Asymmetries in Long-Distance Dependencies: A View from Gradient Harmonic Grammar

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1. Introduction

Claim:
Gradient Harmonic Grammar (Smolensky & Goldrick (2016)) offers a new perspective on how to derive three different types of asymmetries as they can be observed with long-distance dependencies in the world’s languages:
• asymptmetries between movement types
• asymmetries between types of moved items
• asymmetries between types of local domain

Background assumptions:
(i) Harmonic Grammar
(ii) Gradient Representations
(iii) Harmonic Serialism

1.1. Harmonic Grammar

Harmonic Grammar (Smolensky & Legendre (2006), Pater (2016)): A version of optimality theory that abandons the strict domination property and replaces harmony evaluation by constraint ranking with harmony evaluation based on different weights assigned to these constraints. This makes it possible to derive some (but not all) kinds of cumulative effects in syntax (Murphy (2017), Müller (2017a)).

(1) Harmony (Pater (2009)):

\[ H = \sum_{k=1}^{K} s_k w_k \]

\[ w_k = \text{weight of a constraint} \]

\[ s_k = \text{violation score of a candidate} \]

Assumption (simplified):
Constraints assign negative scores, and weights are nonnegative.

(2) Optimality:
An output qualifies as optimal if it is the candidate with maximal harmony in its candidate set.
A candidate has maximal harmony if it has the value closest to zero (i.e., the lowest penalty).

1.2. Gradient Harmonic Grammar

Basic assumption (Gradient Harmonic Grammar; GHG; Smolensky & Goldrick (2016)):
It is not just the constraints that are assigned weights. Symbols in linguistic expressions are also assigned weights; they are not categorical either.

Predecessor:
Squishy Grammar (Ross (1973a,b; 1975)) is a direct predecessor of GHG. Ross argues that there is constituent class membership to a degree, and presupposes that instead of standard category symbols like [X], there are weighted category symbols like \([αX]\) (where \(α\) ranges over the real numbers in \([0,1]\)). Rules, filters, and other syntactic building blocks are given upper and lower threshold values of \(α\) between which they operate.

Note:
This way, the concept of varying strength of syntactic categories (see Chomsky (2015) for a recent reappraisal) can be formally implemented in the grammar.

Observation:
So far, most of the work on GHG has been in phonology (e.g., Zimmermann (2017), Faust & Smolensky (2017), Kushnir (2018)); but cf. Smolensky (2017), Müller (2017b), Lee (2018) for syntactic applications.

1.3. Harmonic Serialism

Note:
Harmonic serialism is a strictly derivational version of optimality theory.

(3) Harmonic serialism (McCarthy (2008), Heck & Müller (2013)):

a. Given some input \(I_i\), the candidate set \(CS_i = \{O_{i1}, O_{i2}, \ldots O_{in}\}\) is generated by applying at most one operation to \(I_i\).

b. The output \(O_{ij}\) with the best constraint profile is selected as optimal.

c. \(O_{ij}\) forms the input \(I_{ij}\) for the next generation step producing a new candidate set \(CS_j = \{O_{ij1}, O_{ij2}, \ldots O_{ijn}\}\).

d. The output \(O_{ijk}\) with the best constraint profile is selected as optimal.

e. Candidate set generation stops (i.e., the derivation converges) when the output of an optimization procedure is identical to the input (i.e., when the constraint profile cannot be improved anymore).

Note:
From the very beginning (see Prince & Smolensky (1993; 2004)), it has been identified as a possible alternative to standard parallel optimization:

Much of the analysis given in this book will be in the parallel mode, and some of the results will absolutely require it. But it is important to keep in mind that the serial/parallel distinction pertains to Gen and not to the issue of harmonic evaluation per se. It is an empirical question […] Many different theories […] can be equally well accommodated in Gen, and the framework of Optimality Theory per se involves no commitment to any set of such assumptions.

Prince & Smolensky (2004, 95-96)


• Morphology: Müller (2018)

Observation:
Harmonic serialism in syntax (‘Extremely Local Optimization’) is a version of minimalist, phase-based syntax (Chomsky (1995; 2001; 2014)) that explicitly incorporates optimization procedures (like Merge over Move; see Chomsky (2000), Hornstein (2009), Weisser (2015), among many others).

Note:
Taken together, this gives rise to a concept of Serial Gradient Harmonic Grammar.

2. Proposal
2.1. Constraints and Weights
Assumptions:
(i) The Phase Impenetrability Condition is an inviolable constraint (e.g., part of Gen).
(ii) The Merge Condition and the Antilocality Condition are violable constraints.

(4) PIC (Phase Impenetrability Condition; Chomsky (2001)):
For all heads Y: *Y that c-commands αi of a dependency Δ but does not m-command αi−1 of Δ.

(5) a. MC (Merge Condition; Chomsky (1995; 2001), Heck & Müller (2013)):
For all structure-building features [●F●] and XPs with a matching F: [●F●] triggers Merge of XP.

3. Three Extraction Asymmetries in German
3.1. Asymmetries between XP Barriers
(6) Local vs. long-distance scrambling in German – VP vs. CP:

a. dass sie [VP [DP, das Buch] [VP [DP, dem Karl] [V v t2 [v gegeben hat]]]]
that she the book [gen] the Karl [dat] given has
b. dass [VP [DP, das Buch] [V [DP, keiner] [V [VP t2 [v v t2 gelesen hat] v]]]]
that the book [gen] no one [nom] read has

c. *dass sie [DP, das Buch] gesagt hat [CP t2 [v dass] [TP sie gelesen hat]]
that she the book [gen] said has that she read has

Observation:
In the clausal spine, the weight increases from bottom to top. VP typically permits extraction from it; CP often does not. Similar considerations hold for the features that trigger movement, and for the moved items: The relative position in the tree is decisive.

(7) Weight assignments for German:

a. Strength of Y:

(i) V: [0.3]
(ii) C[-wh,+fin]: [0.8]
(iii) C[+wh,+fin]: [1.0]
(iv) C[+exstr,+fin]: [0.6]

b. Strength of [●F●] :

(i) [●wh●]: [0.2]
(ii) [●wh••]: [0.5]
(iii) [●stop●]: [0.65]

c. Strength of XP:

(i) DPobj: [0.9]
(ii) DPsubj: [0.8]

(8) Object scrambling via VP:

\[
\begin{array}{c|c|c|c}
& MC & AL & H \\
\hline
\text{O}_1: [VP \cdots \text{DP}_{\text{obj}} [0.9 \text{g}] V [0.3 \text{r}; [\text{scr} [0.2 \text{g}]]] & -2.2 & \text{w = 3.0} & \text{w = 2.0} \\\n\text{O}_2: [VP \cdots \text{DP}_{\text{obj}} [0.9 \text{g}] V [0.3 \text{r}; [\text{scr} [0.2 \text{g}]]] & -0.3 & \text{w = 2.0} & \text{w = 3.0} \\
\end{array}
\]
(9) **Object scrambling via finite declarative CP:**

<table>
<thead>
<tr>
<th>E: [CP C_{[0.8]:[0.0]}; [TP DP_{obj}]_{[0.9]}; [T' ... T]]</th>
<th>MC</th>
<th>AL</th>
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</tr>
</thead>
<tbody>
<tr>
<td>w = 2.0</td>
<td></td>
<td></td>
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<td>w = 3.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>O_1:</strong> [cp [C_{[0.8]:[0.0]}; [TP DP_{obj}]_{[0.9]}; [T' ... T]]]</td>
<td>-1.1</td>
<td>-2.2</td>
<td></td>
</tr>
<tr>
<td><strong>O_2:</strong> [CP DP_{obj}<em>{[0.9]} [C</em>{[0.8]:[0.0]}; [TP t_2] [T' ... T]]]</td>
<td>-0.8</td>
<td>-2.4</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
The CP output that leaves DP_{obj} in SpecT is optimal; consequently, the PIC is fatally violated on a subsequent cycle.

**Observation:**
If different kinds of Cs ([±finite], [±restructuring], [±operator], [±overt], etc.) can have different weights, one and the same movement type (e.g., scrambling) may leave CPs with a weak C head (restructuring infinitives) but not others.

(10) **Restructuring vs. non-restructuring infinitives in German:**

a. dass [dp_{obj}, das Buch] keiner [CP t_2] [c' C [TP t_2 zu lesen]] versucht hat that the book\textsubscript{no-overt} no-one\textsubscript{nom} to read tried has

b. *dass [dp_{obj}, das Buch] keiner [CP t_2] [c' C [TP t_2 zu lesen]] abgelehnt hat that the book\textsubscript{no-overt} no-one\textsubscript{nom} to read rejected has

(11) **Object scrambling via restructuring infinitive CP:**

<table>
<thead>
<tr>
<th>E: [CP C_{[0.8]:[0.0]}; [TP DP_{obj}]_{[0.9]}; [T' ... T]]</th>
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<td><strong>O_1:</strong> [cp [C_{[0.8]:[0.0]}; [TP DP_{obj}]_{[0.9]}; [T' ... T]]]</td>
<td>-1.1</td>
<td>-2.2</td>
<td></td>
</tr>
<tr>
<td><strong>O_2:</strong> [CP DP_{obj}<em>{[0.9]} [C</em>{[0.8]:[0.0]}; [TP t_{obj}] [T' ... T]]]</td>
<td>-0.6</td>
<td>-1.8</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
A weight of [0.8] for non-restructuring infinitival C ensures that scrambling from the infinitive is blocked.

**Independent evidence for CP projections in German restructuring infinitives:**

(12) **Local unstressed pronoun fronting indicates the presence of a CP:**

a. *dass sie mir\textsubscript{1} schon letzte Woche [vp t_2 es_2 zu geben] hat that she\textsuperscript{nom} me\textsubscript{dat} already last week it\textsubscript{nom} given has

b. *dass sie mir schon letzte Woche [vp es_2 zu geben] geschrieben hat that she\textsuperscript{nom} me\textsubscript{dat} already last week it\textsubscript{nom} to write seemed

c. dass sie mir\textsubscript{1} schon letzte Woche [vp t_2 es_2 zu geben] versucht hat that she\textsuperscript{nom} me\textsubscript{dat} already last week it\textsubscript{nom} to try has

d. dass sie mir\textsubscript{1} schon letzte Woche versucht hat [vp t_2 es_2 zu geben] that she\textsuperscript{nom} me\textsubscript{dat} already last week tried has

**Implicational universal I:**
If an XP α can undergo Σ\textsubscript{1}-movement across a Y head δ\textsubscript{1}, and δ\textsubscript{1} has more weight than another Y head δ\textsubscript{2}, then α can ceteris paribus undergo Σ\textsubscript{1}-movement across δ\textsubscript{2}.

3.2. **Asymmetries between Movement Types**

(13) **Object wh-movement vs. object scrambling in German – [\\(\textit{\textbf{\textsc{wh}}}\)]/vs. [\\(\textit{\textbf{\textsc{sc}}})]:**

a. (Ich weiß nicht) [CP [dp_{obj}, welches Buch] sie gesagt hat [CP t_{obj}] [c' dass] [vp sie I know not which book\textsubscript{nom} she said that she \textit{gelesen} has]]

b. *dass sie [dp_{obj}, das Buch] gesagt hat [CP t_{obj}] [c' dass] [vp sie \textit{gelesen} hat]]

**Object wh-movement via VP:**

<table>
<thead>
<tr>
<th>E: [VP ... DP_{obj}<em>{[0.9]} V</em>{[0.3];[\textit{\textbf{\textsc{wh}}}]_{[0.5]}}</th>
<th>MC</th>
<th>AL</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>w = 2.0</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>O_1:</strong> [VP ... DP_{obj}<em>{[0.9]} V</em>{[0.3];[\textit{\textbf{\textsc{wh}}}]_{[0.5]}}]</td>
<td>-1.4</td>
<td>-2.8</td>
<td></td>
</tr>
<tr>
<td><strong>O_2:</strong> [VP DP_{obj}<em>{[0.9]} V</em>{[0.3];[\textit{\textbf{\textsc{wh}}}]_{[0.5]}}]</td>
<td>-0.3</td>
<td>-0.9</td>
<td></td>
</tr>
</tbody>
</table>

**Object wh-movement via finite declarative CP:**

<table>
<thead>
<tr>
<th>E: [CP C_{[0.8]:[0.0]}; [TP DP_{obj}]_{[0.9]}; [T' ... T]]</th>
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<td>w = 3.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>O_1:</strong> [cp [C_{[0.8]:[0.0]}; [TP DP_{obj}]_{[0.9]}; [T' ... T]]]</td>
<td>-1.4</td>
<td>-2.8</td>
<td></td>
</tr>
<tr>
<td><strong>O_2:</strong> [CP DP_{obj}<em>{[0.9]} [C</em>{[0.8]:[0.0]}; [TP t_{obj}] [T' ... T]]]</td>
<td>-0.8</td>
<td>-2.4</td>
<td></td>
</tr>
</tbody>
</table>

**Implicational universal II:**
If an XP α can undergo Σ\textsubscript{1}-movement across a Y head δ, and δ\textsubscript{1} has less weight than another movement type Σ\textsubscript{2}, then α can ceteris paribus undergo Σ\textsubscript{2}-movement across δ.

3.3. **Asymmetries between Moved Items**

**Note:**
In some environments, there are no asymmetries between subject and object extraction in German. E.g., there are no complementizer-trace effects with subject extraction in standard contexts.

(16) **Subject and object wh-movement via finite declarative CP** (Haider (2010)):

a. (Ich weiß nicht) [CP [dp_{sub}, welches Buch] sie gesagt hat [CP t_{obj}] [c' dass] [vp sie I know not which book\textsubscript{nom} she said that she \textit{gelesen} has]]

b. (Ich weiß nicht) [CP [dp_{sub}, welches Buch] sie gesagt hat [CP t_{obj}] [c' dass] [vp sie \textit{gelesen} hat]]

impressed has
(17) **Subject wh-movement via finite declarative CP:**

<table>
<thead>
<tr>
<th></th>
<th>MC:</th>
<th>AL:</th>
<th>H:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\phi$: $\text{CP}<em>{[[0.8];[\text{wh}];[0.5]]}$ $\text{TP} \text{DP}</em>{\text{subj}}[[0.8]]$ $[\text{T} \ldots \text{T}]$</td>
<td>$w = 2.0$</td>
<td>$w = 3.0$</td>
<td>-</td>
</tr>
<tr>
<td>$\phi_{\text{O}1}$: $\text{CP}<em>{[[0.8];[\text{wh}];[0.5]]}$ $\text{TP} \text{DP}</em>{\text{subj}}[[0.8]]$ $[\text{T} \ldots \text{T}]$</td>
<td>-1.3</td>
<td>-2.6</td>
<td>-</td>
</tr>
<tr>
<td>$\phi_{\text{O}2}$: $\text{CP}<em>{[[0.8];[\text{wh}];[0.5]]}$ $\text{TP} \text{DP}</em>{\text{subj}}[[0.8]]$ $[\text{T} \ldots \text{T}]$</td>
<td>-0.8</td>
<td>-2.4</td>
<td>-</td>
</tr>
</tbody>
</table>

**Observation:**

Subject and object wh-movement from interrogative CPs does not show any asymmetries; it is uniformly impossible.

(18) **Subject and object wh-movement via finite interrogative CP (Müller & Sternefeld (1993))**:

a. *[DP$_{adj}$] Was ] weißt du nicht [CP wie man repariert]?
   what$_{nom}$ know you not how one fixes
b. *[DP$_{subj}$] Wer ] weißt du nicht [CP wie man repariert]?
   who$_{nom}$ know you not how that fixes

(19) **Object wh-movement via finite interrogative CP:**

<table>
<thead>
<tr>
<th></th>
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<th>AL:</th>
<th>H:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\phi$: $\text{CP}[[1.0];[\text{wh}];[0.5]]$ $\text{TP} \text{DP}_{\text{obj}}[[0.9]]$ $[\text{T} \ldots \text{T}]$</td>
<td>$w = 2.0$</td>
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<td>-</td>
</tr>
<tr>
<td>$\phi_{\text{O}1}$: $\text{CP}[[1.0];[\text{wh}];[0.5]]$ $\text{TP} \text{DP}_{\text{obj}}[[0.9]]$ $[\text{T} \ldots \text{T}]$</td>
<td>-1.4</td>
<td>-2.8</td>
<td>-</td>
</tr>
<tr>
<td>$\phi_{\text{O}2}$: $\text{CP}<em>{[[0.9];[\text{wh}];[0.5]]}$ $\text{CP}</em>{[[1.0];[\text{wh}];[0.5]]}$ $\text{TP} \text{DP}_{\text{obj}}[[0.9]]$ $[\text{T} \ldots \text{T}]$</td>
<td>-1.0</td>
<td>-3.0</td>
<td>-</td>
</tr>
</tbody>
</table>

**Question:**

Wh-islands have often been derived by assuming that a moved wh-phrase blocks a single escape hatch (Chomsky 1977; 1986). Isn’t it therefore a step backwards to postulate that wh-islands simply go back to increased strength of C?

**Answer:** No.

- **Embedded polar questions** are also wh-islands even though it is not obvious why SpecC should be unavailable if C is headed by a *whether* or *if* clause.
- Minimalist analyses typically rely on the assumption that *multiple specifiers* are freely available (Chomsky 2001; 2014). For instance, otherwise there would be no extraction from a vP containing an external argument DP, given the PIC.
- As shown below, wh-islands can in fact be *circumvented* under certain conditions in German. Given a constraint like the PIC (or the Subjacency Condition), this implies that SpecC must be available in principle in embedded interrogative CPs.

**Observation:**

With topicalization from interrogative CPs, there is an asymmetry between subjects and objects.

(20) **Subject wh-movement via finite declarative CP:**

<table>
<thead>
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<tbody>
<tr>
<td>$\phi$: $\text{CP}[[1.0];[\text{wh}];[0.5]]$ $\text{TP} \text{DP}_{\text{subj}}[[0.8]]$ $[\text{T} \ldots \text{T}]$</td>
<td>$w = 2.0$</td>
<td>$w = 3.0$</td>
<td>-</td>
</tr>
<tr>
<td>$\phi_{\text{O}1}$: $\text{CP}[[1.0];[\text{wh}];[0.5]]$ $\text{TP} \text{DP}_{\text{subj}}[[0.8]]$ $[\text{T} \ldots \text{T}]$</td>
<td>-1.3</td>
<td>-2.6</td>
<td>-</td>
</tr>
<tr>
<td>$\phi_{\text{O}2}$: $\text{CP}<em>{[[0.8];[\text{wh}];[0.5]]}$ $\text{TP} \text{DP}</em>{\text{subj}}[[0.8]]$ $[\text{T} \ldots \text{T}]$</td>
<td>-1.0</td>
<td>-3.0</td>
<td>-</td>
</tr>
</tbody>
</table>

(21) **Subject and object topicalization via finite interrogative CP** (Fanselow (1987), Müller & Sternefeld (1993)):

a. *[DP$_{adj}$] Radios ] weiß ich nicht [CP wie man repariert]
   repariert$_{nom}$ know I not how one fixes
b. *[DP$_{subj}$] Linguisten] weiß ich nicht [CP wie man reparieren]
   reparieren$_{nom}$ know I not how that fixes

(22) **Object topicalization via finite interrogative CP:**

<table>
<thead>
<tr>
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<td>$\phi$: $\text{CP}[[1.0];[\text{wh}];[0.55]]$ $\text{TP} \text{DP}_{\text{obj}}[[0.9]]$ $[\text{T} \ldots \text{T}]$</td>
<td>$w = 2.0$</td>
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<td>-</td>
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<tr>
<td>$\phi_{\text{O}1}$: $\text{CP}[[1.0];[\text{wh}];[0.55]]$ $\text{TP} \text{DP}_{\text{obj}}[[0.9]]$ $[\text{T} \ldots \text{T}]$</td>
<td>-1.55</td>
<td>-3.1</td>
<td>-</td>
</tr>
<tr>
<td>$\phi_{\text{O}2}$: $\text{CP}[[0.9];[\text{wh}];[0.55]]$ $\text{CP}<em>{[[1.0];[\text{wh}];[0.55]]}$ $\text{TP} \text{DP}</em>{\text{obj}}[[0.9]]$ $[\text{T} \ldots \text{T}]$</td>
<td>-1.0</td>
<td>-3.0</td>
<td>-</td>
</tr>
</tbody>
</table>

**Implicational universal III:**

If an XP $\alpha_1$ can undergo $\Sigma$-movement across a Y head $\delta$, and $\alpha_1$ has less weight than another XP $\alpha_2$, then $\alpha_2$ can ceteris paribus undergo $\Sigma$-movement across $\delta$.

4. **Extraction from DP in French**

**Observation** (Mensching, Müller, Werner & Winckel (2018), Kolliakou (1999), Sportiche (1981), and references cited there):

*Don’t*-relativization from DP in French does not apply to the highest $\theta$-role within DP. Rather, at most one DP-internal *de*-phrase can be different from the others, e.g., by qualifying as a (genitive-marked) NP, not as a PP. Only such an item can be extracted from DP.

(24) **Extraction from DP in French:**

a. *[Le Corbusier] dont$_1$ [DP la maison $t_1$ de M. X] n’est guère confortable
   Le Corbusier of whom the house of Mr. X is hardly comfortable
b. M. X dont$_1$ [DP la maison de Le Corbusier $t_1$] n’est guère confortable
   Mr. X of whom the house of Le Corbusier is hardly comfortable
c. la symphonie dont$_1$ j’aime [DP l’ interprétation de Karajan $t_1$]
   the symphony of which I love the interpretation of Karajan

**Reanalysis:**

The sole designated DP-internal argument that can undergo extraction need not have a different anaphoric status; it can simply have more weight. (Alternatively, different anaphoric status correlates with different strength.)
5. Complementizer-Trace Effects in English

(27) The That-Trace Effect
a. [CP Who(m), did you think [CP tı [c- ⊙] John saw tı]?  
b. [CP Who, did you think [CP tı [c- ⊙] tı saw John]]?  
c. [CP Who(m), did you think [CP tı [c- that] John saw tı]?  
d. *[CP Who, did you think [CP tı [c- that] tı saw John]]?

Observation:
• The standard approach to complementizer-trace effects relies on the presence or absence of ‘that’ in narrow syntax.
• ECP-violations give rise to the that-trace effect in English (Aoun et al. (1981); Chomsky (1981); Aoun et al. (1987)).

Question:
If the realization of C is post-syntactic (e.g., vocabulary insertion as in Distributed Morphology), how can it determine syntactic complementizer-trace effects?

Reanalysis:
GHG derives subject/object extraction asymmetries on the basis of the interaction between different strengths of Cs (weak vs. strong) and different levels of activity of DPs (subject vs. object).

(28) Wh-Movement of DP

<table>
<thead>
<tr>
<th>F: [CP C[0.5], [w•[w•]] [S S] [TP DP[0.8], [wh] [‘Y’ ... ‘T’]]]</th>
<th>MC</th>
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<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>w = 3</td>
<td>w = 1.5</td>
<td>-0.5</td>
<td>-1.5</td>
</tr>
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</table>

(29) Wh-Movement of DP

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<th>F: [CP C[0.5], [w•[w•]] [S S] [TP DP[0.8], [wh] [‘Y’ ... ‘T’]]]</th>
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(30) Wh-Movement of DP

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<thead>
<tr>
<th>F: [CP C[0.5], [w•[w•]] [S S] [TP DP[0.8], [wh] [‘Y’ ... ‘T’]]]</th>
<th>MC</th>
<th>AL</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>w = 3</td>
<td>w = 1.5</td>
<td>-0.5</td>
<td>-1.5</td>
</tr>
</tbody>
</table>

Side Remarks
• Asymmetric patterns of subject/object extraction are modelled by assigning different levels of activity.
• As Cs with different strengths are assumed to be selected from the lexicon, the GHG analysis does not encounter a look-ahead problem and it need not refer to the PF form of Cs in the syntactic derivation.
• GHG also gives an insight into iconicity between linguistic symbols and their realization. The more weight a category has, the more likely its lexical realization is (Müller (2017b)).

(32) Constraints
a. VI(VOCA LARY INSERTION): *X if X is not realized by vocabulary insertion.

(33) Vocabulary Insertion for C: [1]

<table>
<thead>
<tr>
<th>F: [CP C[1], [w•[w•]] [S S] [TP DP[0.8], [wh] [‘Y’ ... ‘T’]]]</th>
<th>MC</th>
<th>AL</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>w = 3</td>
<td>w = 1.5</td>
<td>-0.5</td>
<td>-1.5</td>
</tr>
</tbody>
</table>

(34) Vocabulary Insertion for C: [0.5]

<table>
<thead>
<tr>
<th>F: [CP C[0.5], [w•[w•]] [S S] [TP DP[0.8], [wh] [‘Y’ ... ‘T’]]]</th>
<th>MC</th>
<th>AL</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>w = 3</td>
<td>w = 1.5</td>
<td>-0.5</td>
<td>-1.5</td>
</tr>
</tbody>
</table>

6. Three Extraction Asymmetries in Korean

(35) Object extraposition in simple vs. embedded clauses in Korean:

   Yusu-NOM tı meet-PST-C Cini-ACC  
   ‘Yusu met Cini.’

   Suci-NOM [Yusu-NOM tı meet-PST-DECL-C Cini-ACC think-v-C]  
   ‘Suci thinks that Yusu met Cini.’
6.2. Asymmetries between Movement Types

Observation:
Asymmetries are observed depending on the direction of movement in embedded clauses: Leftward movement (i.e., scrambling) of the object is allowed, but rightward movement (i.e., extraposition) is ungrammatical, as we have just seen. These movement type asymmetries have not been analyzed as such. Existing approaches only focus on individual movement types (e.g., cyclic linearization approach and movement approach for scrambling; bi-clausal approach for extraposition; see Chung (2009; 2010; 2012); Ko (2007); Ko & Choi (2009); Yim (2013)).

(38) Object scrambling vs. extraposition in Korean – [[scr*] vs. [ext*]]:

Suci-NOM Cini-ACC Yusu-NOM t, meet-PST-DECL-C think-v-C
Suci thinks that Yusu met Cini.

Suci-NOM Yusu-NOM t, meet-PST-DECL-C Cini-ACC think-v-C

Analysis:
Depending on the movement type (scrambling vs. extraposition) GHG identifies a locality effect with the object in Korean derived by the constraint MC and the different strengths of [scr*].

(39) DPobj: [0.8] -leftward scrambling from embedded clause C: [1]

<table>
<thead>
<tr>
<th></th>
<th>F: [CP [TP DP[0.8], [ext] T [T ... T]] C[1][ext][0.4]]</th>
<th>MC</th>
<th>AL</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>w=2</td>
<td>w=3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O1:</td>
<td>[CP [c' [TP tDP [T ... T]] C[0.2][ext][0.4]]]</td>
<td>-1</td>
<td>-3</td>
<td></td>
</tr>
<tr>
<td>O2:</td>
<td>[CP [TP DP[0.8], [ext] T [T ... T]] C[1][ext][0.4]]</td>
<td>-1.6</td>
<td>-3.2</td>
<td></td>
</tr>
</tbody>
</table>

6.3. Asymmetries between Moved Items with Extraposed CPs in Korean

Observation:
Asymmetrical patterns are shown in extraposed CPs: An object can be extraposed after extraposition of the embedded CP, but a subject cannot undergo extraposition in this context.

(41) A subject/object asymmetry with extraposition from extraposed clauses

a. [CP Suci-ka t sayangkak-han-ta, [CP Yusu-ka t man-ass-ta-ko]] Cini-lul-
Suci-NOM said Yusu-NOM meet-PST-DECL-C Cini-ACC
Suci thinks that Yusu met Cini.

b. *[CP Suci-ka t sayangkak-han-ta, [CP Yusu-ka t man-ass-ta-ko]] Yusu-ka
Suci-NOM think-v-C Yusu-NOM

Assumptions:
- Extrapolated embedded C has less strength than non-extrapolated embedded C, but still more strength than root C.
- Objects have more strength than subjects, as in English and German.
- This gives rise to a surprising complementizer-trace effect in Korean (with extraposition).

(42) DPobj: [0.8] -rightward extraposition from embedded clause C: [1]

<table>
<thead>
<tr>
<th></th>
<th>F: [CP [TP DP[0.8], [ext] T [T ... T]] C[1][ext][0.4]]</th>
<th>MC</th>
<th>AL</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>w=2</td>
<td>w=3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O3:</td>
<td>[CP [TP DP[0.8], [ext] T [T ... T]] C[1][ext][0.4]]</td>
<td>-0.6</td>
<td>-1.8</td>
<td></td>
</tr>
<tr>
<td>O4:</td>
<td>[CP [TP DP[0.8], [ext] T [T ... T]] C[1][ext][0.4]]</td>
<td>-1.2</td>
<td>-2.4</td>
<td></td>
</tr>
</tbody>
</table>

(43) DPobj: [0.4] -rightward extraposition from embedded clause C: [1]

<table>
<thead>
<tr>
<th></th>
<th>F: [CP [TP DP[0.4], [ext] T [T ... T]] C[1][ext][0.4]]</th>
<th>MC</th>
<th>AL</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>w=2</td>
<td>w=3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O5:</td>
<td>[CP [TP DP[0.4], [ext] T [T ... T]] C[1][ext][0.4]]</td>
<td>-0.6</td>
<td>-1.8</td>
<td></td>
</tr>
<tr>
<td>O6:</td>
<td>[CP [TP DP[0.4], [ext] T [T ... T]] C[1][ext][0.4]]</td>
<td>-0.8</td>
<td>-1.6</td>
<td></td>
</tr>
</tbody>
</table>

7. Idioms

Note:
The new perspective offers surprising accounts of some well-known phenomena. For instance, a ban on even very local movement of parts of semantically opaque idioms follows as a PIC effect, assuming that they have extremely little strength. (This approach to transformational deficiency of
idioms is in fact essentially pursued in Ross (1973a).


Idioms resist syntactic transformations that split them up to various degrees.

Implicational generalization:
If an idiom \(\alpha\) dominates an idiom \(\beta\) on the opacity scale, and transformation \(\delta\) can affect \(\alpha\), then \(\delta\) can also affect \(\beta\).

(44) Opacity scale:
\[
\text{XP}_{\text{opaque}} > \text{XP}_{\text{semi-opaque}} > \text{XP}_{\text{semi-transparent}} > \text{XP}_{\text{transparent}}
\]

Variation:
- “Our intuitions in this domain are ... robust and ... consistent across speakers” (Nunberg, Sag & Wasow 1994, 507).
- “Idioms, more than most aspects of language, vary enormously from speaker to speaker. [...] What is important is that the general claims about idioms ... hold true for each speaker” (Fraser (1970, 23)).
- Data are difficult to judge in many cases (creative use of language, meta-linguistic use, playing with language, ...)

(45) VP idioms in German (decreasing semantic opacity):
  a. opaque
  Fersengeld geben (’give heel money’, ‘flee’)
  b. semi-opaque
  den Stier bei den Hörnern packen (’the bull by the horns grab’)
  c. semi-transparent
einen Korb geben (’a basket give’, ‘turn someone down’)
  d. transparent
  (i) light verb constructions: zur Aufführung bringen (’to performance bring’, ’perform’)
  (ii) reanalysis: Buch lesen (’book read’) (vs. Buch zerstören, ’book destroy’)

(46) Topicalization:
  a. *Fersengeld1 hat der Fritz am Ende t1 gegeben
  heel money has the Fritz at the end given
  b. Den Stier1 hat sie t1 bei den Hörnern gepackt
  the bull has she by the horns grabbed
  c. Einen Korb1 hat sie ihm t1 gegeben
  a basket has she him given
  d. Das Buch1 hat keiner t2 gelesen
  the book has no-one read

(47) Wh-movement:
  a. *Was für einen Fersengeld1 hat der Fritz t1 gegeben?
  what for a heel money has the Fritz given

b. *Was für einen Stier1 hat sie t1 bei den Hörnern gepackt?
  what for a bull has she by the horns grabbed

c. *Was für einen Korb1 hat sie ihm t1 gegeben?
  what for a basket has she him given

d. Was für ein Buch1 hat keiner t1 gelesen?
  what for a book has no-one read

(48) Scrambling:
  a. *dass der Fritz Fersengeld1 am Ende t1 gab
  that the Fritz heel money at the end gave
  b. *dass sie bei den Hörnern1 den Stier1 packte
  that she by the horns the bull grabbed
  c. *dass sie einen Korb1 dem Karl1 gab
  that she a basket the Karl gave
  d. dass das Buch1 keiner t1 gelesen hat
  that the book no-one read has

(49) Idiom-part object topicalization via VP:

\[
\begin{array}{|c|c|c|c|}
\hline
\text{I: [VP} & \text{... DP}_{\text{idiom}}[0.1] & \text{V} & \text{[0.3;} & \text{\bullet top;} & \text{[0.65]}] & \text{MC\ W = 2.0} & \text{AL \ W = 3.0} & \text{H} \\
\hline
\text{O1: [VP} & \text{... DP}_{\text{idiom}}[0.1] & \text{V} & \text{[0.3;} & \text{\bullet top;} & \text{[0.65]}] & -0.75 & -1.5 \\
\hline
\text{O2: [VP} & \text{... DP}_{\text{idiom}}[0.1] & \text{V} & \text{[0.3;} & \text{\bullet top;} & \text{[0.65]}] & -0.3 & -0.9 \\
\hline
\end{array}
\]

(50) Idiom-part object scrambling via VP (cf. (8)):

\[
\begin{array}{|c|c|c|c|}
\hline
\text{I: [VP} & \text{... DP}_{\text{idiom}}[0.1] & \text{V} & \text{[0.3;} & \text{\bullet top;} & \text{[0.65]}] & \text{MC\ W = 2.0} & \text{AL \ W = 3.0} & \text{H} \\
\hline
\text{O1: [VP} & \text{... DP}_{\text{idiom}}[0.1] & \text{V} & \text{[0.3;} & \text{\bullet top;} & \text{[0.65]}] & -0.3 & -0.6 \\
\hline
\text{O2: [VP} & \text{... DP}_{\text{idiom}}[0.1] & \text{V} & \text{[0.3;} & \text{\bullet top;} & \text{[0.65]}] & -0.3 & -0.9 \\
\hline
\end{array}
\]

8. Outlook

Further issues:

1. How is ineffability (absolute ungrammaticality) eventually derived in cases where first the output without local movement wins, and subsequently the PIC blocks movement on the next cycle? See Müller (2015) for various options.

2. The analysis has been silent so far as regards barriers by lack of L-marking/selection, including subject and adjunct islands (see Chomsky (1986), Cinque (1990); but also Chaves & Dery (2018) and references cited there for arguments against a modelling of these locality effects in the grammar as such). All the evidence presented here involves restrictions on extraction from complements.

3. The features triggering movement via MC have mostly been relevant for intermediate movement steps, not so much for criterial movement steps (except for the Korean evidence). To model the difference, additional assumptions may be required. (E.g., movement to the specifier of an interrogative C is often ok, movement via an interrogative C sometimes is not.) Possibly, criterial versions of [\(\bullet f\)] are associated with more weight.
4. The approach is categorical as concerns outputs; but it can be combined with MaxEnt grammars (or stochastic OT) yielding non-categorical, gradient output decisions (Hayes (2001)).

References


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