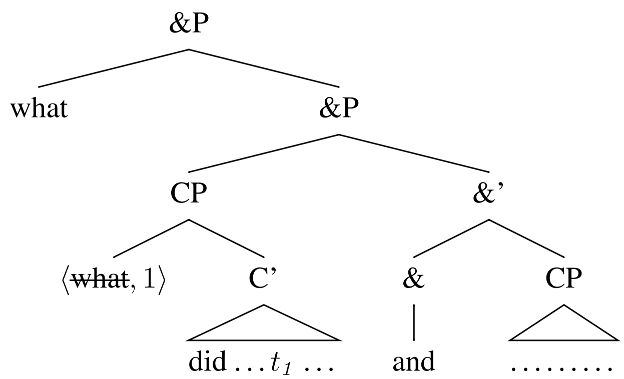
If it was only for movement in the traditional sense, we now would be stuck within CP (because of the MPIC). But, as I argued above, there is also traceless movement, which, in a sense, helps to circumvent the MPIC. If we want to apply traceless movement, however, we first need to know which nodes are accessible from the specifier position of the initial conjunct. As we argued in the last section, a specifier always has access to its mother node. Therefore *what*, which sits in the specifier position of CP, has access to CP. CP in turn has access to &P, since the initial conjunct sits, by assumption, in the specifier position of &P, see (28).

(28)



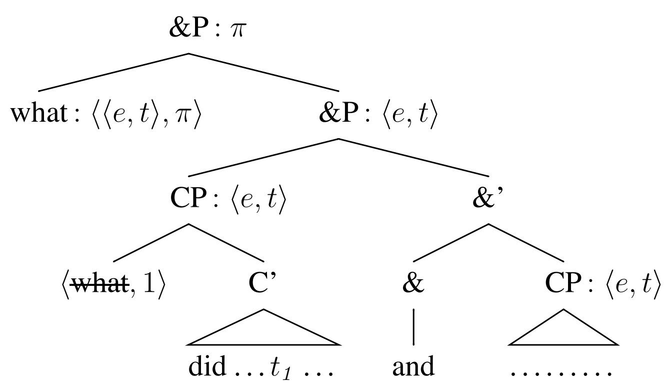
Since accessibility is a transitive relation, we are entitled to conclude that *what* has access to &P, too. As a consequence, *what* can be moved tracelessly out of &P, and thus escapes from the coordinate structure: We first merge a copy of *what* with &P, and then we delete all [!] copies of *what* within &P, see the sketch in (29).

(29)



So much for *wh*-movement with respect to the first conjunct. But what is going on within the second conjunct? Since semantics plays a crucial role in the following considerations, it is advisable to first specify the semantics of the initial conjunct. In (22) we argued in detail that tracelessly moving a DP out of CP results in CP denoting a property, i.e., a semantic object of type $\langle e, t\rangle$. Since coordinate structures are subject to the axiom of semantic symmetry (SEMSYM), it follows that the coordinating conjunction *and* relates two properties, i.e., the second conjunct is of type $\langle e, t\rangle$, too. Since coordinating conjunctions like *and* are type preserving, we can conclude that the same holds of the lower &P. Let π refer to the semantic type of interrogatives, then the higher &P is of type π and *what* denotes a function from properties to interrogatives, see the annotated tree in (30).

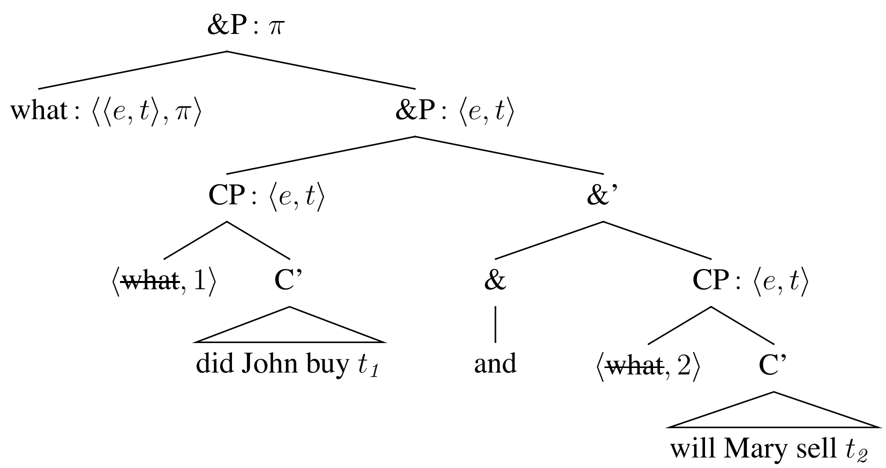
(30)



With respect to the second conjunct, we now have to consider different scenarios. Suppose first that the second conjunct does, from the outset, not contain any copy of *what*, and that no (other) movement to the edge of the second conjunct takes place. This is the scenario in which *what* is asymmetrically extracted out of the first conjunct. But, given that all argument positions of the relevant predicate are filled, the second conjunct ends up in type t, and this results in a violation of SEMSYM. Asymmetric extraction out of &P is thus predicted to be ungrammatical. Moving some other constituent to the edge of the second conjunct does not improve the situation, for it is still interpreted within the second conjunct. Tracelessly moving this other constituent out of the second conjunct is no option either, since from the specifier position of the second conjunct only CP, not &P, is accessible, and the moved constituent will be interpreted, again, within the scope of *and*. Finally, not realizing an(other) argument of the second conjunct's predicate (with the intent to derive a semantic object of adequate type) violates the θ-criterion.

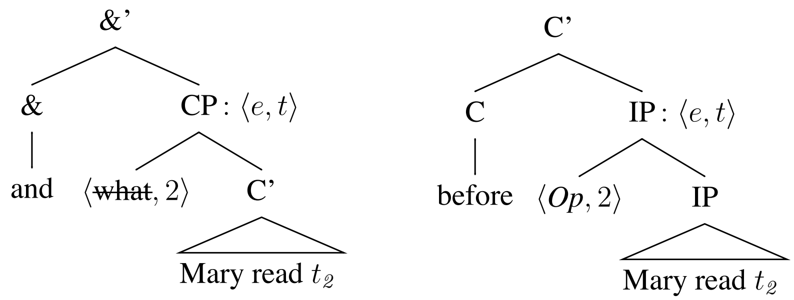
Since none of these scenarios results in a grammatical structure, it follows that the second conjunct contains a copy of *what*. If it does, this copy of *what* could be moved to the edge of the second conjunct, or it could remain in situ. Suppose that it remains in situ. Since we tracelessly moved the first copy of *what* out of &P, all copies of *what* within &P got —by definition of traceless movement— erased during the deletion process associated with traceless movement, including the copy that was contained in the second conjunct. We 'parasitically' deleted this copy of *what*, while deleting the one within the first conjunct. Given that semantic interpretation follows syntactic derivation, this has the effect that the syntactic subject *Mary* is interpreted as the semantic object of *sell*, and that *sell* is not assigned any semantic subject within CP. This violates the θ-criterion, and typically results in a conflict with the semantic selection properties of the predicate involved. The only option left is that the second conjunct contains a copy of *what*, and that this copy is moved to the left edge of the second conjunct. While tracelessly moving the first copy of *what* out of &P, we 'parasitically' deleted the copy of *what* in the second conjunct, and end up with the well-formed syntactic structure in (31). Semantic interpretation of this structure is, of course, absolutely straightforward.

(31)



These considerations show that —given the axiom of semantic symmetry, the &P-analysis of coordinate structures, the CSC, and traceless movement— the only way to extract a constituent from an &P is by "ATB movement". Under closer inspection, however, "ATB movement" turns out to be an epiphenomenon of two syntactic processes that jointly interact: (i) asymmetric extraction out of the first conjunct, and (ii) phase internal movement to the edge of the phase in non-initial conjuncts. The final outcome of this analysis very much reminds of Munn's analysis in Munn (1992), but there are important differences, the most important certainly being that the analysis presented here does not rely on the existence of parasitic gap constructions in a given language. It is equally important, however, to see that under the current approach the similarities between ATB movement and parasitic gap constructions (in English) are not by accident. If we just consider the "parasitic" sentences, i.e., the non-initial conjunct in the case of coordination, and the subordinated sentence in the case of parasitic gaps, it becomes apparent that they are structurally parallel, see (32a) vs. (32b).

(32) a. ATB movement: b. Parasitic gap construction:



It follows then that, if there are parasitic gap constructions in a given language, these are predicted to show non-accidental similarities to ATB movement constructions. It does not follow, however, that the mechanism of parasitic gap constructions is a prerequisite for ATB movement. That this is correct, is evidenced by German.

Why German does not show parasitic gaps, is, to be honest, not clear to me. A good starting point probably is the hypothesis that the operator *Op* is not licensed within the left periphery in German, which is known to be quite different from the left periphery in English. But this is a topic for another occasion.

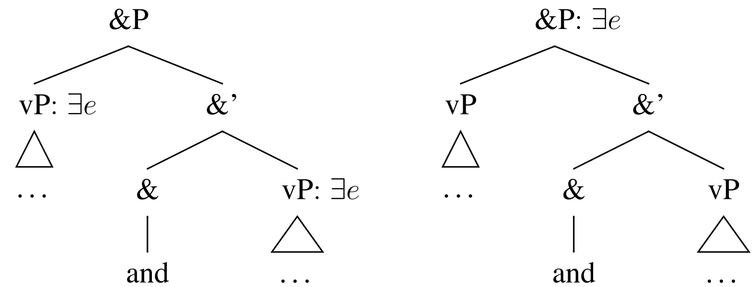
3.4 Asymmetric extraction out of coordinate structures

There is, however, still one question to be answered. In section 2, I argued that there are two types of symmetric coordination: type I coordination, which only allows for ATB movement, and type II coordination, which allows, in principle, for both ATB movement and asymmetric extraction. I, furthermore, proposed that both kinds of symmetric coordination should be analysed as &Ps. In the last section, however, I showed in great detail that movement out of &P is possible only ATB. But then why is asymmetric extraction out of &P possible none the less?

Because of space limitations, I can only hint at a possible solution here (but see Reich, 2007a, for relevant discussion). There are two keys to the problem, I think. The first is the assumption that &P is not a phase by itself, but only because its conjuncts are. The second is that the syntactic notion of being a "phase" itself is ultimately rooted in semantics, and thus essentially a derived notion. The result obtained in the last section therefore has to be stated more precisely as follows: *Given that the conjuncts related by & are phases*, and given all the other relevant conditions, then extraction out of &P has to proceed in an ATB fashion.

In Reich (2007a), I argue that, in the case of (CP and) vP, the status of being a phase correlates with the question of whether vP is considered to be a 'closed' description of an event, or whether it is conceptualized as part of a larger, complex event description.[5] This in turn correlates, to a certain extent, with the question of where the event variable e introduced by the finite predicate is bound: Is it bound at vP-level, then this vP is a 'closed' event description (a "closed sense unit"), and thus a phase. As for coordination, the relevant situation is depicted in (33a). Since each conjunct is a phase, (33a) only allows for ATB movement.

(33) a. Each conjunct is a phase: b. No conjunct is a phase:



(33b), on the other hand, depicts the situation of a symmetric coordination (in the sense of section 2) that allows for asymmetric extraction (out of the first conjunct): The event variables introduced in the two conjuncts are not bound at the level of vP, respectively, but at a later point in the derivation (propably at the level of CP). This has the effect that both conjuncts are conceptualized as a complex description of one (complex) event, rather than as the conjunction of two descriptions of two (loosely connected) events. The vPs in question thus are not "closed sense units" in the relevant sense, and there is no reason to consider them as a phase. But if &P is only a phase if both of its conjuncts are, then there is no need for traceless movement, and we can asymmetrically extract from the first conjunct. This is roughly speaking the analysis of example (8b); (8a) is analysed along the lines of (33b).

4 Conclusion

In this paper, I made two points, one empirical, one theoretical. On the empirical side, I argued that in German there is a hitherto unrecognized class of coordinate structures which, in principle, allow for both ATB movement and asymmetric extraction. On the theoretical side, I proposed to take the intuition underlying the notion "phase" seriously, and to do without so-called "escape hatches". Instead, I introduced the notion of "traceless movement", and showed that ATB movement can be derived as an epiphenomenon on the basis of basic assumptions about coordination. The fact that the status of being a phase is ultimately rooted in semantics (and, thus, not fixed once and for all) finally allowed us to sketch a satisfactory, event-based analysis of the different extraction types observed in German.

[5] In German, extraction is not sensitive to specific (classes of) coherence relations as has been claimed for English in Kehler (2002), see Reich (2007a) for extensive discussion.

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