Towards a Unified Explanation of Apparent Cases of Counter-cyclicity

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Abstract

The Strict Cycle Condition has proven to be an essential constraint on syntactic derivations. Despite this, various analyses have been proposed over the years that (explicitly or implicitly) assume syntactic operations applying in a counter-cyclic fashion. Presupposing that both the SCC and the gist of these proposals are correct, the following questions arise: a) Is it possible to come up with strictly cyclic reformulations of these proposals that preserve their general gist? b) Is there a uniform strictly cyclic account that covers all types of analyses? The present paper answers both questions in a constructive way by offering such a uniform and strictly cyclic account of the different types of apparently counter-cyclic analyses in terms of non-monotonic derivations.

1. Introduction

The Strict Cycle Condition (SCC) was introduced by Chomsky (1973) as a means to constrain syntactic derivations. In essence, the SCC states that a cyclic domain D that has been subject to syntactic operations at earlier stages of the derivation must not be revisited and thus be modified at later stages if the modification exclusively affects D. (1) displays the original formulation of the SCC given in Chomsky (1973: 243-245).

(1) *Strict Cycle Condition*:
No rule can apply to a domain dominated by a cyclic node A in such a way as to affect solely a proper subdomain of A dominated by a node B which is also a cyclic node.

The exact nature of cyclic domains is left open in (1). In what follows, I adopt the most restrictive view that every syntactic node generated by Merge

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(Chomsky 1993, 1995) constitutes a cyclic domain. (1) is also unspecific as to the syntactic operations that are subject to the SCC. It seems that in later work, strict cyclicity was mostly conceived of being a property of Merge (cf. the Extension Condition in Chomsky 1993, 1995 or the No-Tampering Condition in Chomsky 2008). Embracing the original view of Chomsky (1973), I assume that the SCC applies to all syntactic operations, thus comprising both (internal and external) Merge as well as Agree (Chomsky 2000, 2001).

A detailed motivation of the SCC cannot be provided in the present paper. It may seem that with the changes that syntactic theory underwent in the last 50 years, many of the arguments in favor of the SCC have lost their force (see Freidin 1978, 1999, Browning 1991, Boeckx 2003). While this may be correct, there remain good reasons to assume the SCC. In fact, it seems to me that the original idea presented in Chomsky (1973), which motivated the SCC as a means to enforce Minimality (back then: Superiority), can be maintained today, albeit in a way that adapts to more modern theorizing (cf. Riemsdijk and Williams 1986, Freidin 1992, Kitahara 1997, Bošković and Lasnik 1999, Heck 2018 for relevant discussion). In what follows, I therefore assume that the SCC is well motivated and in good health today.

Against this background, it might be surprising that various types of analyses have been proposed over the years that (explicitly or implicitly) assume that syntactic operations may apply in a counter-cyclic fashion. Taking these proposals seriously, the question arises how they can be reconciled with the SCC. In particular, one may ask whether a uniform approach is possible that reformulates each of these counter-cyclic proposals in a strictly cyclic manner while at the same time preserving the gist of the respective analysis. The present paper contains such a proposal. §2 lists the counter-cyclic analyses that have been proposed in the literature that I am aware of. §3 briefly introduces the background that the present proposal is based on, the theory of non-monotonic derivations. §4 contains a strictly cyclic reformulation for each of the counter-cyclic proposals. Finally, §5 concludes.

2. Counter-cyclic Proposals

2.1. Head-Movement/Undermerge

The first counter-cyclic operation to be discussed is head-movement. Head-movement is a widespread and well-established analytical tool (cf. already

McCawley 1968, 1970). It is typically motivated by contexts where one head shows up in various positions (within or across languages). A textbook example is the difference between English and French with respect to the placement of finite main verbs relative to VP-adverbs. While in French a finite main verb precedes a manner adverb such as *often*, a finite main verb in English must follow the same type of adverb (Kayne 1975, Emonds 1976, Pollock 1989). According to the head-movement analysis, finite main verbs in French move out of vP to combine with the higher, preceding T-head, thereby crossing the adverb (2a). In contrast, no such head-movement takes place in English (2b).

(2) a. [$_{TP}$ Nous embrass-ons [$_{vP}$ souvent _ Marie]].
we kiss-1PL.PRES often Marie
'We often kiss Marie.'
b. [$_{TP}$ We [$_{vP}$ often kiss Mary]].

In many cases, the targeted c-commanding head has an overt exponent. For instance, the analysis in (2a) assumes that the T-head is realized by the inflectional affix *-ons*. This indicates that the higher head is not replaced ('substituted') by movement of the lower head. Rather, the lower head adjoins to the higher head, forming a complex head (see Baker 1988; but cf. Roberts 2010 for an alternative analysis of head-movement). Adjunction to the higher head appears to violate the SCC. It applies to a cyclic domain, the T-head in (2a), that is (immediately) dominated by another cyclic domain, the TP.

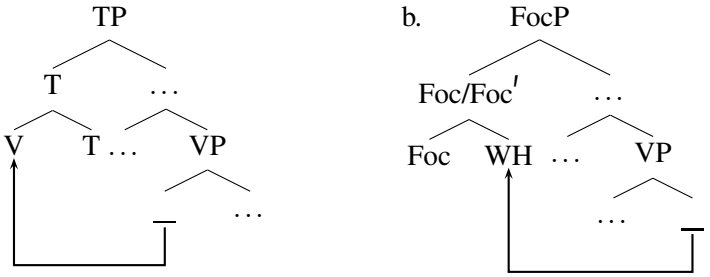
A counter-cyclic operation that is closely related to head-movement has been proposed by Pesetsky (2013) and is called Undermerge. Just like head-movement, Undermerge combines a category with a higher head. Unlike head-movement, however, the moved category targeted by Undermerge is a phrase (see already Sportiche 2005). Yuan (2017) offers an analysis of *wh*-movement in Kikuyu in terms of Undermerge. One of the motivations for this Undermerge analysis comes from the fact that the moved *wh*-phrase in Kikuyu follows the focus head *nĩ*, which is assumed to be the movement trigger:

(3) [$_{FocP}$ nĩ kĩĩ [$_{TP}$ mwana a-ta-na-rug-a _]]?
FOC what child 1SM-NEG-PST-cook-FV
'What didn't the child cook?'

According to Pesetsky (2013), a phrase that undergoes Undermerge literally becomes the complement of a higher head. Alternatively, to make the parallelism to head-movement even clearer, one might think of the moved phrase as adjoining to the higher head. In any event, Undermerge is counter-cyclic: The moved phrase targets a cyclic domain (the focus head in (3)) that is dominated by another cyclic domain (the FocP).

The parallelism between head-movement (in French) and Undermerge (in Kikuyu) is illustrated in (4a,b).

(4) a. b.



One might try to avoid a violation of the SCC by head-movement/Undermerge by stipulating that adjunction (in contrast to Merge) is not subject to the SCC (and by assuming that Undermerge involves adjunction). This is not sufficient to capture other cases of apparent counter-cyclicity, however.

2.2. Minimality

In many languages, an experiencer blocks raising to SpecT out of an embedded infinitive (see, e.g., Italian (5a), French (5b), Icelandic (5c); see McGinnis 1998 and references therein).

(5) a. *Gianni sembra a Piero [$_{TP}$ _ fare il suo dovere].
Gianni seems to Piero to.do the his duty
'Gianni seems to Piero to do his duty.'

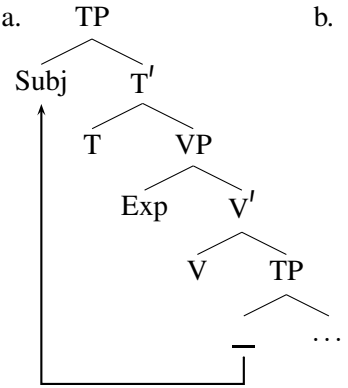
b. *Jean semble à Marie [$_{TP}$ _ avoir du talent].
Jean seems to Marie have of.the talent
'Jean seems to Marie to be gifted.'

c. *Ólafur virðist mér [$_{TP}$ __ vera gáfaður].
Olaf.NOM seems me.DAT to.be intelligent
'Olaf seems to me to be intelligent.'

Curiously, in English such raising is fine, see (6). There, the experiencer does not seem to induce the intervention effect that is usually interpreted as a violation of Minimality, see the analysis in (7a). The alternative analysis, raising to SpecT followed by counter-cyclic merger of the experiencer (Stepanov 2001*a*,*b*), solves the Minimality problem for English, but only at the costs of violating the SCC (7b).

(6) John seems to Mary [$_{TP}$ __ to be smart].

(7) a.



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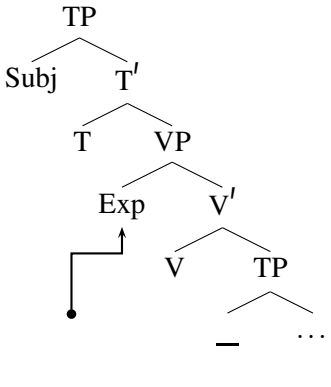
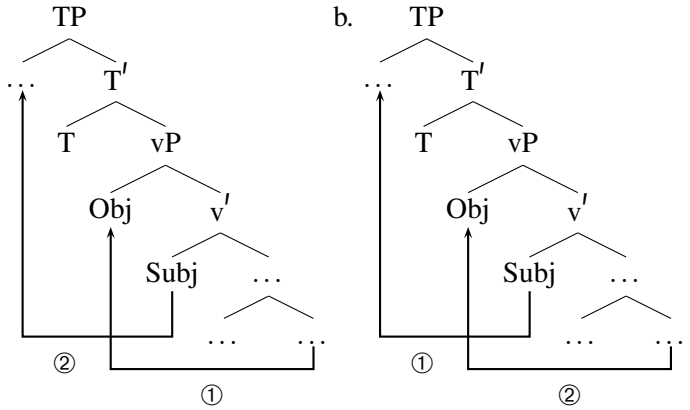


Another analysis that employs counter-cyclicity in order to come to grips with a Minimality problem is presented in Stepanov (2004). In a nutshell, the proposal is as follows: In a theory of ergativity where ergative case is assigned to the Subj by v and absolutive case is assigned to the DObj by T (Campana 1992, Murasugi 1992), one may expect the Subj in Specv to block absolutive assignment due to Minimality, contrary to fact. Stepanov's (2004) solution is to merge the Subj after the DObj has been assigned case, which is obviously counter-cyclic.

As a final example, one may approach an old problem arising with Scandinavian object shift in terms of late merger. There are reasons to assume that object shift (cf. (15)) targets an outer Specv, above the Subj (Chomsky 1993, Holmberg and Platzack 1995, Bobaljik and Jonas 1996, Anagnostopoulou

2003). This, however, creates the puzzle of how the Subj can undergo raising to SpecT (Branigan 1992, Chomsky 1993, 2000, 2001, Koizumi 1993, Kitahara 1997: chapter 3, Hiraiwa 2001, Dikken 2007). The shifted object, which is closer to T, should prevent such raising via Minimality (as first noted by Vikner 1989), see (8a).

(8) a. b.



Although it has not been proposed in the literature (but cf. Heck 2016 and section 4 below), there is an alternative counter-cyclic derivation, which first raises the Subj to SpecT and then performs object shift (late internal merger), see (8b). This derivation avoids the Minimality issue at the cost of weakening (or abandoning) strict cyclicity. (The proposal in Holmberg 1999 comes close to this type of analysis, however, it ultimately eschews counter-cyclicity by placing object shift in the PF-branch.)

2.3. Reconstruction

It is usually assumed that *wh*-movement (in general: Ā-movement) shows obligatory reconstruction behavior with respect to Principle C (Riemsdijk and Williams 1981, Lebeaux 1988, 1990). The ungrammaticality of (9a,b) can thus be traced back to the same source: a Principle C violation.

(9) a. *He$_i$ denied [$_{DP}$ the claim that John$_i$ was asleep].

b. *[$_{DP}$ Which claim that John$_i$ was asleep] did he$_i$ deny $\underline{\quad}$?

c. [$_{DP}$ Which claim that John$_i$ was asleep] did he$_i$ deny [$_{DP}$ ~~which … John$_i$ …~~]?

A popular account of these facts involves the idea that movement leaves behind a copy. This copy is not spelled out at PF (indicated by strike through: ~~copy~~). Since the moved category in (9b) contains the R-expression *John*, so does the copy (see (9c)). It is this latter instance of *John* which remains in the c-command domain of the co-indexed pronoun *he* in (9b,c), thus triggering the Principle C violation (Chomsky 1995, Sauerland 1998, Fox 1999).

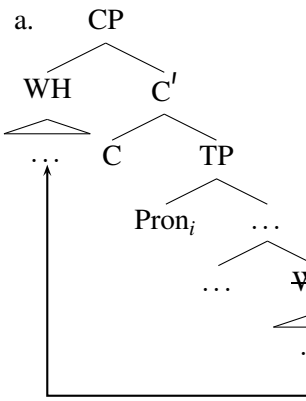
While (9) involves a complement clause to a noun, it has been observed (Lebeaux 1988, 1990) that in the case of a relative clause (often assumed to be adjoined to the nominal projection), the Principle C effect observable for (9b) vanishes (10b). This is surprising if Ā-movement always leaves a copy.

(10) a. *He$_i$ later denied [$_{DP}$ the claim that John$_i$ had made].

b. [$_{DP}$ Which claim that John$_i$ had made __] did he$_i$ later deny __ ?

A common interpretation of this effect (due to Lebeaux 1988, 1990) is that the relative clause may enter the derivation *after* the noun has moved (e.g., Chomsky 1995, Fox 1999, Fox and Nissenbaum 1999, Takahashi 2006, Lebeaux 2009, Takahashi and Hulsey 2009). This is called late merger (but cf. Sportiche 2019 for criticism). Thus, the copy left behind by movement actually does not contain the relative clause (and therefore not the offending R-expression). The relevant steps of the derivation (*wh*-movement and late merger of the relative clause) are displayed in (11a,b).

(11) a.



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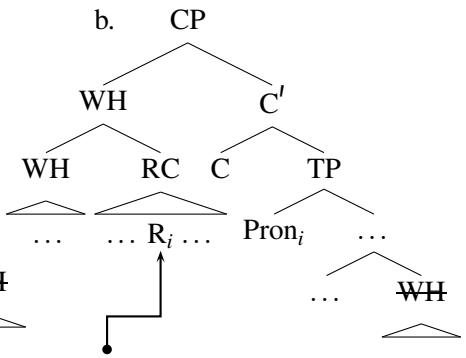


Late merger in (11b) is counter-cyclic. Assuming that the relative clause is adjoined, one may resort to the idea that adjunction is exempt from the SCC.

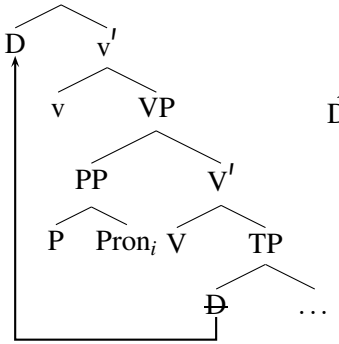
However, Takahashi and Hulsey (2009) and Lebeaux (2009) argue that late merger may also apply to NP complements of determiners. This assumption is motivated by the fact that in contrast to *wh*-movement (Ā-movement), raising (A-movement) appears to show optional reconstruction for Principle C (i.e., a Principle C violation can be avoided by A-movement; Chomsky 1995, Fox 1999, Lebeaux 2009), see (12a,b).

(12) a. $[_{DP}$ The boys $]_i$ seemed to each other$_i$ [__ to be smart].

b. $[_{DP}$ John$_i$'s mother] seems to him$_i$ [__ to be beautiful].

The idea is to account for the lack of obligatory reconstruction in (12a,b) by a derivation that involves the steps displayed in (13a,b): A-movement of a bare determiner D plus subsequent late merger of the complement of D.[1,2]

(13) a.



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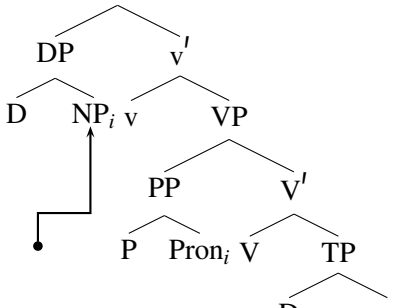


Again, late merger in (13b) violates the SCC. Moreover, since this is arguably a case of merging a complement, one cannot resort to the stipulation that adjunction is exempt from strict cyclicity.

Finally note that in order to avoid such late merger of complements of D

[1]There is reason to believe that the preposition *to* in (12) does not hinder c-command by the pronoun over the R-expression (see Chomsky 1995, Pesetsky 1995, McGinnis 1998).

[2](12a) suggests that only the complete DP *the boys* forms an R-expression, not the definite determiner on its own. (12b) seems to require that the complement *mother (of) John('s)* undergoes late merger, followed by subsequent counter-cyclic DP-internal raising of *John('s)*. This means that not only external Merge but also internal Merge must be able to apply counter-cyclically (cf. Lechner 2019).

with Ā-movement, where reconstruction for Principle C is obligatory (recall (9b)), Takahashi and Hulsey (2009) propose a constraint to the effect that NP must merge with D before case is assigned to the DP (cf. Lebeaux 2009, Stanton 2016, Lechner 2019). In raising contexts such as (12a,b), nominative case is assigned to the raised DP by the matrix T-head. Takahashi and Hulsey (2009) assume that raising makes an intermediate stop in Specv (as indicated in (13); see also Legate 2003, Sauerland 2003, Richards 2004, Deal 2009). In this position, the raised D is outside the c-command domain of the co-indexed pronoun, and the head assigning its case has not been merged yet. Thus late merger can still apply. No such point of the derivation is available for cases of Ā-movement like (9b). In (9b), v assigns accusative case to the Ā-moving DObj. Thus, the D-head of the DObj in (9b) must be merged with its complement while it is still the sister of V. But then the R-expression in the complement of D will be c-commanded by the co-indexed pronoun in Specv, leading to a Principle C violation.

2.4. Tucking-In

If a head H triggers multiple instances of movement, and if these movements are of the same type, i.e., are triggered by the same feature, then the moved categories usually target multiple specifiers of H in an order preserving way. Put differently, the movement paths show a crossing pattern.[3]

This generalization is made explicit in McGinnis (1998), and it is well established (see, e.g., Müller 1997, Richards 1997). (14) illustrates the crossing paths that show up with multiple *wh*-movement in Romanian (Rudin 1988). (15) shows crossing paths arising with multiple object shift in Danish (Vikner 1989).

(14) a. Cine ce __ a spus __?
who what has said
'Who said what?'

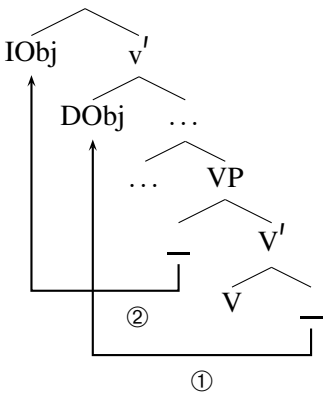
b. *Ce cine __ a spus __?

[3] In contrast, if multiple movements to the same specifier domain are triggered by different features, then the movement paths are nested, flipping the order of the moved categories.

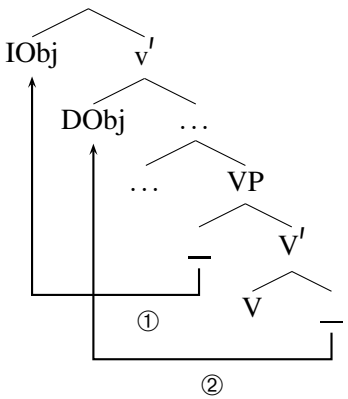
(15) a. Peter viste hende den jo _ _.
Peter showed her it indeed
'Peter indeed showed it to her.'
b. *Peter viste den hende jo _ _.

Order preserving movement that generates crossing paths (exemplified in (16) by multiple object shift) seems to either violate some kind of Minimality (Rizzi 1990, Fanselow 1991, Chomsky 1995), as in (16a), or the SCC, as in (16b), depending on what moves first. In (16a), the DObj moves to an inner specifier first, across the c-commanding IObj, violating Minimality; in (16b), the DObj moves second but targets an inner specifier, violating the SCC.

(16) a.



b.



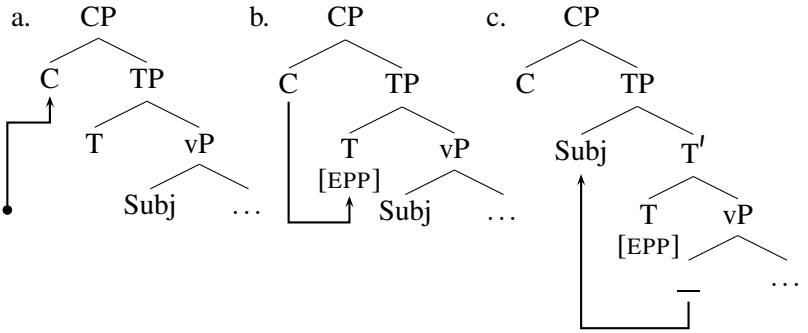
The most popular assumption is that the derivation in (16b) is the correct one. The hypothesis is that a specifier S created by internal Merge targets the lowest position within the specifier domain. If there already is a specifier S′ present in the same domain, then S undergoes 'tucking-in' below S′ (Richards 1997, 1999, Mulders 1997; see also Řezáč 2002, Doggett 2004, Branigan 2014, Bošković 2016, Safir 2019 for discussion). Thus, the tucking-in hypothesis involves counter-cyclic (internal) Merge.

2.5. Feature Inheritance

Chomsky (2007, 2008) proposes that certain ϕ-features (probes in the sense of Chomsky 2000, 2001) and EPP-features are a property of phase heads

(C and v) only. If such features show up on another head H, such as for instance T, then this is because H inherits the relevant feature from a phase head under c-command. (See Richards 2007 for conceptual motivation for the idea of feature inheritance; cf. Broekhuis 2016 for empirical criticism.) The proposal seems to imply that the satisfaction of the inherited feature applies counter-cyclically (Richards 2007). For instance, C must merge with TP in order to be able to hand down its EPP-feature to T (17a,b).

(17) a. b. c.



Satisfaction of the inherited EPP-feature by subject raising to SpecT (17c) then applies within a cyclic domain, the TP, that is properly included within another cyclic domain, the CP, in violation of the SCC.

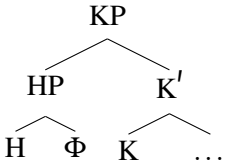
3. Non-monotonic Derivations

This section introduces the background that the strictly cyclic reanalysis is based on: the theory of non-monotonic derivations (Heck 2016, 2022).

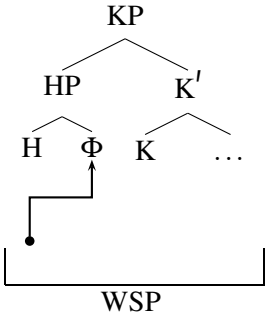
3.1. Necessity of Workspaces

Given the SCC and the existence of complex specifiers, it is clear that syntactic derivations must be able to construct different syntactic objects in parallel. The common assumption is that the derivation may employ different 'workspaces' (WSP), which serve to built up and hold ready various syntactic objects (Uriagereka 1999). To illustrate, suppose that the structure in (18) is to be generated. A (partial) derivation of (18), such as the one in (19), which makes use of only one WSP, violates the SCC: In order to generate the complex category HP Φ must be merged counter-cyclically.

(18)

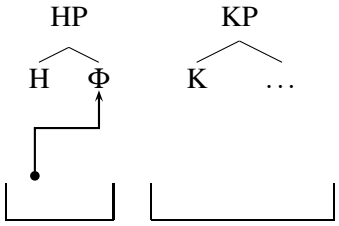


(19)

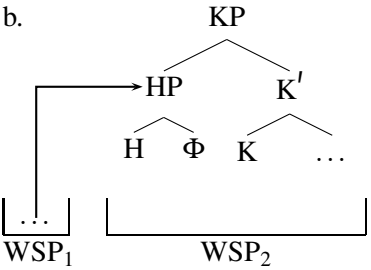


In contrast, the derivation in (20a,b), which makes use of multiple WSPs, is able to generate (18) without violating the SCC: The complex category HP is first generated in WSP_1; later HP is merged from WSP_1 to WSP_2, thereby becoming a specifier of KP.

(20) a.



b.



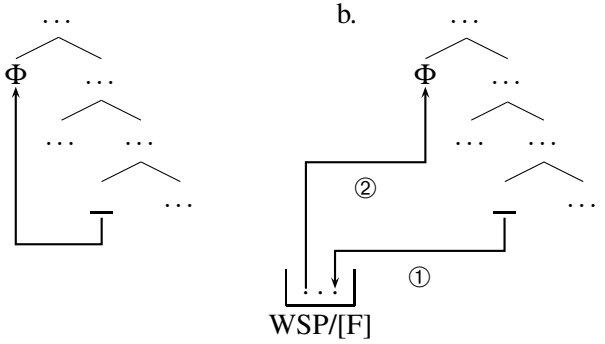
3.2. Making Further Use of WSPs

Following Heck (2016, 2022), I assume that syntactic derivations may make further use of multiple WSPs (see Nunes 2001, 2004; but cf. also Bianchi and Chesi 2014, Jayaseelan 2017, Adger 2017, Thoms 2019, and Thoms and Heycock 2022 for related proposals). In particular, movement of Φ in (21a) may be decomposed into two operations. First, removal of Φ applies (cf. Müller 2017, 2018, Pesetsky 2016), shifting Φ to another WSP, see step ① in (21b).[4] (For ease of exposition, the second WSP, which would host the tree

[4]This reminds of sideward movement (Nunes 2001, 2004, Hornstein 2001). These proposals mainly deal with phenomena where the category shifted to another WSP undergoes external Merge to pick up a second theta role (Control, parasitic gaps, across-the-board movement, but cf. Nunes 2004 on reconstruction and head-movement). The present discussion focuses on cases where internal Merge (implying a c-commanding movement trigger) is involved.

being moved from, is not displayed in (21).) Second, Φ is remerged from the WSP to the current tree (② in (21b)).

(21) a. b.



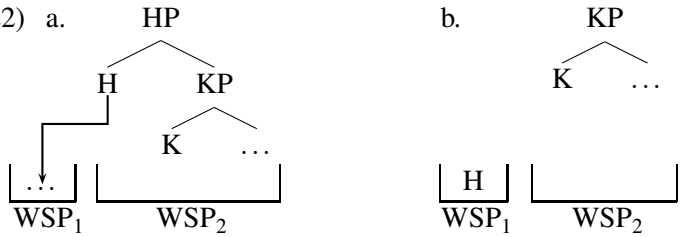
The probe [F] that attracts Φ acts as a pointer to the WSP that Φ is temporarily moved to (in (21b), this is indicated by displaying the probe below the WSP that hosts the attracted category).

If no other operation is interspersed between ① and ② in (21b), the derivation is equivalent to the one in (21a), where movement applies in one fell swoop. It becomes interesting when such interspersion takes place.

3.3. Shrinking Trees

Head-movement, like phrasal movement, may proceed via some WSP (recall (21)). Assume some KP, immediately dominated by an HP. Suppose next that the head H is removed and placed in some WSP_1 (22a). Then, by assumption, the projection of H, HP, ceases to exist temporarily (cf. Heycock and Kroch 1993, Takano 2000). What remains in WSP_2 is thus KP (22b).

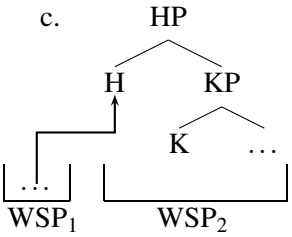
(22) a. b.



In other words, going from (22a) to (22b), the representation has shrunk. (Put yet another way: The representations of the derivation are not monotonously

growing. This is where the notion of a non-monotonic derivation comes from.) Later, H may be remerged. This re-establishes the HP (22c).[5]

(22) c.



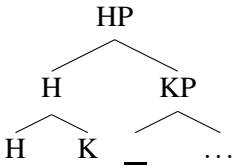
It should be mentioned that I assume that removal of a head H does not lead to the disappearance of HP under two conditions. First, if there is a specifier within HP, removing HP would leave this specifier unconnected to the rest of the representation. Second, if HP is the complement to another head, removing HP would make the higher head lose its connection to its complement. In these configurations, HP is maintained (see Heck 2016).

4. Strictly Cyclic Reformulation

4.1. Head-Movement/Undermerge

Bobaljik (1995) (see also Bobaljik and Brown 1996, Nunes 2004) proposes to render head-movement strictly cyclic by invoking sideward movement (Nunes 2001, 2004). To illustrate, assume that the representation to be generated is the one in (23), where head-movement of K to H has applied.

(23)

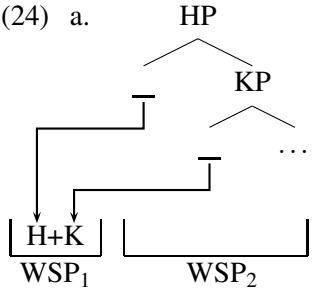


The derivation proceeds as follows. Before H is merged with KP, K is removed from KP and placed into a separate WSP that already hosts H (sideward movement). Being part of the same WSP as H, K may adjoin to H in a strictly cyclic fashion. Afterwards, the thus generated complex head is

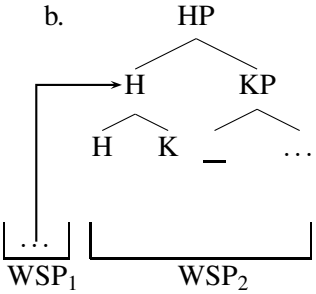
[5] Head-movement as in (22a-c) seems pointless as H ends up in the same position it started from. The motivation for this maneuver will be given in section 4.

remerged. In Heck (2016), the proposal of Bobaljik (1995) is slightly modified by adding the assumption that the attracting head H is first merged to a position c-commanding the head K. In this configuration, H probes K, which triggers the subsequent removal to the two heads to the same WSP (24a). The remains of the derivation match the derivation proposed in Bobaljik (1995): First K adjoins to H (noted as H+K in (24a)), then the complex head formed in WSP_1 is remerged to the tree in WSP_2 (24b).

(24) a.



b.



As a consequence, head-movement is strictly cyclic.

Given the structural parallelism between representations that are generated by head-movement and representations generated by Pesetsky's (2013) operation Undermerge (recall (4)), it appears that Undermerge may be treated in the same way as head-movement.

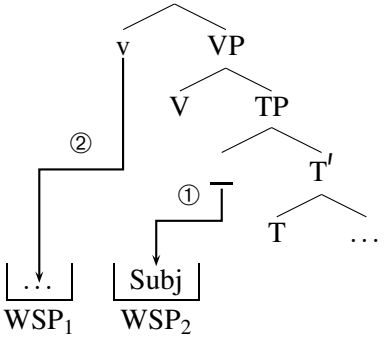
4.2. Minimality

The following analysis of apparent Minimality violations in the context of Subj-raising across an experiencer in English was proposed by Heck (2016). It pursues an idea already put forward in Stepanov (2001*a*,*b*) according to which such raising is possible because the experiencer is not yet part of the structure when raising applies. Rather, the experiencer is merged late, after raising. The crucial difference between Heck (2016) and Stepanov's (2001a,b) analysis is that late merger of the experiencer is strictly cyclic in the former but counter-cyclic in the latter. As will become clear, the analysis makes crucial use of the theory of head-movement presented in section 4.1.

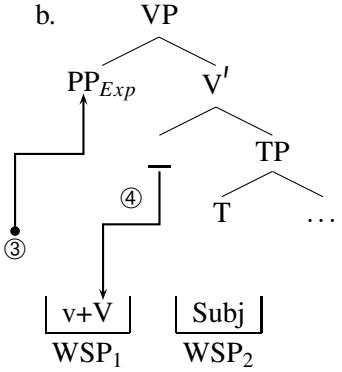
The derivation is given in (25a-c). Suppose that instead of merging the experiencer in SpecV right away, v is merged with VP. The Subj is attracted

by v and is placed in the separate WSP_2, see step ① in (25a).[6,7] As there is no experiencer present, such raising respects Minimality. Next, v is displaced to WSP_1 in order to initiate V-to-v head-movement (step ②; see section 4.1). With v being removed, the vP-shell vanishes, too, and the tree shrinks, becoming a VP again. Accordingly, the experiencer can now be merged to SpecV, respecting the SCC (③ in (25b)). Also, V joins v in WSP_1, to form a complex head (step ④).

(25) a.

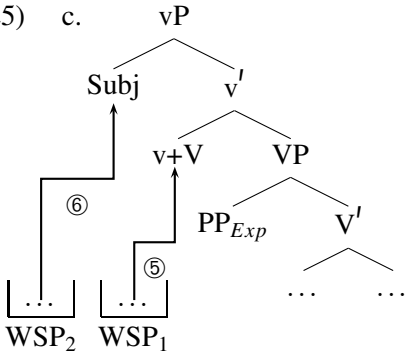


b.



In the remaining steps, the complex v+V-head is remerged with VP from WSP_1, thereby re-establishing the vP of the matrix clause, and the (to-be-raised) Subj is merged from WSP_2 to Specv (steps ⑤ and ⑥).

(25) c.



[6] I am assuming here that A-movement must make an intermediate stop in Specv in order to comply with the Phase Impenetrability Condition (PIC Chomsky 2000, 2001); see also the references in section 2.3.

[7] The clausal spine in (25) is hosted by yet another WSP, not displayed here.

From there, the Subj may move to SpecT at some later point. Related analyses are available to other cases of apparent Minimality violations (Heck 2016; cf. also Thoms 2023 for a similar idea), as for instance those mentioned in section 2.2 above.

Note, however, that the above maneuver that allows the Subj to get past the experiencer crucially relies on two ingredients. First, the derivation must allow to procrastinate Merge of the experiencer. In languages that do not exhibit raising across an experiencer (see section 2.2), it may be the case that such procrastination is not allowed (see Heck 2016, 2022, and Privizentseva 2022 for some ideas what might regulate the availability of late merger). Second, head-movement must take place. Without V-to-v movement applying in (25a-c), the vP-projection would not vanish temporarily. And without the tree shrinking to the size of a VP, late merger of the experiencer to SpecV would violate the SCC. In other words, non-monotonic derivations of the kind illustrated in (25a-c) are contingent on particular conditions and are not simply available across the board. This means that there may be (apparent) Minimality violations that are not amenable to this technique.

4.3. Reconstruction

Before turning to the analysis, it is useful to clarify some background assumptions. In contrast to much contemporary research on reconstruction that is based on the copy theory of movement, I assume here that reconstruction (at least reconstruction with respect to binding) is the result of a derivational interpretation of binding principles (see Burzio 1986, Belletti and Rizzi 1988, Lebeaux 1988, 2009, Heycock 1995, Sabel 1995, 1998). This means that, for instance, Principle C is violated if an R-expression is c-commanded by a coreferential expression at any point of the derivation. Accordingly, I am also not adopting the copy theory of movement (see below). Moreover, I am assuming that semantic interpretation proceeds cyclically (Epstein et al. 1998), as determined, for instance, by phases (Chomsky 2000, 2001, 2008).

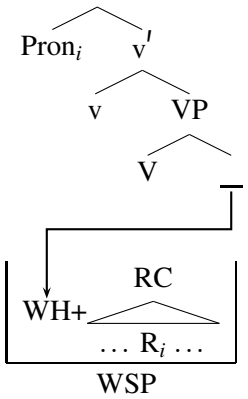
Returning to the main plot, consider first Lebeaux's (1988, 1990) observation that reconstruction of Ā-movement with respect to Principle C is not obligatory if the R-expression is embedded within a relative clause (26).

(26) Which argument [that John$_i$ made __] did he$_i$ believe __?

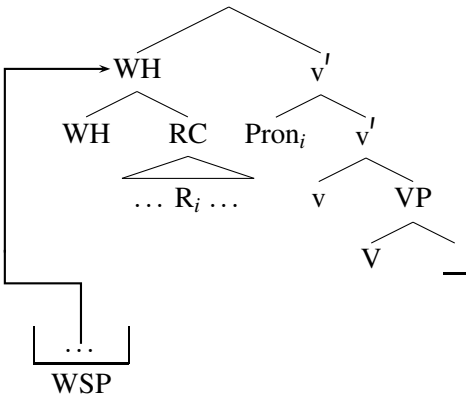
The strictly cyclic analysis pursued here maintains the idea of late merger (Lebeaux 1988) but adds the assumption that late merger applies when the Ā-moved category is shifted to the WSP that also hosts the relative clause. Merge (or: adjunction) of the relative clause may then apply to the root and therefore respect the SCC. The proposal can already be found in Nunes (2004: 146-151). Here, it will be extended (and slightly adapted to present assumptions) to integrate the discussion in Takahashi and Hulsey (2009).

Relevant steps of the derivation are displayed in (27). In (27a), the *wh*-phrase moves to the WSP containing the relative clause. There, *wh*-phrase and relative clause combine. In the next step (27b), the constituent consisting of *wh*-phrase and relative clause is remerged to the main clause.[8]

(27) a.



b.



As the relative clause (containing the R-expression) is not c-commanded by the co-indexed pronoun at any point, Principle C is not violated.

Turning to complement clauses, recall that in this case reconstruction with respect to Principle C is obligatory (28). Thus, any derivation of (28) employing late merger of the kind illustrated in (27) must be blocked.

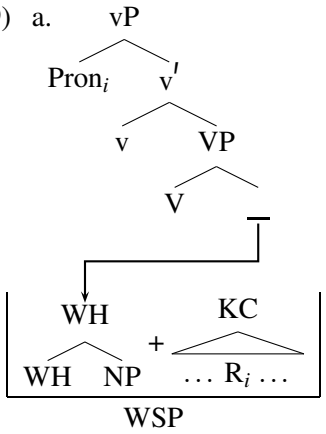
(28) *Which argument [$_{CP}$ that John$_i$ is a genius] did he$_i$ believe ___?

Assuming that complement clauses are merged as the sister of the noun while relative clauses are adjoined to the DP they modify (irrespective of whether

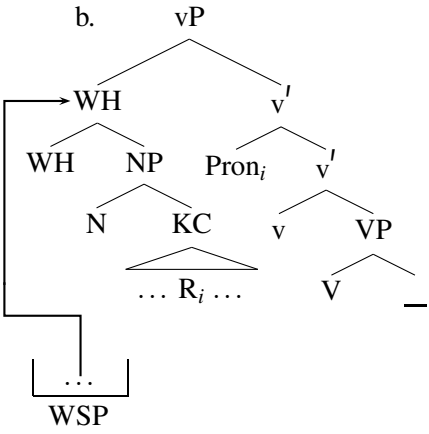
[8] Just like A-movement, *wh*-movement makes an intermediate stop in Specv, enforced by the PIC, cf. section 4.2.

one is dealing with a restrictive or an appositive relative clause),[9] it follows right away why a derivation fails that merges the *wh*-phrase (including the D-head and its NP-restrictor) in argument position and only later combines it with the complement clause (KC) in a separate WSP: Merge of the complement clause as the sister of N (see (29a)) violates the SCC as it does not target the root (cf. the representation in (29b)).[10]

(29) a.



b.



For the same reason, the proposal accounts for a reconstruction asymmetry in multiple modifier constructions noted by Tada (1993) (see also Sauerland 1998, Stanton 2016). Reconstruction of an internal modifier does not enforce reconstruction of an outer modifier: In (30a), the reduced relative clause *compatible with his* (inner modifier) reconstructs (for variable binding), and the full relative clause (outer modifier) does not reconstruct, thereby avoiding a Principle C violation. In contrast, reconstruction of the outer modifier *does* enforce reconstruction of an inner modifier, see (30b).

(30) a. [Which computer compatible with his$_j$ that Mary$_i$ knew how to use] did she$_i$ tell every boy$_j$ to buy __?

[9] For reasons of interpretation, it is often assumed that restrictive relative clauses are adjoined lower than appositive ones (Partee 1975). But cf. Frosch (1995) and Sternefeld (2006), who cast doubt on the necessity of this structural distinction; cf. Heim and Kratzer 1998: §4.5.

[10] In Takahashi and Hulsey (2009), the derivation in (29) is assumed to result in a non-interpretable LF, based on the copy theory of movement.

b. *[Which computer compatible with Mary$_i$'s that he$_j$ knew how to use] did she$_i$ tell every boy$_j$ to buy __?

The theoretical interpretation of this asymmetry under the present assumptions is clear. In multiple modifier constructions late merger may not target an internal modifier to the exclusion of an outer modifier because such late merger would be counter-cyclic (the internal modifier has to be merged in between the DP and the outer modifier). In contrast, nothing prevents late merger of the outer modifier in the presence of an internal modifier.

Returning to the case of complement clauses (recall (28)), a second derivation that has to be blocked involves external merge of a bare D-head to an argument position plus subsequent Ā-movement to a separate WSP, where D then undergoes late merger with an NP-restrictor containing a complement clause. I assume here that such a derivation violates the θ-criterion of Chomsky (1981): A bare D cannot pick up the θ-role that is assigned to the argument position; only a fully fledged argument DP is able to do so. When D finally merges with NP, it no longer occupies an argument position, and thus the resulting DP remains without a θ-role.[11]

Finally, consider the case of A-movement, where reconstruction with respect to Principle C can be avoided, witness (31).

(31) Every argument [$_{CP}$ that John$_i$ is a genius] seems to him$_i$ to be __ flawless.

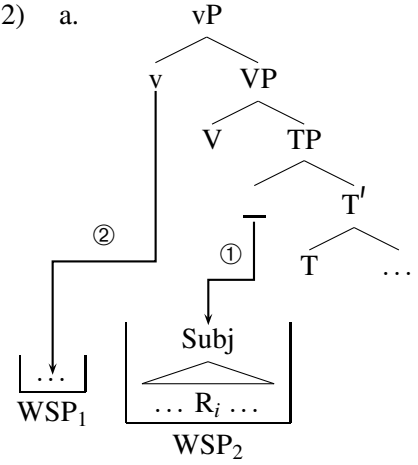
As noted in section 2.3, Takahashi and Hulsey (2009) assume that (31) involves merge of a bare D, followed by movement of D to a position c-commanding the pronoun, and subsequent late merger of the restrictor NP containing the complement clause with D (see (13)). Under present assumptions, this analysis is not available for θ-theoretic reasons (see above).

However, the lack of obligatory reconstruction for Principle C with A-movement already falls out from the analysis presented in section 4.2 (as

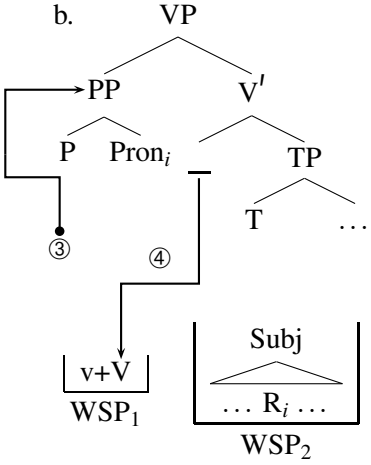
[11] Under the assumptions of Takahashi and Hulsey (2009) no such problem arises (cf. (13), section 2.3): There, the θ-role is assigned to a copy of the moved element, which is semantically enriched by the process of trace conversion (due to Fox 1999) and therefore can receive the θ-role. Accordingly, Takahashi and Hulsey (2009) invoke another constraint to block this derivation, see section 2.3. Nunes (2004), discussing a slightly different but related derivation, makes problems with copy deletion responsible for its failure.

already noted in Heck 2016). The offending co-indexed pronoun in (31) is contained within an experiencer PP. A-movement of the Subj to SpecT of the matrix clause crosses this experiencer, in apparent violation of Minimality. According to the analysis in section 4.2, this Minimality violation is avoided because the experiencer is merged late, after A-movement (to a separate WSP) has taken place. As a consequence, there is no point in the derivation where the pronominal experiencer c-commands the R-expression contained in the A-moved Subj. Therefore, no Principle C violation arises. This is illustrated in (32a-c).

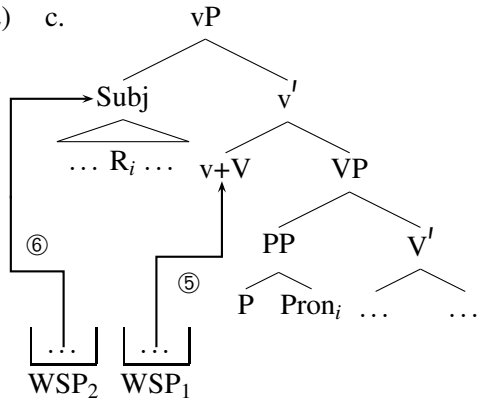
(32) a.



b.



(32) c.



In this way, the lack of Principle C effects with A-movement in English

is related to the independent (and somewhat exceptional) property of A-movement across an experiencer in the same language.[12]

This makes the prediction that in languages that, generally, do not allow for raising across an experiencer Principle C effects should return in scenarios where such raising becomes exceptionally possible (but does not require a non-monotonic derivation of the kind in (32)). As pointed out in Heck (2016), the prediction is testable for such languages if raising applies across a cliticized experiencer (where cliticization helps to void Minimality). In such a scenario, there is a point of the derivation where the experiencer c-commands the to-be-raised Subj. This should trigger a Principle C effect if the experiencer is a pronoun co-indexed with a referential Subj (i.e., a reflexive). The prediction appears to be borne out. (33a) illustrates for French (McGinnis 1998). Similar facts hold for Italian (Rizzi 1986).

(33) a. *Jean$_i$ se$_i$ semble _ _ avoir du talent.
Jean SELF.DAT seems to.have of.the talent
'Jean seems to himself to be gifted.'

b. Jean$_i$ lui$_j$ semble _ _ avoir du talent.
Jean him.DAT seems to.have of.the talent
'Jean seems to him to be gifted.'

If the clitic is a non-coreferential pronoun, then the result is well-formed (33b), as expected. See Heck (2022) for further discussion of reconstruction effects in terms of non-monotonic derivations.

4.4. Tucking-In

One way to rephrase tucking-in in a way that obeys the SCC makes use of a buffer that is organized as a stack or a queue. Different versions of this proposal have been put forward (without being fully aware of previous works), see Doggett (2004) (who mentions the idea in a footnote, attributing it to David Pesetsky), Stroik (2009), Unger (2010), and Heck and Himmelreich (2017). The main point relevant here is that such a buffer can be straightfor-

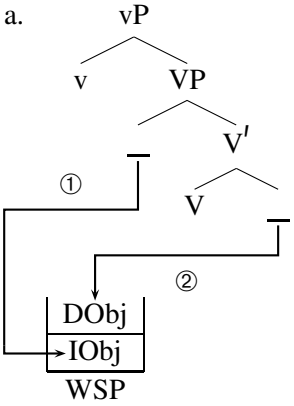
[12] A remaining problem for the approach is the fact that A-movement in English may reconstruct for Principle A and variable binding; see Heck (2016) for some discussion.

wardly described as a WSP pointed to by a single probe attracting multiple categories (Heck 2016).

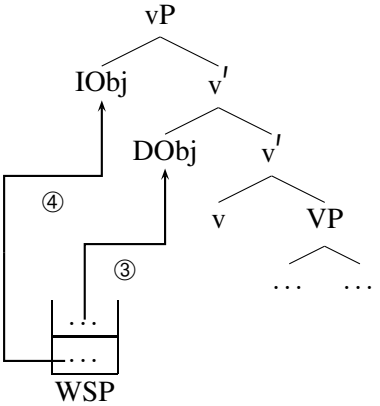
The idea is as follows. The probe may only attract the highest category (respecting Minimality). Each attracted category is stored on top of the same stack in a separate WSP. If some category has been attracted to the stack, the next higher one becomes accessible to the probe. Once all categories have been attracted, the topmost category is removed from the stack and is remerged as the innermost specifier. Such removal makes the second topmost category of the stack accessible, which is then remerged as the next higher specifier (following strict cyclicity). This procedure continues until the stack is empty. In this way, the attracted categories show up as specifiers in an order (bottom up) that is the inverse of the order of attraction, leading to crossing paths.

A sample derivation is illustrated in (34a,b).[13]

(34) a.



b.



(34a) shows that attraction obeys Minimality. First the closer IObj is attracted. Once removed and placed on the stack, the probe gets access to the DObj, attracts it and places it on top of the IObj on the stack (steps ① and ②). All objects have been attracted, and thus the remerge procedure starts, beginning with the DObj, which occupies the top of the stack. After the DObj is remerged (as the innermost specifier), the IObj is accessible and becomes the outermost specifier, see steps ③ and ④ in (34b), which obey the SCC.

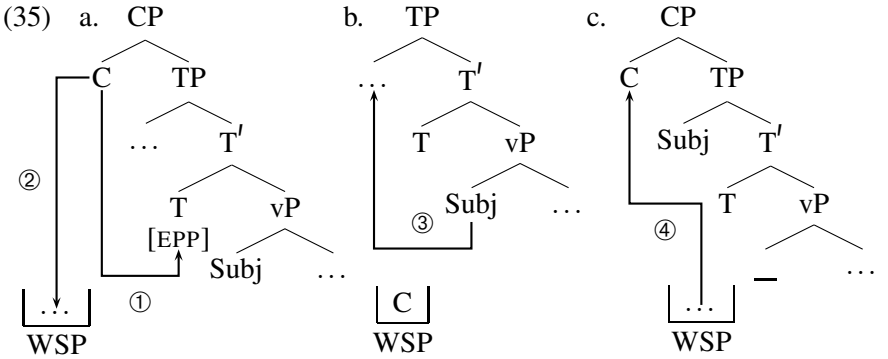
[13] (34) could, for instance, instantiate multiple object shift or multiple successive cyclic *wh*-movement of two objects.

4.5. Feature Inheritance

Finally, feature inheritance may receive a strictly cyclic interpretation if one makes the additional assumption that it shares the property of head-movement to temporarily remove the higher head (placing it in a separate WSP) after having handed down its features (Heck 2016).[14]

(35a-c) illustrates the effect of removing the higher head by means of a non-monotonic derivation:

(35)



Step ① in (35a) represents feature inheritance. Once C has assigned its EPP to T, it is removed to the WSP (step ②). With C removed, its projection vanishes, too (cf. section 4.1). The current tree shrinks, temporarily becoming a TP again. Accordingly, T can now satisfy the EPP it inherited from C by attracting the subject without violating the SCC (see step ③ in (35b)). Finally, C is remerged from the WSP, restoring the CP-layer (step ④ in (35c)).

5. Conclusion

To briefly conclude, in the present study I argued that non-monotonic derivations that make use of additional WSPs may be fruitfully put to use when approaching the problem of (apparent) counter-cyclic operations in syntax (including head-movement/Undermerge, Minimality, reconstruction, tucking-

[14] Given that it is not an operation involving the higher head itself that violates the SCC but rather an operation that involves the inheriting head (the SCC-violation being caused indirectly by the presence of the higher head), such an assumption is perhaps less motivated than it was for the case of head-movement.

in, and feature inheritance) in a uniform manner. Whether there are instances of apparent counter-cyclicity that are beyond the scope of this approach remains to be seen.

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