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Constraints on Movement in Optimality-Theoretic Syntax

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Kooperation im personalisierten Verhältniswahlrecht

Bei Wahlen z.B. von Fakultätsräten an der Universität Leipzig gilt ein personalisiertes Verhältniswahlrecht, in dem Sinne, dass z.B. im Fall der HochschullehrerInnen jede(r) Wahlberechtigte drei Stimmen an EinzelkandidatInnen zuweisen kann, die ihrerseits in Listen organisiert sind (Stimmen gehen nicht an Listen direkt). Gemäß Höchstzahlenverfahren nach Sainte-Laguë werden für jede Liste alle Stimmen addiert und dann nach einer Teilerreihe 1-3-5-7-etc. mit den Stimmen für die EinzelkandidatInnen ausgerichtet, so dass sich die Endreihung ergibt. Auf diese Weise können durch Kooperation in einer Liste EinzelkandidatInnen mit weniger Stimmen am Ende vor EinzelkandidatInnen mit mehr Stimmen einer anderen Liste liegen – und das, obschon nicht Listen, sondern KandidatInnen gewählt wurden. Diese exzitatorische Interaktion – durch Verknüpfung setzen sich A und B gegenüber C durch, obwohl A und B jeweils allein C unterlegen sind – entspricht der lokalen Konjunktion in der Optimalitätstheorie (A&B $\gg$ C $\gg$ A, B).

Background: Cumulativity

Cumulativity:
Cumulative effects in grammar qualify as a core instance of excitatory simultaneous interaction: There are two factors F_1, F_2 which by themselves are too weak to determine a given property π of a linguistic expression LE, but if F_1 and F_2 cooperate and combine their forces, they can successfully ensure that LE has π.

Note:
There are few grammatical theories which can faithfully model simultaneous excitatory interaction. Among these, the best-developed and most widely pursued approach would seem to be optimality theory (Prince & Smolensky (1993; 2004)). However, even here, integrating cumulativity is not straightforward: Given strict domination, no number of violations of lower-ranked constraints can ever outweigh even a single violation of a higher-ranked constraint. Way out: local conjunction (Smolensky (1995; 2006)).

Local Conjunction

(1) Local Conjunction:

a. Local conjunction of two constraints Con_1, Con_2 with respect to a local domain D yields a new constraint $Con_1 \&_D Con_2$ that is violated iff there are two separate violations of Con_1 and Con_2 in a single domain D.

b. Universal ranking: $Con_1 \&_D Con_2 \gg \{Con_1, Con_2\}$

c. If $Con_1 = Con_2$, local conjunction is reflexive.

(2) A consequence of local conjunction

	$B\&_D C$	A	B	C
O_1				*
O_2			*	
☞ O_3		*		
O_4	*!		*	*

Phenomena

Phenomena and analyses involving local conjunction:

- Phonology: OCP effects, sonority effects, vowel harmony, derived environment effects, chain shifts (Alderete (1997), Itô & Mester (1998), Kager (1999, 392-400), Łubowicz (2005)).
- Syntax: locality constraints on movement (Legendre et al. (1998; 2006)), assignment of quantifier scope (Fischer (2001)), differential argument encoding (Aissen (1999; 2003))
- Morphology: differential argument encoding (Keine & Müller (2011; 2014)), three-way case systems (Müller & Thomas (2017)).

Local Conjunction

Goal (Legendre et al. (1998; 2006)):
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

(3) 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.

Index

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?

Extraction from Complement Clause

(4) Extraction from a declarative clause:

a. How$_1$ do [$_{IP}$ you [$_{VP}$ think [$_{CP}$ t_1' that [$_{IP}$ she [$_{VP}$ did it] t_1]]]] ?
b. What$_1$ do [$_{IP}$ you [$_{VP}$ think [$_{CP}$ t_1' that [$_{IP}$ she [$_{VP}$ did t_1]]]]] ?

(5) Extraction from a wh-island:

a. *How$_1$ do [$_{IP}$ you [$_{VP}$ wonder [$_{CP}$ t_1' what [$_{IP}$ PRO to fix t t_1]]]] ?
b. What$_1$ do [$_{IP}$ you [$_{VP}$ wonder [$_{CP}$ t_1' when [$_{IP}$ PRO [$_{VP}$ to fix t_1]]]]] ?

(6) 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.

Barriers

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

(8) 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.

(9) Ranking of constraints in English:
$\textsc{Sel} \gg \textsc{Bar}^{2[-ref]} \gg \textsc{ParseScope}$

Wh-Islands

(10) Wh-islands for wide scope of adjuncts

	SEL	BAR$^{2[-ref]}$	PARSESCOPE
O_1: [$_S$ how$_1$] ... $V_{[+wh]}$ [$_{CP}$ t'_1 ... t_1 ...]		*!	
☞ O_2: [$_S$ –] ... $V_{[+wh]}$ [$_{CP}$ Q_1 ... how$_1$ ...]			*

(11) Narrow scope of adjuncts: → neutralization

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

(12) Neutralization:

a. You wonder [$_{CP}$ how$_1$ [$_{IP}$ PRO [$_{VP}$ to fix what] t_1]]
b. *You wonder [$_{CP}$ what [$_{IP}$ PRO [$_{VP}$ to fix t] in some way$_1$]]

Input Optimization

(13) 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.

Question:
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?

Answer:
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 $\text{BAR}^{2[-ref]}$ that proves fatal with embedded wh-clauses is tolerable with embedded declarative clauses.

Extraction from Declarative Clauses

(14) Declarative clauses and wide scope of adjuncts

	SEL	BAR$^{2[-ref]}$	PARSESCOPE
☞ O_1: [$_S$ Q_1] ... $V_{[-wh]}$ [$_{CP}$ t'_1 ... how_1 ...]		*	
O_2: [$_S$ –] ... $V_{[-wh]}$ [$_{CP}$ 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, which covers wh-in situ languages). Alternatively, an undominated constraint NONTRIV can be postulated which requires wh-chains to be non-trivial (i.e., to be multi-membered).

Building the System

(15) 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.

(16) Locality constraints:

a. 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: (16-a) can be derived from (16-b), via local conjunction.

Local Conjunction and the Bar Subhierarchy

(17) 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	***

(18) BAR subhierarchy (derived by reflexive local conjunction):

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

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

c. BAR^n:
A single link of chain must not cross n barriers.

d. Universal ranking:
... $\gg$ BAR^3 $\gg$ BAR^2 $\gg$ BAR^1

Why Intermediate Movement Helps

(19) A correct prediction derivable from the BAR subhierarchy

	BAR^3	BAR^2	BAR^1
☞O_1: α_1 ... β ... β ... t'_1 ... β ... t_1		*	*
O_2: α_1 ... β ... β ... β ... t_1	*!		

Domains for Local Conjunction

What is the domain for local conjunction in syntax?

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). (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.

Arguments vs. Adjuncts

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).

(20) REF:
A (non-trivial) chain is referential.

(21) 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?

Ref and the Bar Subhierarchy

Assumption:
There is local conjunction of $\textsc{Ref}$ with the $\textsc{Bar}$ subhierarchy.

(22) Family of Barriers constraints:

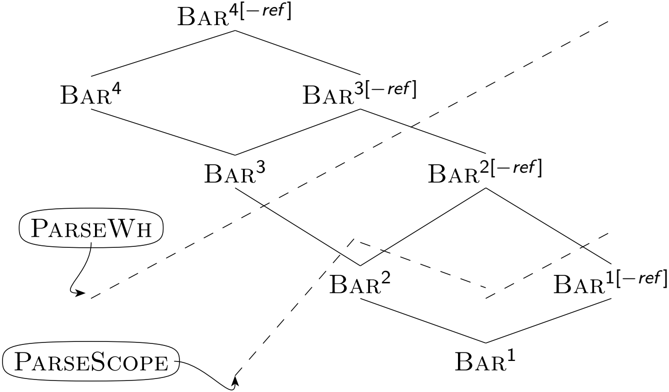
a. $\textsc{Bar}^n \&_l \textsc{Ref} = \textsc{Bar}^{n[-ref]}$:
A single link of a non-referential chain must not cross n barriers.

b. Universal ranking:
... $\gg \textsc{Bar}^{3[-ref]} \gg \textsc{Bar}^{2[-ref]} \gg \textsc{Bar}^{1[-ref]}$

(23) Typological prediction: Adjunct movement is more restricted than argument movement:
$\textsc{Bar}^{n[-ref]} \gg \textsc{Bar}^n$

Fixed and Variable Constraint Rankings

(24) Two-dimensional restrictions on long-distance extraction:



A Full Language-Specific Ranking

(25) Constraint ranking in English:

SEL ≫ BAR$^{4[-ref]}$ ≫ BAR$^{3[-ref]}$ ≫ BAR^{4} ≫ BAR^{3} ≫

PARSEWH ≫ BAR$^{2[-ref]}$ ≫

PARSESCOPE ≫ BAR^{2} ≫ BAR$^{1[-ref]}$ ≫ BAR^{1}

(26) Evidence for BAR^{2} ≫ BAR$^{1[-ref]}$

a. How$_1$ did [$_{IP}$ he [$_{VP}$ fix what$_2$] t$_1$] ?

b. *What$_2$ did [$_{IP}$ he [$_{VP}$ fix t$_2$] how$_1$] ?

(27) Short movement:

a. How$_1$ did [$_{IP}$ she [$_{VP}$ do it] t$_1$] ?

b. What$_1$ did [$_{IP}$ she [$_{VP}$ do t$_1$]] ?

Declarative Clauses

(19) Ordnung im Englischen:

SEL ≫ $\text{BAR}^{4[-ref]}$ ≫ $\text{BAR}^{3[-ref]}$ ≫ BAR^{4} ≫ BAR^{3} ≫
W-TREUE ≫ $\text{BAR}^{2[-ref]}$ ≫
SKOP-TREUE ≫ BAR^{2} ≫ $\text{BAR}^{1[-ref]}$ ≫ BAR^{1}

(28) Bewegung aus einem Deklarativsatz:

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]]]]] ?

Wh-Islands

(19) Ordnung im Englischen:
SEL ≫ W-TREUE ≫ SKOP-TREUE ≫ $\text{BAR}^{4[-ref]} \gg \text{BAR}^{3[-ref]} \gg \text{BAR}^{4} \gg \text{BAR}^{3} \gg \text{BAR}^{2[-ref]} \gg \text{BAR}^{2} \gg \text{BAR}^{1[-ref]} \gg \text{BAR}^{1}$

(29) Bewegung aus einer W-Insel:

a. *How$_1$ do [$_{IP}$ you [$_{VP}$ wonder [$_{CP}$ t'_1 what [$_{IP}$ PRO to fix t t_1]]]] ?
b. What$_1$ do [$_{IP}$ you [$_{VP}$ wonder [$_{CP}$ t'_1 when [$_{IP}$ PRO [$_{VP}$ to fix t_1]]]]] ?

(30) Neutralisierung:

a. You wonder [$_{CP}$ how$_1$ [$_{IP}$ PRO [$_{VP}$ to fix what] t_1]]
b. *You wonder [$_{CP}$ what [$_{IP}$ PRO [$_{VP}$ to fix t] in some way$_1$]]

Adjunct Islands

(19) Ordnung im Englischen:
SEL ≫ W-TREUE ≫ SKOP-TREUE ≫ $\text{BAR}^{4[-ref]} \gg \text{BAR}^{3[-ref]} \gg \text{BAR}^{4} \gg \text{BAR}^{3} \gg \text{BAR}^{2[-ref]} \gg \text{BAR}^{2} \gg \text{BAR}^{1[-ref]} \gg \text{BAR}^{1}$

(31) Adjunktinseln:

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

(32) Neutralisierung:

a. He was [$_{VP}$ fired [$_{CP}$ after behaving in some way$_1$]]
b. He was [$_{VP}$ fired [$_{CP}$ after reading something$_1$]]

Subject Islands

(19) Ordnung im Englischen:
SEL ≫ W-TREUE ≫ SKOP-TREUE ≫ $\text{BAR}^{4[-ref]} \gg \text{BAR}^{3[-ref]} \gg \text{BAR}^{4} \gg \text{BAR}^{3} \gg \text{BAR}^{2[-ref]} \gg \text{BAR}^{2} \gg \text{BAR}^{1[-ref]} \gg \text{BAR}^{1}$

(33) Subjektinseln:

a. *How$_1$ would [$_{IP}$ [$_{CP}$ t'_1 PRO to behave t_1] be inappropriate] ?
b. *Who$_1$ would [$_{IP}$ [$_{CP}$ t'_1 PRO to kiss t_1] be inappropriate] ?

(34) Intendiertes Ergebnis: Neutralisierung:

a. [$_{IP}$ [$_{CP}$ PRO to behave in some way$_1$] would be inappropriate]
b. [$_{IP}$ [$_{CP}$ PRO to kiss someone$_1$] would be inappropriate]

Problem:
Es gibt nur zwei intervenierende Barrieren; das reicht nicht. (Mögliche Lösung: mehr Struktur in Subjektsätzen, wie z.B. eine leere NP-/DP-Schale.)

General Comments

Potentielle Probleme:
(i) Lokale Konjunktion:
Der Mechanismus der lokalen Konjunktion von Beschränkungen ist aufgrund seiner Rekursivität zwar elegant, aber auch sehr mächtig. Ohne weitere Restriktionen gibt man damit eine elementare Annahme über Grammatiken auf, nämlich die, dass die Menge der Beschränkungen in einer Grammatik finit ist.
(ii) Neutralisierung:
Dasselbe gilt für den Mechanismus der Neutralisierung.

Konsequenz:
Die beiden Kernstücke des Ansatzes von Legendre, Smolensky & Wilson (1998) sowie Legendre et al. (2006) – lokale Konjunktion und Neutralisierung – führen zwar zu einer überzeugenden Theorie der Lokalität von Ketten, dies aber nicht umsonst: Der Preis ist ein Komplexitätsanstieg.

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