Successive Cyclicity, Long-Distance Superiority, and Local Optimization

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1. Introduction

It is not a priori clear how intermediate steps of successive-cyclic *wh*-movement can comply with (1), which requires movement to be feature-driven (Chomsky 1995).

(1) LAST RESORT (LR):
Movement must result in feature checking.

A standard solution is the assumption that movement to intermediate $\text{SpecC}_{[-wh]}$ positions is triggered by pseudo-*wh*-features which are either optionally present on $\text{C}_{[-wh]}$ (Fanselow and Mahajan 2000, Collins 1997, and others), or which can optionally be inserted at the left edge of phases (Chomsky 1998). In this paper, we will argue for a different kind of approach: Whereas the last step of successive-cyclic *wh*-movement is triggered by a [+*wh*]-feature on C, an intermediate step is not feature-driven; rather, it is a repair operation that violates LAST RESORT in order to satisfy another constraint that we will call PHASE BALANCE. This presupposes constraint violability and constraint ranking, and thus suggests an optimality-theoretic approach: A 'repair' is a competition in which the optimal candidate incurs an (otherwise fatal) violation of a high-ranked constraint C_i in order to respect an even higher-ranked constraint C_j. More specifically, we argue that successive-cyclic *wh*-movement lends further support to the approach to repair-driven movement in Heck and Müller (2000) and Müller (2000), where evidence for an optimality-theoretic treatment of repair-driven scrambling, sluicing, quantifier raising, and remnant movement is presented. This approach presupposes that optimization proceeds locally, not globally (as is standardly assumed; cf. Prince and Smolensky 1993). The evidence from successive-cyclic *wh*-movement reinforces this position: An 'offending' property is removed instantaneously, not at some earlier or later stage in the derivation. Furthermore, we show that the repair approach to successive cyclicity offers an account of

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both long-distance superiority effects in German, and certain long-distance intervention effects that seem to have gone unnoticed so far.

1.1. Local vs. Global Optimization

Global (standard) optimization applies once to complete structures. Local optimization, however, applies iteratively to small portions of structure. On this view, syntactic structure is created derivationally, with each XP a cyclic node, as in Chomsky (1995). Structure building operations obey an inviolable STRICT CYCLE CONDITION (Chomsky 1973, Perlmutter and Soames 1979), a version of which is given in (2):

(2) STRICT CYCLE CONDITION (SCC):[1]
Within the current cyclic domain D, Merge/Move may not target a position that is included within another cyclic domain D′, such that D properly includes D′.

Based on a given input, the operations Merge and Move create various XP outputs α_1,...,α_n: the candidate set M. M is then subjected to an optimization procedure. The optimal output α_i (a subderivation) is the one that respects all inviolable constraints (e.g., the SCC), and that also best satisfies an ordered set of violable constraints. α_i then serves as the input for the next cycle, and so on, until the numeration is empty and the sentence complete.

As a consequence, structure that has not yet been created at a given point of the derivation cannot have any impact on the current optimization procedure: Local optimization does not have look-ahead capacity.

1.2. The Problem

There is evidence from a variety of languages that long-distance *wh*-movement across a CP applies successive-cyclically, by an intermediate movement step to SpecC$_{[-wh]}$.[2] An example from German is given in (3).

(3) [$_{\text{CP}_7}$ Wen$_1$ hat er gesagt [$_{\text{CP}_5}$ t$'_1$ daß Maria t$_1$ liebt]] ?
whom has he said that Maria loves

The derivation underlying (3) must be D$_1$, not D$_2$ or D$_3$.

1. For derivations of the SCC, see Chomsky (1995), Boskovic and Lasnik (1999).
2. Morphological or syntactic reflexes of this movement step include the choice of complementizer in Modern Irish (McCloskey 1979), *wh*-agreement in Chamorro (Chung 1982), partial *wh*-movement in Ancash Quechua (Cole 1982) and Iraqi Arabic (Wahba 1992), obligatory V-to-C raising with (certain types of) *wh*-phrases in Spanish (Torrego 1984) and Basque (Ortiz de Urbina 1989), the selection of subject pronouns by C in Ewe (Collins 1994), tonal downstep in Kikuyu (Clements, McClocksey, Maling, and Zaenen 1983), *meN* deletion in colloquial Singapore Malay (Cole and Hermon 2000), *wh*-copying in German (Fanselow and Mahajan 2000) and Africaans (Plessis 1977), and obligatory CP extraposition in German (M¨uller 1999).

(4) *Cyclic Derivation* D_1

a. [$_{\text{TP}}$ Maria wen$_1$ liebt] + $C_{5[-wh]}$, (*wen*$_1$ moves to SpecC_5) →

b. [$_{\text{CP}_5}$ wen$_1$ daß Maria t$_1$ liebt] . . . →

c. [$_{\text{TP}}$ er gesagt hat [$_{\text{CP}_5}$ wen$_1$ daß Maria t$_1$ liebt]]
+ $C_{7[+wh]}$, (*wen*$_1$ moves to SpecC_7; V/2) →

d. [$_{\text{CP}_7}$ Wen$_1$ hat er gesagt [$_{\text{CP}_5}$ t'_1 daß Maria t$_1$ liebt]]

(5) *Acyclic Derivation* D_2

a. [$_{\text{TP}}$ Maria wen$_1$ liebt] + $C_{5[-wh]}$, (*wen*$_1$ does not move) →

b. [$_{\text{CP}_5}$ – daß Maria wen$_1$ liebt] . . . →

c. [$_{\text{TP}}$ er gesagt hat [$_{\text{CP}_5}$ – daß Maria wen$_1$ liebt]]
+ $C_{7[+wh]}$, (*wen*$_1$ moves to SpecC_7, via SpecC_5; V/2) →

d. [$_{\text{CP}_7}$ Wen$_1$ hat er gesagt [$_{\text{CP}_5}$ t'_1 daß Maria t$_1$ liebt]]

(6) *One-step Derivation* D_3

a. [$_{\text{TP}}$ Maria wen$_1$ liebt] + $C_{5[-wh]}$, (*wen*$_1$ does not move) →

b. [$_{\text{CP}_5}$ – daß Maria wen$_1$ liebt] . . . →

c. [$_{\text{TP}}$ er gesagt hat [$_{\text{CP}_5}$ – daß Maria wen$_1$ liebt]]
+ $C_{7[+wh]}$, (*wen*$_1$ moves to SpecC_7; V/2) →

d. [$_{\text{CP}_7}$ Wen$_1$ hat er gesagt [$_{\text{CP}_5}$ – daß Maria t$_1$ liebt]]

D_2 is not available since movement to SpecC_5 violates the SCC. D_3, in contrast, does without the intermediate *wh*-movement step. This derivation is incompatible with the evidence for successive cyclicity just cited; furthermore, it involves a non-local *wh*-chain of a type that (fatally) violates locality requirements (see below). D_1 respects both the SCC and locality by applying *wh*-movement to SpecC_5 in the step from (4-a) to (4-b). However, the trigger for *wh*-movement – the [+*wh*]-feature of C_7 – is not yet available at this point of the derivation. Thus, either there is a different trigger (a pseudo-*wh*-feature), or LR is violated by this operation. We suggest the latter. Then, the question arises as to what property of the derivational stage involving TP and $C_{5[-wh]}$ in (4-a) forces a violation of LR by *wh*-movement to SpecC_5. The property cannot possibly be inherent in either TP or $C_{5[-wh]}$. The reason is that the embedded TP and $C_{5[-wh]}$ are identical in the multiple question in (7-a), where *wh*-movement to SpecC_5 is impossible (cf. (7-b)); partial *wh*-movement is only permitted in German if Spec$C_{[+wh]}$ is filled by a scope marker, not by another *wh*-phrase.[3]

(7) a. [$_{\text{CP}_7}$ Wer$_2$ hat t$_2$ gesagt [$_{\text{CP}_5}$ – daß Maria wen$_1$ liebt] ?
who has said that Maria whom loves

b. *[$_{\text{CP}_7}$ Wer$_2$ hat t$_2$ gesagt [$_{\text{CP}_5}$ wen$_1$ (daß) Maria t$_1$ liebt] ?
who has said whom that Maria loves

3. The same problem arises in an approach that employs pseudo-*wh*-features.

The crucial distinction seems to be that there is another *wh*-phrase that eventually checks the [+*wh*]-feature of the matrix C in (7), whereas there is no such *wh*-phrase in (3). Given this state of affairs, the task is to find a way to determine whether *wh*-movement to $\text{SpecC}_{[-wh]}$ does or does not apply at the derivational stage (4-a) on a local basis, without look-ahead capacity providing information about later stages of the derivation. This can be achieved by employing the concept of numeration, i.e., the array of lexical material that is used in a derivation (Chomsky 1995): At any given stage, the derivation has access to what is left in the numeration. The constraint that outranks LR and triggers successive-cyclic movement relies on information of this type.[4]

2. Repair-Driven Wh-Movement

We propose that the constraint in question is (8).

(8) PHASE BALANCE (PB):
Phases must be balanced: If P is a phase candidate, then for every feature F in the numeration there must be a distinct potentially available checker for F.

The notions *phase* and *potentially available* must be clarified. Every CP constitutes a phase in the sense of Chomsky (1998), Chomsky (1999), i.e., a special derivational unit.[5] Syntactic material counts as potentially available within the current phase P if it is either part of the numeration or at the left edge (i.e., in SpecC) of P.[6] Thus, PB forces material from the current phase P that is supposed to check a feature within a higher phase P′ to move to the edge of P, in violation of LR. Given that LR is violable and ranked below PB, successive-cyclic *wh*-movement now emerges as a repair strategy.

Before we continue, two further constraints need to be introduced. The first one is obvious: In addition to a constraint that blocks movement that is not feature-driven (LR), there must be a complementary constraint that forces

4. Isn't this another form of look-ahead? The question is primarily terminological, since there can be little doubt that this kind of procedure is much more restricted – it utilizes a concept that has been proposed for independent reasons, and it does not have access to structural information provided by later parts of the derivation.

5. Whether or not vP is also a phase is irrelevant for present purposes; but cf. Heck and M¨uller (2000) for evidence against this.

6. Material that is part of a tree that has been created earlier and has not yet been used in the derivation is not included in either the numeration or the current phase. Items in these external trees belong to the work space of the derivation (also cf. the complex notion of "representation" in Frampton & Gutman 1999), just like items in the numeration; we assume that they also count as potentially available. In what follows, we understand the notion of numeration in this extended sense, as comprising all derivational material outside the current tree.

features to be checked by movement (Chomsky 1995):[7]

(9) FEATURE CONDITION (FC):
Features must be checked by overt movement.

The second constraint may be less obvious: FEATURE FAITHFULNESS prohibits the deletion of features that are present in the input (Legendre, Smolensky, and Wilson 1998). In the present context, this constraint mainly serves the purpose of accounting for absolute ungrammaticality (ineffability) of certain sentences. The proposed ranking is PB, FC $\gg$ FF $\gg$ LR.

(10) FEATURE FAITHFULNESS (FF):
Features must not be deleted.

2.1. Simple Questions

We can now reconsider the case of successive-cyclic *wh*-movement in a simple question; cf. (3). The following two tableaux illustrate the optimization of the embedded and the matrix phase, respectively. Consider first T_1.

T_1: Local optimization of embedded phase

Input: $[_{\text{TP}} \ldots wh_1 \ldots]$, $C_{5[-wh]}$ Numeration = $\{C_{7[+wh]}, \ldots\}$	FC	PB	FF	LR
O_1: $[_{\text{CP}_5}$ – $C_{[-wh]} \ldots wh_1 \ldots]$		*!		
O_2: $[_{\text{CP}_5}$ – $C_{[-wh]} \ldots wh_1$~~[+wh]~~ $\ldots]$		*!	*	
☞ O_3: $[_{\text{CP}_5}$ wh_1 $C_{[-wh]} \ldots t_1 \ldots]$				*

As soon as CP_5 is created by merging C_5 and TP, PB becomes important. Since there is still a [+*wh*]-feature in the numeration but no potentially available item to check it, CP_5 can be balanced only by movement of the TP-internal *wh*-phrase to the left edge of CP_5, in violation of LR; see output O_3. If the *wh*-phrase stays in situ, as in output O_1, PB is fatally violated. Deletion of the [+*wh*]-feature of the *wh*-phrase as in output O_2 is even worse since it violates both PB and FF without improving the output's constraint profile. Note that an output candidate that has been eliminated cannot be continued, and can thus never serve as the basis for any further competition: Once classified as suboptimal, it will never be reconsidered. Only the optimal output of T_1 serves as the input for subsequent optimization. Tableau T_2 shows the last cycle of the matrix phase competition.

The optimal candidate O_{33}[8] moves the *wh*-phrase and checks the [+*wh*]-feature of C. Again, strategies that delete some features or leave the [+*wh*]-

7. Since we are only concerned with overt movement here, we abstract away from the issue of strength.
8. The candidates here are prefixed by 3 so as to indicate that they are all descendants of O_3 in T_1.

T_2: Local optimization of matrix phase

Input: $[_{\text{TP}} \ldots [_{\text{CP}_5}\ wh_1\ C_{[-wh]} \ldots t_1 \ldots]]$, $C_{7[+wh]}$ Numeration = { . . . }	FC	PB	FF	LR
O_{31}: $[_{\text{CP}_7} - C_{7[+wh]} \cdots$ $[_{\text{CP}_5}\ wh_1\ C_{5[-wh]} \ldots t_1 \ldots]$	*!			
O_{32}: $[_{\text{CP}_7} - C_{7\text{~~[+wh]~~}} \cdots$ $[_{\text{CP}_5}\ wh_{1\text{~~[+wh]~~}}\ C_{5[-wh]} \ldots t_1 \ldots]$			*!*	
☞ O_{33}: $[_{\text{CP}_7}\ wh_1\ C_{7[+wh]} \cdots$ $[_{\text{CP}_5}\ t_1'\ C_{5[-wh]} \ldots t_1 \ldots]$				

feature on C unchecked do worse. PB is satisfied vacuously since there is no further material in the numeration.

2.2. Long-Distance Superiority

Let us now turn to multiple questions. German is like English in that only one *wh*-phrase moves overtly; cf. (11):

(11) *Wer$_2$ wen$_1$ hat t$_2$ t$_1$ getroffen ?
who whom has met

Given that overt *wh*-movement in German is triggered by a [+*wh*]-feature on C (not by a [+*wh*]-feature on *wh*-phrases), this follows from LR. Next, recall that in multiple questions where one *wh*-phrase originates in a matrix clause and another *wh*-phrase originates in an embedded clause, the second *wh*-phrase must stay in situ; cf. (7-a), which is repeated here.

(12) Wer$_2$ hat t$_2$ gesagt [$_{\text{CP}}$ – daß Maria wen$_1$ liebt] ?
who has said that Maria whom loves

Wh-movement of the embedded *wh*-phrase to the embedded SpecC$_{[-wh]}$ position is impossible (blocked by LR) since there is another *wh*-phrase in the numeration that is potentially available for checking the [+*wh*]-feature of C. In other words: PB can be satisfied without movement. Hence, the embedded *wh*-phrase stays in situ; cf. T$_3$.

T_3: Local optimization of embedded phase

Input: $[_{\text{TP}} \ldots wh_1 \ldots]$, $C_{5[-wh]}$ Numeration = $\{C_{7[+wh]}, wh_2 \ldots\}$	FC	PB	FF	LR
☞ O_1: $[_{\text{CP}_5} - C_{5[-wh]} \ldots wh_1 \ldots]$				
O_2: $[_{\text{CP}_5} - C_{5[-wh]} \ldots wh_{1\text{~~[+wh]~~}} \ldots]$			*!	
O_3: $[_{\text{CP}_5}\ wh_1\ C_{5[-wh]} \ldots t_1 \ldots]$				*!

The optimal output O$_1$ of tableau T$_3$ again serves as the input for subsequent cycles. Suppose now that different matrix phases based on O$_1$ have been constructed. PB is not an issue then since no material is left within the numeration. But the [+*wh*]-feature of matrix C has to be checked. As it stands, both *wh*-phrases could in principle accomplish this. However, on the one hand this would reintroduce the possibility of one-step long-distance movement as in (6) in multiple questions, obviously an unwanted result. On the other hand, this prediction is not empirically correct. German exhibits a long-distance superiority effect in this context (Buering and Hartmann 1994) – only the higher *wh*-phrase can check the [+*wh*]-feature. Compare (12) with (13).

(13) *Wen$_1$ hat wer$_2$ gesagt [$_{CP_5}$ daß Maria t$_1$ liebt] ?
whom has who said that Maria loves

At first sight, it looks as though this long-distance superiority effect could be derived by whatever accounts for clause-bound, standard superiority effects; e.g., the Minimal Link Condition (MLC) (Chomsky 1995). This is not an option for German, though: German does not have superiority effects with clause-bound *wh*-movement; cf. (14) (Haider 1983).

(14) a. Wer$_2$ hat t$_2$ wen$_1$ getroffen ?
who has whom met
b. Wen$_1$ hat wer$_2$ t$_1$ getroffen ?
whom has who met

This strongly suggests that long-distance superiority effects are to be explained independently of the issue of clause-bound superiority effects. We will assume that long-distance superiority effects are due to the following high-ranked locality constraint (cf. Chomsky 1998):

(15) PHASE IMPENETRABILITY CONDITION (PIC):
Move operates only on locally available items.

Syntactic material counts as *locally available* within the current phase P if it is contained within P or at the left edge of the last phase P′.[9] Since optimization of the embedded CP has filtered out the candidate that moves the lower *wh*-phrase to the embedded SpecC position (cf. T_3), any movement operation applying to this *wh*-phrase in the matrix CP will fatally violate the PIC, and long-distance superiority is accounted for; cf. T_4.

O_{14} (= (12)) checks the matrix [+*wh*]-feature with the higher *wh*-phrase; all constraints are respected. In contrast, O_{12} (= (13)) fatally violates the PIC. Finally, O_{13} deletes the [+*wh*]-feature on the C-head and on the *wh*-phrases,

9. This analysis builds on the proposal made in Chomsky (1998). The interaction of the PIC and PB in the present system is roughly comparable to that of the PIC and condition (24) in Chomsky's feature-based system, with PB a strengthened form of his (24).

T_4: Local optimization of matrix phase

Input: [$_{\text{TP}}$ *wh*$_2$ . . . [$_{\text{CP}_5}$ – C$_{5[-wh]}$ . . . *wh*$_1$ . . .]], C$_{7[+wh]}$ Numeration = { . . . }	FC	PB	PIC	FF	LR
O$_{11}$: [$_{\text{CP}_7}$ – C$_{7[+wh]}$ . . . *wh*$_2$ . . . [$_{\text{CP}_5}$ – C$_{5[-wh]}$ . . . *wh*$_1$ . . .]]	*!				
O$_{12}$: [$_{\text{CP}_7}$ *wh*$_1$ C$_{7[+wh]}$ . . . *wh*$_2$ . . . [$_{\text{CP}_5}$ – C$_{5[-wh]}$ . . . t$_1$ . . .]]			*!		
O$_{13}$: [$_{\text{CP}_7}$ – C$_7$~~[+wh]~~ . . . *wh*$_2$~~[+wh]~~ . . . [$_{\text{CP}_5}$ – C$_{5[-wh]}$ . . . *wh*$_1$~~[+wh]~~ . . .]]				*!**	
☞O$_{14}$: [$_{\text{CP}_7}$ *wh*$_2$ C$_{7[+wh]}$ . . . t$_2$ . . . [$_{\text{CP}_5}$ – C$_{5[-wh]}$ . . . *wh*$_1$ . . .]]					

turning them into *wh*-indefinites; this violates FF.[10]

2.3. Further Long-Distance Intervention Effects

This approach makes an interesting prediction: Long-distance *wh*-movement should also be impossible if there is another *wh*-element in the numeration (more generally, outside the current tree; cf. footnote 6) that eventually ends up in a more deeply embedded position, e.g., in an island. This prediction is indeed borne out in German. (16) illustrates a long-distance intervention effect with *wh*-in situ inside an adjunct; (17) with *wh*-in situ inside an NP/CP structure; and (18) with *wh*-in situ inside an NP/PP configuration.

(16) a. Wen$_1$ hat Fritz [$_{\text{CP}}$ nachdem er was$_2$ gemacht hat] t$_1$ getroffen ?
whom$_{acc}$ has Fritz after he what done has met

b. *Wen$_1$ hat Fritz [$_{\text{CP}}$ nachdem er was$_2$ gemacht hat] gesagt [$_{\text{CP}}$ (t$'_1$) daß Maria t$_1$ liebt] ?
whom$_{acc}$ has Fritz after he what done has said that Maria loves

(17) a. ?Wen$_1$ hat Fritz [$_{\text{NP}}$ einem Mann [$_{\text{CP}}$ der was$_2$ kennt]] t$_1$ vorgestellt ?
whom$_{acc}$ has Fritz a man$_{dat}$ that what knows introduced

10. *Wh*-movement from infinitives in German does not give rise to clear superiority effects (Fanselow 1991), modulo some minor variation between restructuring infinitives and others, and a non-identity requirement on *wh*-phrases (Haider 2000). This suggests that German infinitives are not phases. Indeed, extraction from German infinitives does not trigger obligatory extraposition either; cf. footnote 2.

b. *Wen$_1$ hat Fritz [$_{NP}$ einem Mann [$_{CP}$ der was$_2$ kennt]]
whom$_{acc}$ has Fritz a man$_{dat}$ that what knows
gesagt [$_{CP}$ (t'_1) daß er t_1 einladen soll] ?
said that he invite should

(18) a. Wen$_1$ hat Fritz [$_{NP}$ einem Freund von wem$_2$] t_1
whom$_{acc}$ has Fritz a friend$_{dat}$ of whom
vorgestellt ?
introduced

b. ?*Wen$_1$ hat Fritz [$_{NP}$ einem Freund von wem$_2$] gesagt [$_{CP}$
whom$_{acc}$ has Fritz a friend$_{dat}$ of whom said
(t'_1) daß Maria t_1 liebt] ?
that Maria loves

The well-formed (a)-examples involve clause-bound, feature-driven *wh*-movement of *wh*$_1$. The (b)-examples are interesting, though: They are just as ill formed as long-distance superiority cases, even though the "intervening" *wh*$_2$ does not c-command the base position of *wh*$_1$. This is unexpected under standard (e.g., MLC-based) approaches to superiority. Here, these intervention effects without c-command are treated in exactly the same way as the long-distance superiority effects: Repair-driven movement of *wh*$_1$ in the lower CP is blocked by LR (PB is fulfilled by the potential availability of *wh*$_2$), and feature-driven movement of *wh*$_1$ in the higher CP fatally violates the PIC. Still, there is a difference: In the superiority case, the higher *wh*$_2$ moves to the matrix SpecC position. In the present case, *wh*$_2$ cannot move either; compare, e.g., (16-b) and (19).

(19) *Was$_2$ hat Fritz [$_{CP}$ nachdem er t_2 gemacht hat] gesagt [$_{CP}$ daß
what$_{acc}$ has Fritz after he done has said that
Maria wen$_1$ liebt] ?
Maria whom$_{acc}$ loves

The reason is that *wh*$_2$ moves across a barrier. This fatally violates the CED (Huang 1982, Chomsky 1986), which we assume to also outrank FF.

(20) CONDITION ON EXTRACTION DOMAIN (CED):
a. Movement must not cross a barrier.
b. An XP is a barrier if it is a non-complement.

Thus, if O_{14} in T_4 violates a high-ranked CED, the optimal candidate will be O_{13}, which deletes three [+*wh*]-features and thereby violates FF. This candidate neutralizes the *wh*-features of the input, and the result is (21), with indefinite readings of the two *wh*-phrases and a declarative matrix C head.[11]

11. This output can also be generated on the basis of an input that has indefinites and declarative C to begin with. More generally, the neutralization approach to un-

(21) Fritz hat [$_{\text{CP}}$ nachdem er was$_{[-wh]}$ gemacht hat] gesagt [$_{\text{CP}}$ daß
Fritz has after he something done has said that
Maria wen$_{[-wh]}$ liebt]
Maria someone loves

On this basis, we can give an argument for local as opposed to global optimization. Since we presuppose the existence of repair-driven *wh*-movement, and since in a global approach all structural information is given from the very start, we would expect that in order to avoid a CED or FF violation, the lower wh_1 should check the matrix feature, which only violates LR. Then, sentences like (16-b) should be well formed after all. This wrong prediction of global optimization is shown in T_5 (★ indicates the wrong optimal output).

T_5: Global optimization of complete sentence

Input: [$_{\text{CP}_7}$ – $C_{7[+wh]}$ . . . [$_{\text{Island}}$ . . . wh_2 . . .] [$_{\text{CP}_5}$ – $C_{5[-wh]}$ . . . wh_1 . . .]]] Numeration = { . . . }	CED	FC	PIC	FF	LR
O_{11}: [$_{\text{CP}_7}$ – $C_{7[+wh]}$ . . . [$_{\text{Island}}$ . . . wh_2] [$_{\text{CP}_5}$ – $C_{5[-wh]}$ . . . wh_1 . . .]]		*!			
O_{12}: [$_{\text{CP}_7}$ wh_1 $C_{7[+wh]}$ . . . [$_{\text{Island}}$ . . . wh_2] [$_{\text{CP}_5}$ – $C_{5[-wh]}$ . . . t_1 . . .]]			*!		
O_{13}: [$_{\text{CP}_7}$ – $C_{7\cancel{[+wh]}}$ . . . [$_{\text{Island}}$ $wh_{2\cancel{[+wh]}}$] [$_{\text{CP}_5}$ – $C_{5[-wh]}$ . . . $wh_{1\cancel{[+wh]}}$ . . .]]				*!**	
O_{14}: [$_{\text{CP}_7}$ wh_2 $C_{7[+wh]}$ . . . [$_{\text{Island}}$ . . . t_2] [$_{\text{CP}_5}$ – $C_{5[-wh]}$ . . . wh_1 . . .]]	*!				
★O_{15}: [$_{\text{CP}_7}$ wh_1 $C_{7[+wh]}$ . . . [$_{\text{Island}}$ . . . wh_2] [$_{\text{CP}_5}$ t'_1 $C_{5[-wh]}$ . . . t_1 . . .]]					*

Recall that in the matrix competition of the local approach, candidate O_{15} from tableau T_5 is not an option since it is based on output O_3 from tableau T_3: a candidate that has already been eliminated in the competition of the embedded phase because its LR violation is locally unmotivated.

2.4. A Potential Problem

Examples like (22) show that the approach is too restrictive as it stands.

(22) [$_{\text{NP}}$ Die Frage [$_{\text{CP}_9}$ wer$_1$ $C_{[+wh]}$ t_1 was$_2$ mitbringt]] ist relevant
the question who what brings is relevant
für die Frage [$_{\text{CP}_7}$ wie$_3$ Fritz denkt [$_{\text{CP}_5}$ t'_3 daß die Party t_3 wird]]
to the question how Fritz thinks that the party will be

grammaticality (ineffability) gives rise to derivational ambiguities that can only be filtered out by additional assumptions (cf. "input optimization" in Prince and Smolensky 1993).

CP_5 optimization raises the question of whether *wie*$_3$ moves to SpecC_5. Since the CP_5 phase turns out to be balanced without such movement (*wer*$_1$ and *was*$_2$ are potentially available for the [+*wh*]-features of C_9 and C_7), one would wrongly expect *wie*$_3$ to stay in situ. The problem here is that either *was*$_2$ or *wer*$_1$ "fools" *wie*$_3$: The *wh*-phrases do not compete for the same target position. Hence, *was*$_2$/*wer*$_1$ should not qualify as a potentially available checker for the [+*wh*]-feature that is supposed to be checked by *wie*$_3$. To execute this idea, let us assume that *wh*-features are accompanied by scope indices in the numeration. Then, $XP_{[+wh],i}$ will never count as a potentially available checker for a contra-indexed feature on $C_{[+wh],j}$, due to feature mismatch.

3. Conclusion

We have argued that successive-cyclic *wh*-movement to Spec$C_{[-wh]}$ positions should be viewed as repair- rather than feature-driven movement, in violation of LR. The analysis is developed within a new approach to syntactic optimization that is both local and derivational, and that centers around constraints related to CP phases (PB, PIC). This local approach to repair-driven *wh*-movement is corroborated by long-distance superiority effects as well as by certain long-distance intervention effects which are initially surprising; and it can be shown to be empirically preferable to an approach in terms of global optimization.

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