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A derivational ellipsis approach to ATB-movement*

insert:
-movement

Abstract: This article argues for an ellipsis approach to ATB-movement on the basis of morphosyntactic mismatches and reconstruction asymmetries between conjuncts. I will argue that ATB-moved constituents are present in each conjunct; while those in the first conjunct undergo asymmetric extraction, those in the second conjunct are elided under identity with those in the first. Ellipsis in ATB is licensed by means of an $[E]_{atb}$-feature whose selectional restrictions correctly single out the elements that can undergo ATB-movement. Ellipsis applies derivationally and makes the elided constituents inaccessible for further syntactic operations. Asymmetric extraction is sanctioned by a representational definition of the Coordinate Structure Constraint: At LF, the asymmetrically extracted operator can bind both its own trace as well as the trace left behind by the operator in the second conjunct. Binding into the second conjunct is only possible if both operators bear the same index; this in turn is guaranteed by the recoverability condition on ellipsis, which requires an identical antecedent. Since the operator can bind both variables, the single-identity reading characteristic of ATB is correctly derived. Finally, the reconstruction asymmetries follow from mismatches between pronouns/R-expressions and their counterparts in the ellipsis site which ellipsis is famous for, so-called vehicle change effects.

Keywords: ATB-movement, ellipsis, reconstruction

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to

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1 Introduction: one landing site and two extraction sites?

It has been known since Ross (1967) that extraction from a single conjunct of a coordination is illicit no matter which conjunct the extraction takes place from:

(1) a. **[Which car]$_1$ did [John want to sell __$_1$] and [Mary want to buy the bicycle]?*
b. **[Which car]$_1$ did [John want to sell the bicycle] and [Mary want to buy __$_1$]?*

This led to the formulation of a specific constraint barring extraction from coordination, the so-called Coordinate Structure Constraint (CSC, Ross 1967: 89). Additionally, and this will be the topic of this paper, Ross (1967) also observed that extraction from coordination is licit if it takes place from all conjuncts, i.e. across the board (so-called ATB-movement):

(2) *Which book$_1$ did [John like __$_1$] and [Mary dislike __$_1$]?*

In this paper I will argue for a new approach to ATB that is based on asymmetric extraction from the first conjunct and derivational ellipsis of constituents in the second conjunct under identity with the extracted constituents in the first. In the rest of section 1, I will review previous accounts and discuss mismatches between the conjuncts that call for a new solution. The ellipsis account is developed in section 2 where I address the licensing, timing and recoverability of ellipsis as well as the interpretation of the resulting ATB-structure. Finally I will show how the ellipsis approach accounts for the mismatches.

Add the following sentence at the end of this paragraph: Section three concludes and provides an outlook.

1.1 Previous accounts

ATB-movement seems to be a peculiar type of movement in that on the surface there are two (or more) extraction sites but only one landing site. Ross (1967) and Williams (1978) formulated explicit ATB-rules to cope with this difficulty. Since such construction-specific formalisms are no longer available within a Minimalist approach to syntax, alternative proposals have been put forward in recent years: the Parasitic Gap-approach (Munn 1993, 2001; Franks 1995; Boskovic and Franks 2000), the Sideward Movement approach (Nunes 2004) and the sharing/multi-dimensional approach (Goodall 1987; Moltmann 1992; Citko 2005).

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replace with: Parasitic Gap

replace with: Conjunctions are functional heads that take the second conjunct as their complement and project to an XP of category Boolean, viz. BP. The entire BP is adjoined to the first conjunct.

In the first type of approach, ATB-movement is analyzed as a kind Gap. Coordinations are Boolean phrases with the second conjunct being adjoined to the first. ATB-movement involves asymmetric extraction from the first conjunct with a parasitic gap (= movement of a silent operator) in the second (the structure is from Munn 1993: 63):

replace with: Footnote

(3) *Which book$_1$ did [$_{TP}$ [$_{TP}$ John like __$_1$] [$_{BP}$ Op$_2$ [$_{B'}$ and [$_{TP}$ Mary dislike __$_2$]]]]?*

As with Parasitic Gaps, there is an additional chain composition mechanism that links the two chains to make sure that the extracted constituent is related to both conjuncts (see Note 4 for the notion 'single-identity interpretation').

Another approach that subsumes ATB under Parasitic Gaps is Nunes' (2004) Sideward Movement account. Sideward Movement is a special operation that involves copying of a constituent from one phrase marker to a different, unconnected phrase marker. Such copying is possible if the numeration does not contain enough elements to satisfy either lexical requirements of other predicates or to ensure parallelism, i.e. to make sure that if one conjunct involves extraction, the other one does, too. An ATB-derivation with Sideward Movement can be sketched as follows: The operator is merged in the second conjunct. Once the second conjunct has been built, the operator is copied to the unconnected first conjunct (i). After merging the conjuncts under &P, the operator is asymmetrically extracted from the first conjunct to Spec, CP (ii). Since it c-commands both lower copies of itself, they are PF-deleted by means of chain reduction:

(4) a. *[Mary dislike [which book$_1$]]* — *(i)*
b. *[like [which book$_1$]]* ←

(5) *Which book$_1$ did [$_{\&P}$ [John like ~~which book~~$_1$] and [Mary dislike ~~which book~~$_1$]]?*

(ii)

insert: as a complement of

Sharing/multi-dimen…aches to ATB have been proposed in various guises. For reasons of …limit myself to Citko's (2005) approach as it is the most recent one. She argues in favor of a new type of Merge, viz. Parallel Merge, where a constituent can be simultaneously merged with two or more constituents. In the case of ATB, the constituent that is to be extracted is merged as a complement of constituents that belong to different conjuncts, e.g. the two verbs. For reasons of linearization, the constituent has to move to a c-commanding position outside the two conjuncts, in the case at hand Spec, CP. After chain formation, the lower copy is PF-deleted (the following representation is simplified for our purposes):

insert: (or adjunct)

(6)

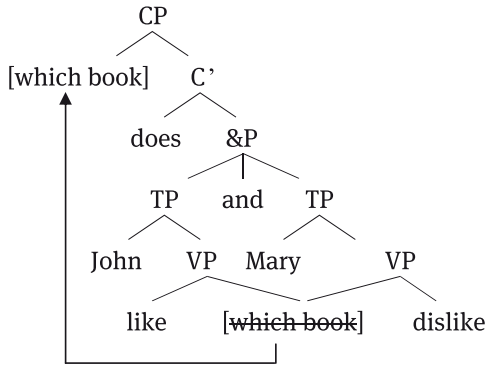

Fig. 1

1.2 Against previous accounts

1.2.1 General issues

The Parasitic Gap-approach suffers from both conceptual as well as empirical shortcomings: First, this type of approach is unattractive for languages like German or Dutch where parasitic gaps of the English type do not seem to exist (Huybregts and van Riemsdijk 1985; Kathol 2001; Reich 2007, 2009). For instance, they are not possible in finite adjunct clauses:

(7) a. *[Which paper]$_1$ did John file $\_\_{}_1$ before Mary read e?*
b. **[Welchen Artikel]$_1$ hat Peter $\_\_{}_1$ abgeheftet, bevor Maria e las?*
which article has Peter filed before Mary read (German)
'Which article did Peter file before Mary read?'

Rather, what looks like a parasitic gap in these languages is perhaps better analyzed as some kind of Left Node Raising. Basing ATB, which itself seems to be universally available, on a structure that is not found in every language therefore seems to be the completely wrong way to go. Second, many instances of ATB also involve ATB-verb movement as in (3). I do not see how this could be assimilated to PGs (see Nunes 2004: 127–128 for the same observation): on standard assumptions, *did* in C originates in T. It thus seems to have been extracted from the first conjunct. To avoid a violation of the CSC, this extraction would have to be

matched by null-operator movement in the second conjunct. Given that a null-operator-like verb has never been postulated, this is unlikely and a violation of the CSC seems unavoidable. Apart from that the question arises how the non-finite form in the second conjunct comes about as this normally requires an auxiliary/*did* in T, which the second conjunct does not contain, though. On standard assumptions, it is impossible for *did* in C to determine/c-select the head of vP in the second conjunct as this would skip TP (quite apart from the fact that the second conjunct is contained within an adjunct).[1] Despite its initial attractiveness, there are thus good reasons to be skeptical about the validity of the PG approach to ATB.

insert after ATB: -movement

Since the Sideward Movement approach, like the PG-approach to ATB, uses the same mechanism for ATB as for PGs, it seems to be similarly unattractive for languages like German. However, since the mechanism employed is more general and is also used for other constructions like e.g. Control, this problem may not be as severe.[2] Nevertheless, there is one central issue that I take to be quite problematic (cf. also Citko 2005: 481): In an example like (5) there will be only one wh-phrase in the numeration but two little v both of which have to enter into an Agree relationship with the wh-phrase for reasons of case checking/valuation. For this to be possible, Sideward Movement from the second conjunct has to take place before Agree applies (cf. Hornstein and Nunes 2002: 45, fn. 20). This suggests that Sideward Movement would have to take place *before* the little v of the second conjunct is merged. This, however, is at odds with the strongly derivational character of the approach which demands that a given subarray must be exhausted before a new subarray can be selected (Nunes 2004: 141–143). In an example (5), the subarray for the vP of the second conjunct contains {Mary, v, dis which book}. Since this array has to be exhausted before a new subarray (in the case at hand, the one containing *like*) can be accessed, one will invariably reach a derivational stage where v takes the VP as its complement, thus c-commands *which book* and therefore will Agree with it. As a consequence, *u*Case on *which book* should be valued so that it should no longer be visible for Agree with the v of the first conjunct, whose uninterpretable phi-features then cannot be valued. As a result, the derivation should crash. According to Jairo Nunes (p.c.), there are two ways of avoiding that: i) Agree is taken to be non-cyclic, i.e. it may apply after

replace with: agree

1 The only possibility, it seems to me, would be to analyze cases like (3) as instances of vP-coordination (perhaps as in Lin 2002) so that *did* would have scope over both conjuncts in its base position. But note that this is clearly not what was intended in Munn's original work and raises a number of independent questions (such as case licensing of the subject in the second conjunct).

2 See Hornstein and Nunes (2002: 50, fn. 24) for a proposal as to how to deal with languages of the German type.

a new subarray is accessed or ii) EPP-checking on v precedes Agree. In that case, the *wh*-phrase can move to Spec, vP before Agree takes place. Since it is no longer in the c-command domain of v, it will not be affected by Agree but will be active after Sideward Movement (Agree will instead target the copy within VP; depending on the definition, this may be in violation of the Strict Cycle Condition). I will not attempt to assess the implications of these assumptions, although they may be substantial. Instead I would like to point out one new empirical problem: In languages with overt movement for object case-checking, there will probably be an EPP-feature linked to *u*Phi on v in addition to the EPP-feature that triggers successive-cyclic movement. In such a constellation it seems difficult to avoid Agree between v and the *wh*-phrase because Agree is usually seen as a precondition for movement. Whatever solution is eventually chosen, it seems that there does remain an important difficulty for the Sideward Movement approach (as the following subsection will show, similar problems arise with ATB verb movement).[3,4]

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3 Any attempt to unify Parasitic Gaps and ATB is confronted with a number of systematic asymmetries, cf. Postal (1993) on categorial and positional asymmetries, Niinuma (2010) on multiple *wh*-movement. Concerning reconstruction, PGs only show reconstruction for Strong Crossover but nothing else (Williams 1987, Nissenbaum 2000, see the next subsection on reconstruction in ATB). Some of these asymmetries (but by no means all) are addressed in Munn (2001), Hornstein and Nunes (2002), and Nunes (2004: 135–139).

I would like to add to the list of asymmetries the fact that ATB is possible with subject extraction. Even though one does find ungrammatical cases (Munn 2001: 372):

i) **Who [__ read the paper] but [John didn't reply to __]?*

one can find counterexamples with relativization (Franks 1995: 76, Munn 2001: 391, fn. 4):

iia) *the man who [__ saw John] and [Sue thinks __ kissed Mary]* SU – embedded SU
iib) *the man who [__ read the paper] and [Bob said __ understood it]* SU – embedded SU

Munn (2001: 291, fn. 4) admits ~~himself~~ that relativization requires a different analysis. What is not so clear is whether subject extraction in the first conjunct actually poses a problem f PG-based account because it is no longer really clear what the ban against subject-licen actually due to. Anti c-command cannot be at stake in ATB because the examples in i) and ii) involve TP-coordination so that the base-position of the subject certainly does not c-command into the second conjunct. For the same reason, binding from an A-position cannot be the cause as the relevant A-positions are contained within the first conjunct. It therefore rather seems that the PG-approach would predict both i) and ii) to be grammatical. See also ~~Note~~ 14.

Note furthermore that Munn (1993) is forced to deny the possibility of ATB A-movement as e.g. in the following example since by assumption PGs are only licensed by variables:

iii) *John came home and was robbed by a stranger.*

If this is vP-coordination (as is assumed, e.g., in Lin 2002), a different (i.e. non-ATB) type of analysis would have to be adopted for such cases.

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1.2.2 Mismatches

A) Morphological Mismatches

The major argument against previous approaches and in favor of an ellipsis approach to ATB as it will be developed here comes from mismatches between the extracted constituents and the gaps in the non-initial conjunct. The first issue are morphological mismatches:

An (2006: 8–10) observed that when an auxiliary or *do* undergoes ATB-movement to C it may agree with the subject of the first conjunct even if it is incompatible with the subject of the second conjunct. Importantly, the reverse pattern is not possible:

(8) a. *Who does he like and they hate?*
b. **Who do he like(s) and they hate?*

Similar mismatches also occur in languages with a richer inflectional paradigm, cf. the following example from Standard German where the extracted verb form is second person singular *hast* while the subject of the second conjunct would require third person singular *hat*:

(9) *Was hast [du gekauft] und [Peter verkauft]?*
what have.2SG you bought and Peter sold
'What did you buy and Peter sell?'

replace with:
Parasitic Gaps

As far as I can assess, Nunes' (2004) approach also predicts both i) and ii) to be grammatical. Since Sideward Movement is not limited to A′-dependencies, nothing in principle rules out extending it to cases like (iii).

Given these asymmetries and the non-availability of ~~parasitic gaps~~ in many languages, I strongly disagree with one of the reviewers that ATB-movement and Parasitic Gaps should necessarily be treated on a par.

4 At least at first sight one may be tempted to analyze ATB-movement as resulting from full CP-coordination + deletion in the second conjunct. However, it has been demonstrated that this fails to derive the correct interpretation: ATB-movement receives a single-identity reading (Munn 1999, Reich 2009: 38–40). Two full coordinated CP-questions, on which ATB is putatively based on such an approach, however, ask for two individuals:

i) *Who does nobody love and hate?* ≠ ii) *Who does nobody love and who does nobody hate?*

See Wilder (1994: 325–327) and te Velde (2005: 274–276) for possible though not fully convincing solutions. In accordance with much of the literature I reject this type of approach.

For exceptions to the single-identity reading, cf. Munn (1999) and te Velde (2005: 268–269).

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The conflict in features is certainly a problem for Citko's approach: While she proposes that a shared constituent can receive conflicting feature values via Agree, she assumes that this is only possible as long as there is ~~an~~ syncretic (and thus underspecified) morphological form that is compatible with both feature values (see also ~~Note~~ 41). This is crucially not the case in the examples at hand. On Nunes' approach (p. 128), ATB-verb movement results from Sideward Movement of *did* from the second conjunct to the first conjunct with subsequent movement of *did* from the first conjunct to C. Since this involves copying, a feature mismatch as in (8a) seems unexpected. One could try to derive the mismatch as follows: for *did* to remain an active probe in the first conjunct, it has to undergo Sideward Movement (and thus copying) before it enters an Agree relationship with the subject in the second conjunct (the same reasoning as above w.r.t. case checking applies). As a consequence, there are two copies of *did* in an ATB-structure each entering an Agree relationship with a different subject so that different feature specifications result. However, given the assumptions in Nunes (2004) and Hornstein and Nunes (2002: 41), this derivation is actually not a possibility: While Sideward Movement of arguments is licensed by last resort (to allow for theta-role checking on the verb of the first conjunct), Sideward Movement of adjuncts and auxiliaries is licensed by parallelism (the requirement that the two conjuncts are semantically similar). Importantly, to be able to implement parallelism locally, Hornstein and Nunes assume that the coordinating head & is able to determine whether Sideward Movement is necessary:

> *Rather, after a coordinating head merges with a given constituent X, it signals that the computational system should proceed to build a constituent Y parallel to X, with the lexical items available at the relevant derivational step. If the available lexical material does not yield a (semantically) parallel structure, then the Parallelism Requirement, locally enforced by the coordinating head (or by the label of the syntactic object it heads), licenses the copying of constituents of X in order to build Y* (Hornstein and Nunes 2002: 41).

The crucial aspect in the present context is that given these assumptions, Sideward Movement cannot apply until & is merged. This implies, however, that the second conjunct must have been fully built up to TP. Given the Strict Cycle Condition, this implies that T will have undergone Agree with the subject (and the subject will have moved to Spec, TP). If that is the case, however, T will no longer be an active probe (its uninterpretable phi-features will have been valued by the subject). It can be copied to the first conjunct, but then it cannot Agree with the subject so that the subject remains case-less and the derivation crashes. Note that the activity problem is independent of morphological mismatches and therefore implies that the Sideward Movement approach not only cannot derive the mor-

replace with: mismatches

phological mismatches observed in ATB-verb movement,[5] but generally fails to account for ATB-verb movement.

Whether Munn's approach can handle the ~~mismatch~~ is difficult to determine because it is unclear how ATB-verb movement can be implemented in that approach if at all (see Section 1.2.1 above). We will see in Section 2.9 below how the mismatches follow under an ellipsis approach.[6]

B) Partial Reconstruction Asymmetries

Another argument against the previous approaches comes from a partial reconstruction pattern observed in ATB: Reconstruction is symmetrical, i.e. into both conjuncts, with variable binding, idiom reconstruction, scope, and Strong Crossover effects. However, reconstruction for Principle A, C[7] and weak crossover only seems to target the first, but not the second conjunct. Here are a few examples [illustrating the pattern (see Salzmann (to appear a/b for full discussion):

please replace all the struck-through material with: the Ts of both conjuncts. This implies that Agree between T and the subject would take place after the conjuncts have been combined under &P and thus after copying of *did* from the second conjunct to the first.This avoids the activity problem (both copies of *did have* unvalued phi-features and can thus attract the subject) and accounts for the morphological mismatches. However, this means that a Sideward Movement approach can handle these data only under an essentially counter-cyclic derivation.

l [Bill pose idiom interpretation

Citko (2005: 492)

and [Bill take

5 One possibility (suggested by a NELS reviewer) may be to adopt the feature inheritance approach: the (unvalued) phi features would then be inherited from C to ~~the T of the first conjunct. This would indeed guarantee that *did* only carries the features of the subject of the first conjunct. However, for the derivation to converge, feature inheritance would also have to target the T of the second conjunct (otherwise the subject could not be assigned a case value). It is unclear to me whether this is possible; even if it is, it will on most accounts lead to heavy violations of cyclicity~~.

6 Morphological mismatches are also found in vP-topicalization in German:

i) *[Ein Buch wegwerfen] würde Maria nie, aber hat Hans schon oft.*
a book throw.away.INF would Mary never but has John already often
Lit.: 'Throw away a book Mary never would but John already often ~~has~~'

replace with: has.

The topicalized infinitive is compatible with *würde* 'would' but not with *hat* 'has', which se a participle (*weggeworfen*). Even though examples where the ATB-moved constituent is compatible with the verbs of both conjuncts is certainly preferred, mismatches as in (i) are quite acceptable.

insert: (i.e. both 13a and 13b are judged ungrammatical)

7 Nissenbaum (2000: 30–33) disagrees with Munn (1993) and Citko (2005) with respect to Principle A and C: according to him there is no reconstruction for Principle A whatsoever while reconstruction for Principle C is symmetrical. I do not know what causes the difference in judgment (Nissenbaum admits that at least with respect to Principle A, many speakers agree with Munn/Citko). The German facts discussed in Salzmann (to appear a/b) are parallel to those presented in Munn/Citko.

insert: (i.e. sentences like 12b are judged ungrammatical as well)

(11) a. *[Which picture of his mother] did [you give __ to every Italian] and [sell __ to every Frenchman]?* — variable binding Nissenbaum (2000: 44)
b. *??[Which picture of his mother] did [you give __ to every Italian] and [sell __ to Mary]?*
c. *??[Which picture of his mother] did [you give __ to Mary] and [sell __ to every Italian]?*

(12) a. **[Which picture of John$_i$] did [he$_i$ like __] and [Mary dislike __]?* — Principle C Citko (2005: 494)
b. *[Which picture of John$_i$] did [Mary like __] and [he$_i$ dislike __]?*

(13) a. *[Which pictures of himself$_i$] did [John$_i$ buy __] and [Mary paint __]?* — Principle A Munn (1993: 52)
b. **[Which pictures of herself$_j$] did [John$_i$ buy __] and [Mary$_j$ paint __]?*

insert: -movement

These facts are problematic for the previous approaches because they predict either consistently asymmetrical reconstruction (PG-approach)[8] or consistently symmetrical reconstruction (Sideward Movement, sharing).[9] But since reconstruction in ATB is sometimes symmetrical and sometimes asymmetrical, their predictions are not borne out. In 2.9 below we will show how this partial reconstruction pattern follows from the ellipsis approach proposed here. Given that we first have to introduce the precise derivation of ATB, I ask the reader to be patient.[10]

8 Under the assumption that the null operator does not contain any internal structure. Munn (1993: 57–58; 2001: 376–378) addresses the Strong Crossover issue, but does not provide a solution for the other symmetrical reconstruction facts. Munn (1994) is a version where the null operator contains a copy; he only addresses Principle A/C and SCO. It is unclear to me whether he could capture the other symmetrical reconstruction facts. Most importantly, as we will see in Section 2.9, the apparent non-reconstruction into the second conjunct with Principle A and C is actually only apparent so that Munn (1994) also makes the wrong predictions with respect to those facts.

9 Nunes (2004) does not address the partial reconstruction asymmetries; Citko (2005: 493–495) admits that the cases with asymmetrical reconstruction remain unaccounted for under her approach.

10 The reconstruction pattern is also a problem for the approach of Reich (2007, 2009) who assumes asymmetric extraction from the coordination of two full and identical CPs.

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2 An ellipsis approach to ATB

In this section I will propose a new approach to ATB. It shares with some previous approaches the intuition that there is extraction from one conjunct only, i.e. asymmetric extraction. It differs from these approaches in assuming that the gap in the second conjunct results from eliding constituents under identity with the constituents extracted from the first conjunct. I will first provide a sketch of the analysis before discussing the various ingredients in detail.[11]

2.1 A sketch of the derivation

insert:
-movement

Given an ATB-sentence like (14), the derivation proceeds as follows:

(14) *Which book$_1$ did John like $\_\__1$ and Mary dislike $\_\__1$?*

1. Both conjuncts are built up independently.[12] The constituents that end up outside the conjunct, i.e. undergo ATB, are assumed to be present twice in the numeration; each conjunct will thus contain an auxiliary and a *wh*-phrase. We will henceforth refer to these elements as ATB-constituents. Depending on their size, there will be successive-cyclic A′-movement in both conjuncts (we assume that *did* is directly inserted into T).

(15) a. *[$_{TP}$ John did [$_{vP}$ [which book]$_1$ like [which book]$_1$]]*
b. *[$_{TP}$ Mary did [$_{vP}$ [which book]$_2$ dislike [which book]$_2$]]*

2. Then, the second conjunct is merged with &:

(16) *[$_{\&P}$ & [$_{TP}$ Mary did [$_{vP}$ [which book]$_2$ dislike [which book]$_2$]]]*

3. In the next step, ellipsis of the ATB-constituents in the non-initial conjunct applies. Ellipsis is licensed by means of Agree between the licensor & and the elements to be deleted (ellipsis is indicated by means of angled brackets):

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11 The analysis proposed here is partly inspired by Ha's (2008) ellipsis account of Right Node Raising, but there are many important differences in implementation.

12 A reviewer wonders who this exactly works. In my view no special assumptions are needed here. The construction of several complex objects in the workspace is independently necessary once a complex specifier is to be added to a syntactic structure.

(17) $[_{\&P}$ & $[_{TP}$ *Mary* ⟨*did*⟩ $[_{vP}$ ⟨[*which book*]$_2$⟩ *dislike* [*which book*]$_2$]]]

4. Then, the first conjunct is merged in the specifier of &:

(18) $[_{\&P}$ $[_{TP}$ *John did* $[_{vP}$ [*which book*]$_1$ *like* [*which book*]$_1$]] & $[_{TP}$ *Mary* ⟨*did*⟩ $[_{vP}$ ⟨[*which book*]$_2$⟩ *dislike* [*which book*]$_2$]]]

5. Finally, after C is merged, there is asymmetric extraction of the ATB-constituents from the first conjunct to the final landing site(s):

(19) $[_{CP}$[*Which book*]$_1$ *did*$_3$ $[_{\&P}$ $[_{TP}$ *John did*$_3$ $[_{vP}$ [*which book*]$_1$ *like* [*which book*]$_1$]] & $[_{TP}$ *Mary* ⟨*did*⟩ $[_{vP}$ ⟨[*which book*]$_2$⟩ *dislike* [*which book*]$_2$]]]]?

5. At PF, the (partial) chain in the second conjunct remains unrealized because of ellipsis and regular PF-deletion of non-top copies. The chain in the first conjunct is regularly reduced: only the copy in the landing site is realized (regular PF-deletion is indicated by strikethrough):

(20) $[_{CP}$[*Which book*]$_1$ *did*$_3$ $[_{\&P}$ $[_{TP}$ *John* ~~*did*~~$_3$ $[_{vP}$ ~~[*which book*]$_1$~~ *like* ~~[*which book*]$_1$~~]] & $[_{TP}$ *Mary* ⟨*did*⟩ $[_{vP}$ ⟨[*which book*]$_2$⟩ *dislike* ~~[*which book*]$_2$~~]]]]?

replace with:
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6. At LF, the preference principle (Chomsky 1995: 209) applies and intermediate copies are deleted; this makes it possible for the extracted operator in Spec, CP to bind both its own trace as well as that of the *wh*-phrase in the second conjunct; this derives the single identity interpretation (cf. ~~Note~~ 4):

(21) $[_{CP}$[*Which*$_x$] $[_{\&P}$ $[_{TP}$ *John did* $[_{vP}$ *like* [*x book*]]] & $[_{TP}$ *Mary did* $[_{vP}$ *dislike* [*x book*]]]]]?

7. Ellipsis in ATB is recoverable in this derivation because for each elided constituent in the second conjunct there is an identical antecedent in the first conjunct.

In the following subsections we will describe the derivation in detail.

2.2 Ellipsis licensing

2.2.1 Ellipsis licensing in sluicing and VP-ellipsis

It has become standard since Merchant (2001) to assume that ellipsis is triggered by an [E]-feature. According to Merchant, the [E]-feature is located on the licensor

and triggers deletion of its complement. By way of illustration, consider the following example involving sluicing:

(22) *I know that he bought something but I don't know what.*

It is assumed that the ellipsis site contains a full syntactic structure which is elided at PF. In sluicing, C bears an [E]-feature which instructs PF to leave the complement TP unpronounced. The structure of (22) is then as follows:

(23) *I know that he bought something but I don't know* $[_{CP}$ *what* $C_{[E]}\langle[_{TP}$ *he bought*$]\rangle]$.

To adequately restrict ellipsis, there is a separate [E]-feature for each elliptical construction, each with its own selectional, phonological and semantic properties. In the case of sluicing, the [E]-feature, i.e. $[E]_s$, has selectional features such as [*u*wh, *u*Q] so that it can only be assigned to an interrogative C-head. The phonological properties specify deletion of C's complement.

In recent work, Aelbrecht (2010: 91–94) has provided evidence that the ellipsis licensing head and the ellipsis site do not always stand in a head-complement relation to one another. Consider the following example involving VP-ellipsis (VPE, Aelbrecht 2010: 91):

(24) *I hadn't been thinking about that. You* ***should*** *have been ⟨[thinking about that]⟩!*

Here the complement of the participle *been* has been elided. Importantly, neither *been* nor *have* can license VPE, as the following examples show:

should be hyphenated differently: Ael-brecht

(25) a. **I hadn't been thinking about it, but I recall Morgan having been.*
b. **I hadn't thought about this, but I recall Morgan having.*

Rather, VPE requires a finite form of the auxiliary *have*, *be*, dummy *do*, a modal or the infinitival marker *to*. Consequently, the licensor in (24) must be *should*. Ellipsis thus applies at a distance (see Aelbrecht 2010: 92–94 for more evidence). Aelbrecht concludes from this that ellipsis is licensed by Agree. In addition to its selectional features (restricting the [E]-feature to certain heads), the [E]-feature bears another syntactic feature, an uninterpretable feature that corresponds to the category feature of the ellipsis licensor. In the case of VPE as in (24), $[E]_{VPE}$ would be restricted to voice heads and bear an *u*T feature, indicating that it can only be licensed by an element in T (Aelbrecht 2010: 174). The structure for (24) then looks as follows:

(26) $[_{TP}\ T_{[T]}\ [_{ASPP}\ [_{VOICEP}\ X_{[E\ [uT]]}\ \langle[_{VP}\ \ldots\ ]\rangle]]]$

Since the feature to be checked on the [E]-feature is an uninterpretable categorial feature, the corresponding feature on the licensor is interpretable. As it is normally assumed that interpretable features do not function as a probe, Aelbrecht (2010) is forced to assume that the directionality of Agree is reversed, i.e. applies bottom up instead of top-down. This may be somewhat non-standard, but there is by now a sizable body of work suggesting that at least for certain phenomena (involving e.g. Negative Concord), reversing the directionality of Agree may be fruitful; see Aelbrecht (2010: 97) for references. The fact that T in (26) has an interpretable categorial feature has an interesting side effect: it should be able to license ellipsis of multiple ellipsis sites. Aelbrecht (2010: 98) provides some evidence that this is indeed correct. Here is an example where the licensor *could* licenses VPE in two conjuncts:

(27) *?Has Ezra been thinking about it? – Well, he could have been ⟨thinking⟩ for the past few days and maybe even be ⟨thinking⟩ right know.*

2.2.2 Ellipsis licensing in ATB-movement

I follow standard practice in assuming that ellipsis in ATB is also triggered by an [E]-feature. There will thus be a special [E]-feature for ATB, viz. $[E]_{atb}$. Like the other [E]-features, it has special selectional and phonological properties. As for the selectional features, the assignment of $[E]_{atb}$ is restricted to elements bearing an (unvalued) *u*F (such as the elements undergoing ATB-movement, e.g. operators, XPs with *u*Case, auxiliaries that move to C etc.; we will further specify the selectional requirement below). Where I crucially differ from previous work is the phonological effects of $[E]_{atb}$: I propose that $[E]_{atb}$ instructs PF to leave unpronounced the constituent on which it is located rather than the complement of that constituent. This is non-standard, as this may look like a case of non-constituent deletion. As we will see presently, though, the mechanism is adequately restricted.[13] Furthermore, if ellipsis were limited to complements of some

13 The anonymous reviewers voice concern because of this assumption, pointing out that separate deletion of T or a DP is ungrammatical elsewhere in English (even if there is an identical antecedent). One reviewer asks in this context "What is the syntactic relation between $[E]_{atb}$ and these elements (i.e. those to be elided, M.S.) other than that it is sometimes the case that they may be targets of ellipsis?" There is no such relation, but as far as I can tell, the same

head, an ellipsis approach would fail to cover ATB-head-movement or instances of subject extraction in cases of non-parallel ATB:

(28) a. *Who did [John support __] and [Mary say __ would win]?* Munn (1993: 43)
b. *I know the man who [John likes __] and [we hope __ will win].* Williams (1978: 34)

If the [E]-feature were located on *say* or *would*, *hope* or *win*, too much would be deleted.[14,15] Furthermore, to make sure that not just single words are elided, I assume that $[E]_{atb}$ behaves like other *u*Fs in that it projects to maximal projections (see Section 2.6 below).

---

goes for $[E]_s$: why it should be limited to a C with *u*Wh is not obvious (for instance: why can't it be assigned to a declarative C?), but this is a fact and the selectional restrictions capture that. In other words: in all ellipsis constructions, the selectional restrictions that are proposed for a given [E]-feature usually simply restate the distribution of a given ellipsis construction. Basically the same is done with $[E]_{atb}$ here, the only major difference being that the selectional restrictions on $[E]_{atb}$ are less specific than e.g. on $[E]_s$.

A priori ruling out ellipsis in other contexts than those that have been established to date in our view unnecessarily limits the possible explanatory force of ellipsis. For instance, an ellipsis perspective has led to interesting results in the analysis of RNR (cf. e.g. Ha 2008 and references cited there) where DP ellipsis (and possibly many other kinds of ellipsis) need to be posited. Another area where ellipsis has proven fruitful are relative clauses where an ellipsis operation has been integrated into the so-called Matching Analysis, thereby deriving the non-reconstruction for Principle C, cf. e.g. Salzmann (2006). Other accounts involving deletion of single constituents are Williams (1997) and Ackema and Szendroi (2002).

14 What remains to be explained is to what extent mismatches in grammatical relation as in (28) are tolerated. The present account allows such mismatches since the operator in the second conjunct will have moved successive-cyclically up to the matrix Spec, vP und will thus be a possible target for deletion. But this does not yet explain why some mismatches like those mentioned in ~~Note~~ 3 are impossible. ATB with local subject wh-movement as in **Who [__ read the paper] but [John didn't reply to __]?* can be ruled out if the first conjunct is just a TP (under the vacuous movement hypothesis for subject questions): when combined with the second conjunct, which is also a TP, the operator cannot have scope over both conjuncts so that a violation of the CSC ensues (see Section 2.5 below). Given the data in Trotta (2004), there are reasons to believe that local subject relativization targets a higher position than local subject *wh*-movement, perhaps Spec, CP, which would account for the difference. The prediction would then be that ATB with local subject extraction in the first conjunct should be acceptable with embedded *wh*-clauses and free relatives (which both involve movement to CP), an issue I intend to investigate in future work. See also Franks (1995) for an interesting approach based on argument prominence.

15 Note that these cases of non-parallel extraction are problematic for Ha (2008) who indeed assumes that the [E]-feature is placed on the verb and triggers deletion of its complement.

replace with: Footnote

I also adopt Aelbrecht's proposal that ellipsis licensing involves Agree. Since ATB-movement is restricted to coordination, I take the ellipsis licensor to be the head of the coordination, viz. &. Consequently, $[E]_{atb}$ will have an *u*F that can only be checked with &, viz. *u*&. Ellipsis occurs once the second complement (or, more generally, a non-initial complement) is merged with &. The following structure represents the operations involving the second conjunct of *Which book did John like and Mary dislike?*:[16]

(29) $[_{\&P}$ $\&_{[\&]}$ $[_{TP}$ Mary ⟨did⟩ $[_{vP}$ ⟨which book$_1$⟩ dislike [which book$_1$]]]]

E[[*u*~~&~~]] Agree

[E[*u*~~&~~]] Agree

Since & bears an interpretable categorial feature, it can license ellipsis of several ATB-ed constituents, as in (27), and since the directionality of Agree is reversed, there will be no intervention.[17]

Ellipsis is local in that it is constrained by the Phase Impenetrability Condition (PIC, Chomsky 2001), i.e. it can only target elements that are still accessible, i.e. elements on the edge of the highest vP-phase. This is desirable because the elements undergoing ATB-movement, operators, subjects and finite auxiliaries/modals/*do*, all carry an *u*F and because of this they will invariably be outside the complement domain of v: operators bear *u*Wh (or *u*Q) and therefore undergo successive cyclic wh-movement, subjects have *u*Case and are base-generated in Spec, vP (or, in case they are derived, move there from the object position), and the verbal elements undergoing ATB are in T (depending on one's assumption; some perhaps move there from v, which is still sufficient from the perspective of the PIC). The selectional restrictions on the assignment of the [E]-feature correctly limit ellipsis in ATB to the elements that actually undergo movement provided

16 Note that since & only c-commands elements in its complement, ellipsis will always target elements in the non-initial conjunct. This is crucial for the explanation of the reconstruction asymmetries in 2.9

17 If one wants to uphold the standard assumption that Agree applies top-down, a number of complications arise: Since it is implausible that the categorial feature on & is uninterpretable and the one on the [E]-feature interpretable, one has to resort to the system proposed in Pesetsky and Torrego (2007) where the valuation-interpretability bi-conditional is given up: in their system, interpretable features can probe if they are unvalued. One could thus argue that the feature on & is an *i*F, but unvalued while the one on the [E]-feature is an *u*F, but valued. Since & does not always occur with ATB, the unvalued *i*F would have to be optional. Finally, to avoid intervention when – as in (29) – more than one constituent is elided, the *i*F on & must be [+multiple] in the sense of Hiraiwa (2000).

that one case can be systematically ruled out: the [E]-feature must not be assigned to elements that themselves do not move but bear an *u*F, as e.g. an embedded C as in the following example:

(30) **Who did [John wonder whether Bill likes __] and [Mary ask ⟨whether$_{uWh}$, E⟩ he invited __]?*

Whether has an *u*Wh because it attracts an empty operator to its specifier and can thus be assigned an [E]$_{atb}$. Deletion cannot be prevented by the PIC (under the more liberal definition in Chomsky 2001) since *whether*, being the phase head of the embedded CP-phase, will not be affected by spell-out until the matrix C-head is merged (which leads to spell-out of the complement of matrix v). Consequently, [E]-feature checking between & and *whether* and, consequently, deletion of *whether*, is possible and the derivation should converge, contrary to fact (furthermore, since there is an identical antecedent in the first conjunct, deletion should be recoverable, cf. Section 2.6).[18] To systematically rule out such cases, we will further specify the selectional restrictions of [E]$_{atb}$: [E]$_{atb}$ can only be assigned to elements that actually undergo movement. This requires a Greed-based view on movement such that it is an imperfection of the target/goal itself that causes it to move and not (only) some property of the probe. There are various ways of implementing this, e.g. as in recer
Minimalism. What is needed
equipped with an *u*F additi
feature), e.g. as described (
done for both XP- and X-movement.[20] I will not dwell on a discussion of possible ways of implementing it. All that matters is that the elements undergoing movement can be naturally singled out by the selectional restrictions on [E]-feature assignment.[21]

insert at the end of the paragraph:
Additionally, as in Boskovic (2007), we assume that heads involved in feature checking/valuation also have an *u*F that needs to be checked against an interpretable equivalent on the moving constituent.

insert:
easily

18 The condition on [E]-feature valuation to be introduced in Subsection 2.7 below rules out [E]-feature checking on and thus deletion of elements with no unvalued features left so that (30) would actually crash, as desired. We nevertheless adhere to the more specific selectional restrictions to be introduced presently as this avoids large numbers of crashing derivations.

19 Boskovic's approach does not work for our purposes because on his approach, both the moving element and the probe have an *u*F so that limiting the assignment of the [E]-feature to moving elements is not possible.

20 In the case of head-movement, there have been a number of recent approaches in terms of reprojective movement that are well-suited for our purposes, e.g. that by Georgi and Müller (2010) where the moving verb has a special feature that causes it to reproject. But Greed-driven adjunction to the higher head would also work for our purposes.

21 One of the reviewers asks why elements that will be elided later on should move at all given that in other "well-studied" ellipsis phenomena movement can be bled by ellipsis: for instance, T-to-C movement does not take place in matrix sluicing. In the present account, elements

2.3 Derivational ellipsis

When a constituent is marked for ellipsis by means of an [E]-feature, it is not a priori clear when ellipsis will happen. It could either take place immediately, i.e. derivationally, or it could take place when the entire derivation has finished, which is the more standard assumption. Aelbrecht (2010: 101–111) provides evidence for a derivational implementation of ellipsis: She argues that facts from Dutch Modal Complement Ellipsis (MCE) only follow if the ellipsis site is shipped off to PF immediately upon checking and thereby becomes inaccessible to narrow syntax. In MCE a part of the complement of a root modal may be elided (Aelbrecht 2010: 129):

(31) *Ik wil wel een brood meebrengen, maar ik kan niet ⟨[een*
I want PRT a bread along.bring but I can not a
brood meebrengen]⟩.
bread along.bring
'I do want to bring a loaf of bread, but I can't.'

Ellipsis targets the VoiceP complement of the T-head, which is the complement of the modal. Since she takes the modal to be a raising verb, this implies that ellipsis also targets the base-position of the subject. The subject can thus escape ellipsis. Intriguingly, objects cannot (Aelbrecht 2010: 131, the sentence is fully grammatical without ellipsis; capitals indicate stress):

delete

carrying an [E]-feature move because of some uninterpretable feature they bear themselves. ~~They do not know that they will be deleted later on. In our view, it is very undesirable to grant elements the ability to see into the future.~~ It is correct that in matrix sluicing, for instance, movement does not take place. The absence of movement is usually explained as follows: Normally, if the verb does not move, some uninterpretable feature on T will survive at PF, thereby leading to a crash. However, in the case of sluicing, this uninterpretable feature on T is PF-deleted so that it is no longer offensive at PF. This is easily written in prose but has rather serious (and in our view undesirable) implications: it either requires powerful look-ahead (T has to know somehow that it will be affected by deletion later on) or feature-driven movement must be taken to be optional. Note that in more recent versions of Minimalism, feature-driven movement is automatic, there is no possibility not to move ("and see what happens") as in the move-alpha approach of the 80ies or as in early Minimalism with strong and weak features. Furthermore, under both options, a transderivational economy constraint is needed to block T-to-C movement. Admittedly, the present proposal has nothing to say about how to derive matrix sluicing. But given the serious issues raised by established analyses of "well-studied" ellipsis phenomena, I take it to be preferable to adhere to an approach without look-ahead or optional movement and attempt to apply it to other ellipsis phenomena in future research.

insert after "and":
will

(32) *Ik weet niet wie Thomas MOET uitnodigen, mar ik weet
I know not whom Thomas must invite but I know
wel **wie** hij niet ⟨[uitnodigen]⟩ MAG.
PRT whom he not invite may
Lit.: 'I don't know who Thomas HAS to invite, but I do know who he isn't ALLOWED to.'

If ellipsis occurred at the end of the derivation, the subject-object asymmetry would remain mysterious. If, however, ellipsis takes place immediately after [E]-feature checking, the asymmetry follows naturally: In the case of subject extraction, there is an escape hatch for the subject, viz. the embedded Spec, TP (later on it will move to the matrix Spec, TP). The subject in (31) can thus leave the ellipsis site before the ellipsis licensor, the modal, is merged and the complement of T is elided (Aelbrecht 2010: 130):

perhaps you can move this a bit to the right so that the vertical lines are directly under "kan" and "T"?

(33) $[_{\text{ModP}}$ __ kan $[_{\text{TP}}$ ik$_1$ $[_{\text{T'}}$ T ⟨$[_{\text{VoiceP}}$ __$_1$ een brood

Things are different with objects: Since there is no intermediate landing site for the object between the ellipsis site and the modal, the object is trapped inside the ellipsis site – even if it is a wh-phrase as in (32): it can only reach the embedded Spec, VoiceP, but then the modal is merged and the object is affected by ellipsis. Consequently, it can no longer be targeted by the *u*Wh on the embedded C (Aelbrecht 2010: 133, I simplify her representation somewhat):

(34) $[_{\text{CP}}$ C $[_{\text{TP}}$ hij$_1$ $[_{\text{ModP}}$ mag $[_{\text{TP}}$ __$_1$ $[_{\text{T'}}$ T ⟨$[_{\text{VoiceP}}$ wie$_2$ __$_1$ __$_2$ uitnodigen]⟩]]]]]
Agree

insert:
(assuming, for the sake of the argument, that late ellipsis could somehow affect the entire chain of the wh-phrase of the second conjunct).

We submit that ellipsis in ATB is also derivational in that it immediately the elided constituent from narrow syntax and transfers it to the i Assuming a single-output syntax as e.g. in Bobaljik (2002), this implie elided constituent is inaccessible for any further syntactic operations covert movement (cf. also Aelbrecht 2010: 109–111 for evidence that LF-movement after ellipsis is impossible).

Suppose instead that ellipsis applied at the end of the derivation ('late ellipsis'). In that case, it seems that nothing rules out moving a wh-phrase from the second conjunct to the matrix Spec, CP (after the two conjuncts are merged, and assuming that there is no phasal boundary between them) and then having it undergo ellipsis. Such a derivation will crash because of the unchecked *u*F on the

insert:
in its specifier

wh-phrase in the first conjunct (since this is a single question, C can license only one *wh*-phrase).

(35) **(Who$_2$) does [John who$_1$ like __$_1$] and [Mary __$_2$ hate __$_2$]*

The derivation only converges if the *wh*-phrase in the second conjunct is left in the highest Spec, vP and the *u*Wh of the matrix C is checked by the *wh*-phrase in the first conjunct; but this is exactly what follows directly under a derivational approach: By applying ellipsis derivationally, the indeterminacy of late ellipsis, i.e. whether movement from the first or from the second conjunct takes place, and crashing derivations can be avoided. The ATB constituents in the non-initial conjunct are immediately shipped off to PF when & is merged and [E]-feature Agree occurs.

Importantly, this means that these elements do not reach their final landing site; they only reach an intermediate position. As a consequence, this raises questions about the unchecked/unvalued *u*Fs of the ATB-elements: it seems that they remain unchecked and could therefore lead to a crash at the interfaces where they are not legible (the *u*Fs of probes like C are not a problem in ATB because they will be checked by constituents that are extracted from the first conjunct, cf. Section 2.4 below). There is by now a sizable body of work that has argued that ellipsis functions as a repair, at least as far as PF is concerned: By eliding a constituent, any feature that may be offensive at PF is elided as well, cf. e.g. Lasnik (1999: 161) for the lack of overt V-movement in pseudogapping, Lasnik (2001) for the absence of T-to-C movement in matrix sluicing, Merchant (2001, 2008) for island violations under sluicing and van Craenenbroeck and den Dikken (2006) for EPP-violations under ellipsis. Importantly, since ellipsis rescues an otherwise ungrammatical structure, such effects have been used as a diagnostic to determine at which interface a given feature is illegible. As a consequence, a number of features/constraints have been reinterpreted as PF-sensitive. In our case, it is difficult to argue that the features involved are only PF-relevant. While in the case of verb movement, it may not be all that clear whether the feature that causes V-movement is LF-relevant (see Lasnik 1999, 2001 for arguments that the lack of V-movement creates an illegitimate PF-object only), things are clearly different with phrasal movement: A *wh*-phase has an *u*Wh which is not legible at the PF-interface (e.g. Chomsky 2001, Nunes 2004), but, and this is the crucial point, without checking/valuation, it is also not legible at LF. We therefore submit that derivational ellipsis in ATB not only repairs a structure with respect to PF-legibility, but also with respect to LF-legibility. By directly shipping off the constituent to the interfaces any offensive features are removed. While this proposal may be somewhat non-standard at first sight, it seems to us that this is a natural

consequence of a single-output syntax. In our system, there are thus two mechanisms that prevent illegibility at the interfaces: regular checking/valuation and ellipsis.[22,23]

2.4 Asymmetric extraction

After Agree between & and the [E]-feature bearing constituents (and subse ellipsis), the first conjunct is merged in the specifier of & (we assume, a become standard, an asymmetric structure for coordination):[24]

insert:
so that they do not lead to any violations at LF.

replace with:
PF-deletion

insert after "intermediate":
and bottom

22 Our approach thus differs from Nunes' (2004) where (in addition to feature checking) separate mechanisms are proposed for PF and LF to remove illegible features, Chain Reduction (PF) and Chain Uniformization (LF). This is due to the fact that we assume a chain check approach: once the *u*Fs of a copy are affected by checking/ellipsis, the corresponding *u* other copies of the chain are as well (basically as in Chomsky 1995). In the present cont implies that all copies in the second conjunct that are c-commanded by the elided copy will be stripped of their uninterpretable/unvalued features as well. Note that this is not meant to imply that elided material is automatically LF-deleted as well. Only the uninterpretable/unvalued formal features are affected. ~~Deletion~~ of intermediate copies follows from the regular chain reduction mechanism (Section 2.5). In cases like VP-ellipsis, where no movement chain is involved, elided material is, of course, present at LF (I am grateful to a reviewer for requiring clarification of this issue).

23 Aelbrecht (2010: 136, fn. 51) also seems to assume that ellipsis deletes features that are illegible at LF. She shows that while object scrambling from MCE in Dutch is impossible (just like object *wh*-movement), there is no crash if object scrambling does not apply, unlike with *wh*-movement in (32) (the object in the second conjunct arguably must have a movement-triggering feature for reasons of parallelism: there is object scrambling in the first conjunct):

i) *Ik will je wel helpen, maar ik kann (*je) niet (je helpen).*
I want you PRT help but I can you not you help
'I would like to help you, but I can't.'

She concludes from this that ellipsis removes the unchecked feature on the object that drives scrambling (she assumes that scrambling is greed-driven).

delete entire paragraph

~~More generally, the fact that ellipsis can repair violations that used to be thought to be LF-relevant does not necessarily have to be interpreted as indicating that the features/constraints involved are actually PF-relevant. An alternative interpretation, in accordance with what is proposed here, could be that ellipsis, especially when applied derivationally, has an effect on both interfaces. Note also that this is all the more plausible as Spell-out in Chomsky (2001) also removes (valued) features that are illegible at both PF and LF. Ellipsis in our conception differs from Spell-out in that it can also remove unvalued/unchecked features.~~

24 Most of the examples in the text involve TP-coordination; subject ATB-movement (cf. below) normally involves vP-coordination. But C'- and T'-coordination are also possible if the conjuncts contain a different verbal element:

(36) $[_{\&P}\,[_{TP}$ *John did* $[_{vP}\,[$*which book*$]_1$ *like* $[$*which book*$]_1]]$ & $[_{TP}$ *Mary* ⟨*did*⟩ $[_{vP}$ ⟨$[$*which book*$]_2$⟩ *dislike* $[$*which book*$]_2]]]$

Then, the structure above & is merged. Since our example is a case of TP-coordination, the C-head is merged next. Since the ATB-elements in the non-initial conjunct have been shipped off to the interfaces, they cannot undergo movement; only the ATB-constituents in the first conjunct, viz. *did* and *which book*, can, thereby checking their own *u*Fs as well as those of the C-head:[25,26]

---

i) *What has John bought and will Mary sell?* (C′-coordination)
ii) *John has bought a new car but will certainly sell it soon.* (T′-coordination)

Certain cases of TP-coordination may be better analyzed as vP-coordination with asymmetric extraction of the subject. This has been argued for in Lin (2002) who shows that quantified subjects in the first conjunct can c-command the subject in the second conjunct. Such coordinations can be combined with ATB-movement:

i) *[Which movie]$_1$ does every man$_2$ [$_{vP}$ __$_2$ like __$_1$] and [$_{vP}$ his wife hate __$_1$]?*

Note incidentally that the existence of vP-coordination is questioned in Boskovic and Franks (2000).

25 As far as we can tell, nothing of our argument hinges on the precise implementation of head movement as long as it is analyzed as syntactic (cf. the next subsection); our representation is thus supposed to be neutral with respect to the v
insert:
(1988: 170f.)
been proposed in recent years.

26 One reviewer voiced concerns about head movement out of &P, i.e. from a specifier position, claiming that this is normally ruled out by standard formulations of the Head Movement Constraint (HMC) as e.g. in Baker (1988). This very much depends on the exa
insert:
This does not seem to be very different from the structural configuration in ATB-movement.
formulation of the HMC and the status of &P. For instance, for the derivation of certain c
structures, Baker assumes incorporation of a verb contained in a VP which is located in
CP into the matrix verb. Spec, CP can thus act as an escape hatch and head movement f
specifier position is not categorically ruled out. In the case at hand, the crucial point se
be the status of &P. In traditional terms, it must not count as a barrier (which CP in the above-mentioned causative constructions does not). It does not count as a barrier if it is selected. This is certainly never the case with &P. As a consequence, any extraction from &P should be barred under old barrier definitions. This is clearly not a desirable result as it
insert:
(a specifier of)
also prevent A′-movement or even pure Agree operations as they are found e.g. in first c
agreement (van Koppen 2005). In other words, several empirical phenomena suggest that &
does not act as a barrier (for whatever reason). Consequently, nothing should a priori prevent head movement out of &P. Note that the barrier problem arises for all ATB-accounts with both conjuncts under &P, i.e. also for Citko (2005) and Nunes (2004).

The reviewer suggests instead using the adjunction structure proposed in Munn. This avoids the barrier problem, and as far as I can see, nothing in the ATB-account developed here argues against using that implementation of coordination. Importantly, though, this must not imply that a Parasitic Gap approach to ATB should be endorsed, which has been pointed out to be problematic for independent reasons (recall 1.2.1). Rather, the derivation would be the same

(37) *[$_{CP}$[Which book]$_1$ did$_3$ [$_{\&P}$ [$_{TP}$ John did$_3$ [$_{vP}$ [which book]$_1$ like [which book]$_1$]] &
[$_{TP}$ Mary ⟨did⟩ [$_{vP}$ ⟨[which book]$_2$⟩ dislike [which book]$_2$]]]]?*

These are instances of asymmetric extraction and thus seem to violate the CSC. As we will see in the next subsection, however, this is not the case under a representational definition because the ATB-constituents end up binding constituents in the second conjunct at LF.

2.5 PF- and LF-chains in ATB

We are now in a position to study how the resulting structure is interpreted at both PF and LF. The chains in the first conjunct are straightforward, they are treated like normal chains in a simple question (we continue using our example *Which book did John like and Mary dislike*): At PF, only the highest copy is realized, the lower copies of *did* and the *wh*-phrase are PF-deleted:

(38) *[$_{CP}$[Which book]$_1$ did$_3$ [$_{\&P}$ [$_{TP}$ John ~~did~~$_3$ [$_{vP}$ ~~[which book]$_1$~~ like ~~[which book]$_1$~~]]
& . . .* PF

At LF, the Preference Principle (Chomsky 1995: 209), which favors unrestricted quantification whenever possible, applies. It leads to a minimized operator phrase while the restriction is interpreted in the bottom copy; intermediate copies are deleted. Furthermore, we assume for the moment that *did* (as well as auxiliaries and modals) is interpreted in T, the locus of tense interpretation (but see below):

(39) *[$_{CP}$[Which$_x$] [$_{\&P}$ [$_{TP}$ John did [$_{vP}$ like [x book]]] & . . .*

The chains in the non-initial conjuncts require more care because they are only partial and are not directly linked to the ATB-constituents. As for PF, the highest copy is marked for deletion anyway (by means of the [E]-feature), and the lower copies of the *wh*-phrase (and, if applicable, of a moving head) undergo regular PF-deletion (via cyclic spell-out). This means that no link is phonetically realized in the second conjunct:

(40) *& [$_{TP}$ Mary ⟨did⟩ [$_{vP}$ ⟨[which book]$_2$⟩ dislike ~~[which book]$_2$~~]]]]?*

insert after "-out":
, assuming that copies that do not occupy the final landing site are automatically PF-deleted

(with ellipsis applying once & is merged), the only difference being that the second conjunct would be part of an &P that is adjoined to the first conjunct.

At first sight, this seems to be an instance of irrecoverable deletion, but since the elided constituents have an identical antecedent in the first conjunct, deletion *is* recoverable (see Section 2.6). The full PF-structure then looks as follows:

(41) *[$_{CP}$[Which book]$_1$ did$_3$ [$_{\&P}$ [$_{TP}$ John ~~did$_3$~~ [$_{vP}$ ~~[which book]$_1$~~ like ~~[which book]$_1$~~]] & [$_{TP}$ Mary ⟨did⟩ [$_{vP}$ ⟨[which book]$_2$⟩ dislike ~~[which book]$_2$~~]]]]?*

replace with: Footnote

The case of LF is more complicated: since the operator in the second conjunct does not reach a scope position but remains in an intermediate position, the chain as such is arguably not interpretable. What is even more important is the fact that ATB normally receives a single identity interpretation (recall ~~Note~~ 4). This implies that the ATB-constituent not only binds a variable in the first conjunct, but also one in the second conjunct. But since the operator is not in the chain in the second conjunct via movement, it is not a priori clear how it should be possible. We propose that it is possible because at LF only the lower copy is retained in the second conjunct (intermediate copies are not interpreted at LF) and interpreted as a variable. Furthermore, since the asymmetrically extracted operator is reduced according to the Preference Principle, it can bind both variables.[27]

insert after "variables": (see also ex. 61b below where the splitting of operator and restriction is instantiated overtly)

(42) *[$_{CP}$[Which$_x$] [$_{\&P}$ [$_{TP}$ John did [$_{vP}$ like [x book]]] & [$_{TP}$ Mary did [$_{vP}$ dislike [x book]]]]]?*

Of course, the operator can bind the variable in the second conjunct only if the operator in the second conjunct, which has left this variable behind, has the same index. This follows from the recoverability requirement on ellipsis to be discussed in the next subsection.

Before we address the interpretation of the moved verb, we first need to come back to the observation made at the end of the last section, namely that asymmetric extraction in ATB seems to violate the CSC. This is correct under a derivational interpretation of the CSC. However, there tends to be a certain consensus that the CSC should rather be interpreted as a representational LF-constraint that requires conjuncts to be identical in semantic type (cf. e.g. Munn 1993; Reich 2007, 2009). If one conjunct contains a question (and thus a variable) while the other does not, the CSC is violated (this can also be analyzed as a case of vacuous quantification, cf. e.g. Fox 2000: 50):

27 The proposal that an operator binds two variables violates the Bijection Principle in its original form, but e.g. not Safir's (2004: 65–66) Parallelism Condition on Operator Binding. For further discussion cf. Ruys (1992: 187, 194) and Ha (2008: 246–247).

(43) a. *[Which car]$_1$ did [John want to sell __$_1$] and [Mary want to buy the bicycle]?
b. *[Which car]$_1$ did [John want to sell the bicycle] and [Mary want to buy __$_1$]?

In the case of ATB, however, things are different because on our analysis, the extracted operator binds a variable in both conjuncts so that they are identical in semantic type (and no vacuous quantification obtains either). For more cases where asymmetric extraction does not violate the CSC, cf. ~~in~~ Ruys (1992: 36–39) and Fox (2000: 52–55) on asymmetric LF-movement, Salzmann (to appear a) on the combination of base-generation and movement in ATB-relativization, and Lin (2002: 73–84) on asymmetric A-movement.[28,29]

Coming back to the interpretation of the verb, note that while the extracted operator binds into the second conjunct, we have provisionally assumed that *did* (or some auxiliary/modal that would move to C) does not. In fact, if it is exclusively interpreted in T, it simply cannot do so. However, while it is obvious that the tense-part of the verb should be interpreted in T, it is not so clear whether this holds for the verb itself. If head-movement were not syntactic but took place at PF (as suggested e.g. in Chomsky 1995), it is no longer clear how to rule out violations of the CSC like the following where only the first verb moves while the second one neither carries an *u*F nor an [E]-feature:

(44) **What did John like and Mary did dislike?*

If T-to-C movement from the first conjunct took place at PF, *did* would arguably be in T in both conjuncts at LF, basically as in the well-formed (42). As a consequence, the ungrammaticality of (44) can no longer be related to the CSC unless

---

28 I will have nothing to say about asymmetric coordination as in the following example pointed out by a reviewer (i.e. a verb-second clause conjoined with a verb-first clause)

i) *Dieses Buch hat Willi gelesen und wird es seinen Freunden empfehlen.*
this book has Willi read and will it his friends recommend
'This book Willie read and he will recommend it to his friends.'

Such cases arguably do not involve ATB-movement. See Reich (2009) for detailed discussion.

29 A reviewer wonders whether a representational LF condition is compatible with the str derivational nature of this proposal. There does indeed seem to be certain architectural cla but to a large extent this is due to the presentation we have chosen: it is certainly not desirable to spell out several times but then wait until the final constituent is spelled out to start with semantic interpretation. Rather, what we have described here as a conversion of a comple syntactic structure into a semantic one occurring at LF can also be thought of as occurring step by step in parallel with the syntactic derivation. Still, certain interpretive aspects such as checking a coordinate structure for semantic parallelism (i.e. the CSC) require a large part of structure, at least &P. As discussed in ~~Note~~ 44, applying the CSC once the conjuncts are merged (and thus before the final LF-representation is reached) may be advantageous.

delete
replace with: Footnote
insert: below

one claims that some form of the CSC also holds at PF, but this seems stipulative. One may then take these facts as evidence that verb movement takes place in syntax (cf. also Lechner 2010 on ATB-verb-second). But even if verb movement takes place in syntax, a number of assumptions are needed to rule out (44). Suppose that only the *did* in the first conjunct is equipped with an *u*F. This will lead to T-to-C movement while the second *did* remains in T in the second conjunct. The crucial point then is what happens at LF. If the asymmetrically extracted verb were fully reconstructed into T, the resulting LF-representation would be again as in (42). Since the *u*F of the first *did* will have been checked, there will be no difference between the two verbs at LF and again, the CSC seems satisfied so that the ungrammaticality of (44) is unexpected. The problems do not obtain if the verb binds into the second conjunct at LF. Importantly, it must be the case that it can only do so if the second *did* is equipped with an *u*F (which implies that it can be assigned $[E]_{atb}$ and undergo deletion). This will be the case if we assume that an *u*F on V/aux/*did* is an indication that it will have to be bound (i.e. will be interpreted as a variable). This may require an approach as in Lechner (2007) where verb movement introduces a lambda-binder which then abstracts over the trace of the verb. Given the intricacies surrounding verb movement and its interpretation, there remain open questions, but given space constraints I have to defer them to future work. What we can conclude here is that ATB-verb movement is syntactic and requires binding into both conjuncts.[30]

So far we have only addressed A′-chains and verb chains. But of course, there is also ATB A-movement (see Munn 1993 for a different view). We limit the discussion to A-movement of the subject, but in languages like German or Dutch there would also be instances of ATB-scrambling or ATB weak pronoun fronting. Here is an example from Lin (2002: 63) with the structure it receives under our ellipsis account:

(45) a. *AJ will chase the puck and be hit from behind.*
b. $[_{TP}$ *AJ will* $[_{\&P}$ $[_{vP}$ ~~*AJ*~~ *chase the puck] and* $[_{vP}$ ⟨*AJ*⟩ *be hit* ~~*AJ*~~ *from behind]]]*

add the following sentence at the end of the paragraph:
In other words, there is an environment that triggers *do*-support.

30 A reviewer asks why the following sentenc

i) **Which book did John like and Mary disliked?*

Under the grammatical derivation (of *Which book did John like and Mary dislike*), there has to be a *did* in the second conjunct. At first sight, this seems hard to argue for given that no environment that could trigger *do*-support seems present. The crucial point is, though, that to respect the CSC, the extracted verb has to bind into the second conjunct. As discussed in the text, this is only possible if the second conjunct also contains a variable. This in turn requires a T-related element with an *u*F that undergoes movement. The verbal inflection alone as in i) is not sufficient.

Importantly, since ATB A-movement also receives a single identity interpretation, the extracted subject must bind into the second conjunct. This raises a number of questions since the nature of A-chains is quite contested (cf. e.g. Chomsky 1995; Boeckx 2001). They are certainly different from A′-chains in that partial reconstruction (with some part being interpreted in the top copy and the other part in the bottom copy) is the exception if it is available at all (Boeckx 2001). Rather, one either finds interpretation of the entire DP in the landing site or in the base position (so-called total/radical reconstruction). For our account this seems to imply that there must not be total reconstruction (we have not been able to establish the empirical facts), otherwise the asymmetrically extracted subject cannot be related to the second conjunct and a violation of the CSC would ensue. However, this depends on the analysis of total reconstruction: a trivial analysis in terms of interpreting the lower copy may run into semantic problems as the lambda abstract that results from movement would remain unbound (under a treatment of movement as in Heim and Kratzer 1998, cf. Boeckx 2001: 524). If, however, Boeckx' (2001: 527–529) solution in terms of expletive insertion into the top copy (with subsequent pushing down of the indefinite) is adopted, the lambda abstract can be bound; crucially, this is also a way to avoid a CSC-violation under total reconstruction: the expletive in Spec, TP will bind two associates, the one in the first conjunct with which it has formed a regular A-chain, and one in the second conjunct. In case there is no reconstruction, the extracted subject binds variables in both conjuncts. We can thus conclude that given certain assumptions about A-reconstruction, our approach is compatible with ATB-A-movement with and without (total) reconstruction.

Before finishing this subsection, we need to address the ungrammaticality of the following example in which the *wh*-phrase in the second conjunct lacks an [E]-feature and therefore does not elide:

(46) **Which book did [Mary like] and [Peter which book dislike*

insert after "-out":
(again under the assumption that copies in non-criterial positions are automatically PF-deleted)

Given our assumptions about PF deletion, *which book* would probably undergo regular PF-deletion when spelled-out ~~so~~ that the surface structure of (46) would actually be the phonetically well-formed (47):

(47) **Which book did [Mary like] and [Peter ~~which book~~ dislike ~~which book~~]?*

Furthermore, after the usual operations applying at LF, it seems that (47) also receives a well-formed representation, in fact exactly that of (42). In other words, this seems to suggest that ATB can be derived without ellipsis at all. However, this is not correct for one very important reason: Since there is only one C that can

insert after "if": *did/*

insert after "phrase": in its specifier (since we are dealing with a single question)

insert: of the second conjunct

license at most one *wh*-phrase, *which book* cannot enter Agree relations with it. Since it neither enters checking relations nor undergoes ellipsis, its *u*F will remain unchecked/unvalued so that the derivation crashes at the i obtains if *which book* of the second conjunct moves to C/Spec, first conjunct stays put). It is for the same reason that frontin both conjuncts in multiple *wh*-fronting languages is impossib

insert after "with it": (in this system, items with a movement diacritic cannot check their features by Agree, instead, movement to a specifier is necessary)

insert: in its specifier

(48) **Kogo*$_i$ *kogo*$_j$ *Jan lubi* __$_i$ *a Maria kocha* __$_j$.
whom whom Jan likes and Maria loves
'Whom does Jan like and Maria love?' (Polish)

Since ATB involves a single question, not a multiple question, C can license only one *wh*-phrase.[31] The same explanation may work for the impossibility of covert ATB-movement: the following example only allows for a double question interpretation (Citko 2005: 488–491):

replace with: there would have to be 2 specifier positions for both wh-phrases to front. But since we are dealing with a single question, there is just one specifier of C so that multiple wh-fronting is blocked.

***shenme ren**] [Lisi taoyan **shenmo ren**]?*
which person Lisi hate which person
hangsan like and which person does Lisi
(Chinese)

If wh-in-situ actually involves movement (with the lower copy being spelled out), ~~there will not be enough *u*Fs for the two wh-phrases since again, C only has one *u*F given that what is intended is a single question.~~ As a consequence, the only grammatical parse of (49) is that of two questions consisting of a full CP each.[32]

2.6 Recoverability

replace with: extracted:

delete

The fact that ellipsis is licensed in a particular structural environment does not yet guarantee that ellipsis is also grammatical. Ellipsis is only recoverable if it has

---

31 Multiple ATB-*wh*-movement is possible if two constituents from each conjuncts are ~~extracted~~

i) *Cine ce a spart şi a distrus?*
who what has broken and has destroyed
'Who has broken and destroyed what?' (Niinuma 2010: 162) (Rumanian)

This is expected as we are dealing with a multiple question here so that C can license more than one *wh*-phrase.

32 The same holds for *wh*-in-situ in English, cf. Boskovic and Franks (2000: 110–111).

delete

insert after "probably": be

an identical antecedent.[33] What is meant by 'identical' has been subject to quite some controversy (see Merchant to appear for an overview). There are approaches based on identity of meaning and some based on identity of structure. What has become clear over the years is that strict syntactic identity (at least in a sense) cannot be at stake because of ~~a~~ the possibility of systematic mismatches between antecedent and ellipsis site. Some of these were documented in 1.2.2 above. We will not choose between the two approaches to identity because given certain adjustments the mismatches we find can probably explained by both (i.e. even approaches based on structural identity as e.g. Fiengo and May can allow for certain mismatches). What is important in the present context is that the operators in the two conjuncts count as identical. This we take to be the case if they bear the same index and thus leave behind the same variable (given the discussion on the interpretation of the verb in 2.5 the same will be assumed for verb movement and A-movement, cf. also Hartmann 2011). Before we address the mismatches as well as the reconstruction facts and show how they follow under the present ellipsis approach, we will first discuss two cases where recoverability is satisfied, but ellipsis is still not possible. As we will see, they are correctly ruled out by the present account. The first example involves deletion of an element that is only a subpart of the ATB-ed constituent. Consider the following example:

(50) *Mary's sister [loves John] and [hates Peter].*

This sentence does not have the interpretation in (51a), but given the structure (51b) this is not immediately obvious since there is an identical antecedent for the elided *Mary* in the first conjunct:

(51) a. ≠ *Mary's sister loves John and Mary hates Peter*. but:
b. *Mary's sister* [$_{vP}$ ~~*Mary's sister*~~ *loves John] and* [$_{vP}$ ⟨*Mary*⟩ *hates Peter]*

---

33 This also provides an answer to the question raised by an example by a reviewer where deletion of the auxiliary is optional but deletion of the subject impossible:

i) *[Welches Buch hat Hans __ gelesen und (hat) (*Fritz) ignoriert?*
which book has John read and has Fritz ignored
'Which book did John read and Fritz ignore?'

Deletion of the auxiliary is possible because there is an identical antecedent in the first conjunct. In that case, TP-coordination results. If the auxiliary is not elided (the assignment of an [E]-feature is optional), C'-coordination obtains. The subject cannot be deleted because it does not have an antecedent in the first conjunct.

replace with: Footnote

Fortunately, the derivation in (51b) can be ruled out because the asymmetrically extracted subject cannot bind into the second conjunct because of the mismatch. Consequently, the example is ruled out because of the CSC (problems may emerge under total reconstruction, though, cf. ~~Note~~ 44. Another type of example is the following: (52a) must not be derived from (52b):

(52) a. *Which books about films does John like and Mary hate?*
b. *[Which books]$_1$ about films does [John $\_\__1$ like $\_\__1$] and [Mary [⟨which⟩ ⟨films⟩ ⟨about⟩ ⟨books⟩]$_2$ dislike $\_\__2$]?*

If individual constituents can be deleted as proposed under the present analysis, one has to rule out (52b) as a source for (52a). The selectional restrictions on [E]-assignment already rule out assigning an [E]-feature to *films*, *about*, *books* they do not move. An [E]-feature can only be assigned to *which*. The question that remains, though, is why deletion can and in fact has to involve the entire *wh*-phrase and not just the operator as in the following ungrammatical example (we assume that the restriction of the *wh*-phrase in the second conjunct undergoes PF-deletion via cyclic Spell-out as it does not occupy the landing site):

insert: again,

(53) *Which books about films does [John like] and [Mary hate ⟨which⟩ ~~films about books~~]?*

Note that at LF such a structure would arguably be well-formed:

(54) *Which$_x$ John did like [x, books about films] and Mary did hate [x, films about books]?*

Since the *wh*-operator has an identical antecedent, ellipsis is licensed, and since the ATB-ed operator binds both variables, the CSC is satisfied. There is, fortunately a way of avoiding this undesirable result, in fact under most assumptions, this case will not obtain in the first place: Since $[E]_{atb}$ is an *u*F that is assigned to the head just like e.g. *u*Wh, it is expected to behave like those *u*Fs. In the case of *wh*-movement (but also in A-relations involving features like *u*Case), it is usually assumed that the *u*Wh feature is visible on the maximal projection via projection (or, in cases where the *wh*-phrase pied-pipes a PP via percolation). This is a way of accounting for intervention effects (e.g. superiority) and the fact that the entire constituent moves and not just the head. We will thus assume that $[E]_{atb}$ projects/percolates together with the other *u*Fs. This ensures that (53) is not a possibility: Since $[E]_{atb}$ is visible on the maximal projection of the *wh*-phrase, the entire XP will be elided. Recoverability requires an identical antecedent, but there is none

in (53). In the case of head-movement, the movement-triggering feature obviously does not project/percolate to TP. Why this is the case is poorly understood, and I have nothing new to add to this discussion, but it is a clear fact (see also Georgi and Müller 2010 for discussion). The same will then hold for an $[E]_{atb}$ feature that is assigned to a moving head; as a consequence, only the head *did* is deleted in our base-line example *Which book did John like and Mary dislike?*[34]

2.7 A constraint on [E]-feature valuation

There is still one systematic gap in our analysis: it seems to allow deletion without ATB, that is without asymmetric extraction and binding into the second conjunct. The following two a-examples do not have the b-interpretation, but given the structure in c, it seems that our approach allows the a-example to be derived from c with the meaning in b:

(55) a. *Nothing is round and square* ≠ b. *Nothing is round and nothing is square.*
c. *[$_{TP}$ Nothing is round] and [$_{TP}$ ⟨Nothing⟩ ⟨is⟩ square]*

(56) a. *What did Peter read and Mary write?* ≠ b. *What did Peter read and what did Mary write?*
c. *[$_{CP}$ What did Peter read] and [$_{CP}$ ⟨What⟩ ⟨did⟩ Mary write]?*

In both cases, & c-commands the deleted elements, there are identical antecedents in the first conjunct for them and the chains also seem to be well-formed. Consequently, ellipsis should be licensed. These structures differ from those we have discussed so far in that the moving elements have reached their final landing sites. In other words, abstracting away from the [E]-feature, they have no unvalued features left and thus are no longer visible for syntactic operations. I therefore postulate a condition which states that the [E]-feature can no longer

34 Our assumptions are arguably incompatible with Bare Phrase Structure (Chomsky 1995) where all features of the head are visible on the label. To make sure that $[E]_{atb}$ only projects/percolates as far as the relevant movement-triggering feature, one could assume that the $[E]_{atb}$ is actually directly merged with the *u*F (perhaps in form of a sub-feature). While projection of features to the maximal XP is relatively uncontested, percolation has been criticized in recent years, cf. e.g. Heck (2009). When a *wh*-phrase pied-pipes a PP, our deletion account will not work without percolation (since the E-feature would not be visible on the PP). A possible solution in that case may be to employ a more powerful CSC-checking mechanism as discussed in ~~Note 44~~ below.

replace with:
Footnote

be valued/checked if the constituent on which it is located does not have any unvalued *u*Fs:[35]

(57) Constraint on $[E]_{atb}$-checking
$[E]_{atb}$ on X can only enter Agree operations if X has an unchecked/unvalued *u*F.

The intuition behind the condition is that the [E]-feature, which is parasitic on other *u*Fs, is trapped once they are all valued. The effects of the condition follow independently under a strongly derivational model where constituents are spelled-out upon valuation. Given that all *u*Fs (apart from $[E]_{atb}$) are valued in the derivations (55c)/(56c), the constituent is transferred to the interfaces before & is merged; since $[E]_{atb}$ remains unchecked, a crash ensues.[36] The grammatical derivations for (55) and (56) instead involve ATB-movement: there is vP/TP-coordination so that the moving elements do not reach their final landing site in the second conjunct and can be elided.[37,38,39]

insert:
in (56)

35 One of the reviewers asks why the [E]-feature cannot be checked at the same point at which the last *u*F of the operator is checked off. This simply follows from the derivation: the *u*F on the *wh*-phrase is checked first because C is introduced before &.

36 We thus have to assume that $[E]_{atb}$ differs from regular *u*Fs in that it cannot keep a constituent active.

37 One of the reviewers argues that the approach overgenerates because "any element within a coordination that is able to move sufficiently close to & can be deleted under identity with an antecedent in the first conjunct". The following example involving Dutch scrambling is provided:

i) **Jan heeft [een auto]$_1$ niet __$_1$ gezien en [Piet heeft ⟨en auto$_2$⟩ niet __$_2$ gehoord.*
John has a car not seen and Peter has a car not heard
lit.: 'John didn't see a car and Peter didn't hear.'

Given (57), such cases of deletion without ATB-movement can be ruled out: when & is merged, the scrambled object no longer has unvalued features so that it is no longer visible for [E] feature checking.

insert:
-movement

38 Given the condition in (57), the ellipsis mechanism cannot be extended to gapping like in i)

i) *John reads a book and Mary a novel.*

If $[E]_{atb}$ is assigned to V, it cannot be deleted because it reaches its landing site little v before & is introduced. Things are different if one assumes that finite verbs move overtly in English as in Johnson (2004, 2009 who, however, assumes that this involves remnant vP-movement). Gapping then involves ATB and the ellipsis approach may indeed be an option. For v-deletion under ATB-verb-second movement, cf. Section 2.8 below.

39 One of the reviewers points out that ellipsis in ATB is obligatory while it is optional in other elliptical constructions such as VP-ellipsis where there is always the possibility of just

2.8 The importance of contrast

Since German features verb second, one might expect there to be instances of ATB verb second: given our assumptions, the verb will be in v (or, depending on one's assumptions, in T) when the second conjunct is merged with &. It should therefore be accessible for deletion. However, the result is ungrammatical (I am grateful to Jutta Hartmann for pointing this out to me):

(58) *Was$_1$ mag$_2$ [der Peter __$_1$ __$_2$] und [die Susi __$_1$ __$_2$]?
what likes the Peter and the Susi
intended: 'Which x is such that Peter and Susi like it?'

The structure would be as follows with [E]-features on the verb and the *wh*-phrase:

(59) [$_{\&P}$ [$_{TP}$ Peter [$_{vP}$ Was [$_{VP}$ ~~Was mag~~] mag]] und [$_{T}$ ~~ag~~] ⟨mag⟩]]]

insert: in fact

insert: -movement

Since the operator and the verb are accessible to & and have id-ents, ellipsis is licensed so that the ungrammaticality of (58) poses a problem. There is good reason to believe that (58) is grammatically well-formed but semantically/pragmatically deviant: it has been independently established that ATB is normally employed to express a contrast between the conjuncts (e.g. Peter likes something while Bill dislikes something). This requirement is violated by (59) as well as the following examples which are certainly grammatically correct but still deviant:

(60) a. *Which book did John read and Mary read?
b. *Which book did John read and John file?* (Citko 2006: 230)

---

deaccenting the constituent in question. He goes on to argue that the following sentence (with @@ indicating deaccentuation) is ungrammatical:

i) *Which book did John read and @@which book did@@ Mary buy?*

What is probably meant is that the sentence no longer allows a single identity interpretation (but only a double question interpretation). Under the present account, the impossibility of i) is explained as follows: if the *wh*-operator in the second conjunct is not deleted, it has to reach a scope position (otherwise its *u*F cannot be deleted). But once it reaches a scope position, a single question interpretation is no longer possible.

Based on this observation, it is possible to construct grammatical ATB-examples that involve deletion of the verb but feature an additional constituent (see Citko 2006: 228–229 for similar data with Polish left branch extraction):[40]

(61) a. *Was schenkt [der Peter der Maria] und [der Hans der Susi]?*
what gives the Peter the.DAT Mary and the John the.DAT Susi
'What does Peter give to Mary and John to Susi?'

b. *Was mag [der Hans für Autos] und [die Maria für Blumen]?*
what likes the John for cars and the Mary for flowers
'What kind of cars does John like and ~~W~~what kind of flowers does Mary like?'

replace with
w

This shows that the verb can be the goal for ATB-movement and thus ellipsis, provided that it is still active when ellipsis applies.

insert after "from":
other

2.9 Explaining the Mismatches

We will be brief concerning the morphological mismatches in (8) and (9) since such mismatches are familiar from ellipsis constructions such as VP-ellipsis:

(62) *John played the violin, and Mary will, too ⟨play the violin⟩.*

In my view such effects cannot be reduced to a simple proximity effect as in disjunctive coordination like *Can you ask Brenda if the boy or the girls ?*is/?are*

40 The examples in (61) are perhaps also amenable to a gapping = V-deletion analysis. Additionally, as pointed out to me by Jeroen van Craenenbroeck (p.c.), (58) can be rescued by inserting a polarity marker like *not* or a focused adverb like *too* in the second conjunct. This would then suggest that one is dealing with *stripping*. Since both constructions also involve contrast, the similarities are not surprising. I intend to investigate further similarities and differences between the three constructions in future work. As pointed out by a reviewer, ATB-subject extraction does not require two contrastive elements in every conjunct:

i) *Who came and fell asleep?*

But it remains important that the verbs contrast:

ii) *#Who read a book and read a magazine?*

going to go first as proposed in Kluck (2009). While disjunctive coordination with non-syncretic mismatches remains degraded, the mismatches in ATB are fully acceptable.[41]

add closing bracket:]

add closing bracket]

add opening bracket [

41 Once ellipsis is involved and if morphological mismatches are tolerated, one may expect case mismatches in ATB. Such mismatches are indeed found as e.g. in the following Polish example (Citko 2005: 487) (see also (28) above):

i) *Kogo* *[Jan* *nienawidzi* ___gen *a* *Maria lubi* ___acc*]?*
who.ACC/GEN Jan hates and Maria likes
'Whom does Jan hate and Maria like?'

According to the literature, mismatches in case values are only tolerated if there are syncretic forms, cf. Citko (2005: 487), te Velde (2005: 229–230). This may support a sharing approach as in Citko (2005), where syncretic forms are taken to be underspecified so that they can be inserted into positions with conflicting values. Under Nunes' approach, such mismatches can arise if Agree between v/T and the operator in the second conjunct applies after Sideward Movement (see the discussion in Section 1.2.1) and the probes differ in the two conjuncts. This raises questions with respect to chain formation (p. 91–93). For such derivations to converge, it must be possible for copies of a single chain to differ in feature values (e.g. gen vs. acc as in (i)). This is certainly non-standard, but at this point I cannot assess whether it has any negative consequences for Nunes' approach in other areas. The possibility of case mismatches is then restricted by the lexical specifications of nouns (if I read the passage on p. 176, fn. 12 correctly): mismatches will only be allowed with underspecified forms. However, ~~given~~ a late insertion approach to morphology, it seems to me that Nunes' approach may also derive ATB-structures with case mismatches where the overt *wh*-phrase matches the case of the verb of the first conjunct only.

replace with: under

Given the claims in the literature that mismatches are restricted to syncretic forms, this is arguably undesirable. But the empirical situation is perhaps more complex: Kluck (2009: 150), who discusses mismatches in Right Node Raising (where non-syncretic case mismatches seem to be tolerated more readily), gives a Polish example (that she attributes to Barbara Citko) where the overt wh-operator is only compatible with the case requirements of the first verb:

ii) *?Kogo/* *?*Komu* *[Jan* *lubi* ___ACC*]* *a* *[Maria* *ufa* ___DAT*]?*
who.ACC who.DAT John likes and Mary trust
'Who does John like and Mary trust?'

Since this actually clashes with the judgment in Citko (2005: 485), the empirical situation is somewhat confusing. Corresponding German examples seem degraded:

iii) *?*Wen* *hat* *[Peter* ___acc *unterstützt]* *aber* *[Hans* *noch* *nie* ___dat
who.ACC has Peter supported but John still never
geholfen]?
helped
'Who did Peter support but John never help?'

The example seems to improve if the *wh*-phrase bears the inherent/oblique case and the conjuncts are reversed:

We now turn to the reconstruction facts. Since these are discussed in detail in Salzmann (to appear a/b), the presentation will be very short. Symmetrical reconstruction as in (10)–(11) trivially follows under the present account because there is an instance of the extracted constituent in each conjunct and because of the recoverability requirement on ellipsis, the operators, and thus the variables, will bear the same index. For a symmetrical case like (10), the LFs will be as follows:

(63) a. *[Which$_x$] [John did take [x picture]] and [Bill did pose for [x picture]]?*
b. *[Which$_x$] [John did pose for [x picture]] and [Bill did take [x picture]]?*

Variable binding as in (11) and scope essentially work the same, for Strong Crossover, see Salzmann (to appear a/b). The crucial data are those in (12) and (13) where there is apparently no reconstruction into the second conjunct. In Salzmann (to appear a/b) I argued that the apparent non-reconstruction is actually due to vehicle change effects (Fiengo and May 1994): As e.g. in VP-ellipsis, R-expressions and pronouns can have non-identical counterparts in an ellipsis site (as long as they refer to the same individual). The Principle C facts can then be explained as follows: the ungrammaticality of (12a) results from the fact that a full copy of the extracted constituent is present in the first conjunct:

(64) *[$_{CP}$ [Which picture of John$_i$]$_1$ did he$_i$ like [x picture of John$_i$]$_1$ & . . .*

iv) ??*Wem* *hat* *[Hans* *__$_{dat}$* *geholfen]* *aber* *[Peter* *__$_{acc}$* *noch* *nie*
who.DAT has John helped but Peter still never
unterstützt]?
helped
'Who did John help but Peter never support?'

Although the empirical situation requires clarification, the case mismatches tend to favor Citko's approach. Munn's approach does not have much to say about mismatches because he is not explicit about the properties of the null operator and the exact mechanism that composes the two chains. What these facts imply for the ellipsis approach pursued here is not fully clear since case mismatches are very limited in other ellipsis constructions. In fact, they only seem to be found in voice mismatches that occur in (English) VP-ellipsis (cf. Merchant to appear):

v) *The janitor must remove the trash whenever it is apparent that it should be ⟨removed⟩.*

Eventually, the predictions of an ellipsis approach depend on what kind of identity requirement holds between antecedent and ellipsis site. What is important in the present context is that ellipsis does allow for morphological mismatches as they are found in ATB-movement while the competing approaches seem to be too restrictive.

The absence of a Condition C effect in (12b) can be explained by means of vehicle change effects: the ellipsis site does not contain a full copy of *John* but a coreferential *him* (as in *Mary loves John$_i$, and he$_i$ thinks Sally does too ⟨love him$_i$⟩*, cf. Fiengo and May 1994: 218):

(65) *[$_{CP}$ [Which ~~picture of John$_i$~~]$_1$ ~~did~~$_2$ [$_{\&P}$ [$_{TP}$ Mary did$_2$ [$_{vP}$ [~~which picture of John$_i$~~]$_1$ like [x picture of John$_i$]$_1$]] and [$_{TP}$ **he$_i$** ⟨did$_4$⟩ [$_{vP}$ ⟨[~~which picture of him$_i$~~]$_3$⟩ dislike [x picture of **him$_i$**]$_3$]]]]?*

The structure in the second conjunct is thus essentially the grammatical *he$_i$ disliked a picture of him$_i$*. So far one could still argue that there simply is no reconstruction into the second conjunct in cases like (12b). However, the following pair shows that there must be reconstruction because ungrammaticality results if the R-expression is not embedded within a DP (66a), but vanishes once a level of embedding is added (66b):

(66) a. **President Bush$_i$, every Democrat criticizes __, but he$_i$ admires __.*
b. *President Bush$_i$, every Democrat criticizes __, but he$_i$ thinks that every member of congress should admire __.*

With the R-expression *President Bush* corresponding to *him*, we get the ungrammatical structure **He$_i$ admires him$_i$* in (66a), but the grammatical *he$_i$ thinks that every member of congress should admire him$_i$* in (66b).

Vehicle change effects also account for the pattern with Principle A: (13b) is ungrammatical for independent reasons: Since there is a full copy of the extracted constituent in the first conjunct, the resulting structure is the ungrammatical **John bought pictures of herself*. The apparent non-reconstruction into the second conjunct in (13a), can again be explained by means of vehicle change effects. As in the VP-ellipsis case *John$_i$ believes himself$_i$ to be heroic, and he$_i$ said that Mary does, too ⟨believe him$_i$ to be heroic⟩* (Fiengo and May 1994: 206), a reflexive can correspond to a pronoun in the ellipsis site. This implies for (13a) that the resulting structure is essentially like *Mary disliked a picture of him* with *him* coreferential with *John* (see Haïk 2009: 77, fn. 100 for related argumentation). Evidence that there is reconstruction into the second clause comes from examples with sloppy identity (see Salzmann to appear a/b for German examples), cf. Haïk (2009: 36) (see Munn 1993: 52 for a different judgment):

(67) *I wonder which picture of himself$_{i/j}$ John$_i$ likes and Bob$_j$ hates.*

Since the reflexive can be bound by the subject of the second conjunct, there has to be a representation of the ATB-ed constituent in the second conjunct.[42,43,44]

42 At first sight, sloppy readings as in (67) or with functional readings as in (11) may be taken as additional evidence for an ellipsis approach. However, as correctly pointed out by a reviewer, sloppy readings also occur outside ellipsis contexts (such as coordination and more generally in certain anaphoric contexts). Furthermore, there are means other than ellipsis to derive sloppy identity effects in ATB, cf. Munn (1999), Sharvit (1999: 457) so that examples like (67) cannot be used to argue against Citko's or Nunes' approach. It is rather the – apparent – non-reconstruction into the second conjunct as in (13a) that they cannot explain while an ellipsis approach provides a coherent explanation for the whole range of reconstruction facts. The reviewer further notes that unlike in e.g. VP-ellipsis, sloppy readings with a morphological mismatch do not seem to be possible in ATB. Thus, (13a) does not seem to have a reading where the reflexive is bound by *Mary*. I tend to agree on the facts, but it should be noted that gender mismatches are not accepted by all speakers even in VP-ellipsis, cf. Fiengo and May (1994: 218). Furthermore, Ha (2008: 162–163, fn. 8) argues that gender mismatches in VP-ellipsis become degraded once the conjuncts stand in contrast to one another. Since contrast is also involved in ATB-movement, there may thus be an independent explanation for the unacceptability of sloppy readings under gender mismatch. I intend to address this issue in more detail in future work.

43 The ellipsis approach by Ha (2008: 236) predicts the reconstruction pattern to be the other way around. This approach bases ATB on an RNR structure which involves ellipsis: the RNRed constituent(s) is in its base position in the second conjunct while the constituents in the first conjunct undergo deletion under identity. ATB then involves asymmetric extraction of the RNRed (and thus non-elided) constituent so that one expects mismatches in the first conjunct only, the opposite of what has been observed.

44 There remains one kind of mismatch that fails to be ruled out by the CSC and the recoverability condition, namely if the operator in the second conjunct is a subpart of an operator phrase in the first conjunct:

i) **To who(m) did [John ~~[to who(m)]~~$_1$ talk ~~[to who(m)]~~$_1$] and [Bill ⟨who(m)$_2$⟩ kiss ~~who(m)~~$_2$]?*

Given that the preposition is reconstructed at LF, such sentences should have a well-fo

ii) *Who$_x$ [John did talk [to x]] and [Bill did ~~Kiss~~ x]?*

The reverse with the ATB-ed constituent being a subpart of the moved phrase in the se conjunct can be ruled out, though (I transpose an example by a reviewer into an English example):

iii) **Who$_1$ did [John ~~[who]~~$_1$ dance with ~~[who]~~$_1$] and [Peter ⟨with whom$_2$⟩ talk ~~[with whom]~~$_2$]?*

Here the elided constituent does not have an identical antecedent in the first conjunct.

Cases like i) can perhaps be ruled out if the CSC is checked before the final LF-representation, when both conjuncts are combined since the two *wh*-phrases still differ at this point. Hornstein and Nunes (2002) apply a parallelism constraint at this point of the derivation; unfortunately, it does not become fully clear how the constraint operates. If it just checks symmetry in semantic type (e.g. that both conjuncts contain the same number of operators), this will not be sufficient for (i). However, if the CSC can actually check whether for each moving element in the first conjunct there is a corresponding one in the second (in our approach, it would suffice to look for deleted elements), then mismatches as in (i) can perhaps be ruled out

replace with:
kiss

insert after "conjunct":
(assuming that it looks for an antecedent in a parallel position, viz. Spec, vP)

3 Conclusion and outlook

In this paper I have argued in favor of an ellipsis approach to ATB. The constituents that undergo ATB are present twice in the numeration. The ATB-constituents in the non-initial conjunct are deleted under identity with constituents in the first conjunct. Subsequently, there is asymmetric extraction from the first conjunct. At LF, the extracted operator binds both its own variable as well as that of the deleted operator in the second conjunct. This avoids a violation of the coordinate structure constraint and derives the single-identity reading characteristic of ATB.

We have followed current practice in employing an [E]-feature as the trigger for ellipsis. Where the current approach differs from previous work is that the [E]-feature triggers deletion of the element on which it is located. By limiting $[E]_{atb}$ to constituents with an *u*F that have to undergo movement and by assuming that like regular *u*Fs $[E]_{atb}$ may also project/percolate to maximal projections, ellipsis can be adequately restricted to the elements that actually undergo ATB-movement.

Even though an analysis based on an [E]-feature has been shown to be feasible, we would briefly like to speculate about an alternative implementation of the deletion operation, especially because some of the conditions on $[E]_{atb}$ have turned out somewhat delicate (like the condition in (57)): as far as we can assess, the same empirical coverage can be attained if we simply formulate the following deletion rule for ATB:

(68) ATB deletion rule: & deletes all constituents in its c-command domain that have an unchecked/unvalued feature indicating that they have to undergo movement.

Given the greed-based notion of activity employed in this paper and the assumption that the movement triggering feature is visible on the projection level that will undergo movement, deletion will only target elements that have not yet reached their final position and will correctly single out the elements that undergo

(as well as those in (44), (51) (especially under total reconstruction) and (52b)). On the downside, such a CSC might rule out the mismatches (vehicle change effects) that we have postulated to explain the reconstruction asymmetries. It seems that both the CSC and the identity condition would have to be checked once &P is completed. ~~At this point their area of application seems to overlap to some extent, which is conceptually unsatisfactory. Teasing them apart will be necessary for full empirical coverage, a task I leave for future research. Note that even if this can be achieved, there remains a representational component in the analysis if CSC and identity are checked at the level of &P.~~ Finally, ~~if~~ it is unclear whether and how the asymmetric extraction facts discussed in Ruys (1992), Fox (2000) and Salzmann (to appear a) can be accounted for if the CSC applies at &P (and thus before the final LF-representation).

delete all the struck-through material

delete

insert:
-movement

delete ,

ATB (as long as recoverability is satisfied). This explicit rule does without an [E]-feature, and avoids the Agree-operation of non-standard directionality as well as the condition in (57). We take this result as an indication that there are viable alternatives to using an [E]-feature for ellipsis and thus as a possible starting point for a reassessment of previous analyses.

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insert:
-movement by means of asymmetric extraction + ellipsis

insert:
The state of the art

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