Locality restrictions on sideward movement: An investigation of parasitic gaps, ATB constructions and question word coordinations

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Abstract: *Sideward movement* refers to a sequence of derivational steps where a constituent of a syntactic object is copied, and the copy merges with another syntactic object which has been assembled independently (Nunes 1995, 2004). In this paper we explore whether sideward movement can be adequately restricted by standard economy constraints, as has been argued previously, or whether additional assumptions are necessary. We argue that one additional constraint is required, which we call *ActivateSelector*. This constraint restricts the order of activation of subarrays of a numeration so that after completion of a phase the next subarray to be activated must be one that contains a selector for the completed phase. Furthermore we argue that movement of a DP to a theta position, which regularly occurs in sideward movement, reactivates the case feature on that DP so that two copies of the same DP can have different case features. Our discussion covers parasitic gap constructions, ATB-constructions and question word coordinations.

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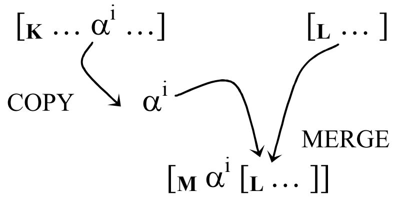
1 Introduction

With the reintroduction of generalized transformations and the reconceptualization of syntactic movement as a complex consisting of the more primitive operations *copy*, *merge* and *delete* in the copy theory of movement (Chomsky 1993), operations that previously were unavailable have been suggested to be theoretically possible and empirically well-motivated. Sideward movement which was investigated in detail in Nunes (1995, 2004) and subsequent work, is one such operation. The term *sideward movement* describes a sequence of derivational steps where a constituent α of a syntactic object K is copied, and the copy merges with a syntactic object L, which has been independently assembled and is unconnected to K, see (1). The resulting syntactic object M and object K are integrated later into the same syntactic object.[1]

(1)



Sideward movement has been applied in the analysis of parasitic gap constructions, across-the-board (ATB) constructions (Nunes 1995, 2001; Nunes & Uriagereka 2000; Hornstein & Nunes 2002; Nunes 2004), adjunct control (Hornstein 2001), and question word coordinations (Zhang 2007; Haida & Repp to appear a). Parasitic gap constructions and ATB constructions are similar in that they seem to involve extraction of an element from more than one position at the same time, and there have been several attempts to derive them by the same mechanisms in the past (e.g. Haïk 1985; Williams 1990; Munn 1992). Question word coordinations are different in this respect so the claim that sideward movement is also involved in their derivation widens the empirical domain in an interesting way.

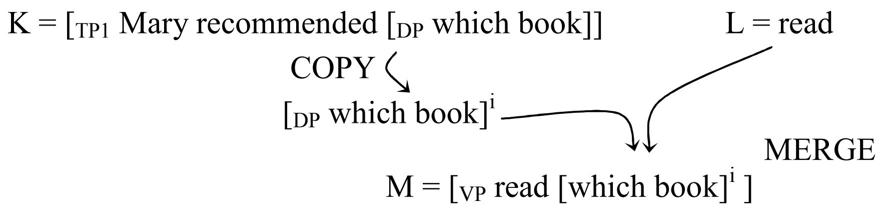
To illustrate the derivation of a parasitic gap construction by sideward movement consider (2). (2a) is derived as shown in (2b-d), as suggested in Nunes & Uriagereka (2000), Hornstein & Nunes (2002). We assume for the moment that (2a) is derived from an unstructured numeration, i.e. from a set of lexical items that is not subdivided into subnumerations (= subarrays), see (2b). (2c) indicates the stage of the derivation where object K has been formed and the lexical verb of the matrix clause, *read* (= object L), needs to discharge its theta role. Since the numeration at this stage contains only one possible theta role bearer (*you*) and yet another theta role assigner (v_2) the only way to save the derivation is to copy the DP *which book* from K and merge it with L, resulting in the VP M. Thus, sideward movement is a last resort operation that saves a derivation that otherwise would crash. As we have just seen, it can be triggered by the need of an element to discharge a theta role. The derivation of (2a) proceeds further and converges in the structure given in (2d). The

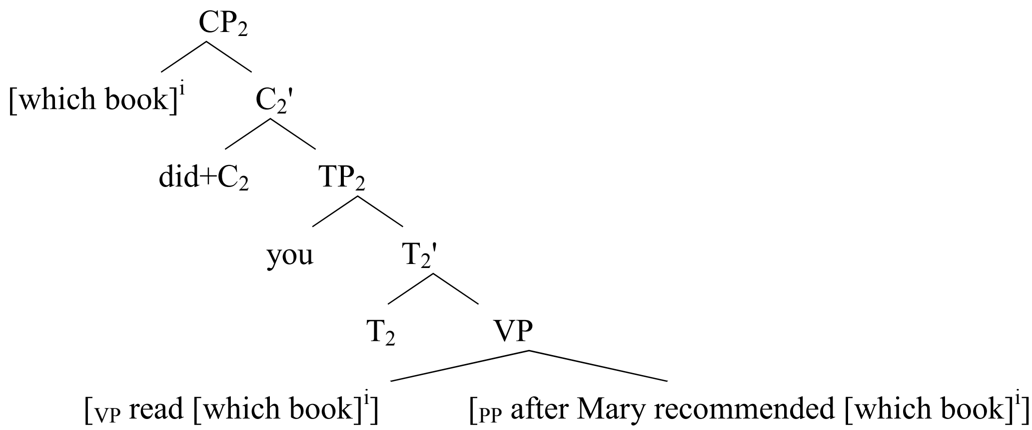
[1] We identify the copies of an item with a superscripted letter, and use subscripted letters to mark syntactic dependencies without classifying their derivational status. Numerical subscripts in numerations differentiate distinct items, see e.g. (2b). These different markings are used for expository reasons. They are descriptive devices only. The same holds for the marking of chain-reduced categories: we use *e* for copies which are the source of sideward movement and *t* for copies which are the source of ordinary movement. In all the structural representations we only present constituents that are immediately relevant for the discussion. So, if there is no CP or PRO etc. in some structures this is for ease of exposition.

last step in the derivation, the movement of *which book* to spec-CP, requires another copy of *which book* to be made (from its occurrence in the complement position of *read*) and merged in spec-CP. The copy in spec-CP forms two chains with the two lower copies because it c-commands both of them and obeys all other conditions on Form Chain (see Nunes 2004: 91). The lower copies in the chain are chain-reduced to ensure linearizability. The resulting PF string corresponds to (2a).

(2) a. Which book$_i$ did you read t_i after Mary recommended e_i ?

b. {C$_2$, did, you, v_2, read, after, C$_1$, Mary, T$_1$, v_1, recommend, which, book}

c.


d.


Sideward movement has been argued to be subject to 'standard' economy constraints by Nunes, Hornstein and Uriagereka in various works. In section 2 we illustrate how this set of constraints adequately restricts sideward movement in the empirical domain under consideration in these works. In sections 3-6 we explore a greater range of data and will show that some of them cannot be accounted for with this set of constraints. In section 3 we discuss the issue of case checking in parasitic gap constructions, and argue that we must assume that case features that have been checked and erased can be activated again after sideward movement to a theta position. In section 4 we review the account of question word coordinations proposed by Haida & Repp (to appear a), and show that the assumption of sideward movement with the constraints currently suggested, explains some interesting characteristics of these coordinations. Sections 5 returns to parasitic gap constructions and reveals that the options for the derivational path as restricted by the constraints assumed so far, must be further narrowed down. We propose an additional constraint, which we call *ActivateSelector,* and which restricts the order of activation of subarrays. Section 6 discuss differences between parasitic gap constructions and ATB constructions, which in previous literature were proposed to be due to a parallelism requirement of the latter construction. We argue that these differences can be explained better if we make specific assumptions for the coordination phrase.

2 Sideward movement and locality

One of the key issues in the discussion of sideward movement has been to work out the restrictions that prevent overgeneration. If a copy of a syntactic object α is merged with the syntactic object that contains α, i.e. in a structure $[_M\ \alpha^i\ [_K \ldots \alpha^i \ldots]]$ derived by 'ordinary' movement, locality can be enforced by the *Phase Impenetrability Condition* (Chomsky 2001). During the derivation of a phase, α is accessible for copying (and subsequent re-merge) only if α is in the same phase or at the edge of the next lower phase. This is ensured by spellout of the domain of the lower phase head upon merger of the next phase head. If, however, a copy of α is merged with an independent object, as is the case in sideward movement, the configuration between α and its copy in the final syntactic object is not determined yet. It seems that the locality of sideward movement must be constrained by different – or additional – derivational means.

Nunes & Uriagereka (2000), Hornstein & Nunes (2002), Nunes (2004) argue that sideward movement is subject to standard economy-related constraints such as *cyclicity of merger* and *cyclic spell-out.* They also assume that numerations are subdivided into subnumerations, or subarrays, and that during a derivation only one subarray can be active at the same time. We call this latter constraint *OneSub* here. OneSub makes sure that the lexical items of an active subarray have to be used up before another subarray can be started and sideward movement can apply, i.e. can be triggered by an element in the new subarray. For illustration, consider the ungrammatical parasitic gap construction in (3a), whose structure is given in (3b). Without OneSub this structure could be derived as follows. (3c) is the subarray from which νP_1 is built, see (3d). (3e) is the subarray from which νP_3 is built. Note that this subarray contains the preposition *after*, which takes CP_2 as a complement. This is something we adopt from the works cited above. The subarray for νP_3 contains two verbal elements, ν_3 and *borrow*, which need to discharge a theta role but only one DP which could take a theta role. This triggers the copying of *which book* from object K and merger with *borrow*, cf. (3g):

(3) a. *Which book did you borrow after leaving the bookstore without finding?

b. $[_{CP3}$ [which book]$_i$ did you $[_{\nu P3}$ $[_{VP3}$ borrow t_i] after
$[_{CP2}$ $[_{\nu P2}$ leaving the bookstore without $[_{\nu P1}$ finding e_i]]]]]

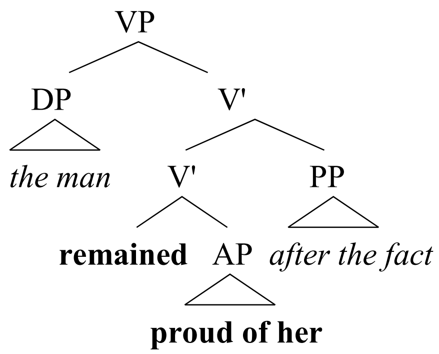
c. $N_{\nu P1}$ = {PRO, ν_1, finding, which, book}
d. K = $[_{\nu P1}$ PRO ν_1 $[_{VP1}$ finding [which book]^i]]

e. $N_{\nu P3}$ = {you, ν_3, borrow, after}
f. L = borrow
g. M = $[_{VP3}$ borrow [which book]^i]

Without OneSub, the next step could be the derivation of νP_2 followed by the completion of CP_2, νP_3 etc. so that (3a) can be derived. However, if by OneSub the subarray $N_{\nu P3}$ must be exhausted before the subarray that is necessary to derive νP_2 is started the derivation crashes since *after* misses its complement, and (3a) is correctly ruled out. We hold that OneSub is an inviolable constraint because otherwise sideward movement would loose its movement characteristics, i.e. the locality restrictions we have just discussed and those we will discuss in the remainder of this paper.

Another ingredient in the locality of sideward movement is an operation we refer to as *early full spellout* here, which is spellout that independently of phase spellout is triggered by linearization requirements. Early full spellout was introduced under the term *multiple spellout* by Uriagereka (1999), and is investigated for sideward movement in Nunes & Uriagereka (2000). It is triggered if a structure cannot be linearized due to a failure to yield a total ordering of terminals. Ordering of terminals is achieved inter alia[2] by a version of the *Linear Correspondence Axiom* (LCA, Kayne 1994) which says that a lexical item α precedes a lexical item β iff α asymmetrically c-commands β, i.e. a version where the recursive step is missing. Nunes & Uriagereka (2000) suggest that it is early full spellout which is responsible for CED islands.[3] Consider the structure in (4) (ibid., p. 22), where the terminals of the subject and the adjunct are marked with italics, and the remaining terminals with bold face. According to the non-recursive LCA no precedence relation exists between the italicized terminals and the bold-face terminals. This problem can be overcome if the subject DP and the adjunct PP are spelled out separately, which on the one hand fixes the order of the terminals within these phrases, and on the other hand turns them into syntactic atoms, which can then be linearized with respect to the bold-face terminals. Another effect is that the constituents within the subject and adjunct become inaccessible for syntactic operations. They have become islands.

(4)



We call this kind of spellout *early full spellout* because it is independent of phasal spellout and can apply before phasal spellout, and because it is the full phrase that is spelled out – the edge does not remain accessible. We illustrate the role of early full spellout for the locality of sideward movement in section 5, and argue that early full spellout can also be triggered if it can save a derivation that has entered a deadlock state independently of linearization considerations.

3 Case checking and successive cyclicity in sideward movement

In what follows, case and successive cyclicity will play an important role. Let us therefore dedicate some time to these issues here. Consider example (5), which was discussed by Hornstein & Nunes (2002: fn. 20) for its case characteristics, and which we discuss here to illustrate the interaction of successive-cyclic movement and sideward movement. In (5) the two instances of *which student* in the true gap and in the parasitic gap have different case: one

[2] The ordering of adjuncts (e.g. the PP in (4)) with respect to the 'host' structure might be due to other constraints (Nunes & Uriagereka 2000). Note that with the LCA the adjunct would always occur to the left of the projection it adjoins to. Also see Chomsky (1995) for discussion.

[3] See Stepanov (2007) for criticism of this account. He argues that subject islands are not universal whereas adjunct islands are, but see Jurka (2010) for a qualification of the former claim, and Truswell (2007) for a qualification of the latter claim.

is a nominative subject and the other a direct object.[4] Hornstein & Nunes (2002) suggest that *which student* can move sideward before its case is checked in CP_1, i.e. the movement can proceed from νP_1 as shown in (5b-g). (5b) is the target structure. (5c) is the subarray from which νP_1 is built, see (5d). After completion of νP_1 subarray $N_{\nu P3}$ is activated, see (5e). $N_{\nu P3}$ contains the verbal head *hire* but no element onto which *hire* could discharge its theta role, which triggers sideward movement of *which student* from νP_1, see (5f-g). The two copies of *which student* thus enter into independent case-checking relations. More generally, Hornstein & Nunes (2002) state that sideward movement may proceed before the operation of Agree establishes feature checking so that each copy can check its case feature in a different derivational workspace.

(5) a. Which student did you hire after Mary said impressed the boss?

b. $[_{CP3}$ [which student]$_i$ did you $[_{\nu P3}$ hire t_i after $[_{CP2}$ Mary said $[_{CP1}$ … $[_{\nu P1}$ e_i impressed the boss] …]]]]

c. $N_{\nu P1}$ = {which, student, ν_1, impressed, the boss}
d. K = $[_{\nu P1}$ [which student]^i ν_1 $[_{VP1}$ impressed the boss]]

e. $N_{\nu P3}$ = {you, ν_3, hire, after}
f. L = hire
g. M = $[_{VP3}$ hire [which student]^i]

There is, however, a problem with the derivation in (5). $N_{\nu P3}$ cannot be exhausted before CP_2 is derived because CP_2 is the complement of *after* in $N_{\nu P3}$. That is $N_{\nu P3}$ cannot be exhausted, and νP_3 cannot be completed, without simultaneous activation of N_{CP2} (and derivation of CP_2), which constitutes a violation of OneSub.

Is there a derivation that does not violate OneSub?[5] Assume that *which student* moves successive-cyclically from νP_1 to the edge of CP_2. From there it can move sideward to νP_3 bypassing the adjunct island that is created when *after* is merged with CP_2:

(6) a. K = $[_{CP2}$ [which student]^i C_2 $[_{TP2}$ Mary said $[_{CP1}$ [which student]^i C_1 $[_{TP1}$ [which student]^i T_1 $[_{\nu P1}$ [which student]^i impressed the boss]]]]]
b. L = hire
c. M = $[_{VP3}$ hire [which student]^i]

[4] Hornstein (p.c.) notes that other examples suggest that the true and the parasitic gap might have to have the same case. He observes that (i) is better than (ii).

(i) Which student did you hire after you said that Mary interviewed.
(ii) Which student did you hire after you said interviewed Mary.

It seems then that this needs more systematic investigation.

[5] Jairo Nunes (p.c.) and Norbert Hornstein (p.c.) suggest further alternatives, such as that *after* belongs to the subarray for CP_3. The problem with these alternatives, which we unfortunately do not have the space to discuss here, is that either they make the ungrammatical example (3) above derivable, or they overgenerate elsewhere.

What about case checking in νP_3 in the derivation in (6)? We suggest that the case feature of a DP is (re)activated when it is attracted by a head that assigns it a theta role.[6] Thus, a DP whose case feature has been checked and erased, receives a new unchecked case feature. In the case of a DP whose case feature has been checked but not erased the feature becomes unchecked again. Essentially this also means that the case feature of a DP need not be present in the numeration either but is acquired through selection by a theta-assigning head. This seems to violate the *inclusiveness condition* assumed in Chomsky (1995, 2001), according to which no new features may be added during a derivation. Note however, that case is not an intrinsic feature of DPs, which means that case features are added as the lexical items enter the numeration. Since the numeration strictly speaking belongs to the derivation this suggests that the addition of case features does not violate the inclusiveness condition. We propose that the same holds for the addition – or reactivation – of case features during the derivation 'proper'. So (re)activating a case feature by a theta-assigning selector is an admissible operation.[7] For the derivation in (6) this means that *which student*, whose case feature has been checked and erased by the time it moves sideward, can enter into an Agree relation with ν_3 after selection by *hire*, which will eventually lead to a convergent derivation.

Our assumptions concerning case reactivation tie in well with proposals according to which reflexive and pronoun binding can be derived by movement (see e.g. Lidz & Idsardi 1998; Hornstein 2001; Zwart 2002) for a movement account of reflexives). Take the numeration in (7a), which seems to give rise to the ungrammatical construction in (7b). If case reactivation is possible by theta selection ν reactivates the case feature on *Mary* and T then can assign nominative even though the other copy of *Mary* within VP has accusative case, as indicated schematically in (7c).

(7) a. N_{CP} = {C, T}; $N_{\nu P}$ = {ν, likes, Mary}
b. *Mary likes Mary.
c. [$_{CP}$ C [$_{TP}$ Mary^{i} [~~CASE~~] T [$_{\nu P}$ Mary^{i} [CASE] ν [$_{VP}$ likes Mary^{i} [~~CASE~~]]]]]

It is not clear that Form Chain would fail to form a three-membered chain of the copies of *Mary* in (7c) and thus rule the example out. The chain link of the two higher copies would be licensed by the case-checking relation between T and the copy in spec-TP, given the unchecked case feature of the copy in spec-νP. The chain link of the two lower copies would

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[6] Also see Boeckx, Hornstein & Nunes (2010) who make a similar point for quirky case in a movement account for Icelandic control structures.

[7] We will remain silent here with respect to the different behaviour of languages as regards admissible case mismatches between the true and the parasitic gap. In Icelandic, for instance, case mismatch is possible as long as the case of the antecedent is the same as that of the true gap (Rögnvaldsson 1993), independently of whether structural or quirky case is assigned in the parasitic gap (Rögnvaldsson p.c.). For English (also see note 4) it has been observed that case mismatches are only allowed if there is case syncretism (Levine & Sag 2003). But note that this only seems to hold for structural case: Postal (1993) and Hornstein & Nunes (2002) hypothesize about examples like (i) that they are ungrammatical because *who* in the parasitic gap does not have structural case.

(i) *It was Ida who$_i$ Bob contacted t_i immediately after concluding that it would amuse e_i to tickle alligators.

Hornstein & Nunes (2002) suggest that this is because only unchecked structural case renders a DP active for A-movement. As far as Icelandic is concerned, recent work by Boeckx, Hornstein & Nunes (2010) suggests that quirky case should behave like structural case.

arguably be licensed by the checking relation between the theta feature of ν and the categorial feature of the higher copy, given the unchecked categorial feature of the lower copy. Furthermore, devising a chain uniformity condition for PF concerning the different values of the case features would be ill-fated in examples like the parasitic gap construction in (5) above, where the case of the antecedent and the case of the copy in the parasitic gap are different. We therefore propose that (7c) converges at the interfaces. Importantly, though, it is not spelled out as (7b) but rather as (8), i.e. if two copies are in different theta positions of the same clause the lower copy will be spelled out as a reflexive pronoun:

(8) Mary likes herself.

Next consider the numeration formed from the subarrays in (9a), which misses an agent expression in $N_{\nu P2}$. Assume that the derivation has reached the stage in (9b), where VP_2 has been built and ν_2 has been merged. The subarrays $N_{\nu P1}$, N_{CP1} have been exhausted. ν_2 needs to discharge a theta role but there is no element in the subarray $N_{\nu P2}$ that could serve this purpose. As a last resort, *who*, which has moved successive-cyclically into spec-CP_1 is copied. It receives a new case feature because it is selected by a theta-assigner. After that the derivation proceeds and converges. The resulting structure is (9c), which has the meaning in (9d), and seems to have the PF of the ungrammatical (9e).

(9) a. $N_{\nu P1}$ = {who, ν_1, impressed, Mary} N_{CP1} = {C_1, T_1}
$N_{\nu P2}$ = {ν_2, thinks} N_{CP2} = {C_2, T_2}

b. [$_{\nu P2}$ ν_2 [$_{VP2}$ thinks [$_{CP1}$ who^i C_1 [$_{TP1}$ who^i T_1 [$_{\nu P1}$ who^i impressed Mary?]]]]]
c. [$_{CP2}$ who^i C_2 [$_{TP2}$ who^i T_2 [$_{\nu P2}$ who^i ν_2 [$_{VP2}$ thinks
[$_{CP1}$ who^i C_1 [$_{TP1}$ who^i T_1 [$_{\nu P1}$ who^i impressed Mary?]]]]]]]

d. For which x: x thinks that x impressed Mary?
e. *Who$_i$ t_i thinks t_i impressed Mary?

Observe, however, that the copies of *who* in (9c) form a chain, and two of these copies occur in a theta position: in spec-νP_1 and in spec-νP_2. We suggest that in such a non-local configuration the copy that is in the lower theta position is spelled out as a pronoun, so that the PF of (9c) is the following:

(10) Who thinks he impressed Mary?

Note that the structure in (9d) will not be excluded by an LF account of condition C violations such as Schlenker (2005) (it is condition C that is pertinent here because traces of A-bar movement are R-expressions). In all relevant respects (9d) is identical to the structure that would arise from a numeration that contains the personal pronoun. Chain reduction at LF guarantees that the copy of the *wh*-pronoun in the subject position of the lower clause in (9d) is interpreted as a bound variable just like the personal pronoun is. Therefore we must assume that this copy is spelled out as a personal pronoun as suggested above. Suggestions for the analysis of pronoun binding in terms of movement come from e.g. Kayne (2000) and Hornstein (2007). Note, however, that we do not suggest that pronoun binding is always derived by movement. The PF in (10) with the meaning in (9d) can also be derived with the pronoun *he* in the numeration.

4 Question word coordinations

Question word coordinations are structures where two *wh*-phrases or an interrogative complementizer and a *wh*-phrase are coordinated, see (11a&b).

(11) a. When and where are we meeting?
b. I want to find out if and when Pete is coming tomorrow night.

Question word coordinations have received increased attention in recent years, see e.g. Comorovski (1996), Giannakidou & Merchant (1998), Whitman (2002, 2004), Lipták (2003), Gračanin-Yuksek (2007), Zhang (2007), Citko (2008), Gribanova (2009), and Haida & Repp (2010, to appear a, b). The analysis of these coordinations is highly controversial, a major point of dispute being whether they are bi- or monoclausal. Zhang (2007) and Haida & Repp (to appear a) suggest that question word coordinations are derived by sideward movement, with Haida & Repp restricting their claim and arguing that it is only coordinations of argument *wh*-phrases, which occur in multiple *wh*-fronting languages (= MF languages), that are derived by sideward movement in a monoclausal structure. Other question word coordinations like those in (11a&b) receive a biclausal analysis in their account.

Let us review Haida & Repp's (to appear a) arguments here briefly and illustrate how the economy constraints discussed in the previous sections adequately constrain the derivation of question word coordinations. (12b) shows that Russian, an MF language, allows the coordination of argument *wh*-phrases (see e.g. Kazenin 2002; Gribanova 2009). A *wh*-subject is coordinated with a *wh*-object. Such constructions are only acceptable with a single-pair reading. (12a) shows that English, a non-MF language, does not allow the coordination of argument *wh*-phrases under any reading.

(12) a. *Who and whom saw? *English, Non-MF*
b. Kto i kogo videl? *Russian, MF*
who and whom saw
'Who saw somebody and who was it?'

To account for the difference between MF-languages and non-MF languages, Haida & Repp follow Bošković (2002) and assume that in MF languages multiple *wh*-words are moved overtly into multiple specifiers of FocP:

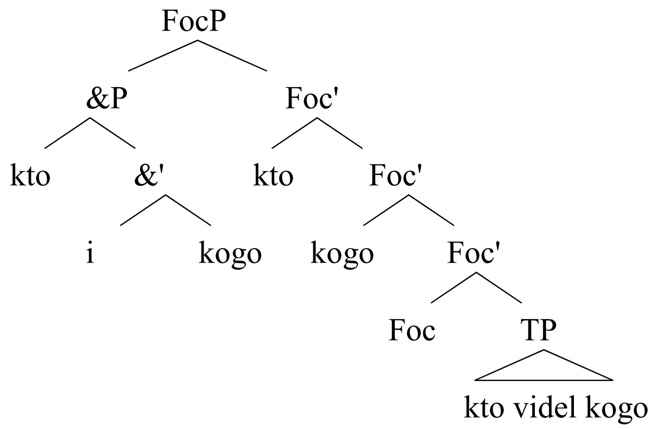
(13) $[_{FocP}$ kto $[_{FocP}$ kogo Foc $[_{TP}$ kto videl kogo]]]

From this position, the *wh*-words are moved sideward to &P due to an *Attract All F* feature on & (see Haida & Repp to appear (a) for motivation and details).

(14) $[_{FocP}$ kto^i $[_{Foc'}$ kogo^j Foc $[_{TP}$ kto videl kogo]]]
SIDEWARD MOVEMENT
$[_{\&P}$ kto^i $[_{\&'}$ i kogo^j]]

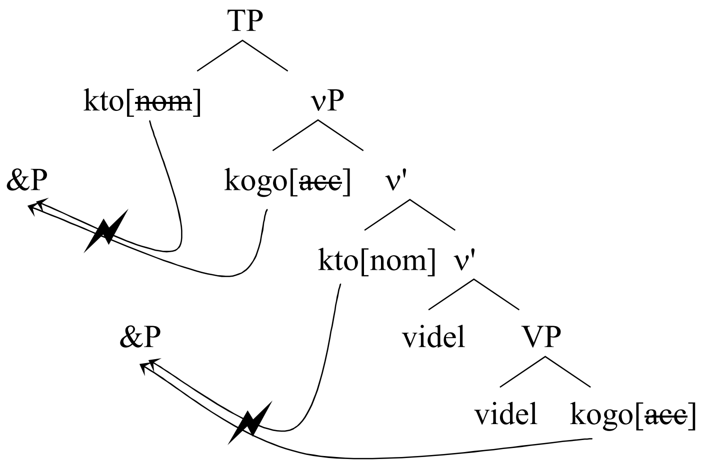
In a next step, &P and FocP are merged:

(15)



A crucial part of the argumentation Haida & Repp put forward is dedicated to case features. They assume that elements with checked but unerased incompatible features cannot merge in a &P, the reason basically being that $\&P_{[DP]}$ has case itself. Note that in contrast to the verbal heads that trigger sideward movement in parasitic gap constructions, which we discussed in the previous section, the head of the coordination phrase does not assign a theta role and therefore cannot reactivate a case feature. This explains why it is only from spec-FocP[8] that the *wh*-phrases move to &P, and why it is not possible to move one of the lower *wh*-phrases – e.g. those in νP or TP to &P: a feature is only erased upon merger of the next phase head; a feature that has only been checked is still visible and is incompatible with a distinct feature, see (16).

(16)



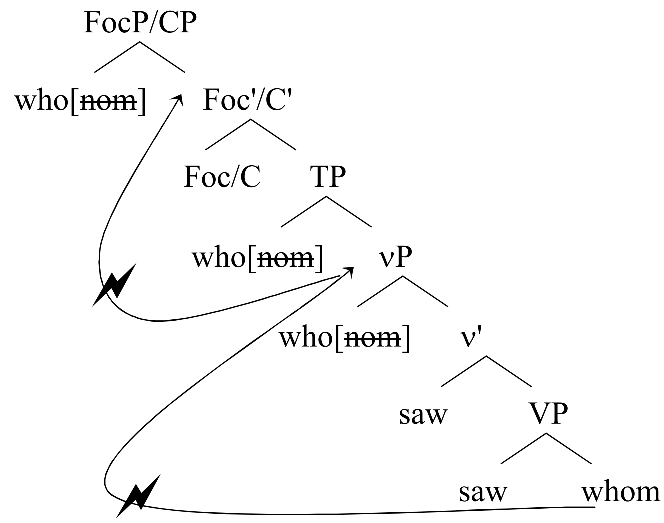
Upon merger of the next phase head, Foc (which is the first head of the C-domain), features checked in the νP phase – here [~~acc~~] – are erased, and VP is spelled out. Foc attracts the *wh*-arguments, whose features are no longer incompatible, and which thus can move sideward to &P. Thus, cyclic spellout with concomitant feature erasure determines the point in the derivation when sideward movement to &P becomes possible: from spec-FocP.

In non-MF languages like English, Foc/C attracts only one *wh*-phase. Consequently there is no successive-cyclic movement of the object *wh*-phrase to the left edge of νP, and further to FocP/CP, see (17). We assume that the optional addition of an EPP feature on ν, which triggers successive-cyclic movement, is regulated by economy considerations: if there is already a phrase at the edge of νP which has the relevant peripheral features – in this case [wh] – there is no need in non-MF languages like English for the addition of an EPP feature

[8] Technically there is a little complication but conceptually this is what Haida & Repp claim.

and therefore it is excluded. For the structure in (17) this means that *whom* will not be moved to the edge of νP because *who* already resides there. As a result, sideward movement cannot occur: the merger of the Foc head erases the offending case feature on the object *wh*-phrase in the complement position of V but also makes that phrase inaccessible for further syntactic operations: it is spelled out as part of the domain of the ν phase.

(17) *Who and whom saw? (= (12a))



Let us next illustrate how the constraint OneSub correctly rules out question word coordinations in complex questions in English like (18), which is a control structure where two *wh*-phrases with the same case features from different phases are coordinated.[9]

(18) *Who and what did you convince to read?
Intended: 'Who did you convince to read something and what was it?'

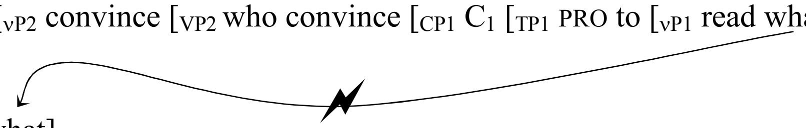
What we need to consider here is the question of which subarray contains the coordinating conjunction. There are basically two options both of which deliver the right result, viz. the derivation of (18) does not converge under either option. The first option is that the coordinating conjunction *and* is in the subarray of the top CP. This is the CP where *and* would end up at PF if the structure in (18) were grammatical. The second option is that *and* is in the subarray of one of the lower phases. Let us look at these two options in some more detail and start with the first. (19) depicts the point in the derivation where TP_2 has been built and the numeration of CP_2 has been started. The conjunction *and* is selected but cannot fulfil its featural requirements and fill its complement and specifier positions from elements in the same subarray. Sideward movement cannot save the situation: sideward movement of *what* from νP_1 is not possible at this stage, because νP_1 has already been spelled out (upon merger of the head of the lower CP, C_1). Activation of N_{CP2} and sideward movement of *what* to &P at the stage where only νP_1 has been built neither is possible: the derivation cannot proceed without a violation of OneSub because N_{CP2} cannot be exhausted before νP_2 has been derived. Note that there cannot be successive-cyclic movement of *what* to spec-νP_2 (via spec-νP_1, spec-CP_1) – which would make *what* accessible in the CP_2 phase – because attraction to

[9] Note that such sentences can be grammatical in Russian (Kazenin 2002), see Haida & Repp to appear (a) for details.

spec-νP_2 would be triggered by (optional) peripheral and EPP features on ν_2, which, however, attract the closer *who*.

(19) Option1: N_{CP2} = {Q, did, and}

[$_{TP2}$ you [$_{\nu P2}$ convince [$_{VP2}$ who convince [$_{CP1}$ C_1 [$_{TP1}$ PRO to [$_{\nu P1}$ read what]]]]]]



[$_{\&P}$ and what]

Consider next option 2, where *and* is in the subarray of the νP_1 phase:

(20) Option 2: $N_{\nu P1}$ = {PRO, ν_1, read, what, and}

Again, featural requirements of *and* (here just the EPP feature) cannot be fulfilled from the lexical material in the current subarray $N_{\nu P1}$. OneSub prevents that another subarray is activated whilst νP_1 is not yet completed. The derivation cannot converge.

Note that OneSub only prevents parallel computations of different phases. It does not prevent parallel computations within the same phase. In the derivation of the question word coordinations in MF-languages that we have seen, two independent phrase markers (&P and FocP) are computed in parallel within the same phase. This must be generally possible.

To conclude, sideward movement seems to be sufficiently locally restricted by the set of constraints suggested so far also in the derivation of question word coordinations. Still, as we shall see in the next section this set of constraints is not sufficient to account for other data. We are returning to parasitic gaps.

5 OneSub is not enough: Back to parasitic gaps

The following examples are repeated from section 1. For easier exposition we have underlined the phase from which sideward movement proceeds with a single line, and the phase to which sideward movement proceeds with a double line (abstracting away from the fact that the subject is in spec-TP).

(21) a. Which book$_i$ did [you read t_i after [Mary recommended e_i]] ? = (2a)
b. *Which book$_i$ did [you borrow t_i after
[leaving the bookstore without [finding e_i]]] ? = (3a)

Recall from section 1 that the difference in grammaticality between (21a) and (21b) can be explained as follows. In (21a) the selectional requirements of *after* can be fulfilled because its complement has already been derived. In (21b), in contrast, the selectional requirements of *after* cannot be fulfilled because its complement cannot be derived: it is not possible to exhaust the subarray *after* is part of without opening the subarray for its complement. OneSub does not allow the concurrent activation of two subarrays. Next consider the following, arguably more complex, example:

(22) *Which walls$_i$ did John [assume [that [the cat scratched t_i]] before
complaining to his wife without [examining e_i]] ?

In (22) *before* is not part of the phase to which sideward movement proceeds. This means that this phase can be completed before the subarray containing *before* is started, which makes

(22) derivable. Let us demonstrate this.[10] (23a) is the structure of (22). (23b) is the subarray for νP_1. (23c) is the structure of νP_1. Assume that after the derivation of νP_1 the subarray for νP_3 is started, (23d). As before, the selectional requirements of the verbal head of VP_3, *scratched*, cannot be fulfilled from the elements in the same subarray, which triggers the copying of *which walls* from νP_1 and subsequent merger with *scratched*, see (23e). Next, ν_3 from the active subarray is merged, and then *the cat* is merged. From this derivational stage, CP_4 can be built without violating OneSub: after completion of νP_1 and νP_3, $N_{\nu P2}$ can be activated and νP_2 can be completed, followed by CP_3 and CP_4. The derivation converges. The system overgenerates.

(23) a. *[$_{CP4}$ [which walls]$_i$ did John assume [$_{CP3}$ that the cat [$_{\nu P3}$ scratched t_i]] before [$_{\nu P2}$ complaining to his wife without [$_{\nu P1}$ examining e_i]]]

b. $N_{\nu P1}$ = {PRO, ν_1, examining, which, walls}
c. K = [$_{\nu P1}$ PRO ν_1 [$_{VP1}$ examining [which walls]$_i$]]

d. $N_{\nu P3}$ = {the, cat, ν_3, scratched}
e. L = scratched

f. M = [$_{VP3}$ scratched [which walls]$_i$]
g. O = [$_{\nu P3}$ the cat ν_3 [$_{VP3}$ scratched [which walls]$_i$]]

To solve this problem, we suggest that OneSub must be augmented with a constraint which forces derivations to proceed bottom-up more strictly. Let us call this constraint *ActivateSelector*.

(24) **ActivateSelector** (to be revised)
After a subarray has been exhausted and a phase been completed, the next subarray to be activated must be one that contains a selectional requirement for the syntactic object just completed (if there is such a subarray).

ActivateSelector requires lookahead to the next derivational step but no further than that. Importantly, although the numeration determines the class of syntactic objects that can be derived, accessing the numeration and scanning it for a particular kind of element is not equivalent to accessing the derivable syntactic objects. The computational complexity of accessing and scanning the numeration is linear in the number of elements in the numeration because for each of these elements it takes a constant time to scan for the selection property. Thus, the overall computational complexity induced by ActivateSelector is of order *n log n,* where *n* is the number of lexical items in the numeration. In contrast to this the number of steps to derive a syntactic object from a numeration is clearly not bounded by *n log n*.

Let us illustrate how ActivateSelector rules out (22). Consider once more (23a). Due to ActivateSelector N_{CP1} is activated after completion of νP_1. By the completion of CP_1, spec-CP_1 hosts a copy of *which walls* which moved there successive-cyclically. Due to ActivateSelector, $N_{\nu P2}$ is the next array that is activated. The assembly of νP_2 creates an adjunct island: [without [$_{CP1}$ …]]. The island is created by early full spell-out triggered to ensure linearizability. As a result, *which walls* in CP_1 is no longer accessible for syntactic

[10] For ease of exposition we simplify here by illustrating without successive-cyclic movement unless absolutely necessary.

operations. Due to OneSub there is no point in the derivation where N_{vP3} is activated, *which walls* is accessible and thus could undergo sideward movement to VP_3.

ActivateSelector is also necessary to explain the ungrammaticality of examples like (25), where the true gap just like in (22) above occurs in a complement clause of the matrix clause but where the parasitic gap is separated from the true gap by only one island:[11]

(25) *Which window$_i$ did John [assume [that [the wind broke t_i]]
without [examining e_i]]?

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[11] Barss (1986) (cited in Nunes 2004: 110) discusses an example that structurally is identical with (25) in the relevant structural aspects, and which is judged to be grammatical.

(i) I wonder [$_{CP3}$ which papers$_i$ John [$_{vP3}$ said [$_{CP2}$[$_{vP2}$ were t_i unavailable]] before
[$_{CP1}$[$_{vP1}$ reading e_i]]].

This of course requires closer empirical investigation. If these examples turn out to be grammatical ActivateSelector cannot be upheld because it would wrongly rule them out. In this case we would like to propose an alternative explanation for (23) which concerns the way derived structures are stored when a new subarray is opened. We suggest that upon opening a new subarray the syntactic object derived immediately beforehand is put upon (*pushed onto,* in computer science terminology) a last-in-first-out (LIFO) stack. An object on the stack top will be taken from (*popped from*) the stack if this satisfies a featural requirement of an element in the new subarray. Also, elements in the object on the stack top can be copied, e.g. in the case of sideward movement. With these assumptions, the difference between the crucial examples (i) and (23) can be explained as follows. Let us start with the ungrammatical (23), repeated as (ii) below.

(ii) *[$_{CP4}$ [which walls]$_i$ did John [$_{vP4}$ assume [$_{CP3}$ that the cat [$_{vP3}$ scratched t_i]] before
[$_{CP2}$[$_{vP2}$ complaining to his wife without [$_{CP1}$[$_{vP1}$ examining e_i]]]]]]

After the derivation of vP_1, vP_1 is pushed onto the stack. CP_1 is built popping vP_1 from the stack and merging it with T_1. Upon completion, CP_1 is pushed onto the stack and the subarray for vP_3 is started. The selectional requirements of the verbal head of VP_3, *scratched*, triggers the copying of *which walls* from spec-CP_1 on the stack top and subsequent merger with *scratched*. vP_3 is finished and pushed onto the stack. Then CP_3 is built popping vP_3 from the stack. Recall that CP_1 is still on the stack (as the only object). Let us assume that next the subarray of vP_2 is activated, which pushes CP_3 onto the stack. The subarray of vP_2 contains *without*, which takes CP_1 as its complement. Since CP_1 is not on the top of the stack it is not available. CP_3, which is on top of the stack cannot be popped from the stack (which would make CP_1 available) because vP_2 does not contain an element which has a selectional requirement for CP_1. The derivation cannot converge. If instead of vP_2, the derivation for vP_4 is started the derivation cannot converge either because *before* in vP_4 contains a featural requirement for CP_2, which, however, has not been built at this stage.

For (i) these problems do not arise. First CP_1 is derived and pushed onto the stack. Then CP_2 is derived with sideward movement from CP_1. Upon the activation of the subarray for vP_3 CP_2 is pushed onto the stack but it is immediately popped from the stack again because *said* in vP_3 takes it as a complement. From here the derivation can proceed without any problems.

(25) fails for the same reasons as (22), see (26). By *ActivateSelector*, N_{vP3} is activated after completion of vP_1. vP_3 is derived and the *without*-PP becomes an island. There is no point in the derivation where N_{vP2} is activated, and *which window* is accessible and could undergo sideward movement to VP_2.

(26) *[$_{CP3}$ [which window]$_i$ did John [$_{vP3}$ assume [$_{CP2}$ that the wind [$_{vP2}$ broke t_i]]
without [$_{vP1}$ examining e_i]]]

Consider next the same structure without *wh*-dependencies, see (27). The gaps are replaced by a full DP *(the window)* and an anaphoric pronoun *(it)*, respectively. The structure is grammatical, which is problematic for the definition of ActivateSelector proposed in (24). Like in (26) above both *assume* and *without* in vP_3 take phases as complements. By everything we said so far the derivation of either of these phases activates the numeration of vP_3 (ActivateSelector) and thus the derivation of vP_3. However, vP_3 can never be completed because the other phase will not have been derived yet (OneSub) and the selectional requirements of either *assume* or *without* cannot be fulfilled. The derivation is in a deadlock state. Still, the data tell us that there is a derivation available.

(27) [$_{CP3}$ John [$_{vP3}$ assumed [$_{CP2}$ that the wind [$_{vP2}$ broke the window]]
without [$_{vP1}$ examining it]]]

To solve this puzzle we amend the definition of ActivateSelector as follows:

(28) **ActivateSelector** (final version)
After a subarray has been exhausted and a phase been completed **and not yet spelled out**, the next subarray to be activated must be one that contains a selectional requirement for the syntactic object just completed (if there is such a subarray).

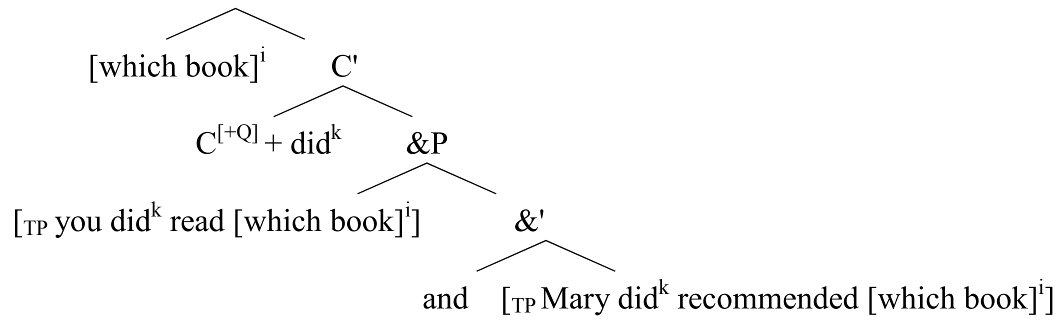
With this, (27) can be derived. First vP_1 is derived followed by CP_1. CP_1 is spelled out early, which makes the entire CP_1 a syntactic atom. This early spellout is triggered as a last resort in order to avoid the deadlock described above. We assume that early full spellout is relevant for ActivateSelector because a phase that has been fully spelled out and consequently is a syntactic atom, no longer constitutes the current derivational path. Therefore it does and should not determine the future derivational path. The derivation of (27) can now proceed with the activation of any of the other subarrays in the numeration. The activation of vP_2 allows a convergent derivation. Note that (22) and (25) are still underivable with this new version of ActivateSelector because early full spellout of CP_1 makes the *wh*-phrase (*which walls* / *which window*) inaccessible for sideward movement.

6 ATB constructions

Let us turn next to ATB constructions, another empirical domain for which sideward movement has been suggested to be involved in the derivation. We shall see in this section that the amendments we made in the context of parasitic gap constructions, now preclude the derivation of run-of-the-mill ATB constructions. Consider (29a) whose structure is given in (29b), from Hornstein & Nunes 2002: 33). The subarrays are given in (29c).

(29) a. Which book did John read and Mary recommend?

b. CP



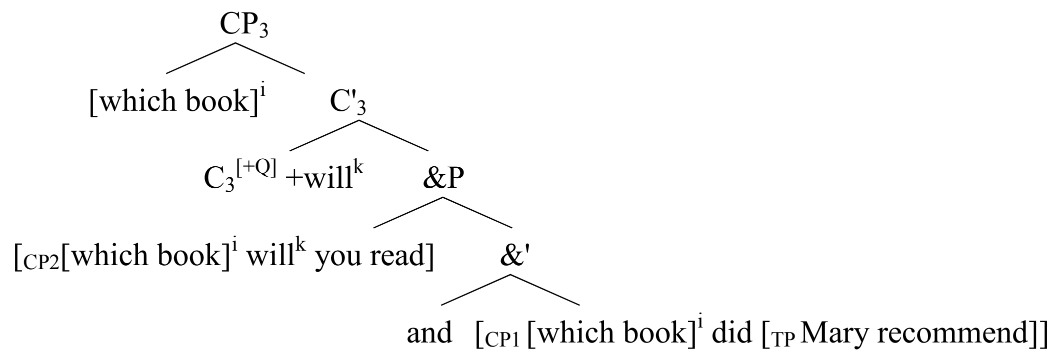
c. $N_{\nu P1}$ = {Mary, ν_1, recommend, which, book}
$N_{\nu P2}$ = {you, ν_2, read}
N_{CP} = {$C^{[+Q]}$, and, did }

Without ActivateSelector, the derivation could proceed along the following lines. First νP_1 is derived, then νP_2, where the lack of a complement for the verbal head *read* in the subarray $N_{\nu P2}$ triggers sideward movement of *which book* from νP_1. Then follow the derivation of TP_1, of TP_2 (with sideward movement of *did* from TP_1) and of the matrix CP. With ActivateSelector this sequence of derivational steps is disallowed: the selector for νP_1 *(did)* is in N_{CP}. So it should be N_{CP} that is activated after completion of νP_1 but N_{CP} cannot be exhausted because the featural requirements of *and* cannot be fulfilled without starting $N_{\nu P2}$. If, on a different scenario, νP_1 undergoes early full spell-out, which would open up the possibility of activating $N_{\nu P2}$, sideward movement of *which book* from VP_1 is pre-empted because νP_1 has been spelled out. It seems that (29a) cannot be derived.

Here is a second attempt, with a structure that has bigger conjuncts. Maybe we are not dealing with TP coordination but with the coordination of CPs. That this is a general possibility is evidenced by examples like (30a), where the C position is occupied by different elements in the two conjuncts. We suggest that such examples involve CP recursion, see the structure in (30b). Note that only C_3 is an interrogative C.

(30) a. Which book will you read and did Mary recommend?

b.



Next, assume the subarrays given in (31). $N_{\nu P1}$ and $N_{\nu P2}$ are the same as before.

(31) $N_{\nu P1}$ = {Mary, ν_1, recommend, which, book} N_{CP1} = {C_1, did}
$N_{\nu P2}$ = {John, ν_2, read} N_{CP2} = {C_2, will }
N_{CP3} = {$C_3^{[+Q]}$, and}

Again, the derivation starts with νP_1. Then, in compliance with ActivateSelector, N_{CP1} is activated. CP_1 is built, including successive-cyclic movement of *which book* to spec-CP_1. The selector for CP_1 (*and*) is in the subarray for the matrix clause CP_3. The problem is just the same as before: there can be no sideward movement to νP_2.

Assuming that *and* is part of a different subarray does not lead to a convergent derivation either. Assume, for the sake of the argument, that *and* is in N_{CP2}. ActivateSelector would then force the activation of N_{CP2} after the completion of CP_1. However, *which book* must be copied to νP_2, which cannot be built after CP_2 because the subarray of CP_2 cannot be exhausted if νP_2 has not been built yet.

To get to the core of the problem compare the ATB construction in (32) with the parasitic gap construction in (33) (= (25) from above). We said earlier that (33) cannot be derived because by ActivateSelector the νP which is the goal of the sideward movement of the *wh*-phrase cannot be activated at a time when the *wh*-phrase is still accessible. For the ATB construction in (32), which is exactly parallel with respect to this derivational stage, this makes the wrong prediction. Importantly, it is not obvious that there could be a locality constraint which would discriminate between these two structures.

(32) Which book$_i$ did John assume [that [Paul read *t*$_i$]]
and Peter say that [Mary recommended *e*$_i$]?

(33) *Which window$_i$ did John assume [that [the wind broke *t*$_i$]] = (25)
without [examining *e*$_i$]?

Now, it has of course long been observed that parasitic gap constructions in general are more restricted than ATB constructions. Hornstein & Nunes (2002: 33) list inter alia the following examples, which illustrate Postal's (1993) observation that e.g. AdvPs and nonreferential NPs cannot be extracted in parasitic gap constructions but in ATB constructions they can:

(34) a. *How$_i$ did Deborah cook the pork *t*$_i$ after cooking the chicken *e*$_i$?
b. *[How many weeks]$_i$ did he spend *t*$_i$ in Berlin without wanting to spend *e*$_i$ in London?

(35) a. How$_i$ did Deborah cook the pork *t*$_i$ and Jane cook the chicken *e*$_i$?
b. [How many weeks]$_i$ did you spend *t*$_i$ in Berlin but want to spend *e*$_i$ in London?

Hornstein & Nunes (2002) explain these differences as a function of the last resort nature of the copying operation. In all the grammatical parasitic gap constructions we have been looking at, copying for sideward movement was triggered by the need of a head to discharge a theta role which could not be satisfied by an element in the current subarray. This is different in (34): none of the elements that would have to undergo sideward movement to make the derivation converge are bearers of theta roles. Hornstein & Nunes hold that selection (without discharging a theta role) is not sufficient to trigger copying. This is why the verb in (34b) although selecting the gapped element does not trigger copying: it does not assign a theta role. In the ATB constructions in (35) the situation obviously is exactly the same. Still, they are grammatical. Since ATB constructions are essentially coordinations Hornstein & Nunes suggest that they are subject to a parallelism requirement, which has been observed to hold in coordinations in general, especially in the context of ellipsis (e.g. Fox 1995, 2000; Merchant 2001; Repp 2009; Zhang 2010). The role parallelism plays in the grammatical system differs in these proposals. Hornstein & Nunes (2002) assume that the parallelism requirement can be viewed as a bare output condition at the Conceptual-Intentional interface. This means that the parallelism requirement will trigger copying to ensure legibility at the interface. So for instance *how* (35a) would be copied from one VP to the other to make the two VPs maximally parallel.

There are two aspects to be discussed here. The first is an empirical consideration. The verbs in our examples (32) and (33) above do assign theta roles so there is an 'ordinary' trigger for sideward movement both in the parasitic gap construction in (32) and in the ATB construction in (33). It therefore is not possible to argue that the ATB-construction is saved because in this case there is the parallelism trigger for sideward movement which is missing in the parasitic gap case. The second aspect is of a more conceptual nature. The parallelism requirement envisaged by Hornstein & Nunes (2002) provides a post-hoc motivation for sideward movement for the ATB constructions in (35), which in our view begs the more general question of how sideward movement is *triggered in the course of the derivation*. The parasitic gap cases in (34) are taken to show that sideward movement is a last resort operation which is triggered by a featural requirement. In (35) the featural requirement does not exist at the point in the derivation where it would lead to a structure that satisfies the parallelism requirement. So it seems to us that the parallelism requirement only makes sense in a system that is substantially different from the derivational system assumed here and in Hornstein & Nunes (2002). In the present system a violation of bare output conditions leads to phonetic or semantic deviance but it does not lead to backtracking to a former a derivational stage – which would be required to trigger an instance of sideward movement in order to make the derived structure legible.[12] In a backtracking system it is conceivable that OneSub and ActivateSelector can be violated in order to fulfil the parallelism requirement. We leave this option unexplored here.

While acknowledging that a parallelism requirement of some sort might play a role in the differentiation between the examples in (34) and (35), we would like to follow a different route here to explain the difference between the structures in (32) and (33). This route, however, also follows the insight that coordinations of clauses differ from subordinations in crucial ways. As above we assume that a preposition like *before* is an element of the subarray of the subordinating structure. A clausal conjunction, however, is an element of the subarray of the non-initial conjunct. We can conceive of it as heading an extended projection of the XP it combines with. Further we assume that the clause-coordinating conjunction *and* – in contrast to the DP-coordinating conjunction *and* that conjoins e.g. the *wh*-pronouns in question word coordinations (see section 4) – selects for only one argument: it takes the right conjunct as its complement. Evidence for this comes from sentences that are introduced by *and* without being conjoined with a left conjunct:

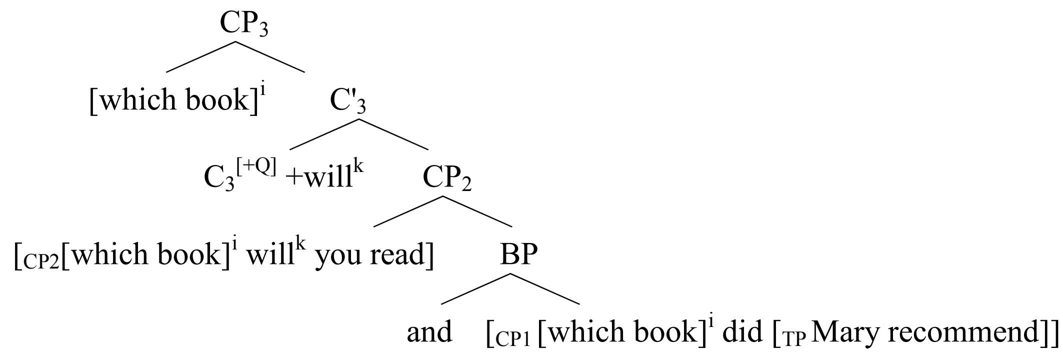
(36) A: Pete said he does not like sideward movement.
B: And what does that prove?

A separate analysis for clause-conjoining *and* vs. DP-conjoining and is also motivated by the fact that in many languages, e.g. Japanese, Korean, Yoruba, Wolof and Hausa, there are different conjunctions for DPs on the one hand, and clauses or verb phrases on the other (e.g.

[12] Note that the assumption of early full spellout (see section 2) suffers from quite similar conceptual problems. These can be overcome, however, if we assume with Chomsky (2008) that the operation Merge can never be applied to two phrases but only to two syntactic atoms or a syntactic atom and a phrase. This requires the spellout of subjects and adjuncts independently of LCA considerations.

Haspelmath 2004).[13] Furthermore, we assume that the phrase formed by the conjunction and the second conjunct in clausal coordination adjoins to the first conjunct (Munn 1992, 1993). To make clear the difference with the specifier-complement structure of DP coordination, we shall refer to this phrase as BP as in Munn (1993). So the ATB construction in (30a) has the following structure:

(37)



$N_{\nu P1}$ = {Mary, ν_1, recommend, which, book} – *as above*
$N_{\nu P2}$ = {John, ν_2, read} – *as above*
N_{CP1} = {C_1, did, and}
N_{CP2} = {C_2, will} – *as above*
N_{CP3} = {$C_3^{[+Q]}$}

Let us illustrate how it is derived. First νP_1 and CP_1 are derived with *which book* moving successive-cyclically to spec-CP_1. Then *and* and CP_1 are merged. The resulting structure is not yet spelled out. As an adjunct it is not selected. Therefore $N_{\nu P2}$ can be started without violating ActivateSelector, *which book* is moved sideward to VP_2. Then νP_2 is completed, followed by CP_2. CP_2 is merged with &P, which must be spelled out to ensure linearizability (early full spellout). Finally CP_3 is derived.

Now, Zhang (2010) explicitly argues against an adjunction analysis of coordination.[14] The main argument in our view[15] is that the conjunct headed by the conjunction (the '*and*-conjunct') cannot undergo movement (e.g. to the left periphery), which should be possible given the BP analysis:

[13] The issue of which conjunction occurs in question word coordinations in such languages – provided such coordinations exist in these languages – is a matter for future research.

[14] Johannessen (1998) also lists a number of problems for an adjunction analysis of coordination, which, however, all concern the coordination of nominal categories for which we assume a specifier-complement structure as given in section 4.

[15] Another argument Zhang puts forward is the observation made by Lakoff (1986) that extraction from only the second conjunct is available in some contexts. This is unexpected given that adjuncts are islands. For reasons of space, we will not discuss this in detail here. Note, however, (a) that the data are controversial (cf. Postal 1998; also, most violations of the Coordinate Structure Constraint that Zhang discusses are extractions from the first conjunct), and (b) that the overall unacceptability of such extractions is unexpected if the second conjunct is a complement. Zhang herself suggests a processing filter for parallel structures to explain the observed effects, which, however, seems somewhat weak given the strong ungrammaticality of most cases of extraction from the second conjunct.

(38) a. The rain stopped [and they finished the second game]. Sledd (1959: 101)
b. *[And they finished the second game] the rain stopped.

Zhang argues that a specifier-complement analysis can account for this fact: the '*and*-conjunct' is an intermediate projection and thus cannot move. We suggest that despite first appearances data like (38) are no more problematic for an adjunct analysis than they are for a specifier-complement analysis. Note that for the data in (36B) above Zhang has to assume that there is a null element in the specifier. If that is so she has to explain why the null specifier cannot occur in (38b). Importantly for our purposes, the relevant property of the null element involved in such an explanation can also be captured as a property of the head of the BP in the adjunct analysis. So these data cannot decide between the two analyses. As a matter of fact, we believe that the contrast between (38b) vs. (36)/(38a) should receive a semantic-pragmatic explanation rather than a syntactic one (which then might also be connected to the observation that the *and*-conjunct in (36)/(38a) has a left context, whereas in (38b) it does not). We leave this for future research.

An anonymous reviewer points out that movement analyses of ATB constructions in general face serious difficulties in view of data like (39) where only a strict reading is available, i.e. (39) can only be understood as Bill hating a picture of John (and not of himself). This seems to suggest that the left-peripheral *wh*-phrase cannot originate from both conjunct 1 and conjunct 2.

(39) Which picture of himself does John like and Bill hate? (Munn 1992: 10)

However, these data can be reconciled with our account. Recall from the discussion of the example *Mary likes herself* (ex. (8)) in section 3 that the reflexive *herself* can be the spell-out of an occurrence of *Mary* in the object position. Now, the semantics of example (39) tells us that the vP of the second conjunct is *Bill hates which picture of John*. Let us assume that this is indeed the case. Let us assume further, as before, that the subarray for the vP of the first conjunct misses a direct object. Therefore the direct object of conjunct 2, *which picture of John*, is moved sideward. The vP of conjunct 1 therefore becomes *John likes which picture of John*. At a later step in the derivation, the object DP is moved into the specifier of the interrogative C.

(40) $[_{CP}$ [which picture of John] $C^{[+Q]}$ +does
$[[_{CP}$[which picture of John] does $[_{TP}[_{vP}$ John like [which picture of John]]]]
$[_{\&P}$ and $[_{CP}$[which picture of John] does $[_{TP}[_{vP}$ Bill hate [which picture of John]]]]]]

We must assume that there is a phonological rule that spells out the occurrence of *John* in spec-$C^{[+Q]}$ as a reflexive due to the fact that a lower, referentially identical copy, is locally bound by the subject phrase of the first conjunct. Note that something like this assumption is necessary for movement accounts of reflexives in any case and not peculiar to the above example, cf.:

(41) Which picture of himself does John like?

Of course, we must ask why it should be the left conjunct that is relevant for this rule. Recall that the right conjunct is spelled out before the left conjunct. If we assume that the replacement of *John* by *himself* is indeed the result of spell-out the right conjunct is not relevant at the point when this replacement is carried out because it has already been spelled out.

7 Summary

In this paper we explored the syntactic operation of sideward movement, which was first investigated in detail in Nunes (1995, 2004), with a special emphasis on locality restrictions. We argued that standard economy constraints, such as cyclicity of merger, cyclic spell-out, early full spell-out, and OneSub, which in previous work were proposed to be sufficient to restrict sideward movement adequately, need to augmented with a further constraint and with more specific assumptions about case feature checking when we consider a wider range of data. In a detailed discussion of parasitic gap constructions we proposed that the constraint ActivateSelector is required, which restricts the order of activation of subarrays of a numeration so that after completion of a phase the next subarray to be activated must be one that contains a selector for the completed phase. We also argued that movement of a DP to a theta position, which regularly occurs in sideward movement, reactivates the case feature on that DP so that two copies of the same DP can have different case features. Further, we compared parasitic gap constructions to ATB constructions and argued that some problematic differences between the two phenomena are best put down to structural differences between them rather than to a parallelism constraint, which in our view requires too much lookahead to be operable in the course of a derivation. Finally, we reviewed our earlier sideward movement account of question word coordinations and demonstrated that these constructions can receive an adequate analysis with the assumptions made for sideward movement in general.

8 References

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