Harmonic Serialism

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Reconstructing Syntactic Parallel OT Analyses in Harmonic Serialism

1. Lenerz' Paradigm

SPOT Analyses
Question:
Can Büring's (2001) account of *Lenerz' Paradigm* (Lenerz (1977)) be transferred into an approach in terms of Harmonic Serialism? (Also see Choi (1999), Müller (1999).)

(1) *Constraints*:

a. IND (Indefinites):
Existentially interpreted indefinites need to be fully contained in the VP.

b. FINALFOCUS :
Focus is clause-final.

c. STAY:
Movement is prohibited.

Assumptions:
(i) Fix base order:
Subject ≻ indirect object ≻ direct object in the VP.
(ii) The order can only be changed via scrambling to (e.g.) VP-adjunction positions.
(iii) Such scrambling always violates STAY.

The role of IND:
Items that are adjoined to VP are not fully contained in VP. Therefore, IND blocks scrambling of indefinites if they are interpreted existentially (not if they are interpreted generically).
The role of FINALFOCUS:
This constraint is a potential trigger for scrambling. A direct object can be scrambled across a focus-marked indirect object so as to get the latter closer to the right edge of the clause.

Side remarking:
Unlike others, Büring does not distinguish between completive and contrastive focus.

(2) *Constraint order in German*:
IND ≫ STAY ∘ FINALFOCUS

Remark:

The tie of STAY and FINALFOCUS in Büring's approach corresponds to the tie of CN_2 and NEW in Choi (1999).

More specifically:
(i) FINALFOCUS ∼ NEW (direct correspondence)
(ii) STAY ∼ CN_2 (indirect correspondence)

(3) *Lenerz' Paradigm* (Lenerz (1977)):

a. dass der Fritz der MARIA das Buch gegeben hat
that the Fritz$_{nom}$ the Maria$_{dat}$ the book$_{acc}$ given has

b. dass der Fritz das Buch der MARIA gegeben hat
that the Fritz$_{nom}$ the book$_{acc}$ the Maria$_{dat}$ given has

c. dass der Fritz der Maria das BUCH gegeben hat
that the Fritz$_{nom}$ the Maria$_{dat}$ the book$_{acc}$ given has

d. ?*dass der Fritz das BUCH der Maria gegeben hat
that the Fritz$_{nom}$ the book$_{acc}$ the Maria$_{dat}$ given has

T_1: Order with focus on direct object, Büring

DO = focus	IND	STAY | FINALFOCUS
☞ O_1: Subj IO_1 DO_2		|
O_2: Subj DO_2 IO_1 t_2		*! | *

T_2: Order with focus on indirect object, Büring

IO = focus	IND	STAY | FINALFOCUS
☞ O_1: Subj IO_1 DO_2		| *
☞ O_2: Subj DO_2 IO_1 t_2		* |

Observation (Lenerz (1977)):
There is no optionality if an existentially interpreted indefinite DP would have to be scrambled in order to satisfy FINALFOCUS.

(4) *Scrambling of indefinites*:

a. dass der Fritz der MARIA ein Buch geschenkt hat
b. ?*dass der Fritz ein Buch der MARIA geschenkt hat
c. dass der Fritz einer Frau das BUCH geschenkt hat
d. ?*dass der Fritz das BUCH einer Frau geschenkt hat

Observation:
Scrambling become possible in this context under a generic interpretation.

T_3: order with focus on IO and existentially interpreted DO indefinite, Büring

IO = focus *DO = exist. indef.*	IND	STAY | FINALFOCUS
☞ O_1: Subj IO_1 DO_2		*
O_2: Subj DO_2 IO_1 t_2	*!	*

(5) *Bare plurals, generic interpretation*:

a. dass der Fritz der MARIA Bücher$_{gen./exist.}$ schenkt

b. dass der Fritz Bücher$_{gen./*exist.}$ der MARIA schenkt

Generic interpretation:
"What Fritz typically does with books is give them to Maria." (Such a generic interpretation does not suggest itself in (4-b).)

note:
The argument here is exactly as in T_2 for definite direct objects.

Note:
This analysis goes back to Büring (1997). It is first adopted in Büring (2001), but then generalized/changed in various ways.

(6) *Changes: Büring (1997) → (2001)*:

a. STAY → DATIVE.
(I.e., the constraint does not depend on the existence of a movement operation anymore.)

b. FINALFOCUS → ADF, A/P.
(I.e., the constraint is reduced to the interaction of two independently motivated prosodic constraints.)

(7) *Constraints in Büring (2001)*:

a. DATIVE:
Dative NPs precede accusative NPs.

b. *ADF* ('Accent Domain Formation'):

(i) PRED:
A predicate shares its AD with at least one of its arguments.

(ii) XP:
AD contains an XP. If XP and YP are within the same AD, one contains the other (where X and Y are lexical categories).

c. A/P ('Argument-Over-Predicate'):
Within AD, an argument is more prominent than a predicate.

d. FOCUS PROMINENCE:
Focus is most prominent.

(8) *Order*:
FOCUS PROMINENCE ≫ DATIVE ∘ { ADF ≫ A/P }

Note:
The prosodic constraints need to be tied with DATIVE as a single unit.

1.1. Harmonic Serialism

Question:
Is it possible to directly transfer this analysis into an approach in terms of harmonic serialism?

Answer:
This is trivial under FINALFOCUS, less so under ADF/A/P.

2. Do-Support

2.1. Background

Lit.:
Chomsky (1957; 1991)

(9) *'Do'-Einsetzung im Englischen bei Negation*:

a. *Mary not left

b. Mary did not leave

(10) *Keine 'do'-Einsetzung im Englischen bei fehlender Negation*:

a. Mary left

b. *Mary did leave

(11) *Lösung in Chomsky (1957, 39 & 62)*:

a. *Affix Hopping*:
Let *Af* stand for any of the affixes *past*, *S*, *en*, *ing*. Let *v* stand for any M(odal) or V(erb), or *have* or *be* (i.e., for any non-affix in the phrase *Verb*). Then:
Af + *v* → *v* + *Af*#,
where # is interpreted as word boundary.
Replace + by # except in the context *v* – *Af*. Insert # initially and finally.

b. T_{not}:
T_{not} adds *not* after the second segment of the string.

c. *Do Support*:
#*Af* → #do+*Af*.

d. Assumption: T_{not} applies before *Affix Hopping* (bleeding), *Do Support* applies after *Affix Hopping* (counter-feeding).

Intuition: Affix Hopping wird blockiert bei Nicht-Adjazenz von Af und v (nach Negationseinsetzung). In diesem Fall, und nur in diesem, erfolgt dann *Do* Support (weil Af am linken

Rand geblieben ist).

(12) *Keine 'do'-Einsetzung bei Negation und* have:

a. *Basis*:
Mary – S+have – en+come

b. T_{not}:
Mary – S+have+not – en+come

c. *Affix Hopping*:
Mary – have+S+not – en+come

d. *Do Support*:
– (Kann nicht applizieren, weil es kein allein stehendes Affix gibt).

e. *Realisierung*:
Mary has not come.

(13) *'Do'-Einsetzung bei Negation ohne Auxiliar*:

a. *Basis*:
Mary – S – come

b. T_{not}:
Mary – S+not – come

c. *Affix Hopping*:
– (Kann nicht applizieren, weil Neg-Insertion zu Nicht-Adjazenz von *Af* und *v* geführt hat.)

d. *Do-Support*:
Mary – do+S+not come

e. *Realisierung*:
Mary did not come.

2.2. SPOT Analyses

Rekonstruktion bei Speas (1995)

(14) *Beschränkungsordnung*:
ECP ≫ LETZT-AUS ≫ ÖKON

T_4: Negation und 'do'-Einsetzung bei Speas

Kandidaten	ECP	LETZT-AUS	"OKON
☞ K_1: Mary did_1 not t_1 leave		*	*
K_2: Mary t_1 not $left_1$	*!		*

Rekonstruktion von Chomsky (1991):
"Um die korrekten Ergebnisse zu erzielen, muss das Prinzip des 'letzten Auswegs' so interpretiert werden, dass Prinzipien der UG angewendet werden, wann immer das möglich ist, und dass sprachspezifische Regeln nur benutzt werden, um eine D-Struktur-Repräsentation zu "retten", die ansonsten

T_5: Verbot der 'do'-Einsetzung ohne Negation bei Speas

Kandidaten	ECP	LETZT-AUS	ÖKON
K_1: Mary did_1 t_1 leave		*!	*
☞ K_2: Mary t_1 $left_1$			*

kein Ergebnis liefert" (Chomsky (1991, 427)). (Vgl. auch die Logik bei Adgers (2003) Erklärung über die "Pronouncing Tense Rule" (PTR).)

(15) *Unabhängig blockiert*:

a. *Mary $left_1$ not t_1

b. *Mary $left_1$ t_1

Rekonstruktion bei Grimshaw (1997)

(16) a. LEX-ÖKON ("Bewegungsökonomie für lexikalische Köpfe", "No-Lex-Mvt"):
Bewegung von lexikalischen Köpfen ist verboten (X^0-$Spur_{lex}$ ist nicht erlaubt).

b. KASUS ("Case"; Chomsky (1981)):
Der Kopf einer NP-Kette muss in einer Kasusposition sein.

c. OB-KOPF ("Obligatorische Köpfe", "Ob-Hd"):
Eine Projektion hat einen (nicht-leeren) Kopf.

d. SUBJEKT ("Erweitertes Projektionsprinzip", "Subj"; Chomsky (1982; 1995)):
Der höchste A-Spezifikator eines Satzes muss durch ein Argument gefüllt sein.

e. VOLL-INT ("Vollständige Interpretation", "Full Interpretation"; Chomsky (1986b)):
Expletiveinsetzung ist verboten.

f. ÖKON ("Stay", s.o.):
Bewegung ist verboten (Spur ist nicht erlaubt).

(17) *Beschränkungsordnung*:
LEX-ÖKON ≫ KASUS ≫ OB-KOPF ≫ SUBJEKT ≫ VOLL-INT ≫ ÖKON

(18) VOLL-INT:
Die lexikalisch-konzeptuelle Struktur muss respektiert werden.

Grundannahme:
Die Größe der Satzstruktur ist variabel.

(19) a. *[$_{NegP}$ Not [$_{VP}$ Mary left]]
b. *[$_{NegP}$ $Mary_1$ not [$_{VP}$ t_1 left]]
c. *[$_{IP}$ $Mary_1$ [$_I$ –] [$_{NegP}$ not [$_{VP}$ t_1 left]]]
d. *[$_{IP}$ $Mary_1$ [$_I$ $left_2$] [$_{NegP}$ not [$_{VP}$ t_1 t_2]]]
e. [$_{IP}$ $Mary_1$ [$_I$ did] [$_{NegP}$ not [$_{VP}$ t_1 leave]]]

(20) a. [$_{VP}$ Mary left]

T_6: Negation und 'do'-Einsetzung bei Grimshaw

Kandidaten	Lex-Ökon	Ka-sus	Ob-Kopf	Sub-jekt	Voll-Int	Ökon
K_1: [Neg [$_{VP}$ NP_1 V]]				*!		
K_2: [NP_1 Neg [$_{VP}$ t_1 V]]		*!				*
K_3: [NP_1 – [t_1 Neg [$_{VP}$ t_1 V]]]		*!	*			**
K_4: [NP_1 V_2 [t_1 Neg [$_{VP}$ t_1 t_2]]]	*!					***
☞ K_5: [NP_1 did_2 [t_1 Neg [$_{VP}$ t_1 V]]]					*	**

b. *[$_{IP}$ $Mary_1$ [$_I$ –] [$_{VP}$ t_1 left]]
c. *[$_{IP}$ $Mary_1$ [$_I$ $left_2$] [$_{VP}$ t_1 t_2]]
d. *[$_{IP}$ $Mary_1$ [$_I$ did] [$_{VP}$ t_1 leave]]

T_7: Verbot der 'do'-Einsetzung ohne Negation bei Grimshaw

Kandidaten	Lex-Ökon	Ka-sus	Ob-Kopf	Sub-jekt	Voll-Int	Ökon
☞ K_1: [$_{VP}$ NP_1 V]						
K_2: [NP_1 – [$_{VP}$ t_1 V]]		*!	*			*
K_3: [NP_1 V_2 [$_{VP}$ t_1 t_2]]	*!					**
K_4: [NP_1 did_2 [$_{VP}$ t_1 V]]					*!	*

Gemeinsamkeit:
Die Rolle des Ecp in Speas' Analyse und die Rolle von Kasus in Grimshaws Analyse sind äquivalent; es sind die entscheidenden Auslöser von *do*-Einsetzung in Negationskontexten. Ebenso äquivalent sind Letzt-Aus bei Speas und Voll-Int bei Grimshaw: Beide Beschränkungen bestrafen die Verwendung eines expletiven Verbs *do*; sie sind in (Auxiliarfreien) Negationskontexten von optimalen Kandidaten verletzbar. Lex-Ökon ist bei Speas implizit, bei Grimshaw explizit angenommen; dasselbe gilt auch für Subjekt (denn bei Annahme der Hypothese der prädikats-internen Subjekte muss auch Speas gewährleisten, dass ein Satz wie **Not Mary left* ausgeschlossen ist). Schließlich hat auch Ökon in beiden Analysen dieselbe Funktion, nämlich interessanterweise – für die betrachteten Fälle – gar keine.

2.3. Harmonic Serialism

Consider the analysis of *do* support with negation in English developed in Grimshaw (1997, 381-393). The relevant part is repeated here (in an English version). (21) has the crucial constraints adopted by Grimshaw (1997), and (22) gives a ranking for English which produces *do* support in negative contexts.

(21) a. No-Lex-Mov:
Movement of lexical heads is prohibited (assign a * for every trace of a lexical head).

b. Case:
The head of a DP chain must be in a case position.
(For our purposes, this means it must be part of a verbal projection.)
c. Ob-Hd:
A projection has a (non-empty) head.
d. Subj:
The highest A-specifier of a sentence must be filled by an argument.
e. Full-Int:
Don't insert expletives (like *do*).
f. Stay:
Movement is prohibited (assign a * for every trace).

(22) *Constraint ranking*:
No-Lex-Mov ≫ Case ≫ Ob-Hd ≫ Subj ≫ Full-Int ≫ Stay

(23) *Do support and negation*:
a. *[$_{NegP}$ Not [$_{VP}$ Mary left]]
b. *[$_{NegP}$ $Mary_1$ not [$_{VP}$ t_1 left]]
c. *[$_{IP}$ $Mary_1$ [$_I$ –] [$_{NegP}$ not [$_{VP}$ t_1 left]]]
d. *[$_{IP}$ $Mary_1$ [$_I$ $left_2$] [$_{NegP}$ not [$_{VP}$ t_1 t_2]]]
e. [$_{IP}$ $Mary_1$ [$_I$ did] [$_{NegP}$ not [$_{VP}$ t_1 leave]]]

T_1 illustrates the necessity of *do* support in this contexts. A basic assumption concerning the structure of the candidates is that the size of clauses is variable, subject to optimization. A minimal clause is a VP (which includes the external argument), but there may in principle be arbitrarily many additional extended projections on top of it.

T_8: Negation and 'do' support

Candidates	No-Lex-Mvt	Case	Ob-Hd	Subj	Full-Int	Stay
O_1: [Neg [$_{VP}$ DP_1 V]]				*!		
O_2: [DP_1 Neg [$_{VP}$ t_1 V]]		*!				*
O_3: [DP_1 – [t_1 Neg [$_{VP}$ t_1 V]]]		*!	*			**
O_4: [DP_1 V_2 [t_1 Neg [$_{VP}$ t_1 t_2]]]	*!					***
☞ O_5: [DP_1 did_2 [t_1 Neg [$_{VP}$ t_1 V]]]					*	**

(24) *No do support without negation*:
a. [$_{VP}$ Mary left]
b. *[$_{IP}$ $Mary_1$ [$_I$ –] [$_{VP}$ t_1 left]]
c. *[$_{IP}$ $Mary_1$ [$_I$ $left_2$] [$_{VP}$ t_1 t_2]]
d. *[$_{IP}$ $Mary_1$ [$_I$ did] [$_{VP}$ t_1 leave]]

T_9: Absence of do support without negation

Candidates	No-Lex Mvt	Case	Ob-Hd	Subj	Full-Int	Stay
☞ O_1: $[_{VP}$ DP_1 V $]$						
O_2: [DP_1 – $[_{VP}$ t_1 V]]		*!	*			*
O_3: [DP_1 V_2 $[_{VP}$ t_1 t_2]]	*!					**
O_4: [DP_1 did_2 $[_{VP}$ t_1 V]]					*!	*

Question:
Is it possible to faithfully transfer Grimshaw's SPOT analysis to an analysis in terms of harmonic serialism? It might be helpful to keep in mind that there are other rankings than the one in (1) which are compatible with the evidence from English (see Grimshaw (1997, 375)); also, the idea about variable clause size may have to be given up (e.g., all clauses would have to be IPs, or even CPs, after all, which would imply that Ob-Hd only holds for projections that have a specifier). Here is the sketch of a proposal.

Crucial assumption:
The ranking is changed to (25), where Subj is promoted. (This is compatible with Grimshaw's assumptions.)

(25) *Constraint ranking* (revised for HS reanalysis):
No-Lex-Mov ≫ Subj ≫ Case ≫ Ob-Hd ≫ Full-Int ≫ Stay

Further assumption:
There is an I, and it needs to be merged independently (perhaps enforced by high-ranked "Exhaust Numeration" or something similar.)

(26) *HS derivation*:

a. $[_{NegP}$ Neg $[_{VP}$ DP_1 V $]]$
b. $[_{NegP}$ DP_1 Neg $[_{VP}$ t_1 V $]]$
gets rid of Subj violation, triggers violations of Case, Stay
c. $[_{IP}$ I $[_{NegP}$ DP_1 Neg $[_{VP}$ t_1 V $]]]$
reintroduces Subj violation, maintains violations of Case, Stay, adds Ob-Hd violation
d. $[_{IP}$ DP_1 I $[_{NegP}$ t'_1 Neg $[_{VP}$ t_1 V $]]]$
gets rid of Subj and Case violations, maintains violation of Ob-Hd, adds violation of Stay
e. $[_{IP}$ DP_1 I-do $[_{NegP}$ t'_1 Neg $[_{VP}$ t_1 V $]]]$
gets rid of Ob-Hd violation, maintains Stay violations, adds Full-Int violation
f. $[_{IP}$ DP_1 I-do $[_{NegP}$ t'_1 Neg $[_{VP}$ t_1 V $]]]$ convergence

3. Locality and Wh-Chains

3.1. SPOT Analysis

3.1.1. Basic Assumptions

Goal:
The authors' goal is to develop an optimality-theoretic approach to locality that is both sufficiently flexible and reasonably restrictive.

Important theoretical concepts:
- *Neutralization*
- local constraint conjunction

(27) *Candidate sets* (Legendre, Smolensky & Wilson (1998, 257), Legendre et al. (2006, 225)):
Two candidates O_i, O_j are part of the same candidate set iff (a) and (b) hold:
a. O_i and O_j realize identical predicate/argument structure.
b. O_i and O_j *target* identical LFs.

Note:
The competition is defined exclusively via input identity (in contrast to what is the case in various other versions of OT syntax): The input contains predicate/argument structures with an associated LF representation. The target positions for LF interpretation that differ from base positions are signalled by abstract scope markers in the input. This special version of the input is referred to by Legendre et al. (1998; 2006) as the *Index*.

Question:
Where does the Index come from?

3.1.2. A Case Study: Wh-Chains in Chinese

Assumption:
Wh-in situ languages have syntactic wh-movement. The only relevant difference to wh-ex situ languages is that it is not the first chain member (i.e., copy) that is pronounced; rather it is the last member of a wh-chain that is PF-realized.

(28) *Long-distance movement of adjuncts from declarative clauses*:
a. Ni renwei $[_{CP}$ Lisi yinggai zenmeyang chuli zhe-jian shi] ?
you think Lisi should how treat this-CL matter
b. 'How$_1$ do you think that Lisi should treat this matter t_1?'

(29) *Long-distance movement of adjuncts from embedded wh-clauses*:
a. Ni xiang-zhidao $[_{CP}$ shei zenmeyang chuli zhe-jian shi] ?
you ask yourself who how treat this-CL matter
b. "*How$_1$ do you ask yourself who treated this matter t_1?"
c. "You ask yourself who treated this matter how."

(30) a. SELECTION (SEL):
Lexically marked selection requirements must be respected in the output.
b. BAR$^{2[-ref]}$:
A single link of a non-referential (adjunct) chain must not cross two barriers.
c. PARSESCOPE:
The scope of a wh-chain contained in an Index must be realized by syntactic chain formation in the output.

(31) *Barrier* (Chomsky (1986)):
An XP is a barrier iff it is not L-marked.

(32) *L-Marking* (Chomsky (1986)):
α L-marks β iff (a)–(c) hold:
a. α is a lexical X^0 category.
b. α θ-marks β.
c. β is a sister of α.

Consequence:
VP and IP qualify as barriers.
(This result also holds in Chomsky's (1986) approach, but it is clearly undesirable there because it would imply massive undergeneration (lots of fatal locality violations should be expected if movement must not cross barriers). Chomsky (1986) avoids these wrong predictions by introducing various stipulations, including the option of adjunction to VP and a differentiation between blocking categories and barriers.)

(33) *Ranking of constraints in Chinese*:
SEL $\gg$ BAR$^{2[-ref]}$ $\gg$ PARSESCOPE

(34) *Wh-islands for wide scope of adjuncts in Chinese*

	SEL	BAR$^{2[-ref]}$	PARSESCOPE
O_1: [$_S$ Q_1] ... $V_{[+w]}$ [$_{CP}$ t'_1 ... how$_1$ ...]		*!	
☞ O_2: [$_S$ –] ... $V_{[+w]}$ [$_{CP}$ Q_1 ... how$_1$ ...]			*

(35) *Narrow scope of adjuncts in Chinese: → neutralization*

	SEL	BAR$^{2[-ref]}$	PARSESCOPE
☞ O_1: ... $V_{[+w]}$ [$_{CP}$ [$_S$ Q_1] ... how$_1$ ...]			
O_2: Q_1 ... $V_{[+w]}$ [$_{CP}$ [$_S$ –] ... how$_1$ ...]		*!	*

(36) *Input optimization*:
Suppose that different inputs I_1, I_2, ..., I_n lead to corresponding optimal outputs O_1, O_2, ..., O_n in a grammar, which are all realized by the same form Φ. Then one of these outputs must qualify as most harmonic because it incurs the least significant violations; let O_k be this output. Then the learner should choose input I_k as the underlying representation of Φ.

Problem:
This account of wh-islands effects does not rely on the presence of an intervening wh-phrase in the embedded SpecC position. (Thus, the present account of wh-islands is fundamentally different from nearly all other approaches in the tradition of Rizzi (1990; 2004), which are strictly intervention-based.) But how can long-distance movement from a declarative clause circumvent an analogous neutralization effect?

Solution (ingenious):
From a purely locality-based perspective, reducing wide wh-scope in the Index to narrow wh-scope in the output would also be the best option with embedded declaratives. However, this candidate will then fatally violate the higher-ranked SEL requirement; hence, the same violation of BAR$^{2[-ref]}$ that proves fatal with embedded wh-clauses is tolerable with embedded declarative clauses.

(37) *Declarative clauses and wide scope of adjuncts in Chinese*

	SEL	BAR$^{2[-ref]}$	PARSESCOPE
☞ O_1: [$_S$ Q_1] ... $V_{[-w]}$ [$_{CP}$ t'_1 ... how$_1$ ...]		*	
O_2: [$_S$ –] ... $V_{[-w]}$ [$_{CP}$ Q_1 ... how$_1$ ...]	*!		*

Conclusion:
Somewhat surprisingly, what *rules out wh*-island constructions is the fact that a violation of locality *can be avoided* by relocating the *wh*-scope to the embedded clause; and what *permits* extraction from declarative complements is the fact that a violation of locality *cannot be avoided* here.

Note:
A third candidate in which the *wh*-phrase stays in situ throughout the derivation must also be considered. As a matter of fact, as it stands, this output O_3 would qualify as optimal in both embedded wh-contexts and embedded declarative contexts. This problem can be solved if it is assumed that Gen requires *wh*-elements to show up in non-trivial chains (with pronunciation a matter of PF realization, as before). Alternatively, an undominated constraint NONTRIV can be postulated which requires wh-chains to be non-trivial (i.e., to be multi-membered).

3.1.3. Local Conjunction

(38) *Faithfulness constraints*:
a. PARSEWH:
A wh-feature contained in an Index must be realized by an operator-variable chain in the output.
b. PARSETOP:
A top-feature contained in an Index must be realized by an operator-variable chain in the output.
c. PARSESCOPE:
The scope of a wh-chain contained in an Index must be realized by syntactic chain

formation in the output.

(39) *Locality constraints*:

a. $\textsc{Bar}^{2[-ref]}$:
A single link of a non-referential (adjunct) chain must not cross two barriers.

b. Bar:
A single link of a chain must not cross a barrier.

Observation:
(39-a) can be derived from (39-b), via local conjunction.

(40) *A wrong prediction under* Bar:

	Bar
☞ O_1: α_1 ... β ... β ... t'_1 ... β ... t_1	** *
☞ O_2: α_1 ... β ... β ... β ... t_1	***

(41) *Local conjunction* (Smolensky (1996; 2006)):

a. Given two constraints C_1 and C_2, their local conjunction (with respect to a domain type D), $C_1\&_D C_2$, is a new constraint that is violated when two distinct violations of C_1 and C_2 occur within a single domain of type D.

b. There is a universal ranking: $C_1\&_D C_2 \gg \{C_1, C_2\}$

(42) Bar subhierarchy ('minimal link subhierarchy'):

a. $\textsc{Bar}\&_l\textsc{Bar} = \textsc{Bar}^2$:
A single link of a chain must not cross two barriers.

b. $\textsc{Bar}^2\&_l\textsc{Bar} = \textsc{Bar}^3$:
A single link of a chain must not cross three barriers.

c. $\textsc{Bar}^n$:
A single link of chain must not cross n barriers.

d. *Universal ranking*:
... $\gg \textsc{Bar}^3 \gg \textsc{Bar}^2 \gg \textsc{Bar}^1$

(43) *A correct prediction derivable from the* Bar *subhierarchy*

	$\textsc{Bar}^3$	$\textsc{Bar}^2$	$\textsc{Bar}^1$
☞O_1: α_1 ... β ... β ... t'_1 ... β ... t_1		*	*
O_2: α_1 ... β ... β ... β ... t_1	*!		

Observation:
It's actually not so clear how it can be ensured that the local domain for local conjunction is properly defined. If the relevant domain is, e.g., the clause (as a unit that contains a chain link), the scenario has to be blocked where some completely different movement operation adds to the overall number of barriers crossed by the operation we are interested in. Basically, it looks as though the relevant domain should be the chain link, but it is not fully clear how this can work (the chain link is not a discrete phrase-structural unit; see Murphy (2017)). (Problem of this type do not arise in harmonic serialism, where only one operation can take

place between input and output.)

Convention:
Of course, O_2 also violates $\textsc{Bar}^2$ and $\textsc{Bar}^1$, given that it follows from the definition of local conjunction that $\textsc{Bar}^n$ is in a *stringency* (special to general) relation with $\textsc{Bar}^{n-1}$. However, since these violations can never play a role, they can be ignored in tableaux.

Observation:
Every theory of locality of movement (or chain formation) needs to be able to account for the different behaviour of arguments and adjuncts (or, following Cinque (1990), referential and non-referential items, where the latter include most adjuncts and some arguments).

(44) Ref:
A (non-trivial) chain is referential.

(45) *Arguments for referentality as the relevant concept*:

a. *How many kilos do you wonder whether he weighs?

b. ?Where do you wonder whether to go?

c. *Who left why?

d. Who lives where?

Assumption:
There is local conjunction of Ref with the Bar subhierarchy.

Side remark:
How does one get from (46-a) and (46-b) to (46-c)?

(46) a. A single link of a chain must not cross a barrier.
b. A chain is referential.
c. A single link of a non-referential chain must not cross a barrier.

(47) *Compositional interpretation of* $\textsc{Bar}^{1[-ref]}$:

a. [A single link of a chain must not cross a barrier] $\wedge$ [A chain is referential].

b. [A single link of a chain must not cross a barrier] $\vee$ [A chain is referential].

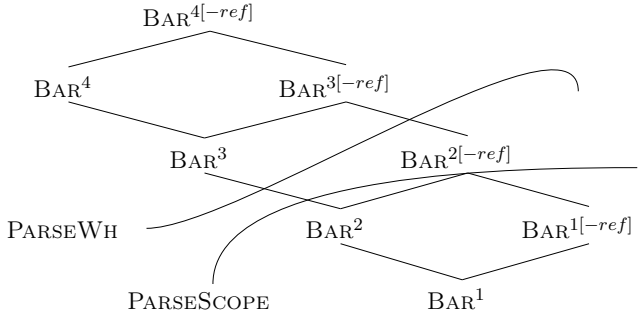
Propositional logic:
A$\vee$B is true iff at least one of its clauses is true, and false only if both clauses are false. Intended interpretation for $\textsc{Bar}^{1[-ref]}$: This constraint is violated only if $\textsc{Bar}^1$ is violated and Ref is violated. Conclusion: In many (most?) cases, local *conjunction* must be interpreted as local *disjunction*.
(In addition, a special assumption must be made about reflexive local conjunction.)

(48) *Family of minimal link constraints*:

a. $\text{BAR}^n\&_l\text{REF} = \text{BAR}^{n[-ref]}$:
A single link of a non-referential chain must not cross n barriers.
b. *Universal ranking*:
$\ldots \gg \text{BAR}^{3[-ref]} \gg \text{BAR}^{2[-ref]} \gg \text{BAR}^{1[-ref]}$

(49) *Typological prediction: Adjunct movement is more restricted than argument movement*:
$\text{BAR}^{n[-ref]} \gg \text{BAR}^n$

(50) *Fixed and variable rankings of constraints* (visualization based on Aissen (1999; 2003)):



3.1.4. Wh-Movement in English

(51) *Constraint ranking in English*:
$\text{SEL} \gg \text{PARSEWH} \gg \text{PARSESCOPE} \gg \text{BAR}^{4[-ref]} \gg \text{BAR}^{3[-ref]} \gg \text{BAR}^4 \gg \text{BAR}^3 \gg \text{BAR}^{2[-ref]} \gg \text{BAR}^2 \gg \text{BAR}^{1[-ref]} \gg \text{BAR}^1$

(52) *Evidence for* $\text{BAR}^2 \gg \text{BAR}^{1[-ref]}$
a. How$_1$ did $[_{\text{IP}}$ he $[_{\text{VP}}$ fix what$_2$ $]$ t$_1$ $]$?
b. *What$_2$ did $[_{\text{IP}}$ he $[_{\text{VP}}$ fix t$_2$ $]$ how$_1$ $]$?

(53) *Short movement*:
a. How$_1$ did $[_{\text{IP}}$ she $[_{\text{VP}}$ do it $]$ t$_1$ $]$?
b. What$_1$ did $[_{\text{IP}}$ she $[_{\text{VP}}$ do t$_1$ $]]$?

(54) *Extraction from a declarative clause*:
a. How$_1$ do $[_{\text{IP}}$ you $[_{\text{VP}}$ think $[_{\text{CP}}$ t$'_1$ that $[_{\text{IP}}$ she $[_{\text{VP}}$ did it $]$ t$_1$ $]]]]$?
b. What$_1$ do $[_{\text{IP}}$ you $[_{\text{VP}}$ think $[_{\text{CP}}$ t$'_1$ that $[_{\text{IP}}$ she $[_{\text{VP}}$ did t$_1$ $]]]]]$?

(55) *Extraction from a wh-island*:
a. *How$_1$ do $[_{\text{IP}}$ you $[_{\text{VP}}$ wonder $[_{\text{CP}}$ t$'_1$ what $[_{\text{IP}}$ PRO to fix t t$_1$ $]]]]$?
b. What$_1$ do $[_{\text{IP}}$ you $[_{\text{VP}}$ wonder $[_{\text{CP}}$ t$'_1$ when $[_{\text{IP}}$ PRO $[_{\text{VP}}$ to fix t$_1$ $]]]]]$?

(56) *Neutralization*:
a. You wonder $[_{\text{CP}}$ how$_1$ $[_{\text{IP}}$ PRO $[_{\text{VP}}$ to fix what $]$ t$_1$ $]]$
b. *You wonder $[_{\text{CP}}$ what $[_{\text{IP}}$ PRO $[_{\text{VP}}$ to fix t $]$ in some way$_1$ $]]$

(57) *Adjunct islands*:

a. *How$_1$ was $[_{\text{IP}}$ he $[_{\text{VP}}$ fired $[_{\text{CP}}$ after behaving t$_1$ $]]]$?
b. *What$_1$ was $[_{\text{IP}}$ he $[_{\text{VP}}$ fired $[_{\text{CP}}$ after reading t$_1$ $]]]$?

(58) *Neutralization*:
a. He was $[_{\text{VP}}$ fired $[_{\text{CP}}$ after behaving in some way$_1$ $]]$
b. He was $[_{\text{VP}}$ fired $[_{\text{CP}}$ after reading something$_1$ $]]$

(59) *Subject islands*:
a. *How$_1$ would $[_{\text{IP}}$ $[_{\text{CP}}$ t$'_1$ PRO to behave t$_1$ $]$ be inappropriate $]$?
b. *Who$_1$ would $[_{\text{IP}}$ $[_{\text{CP}}$ t$'_1$ PRO to kiss t$_1$ $]$ be inappropriate $]$?

(60) *Intended result: Neutralization*:
a. $[_{\text{IP}}$ $[_{\text{CP}}$ PRO to behave in some way$_1$ $]$ would be inappropriate $]$
b. $[_{\text{IP}}$ $[_{\text{CP}}$ PRO to kiss someone$_1$ $]$ would be inappropriate $]$

Problem:
There are only two intervening barriers, which is not sufficient. Possible solution: There is more structure in subject clauses (e.g., an empty DP shell on top of them).

3.2. Harmonic Serialism

Question:
Is it possible to directly transfer this analysis into an approach in terms of harmonic serialism?

Answer:
Yes. $[_{\text{S}_1}$ $]$ is moved down; this is required so as to distinguish intermediate and final movement. Note that the only potential problem with a serial reconstruction could arise under locality considerations (strict cyclicity in particular); but this is not currently at issue.

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