1. Background

There is a standard objection:
Since optimality theory relies on free constraint reranking, it is not sufficiently restrictive. For instance, it cannot account for implicational generalizations.

However:
There are general means to derive implicational generalizations in optimality theory. One of them is harmonic alignment of markedness scales, which results in an invariant order among constraints.

Aim of this talk:
Harmonic alignment is applied to a domain where implicational generalizations hold: idioms.

(1) Scale of idioms:
\[ \text{XP}_{\text{opaque}} > \text{XP}_{\text{semi-opaque}} > \text{XP}_{\text{semi-transparent}} > \text{XP}_{\text{transparent}} \]

Implicational generalizations derivable from harmonic alignment:
If a given item \( \alpha \) on a scale \( \Sigma \) has property \( \delta \), then any item \( \beta \) that is lower on \( \Sigma \) than \( \alpha \) also has \( \delta \).

2. Harmonic Alignment


Harmonic alignment is a meta-principle that, based on independently motivated universal scales, systematically creates constraints with strict relative order.

(2) Harmonic Alignment (Prince & Smolensky (1993, 136)):
Suppose given a binary dimension \( D_1 \) with a scale \( X > Y \) on its elements \{X,Y\}, and another dimension \( D_2 \) with a scale \( a > b > ... > z \) on its elements \{a,b,...,z\}. The harmonic alignment of \( D_1 \) and \( D_2 \) is the pair of Harmony scales \( H_X, H_Y \):

a. \( H_X : X/a \succ X/b \succ ... \succ X/z \)
b. \( H_Y : Y/z \succ ... \succ Y/b \succ Y/a \)

The constraint alignment is the pair of constraint hierarchies \( C_X, C_Y \):

a. \( C_X : *X/z \gg ... \gg *X/b \gg *X/a \)
b. \( C_Y : *Y/a \gg *Y/b \gg ... \gg *Y/z \)

Application in Prince & Smolensky (1993):
H-Nuc (“Harmony of the nucleus”) is not a binary constraint. In order to find
out how a candidate fulfills H-Nuc, it does not suffice to only consider the candidate itself. Rather, the candidate must be compared with other candidates so as to find out which candidate has the most harmonic nucleus. This is theoretically unattractive because it implies an additional (albeit trivial) optimization procedure (much like transderivational constraints in early versions of the minimalist program). Prince & Smolensky’s solution: Two hierarchies.

(3) a. **Syllable Position Prominence:**
   
   \[ P > M (\text{Peak} > \text{Margin}) \]

   b. **Sonority Hierarchy:**
   
   \[ a > i > \ldots > t \]

(4) **Harmonic Alignment:**

   a. \[ H_P: P/a > P/i > \ldots > P/t \]
   
   b. \[ H_M: M/t > \ldots > M/i > M/a \]

(5) **Constraint Alignment:**

   a. \[ C_P: *P/t \gg \ldots \gg *P/i \gg *P/a \]
   
   b. \[ C_M: *M/a \gg *M/i \gg \ldots \gg *M/t \]

**Result:**

The syllable peak constraint hierarchy \( C_P \) can do everything that has been done by H-Nuc (and more). The revised system makes it possible to dispense with non-binary constraints.

**Syntactic applications of harmonic alignment:**

Aissen (1999), Artstein (1998) on GF-mapping and pro-drop, conditioned by (i.a.) a person scale (1./2. Pers. > 3. Pers.)

**Further applications:**

(i) the transformational deficiency of idioms

(ii) the transformational deficiency of pronouns

3. **Idioms in English and German**

**Observation\(^1\):**

Idioms resist transformations to various degrees.

**Implicational generalization:**

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

(6) a. **Opacity hierarchy:**

\[ X_P_{\text{opaque}} > X_P_{\text{semi-opaque}} > X_P_{\text{semi-transparent}} > X_P_{\text{transparent}} \]

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b. **Integrity Hierarchy:**

Intact ≻ affected

(7) A transformation affects an XP iff it applies to a proper subpart of XP. (Movement out of XP makes XP incomplete and thereby always affects it.)

**Note:**
The Opacity hierarchy encodes a taxonomy of idioms arrived at in the Soviet school of phraseology (Vinogradov (1946; 1947), Sanskij (1972), Černiševa (1970)).

(8) **Soviet taxonomy of idioms:**

a. Frazeologičeskije srásčenija (“Phraseologische Fügungen”)
b. Frazeologičeskije edinstva (“Phraseologische Ganzheiten”)
c. Frazeologičeskije cočetanija (“Phraseologische Verbindungen”)
d. Frazeologičeskije vyraženija (“Phraseologische Ausdrücke”)

**Note:**
Nunberg, Sag & Wasow (1994) assume that there are only two idiom classes with respect to semantic opacity. Idioms in one class are completely opaque; idioms in the other class are completely transparent, given a metaphorical interpretation of the idiom parts that is contextually restricted (e.g., beans can mean “information” in the context of spill, and spill can mean “divulge” in the context of beans). We will see that this two-way system is not fine-grained enough. (That said, the Opacity hierarchy can also be viewed as reflecting different degrees of contextually restricted metaphorization, even in the most opaque cases; cf. Everaert (1991).)

(9) **Harmonic alignment:**

a. $H_{in.}:\;\text{XP}_{op}/\text{in.} \gg \text{XP}_{s-op}/\text{in.} \gg \text{XP}_{s-tr}/\text{in.} \gg \text{XP}_{tr}/\text{in.}$
b. $H_{aff.}:\;\text{XP}_{tr}/\text{aff.} \gg \text{XP}_{s-tr}/\text{aff.} \gg \text{XP}_{s-op}/\text{aff.} \gg \text{XP}_{op}/\text{aff.}$

(10) **Constraint alignment:**

a. $C_{in.}:\;^{*}\text{XP}_{tr}/\text{in.} \gg ^{*}\text{XP}_{s-tr}/\text{in.} \gg ^{*}\text{XP}_{s-op}/\text{in.} \gg ^{*}\text{XP}_{op}/\text{in.}$
b. $C_{aff.}:\;^{*}\text{XP}_{op}/\text{aff.} \gg ^{*}\text{XP}_{s-op}/\text{aff.} \gg ^{*}\text{XP}_{s-tr}/\text{aff.} \gg ^{*}\text{XP}_{tr}/\text{aff.}$

**Proposal:**
The generalization concerning transformational deficiency follows from the fact that constraints that trigger transformations are interspersed with the subconstraints of the $C_{aff.}$ hierarchy.

(11) **Idiom classes in English:**

a. **Opaque VPs:**
   - kick the bucket, chew the fat, face the music
b. **Semi-opaque VPs:**
   - break the ice, bring down the house, keep up one’s guard, the cat have x’s tongue
c. **Semi-transparent VPs:**
   - spill the beans, pass the buck, lay down the law, pull strings, let the cat out of the bag
d. **Transparent VPs:**
light verb constructions: put the blame on (blame), give a kick (kick), take a walk (walk)
reanalysis constructions: read (vs. destroy) book

Gerundive nominalization:
- Bill’s kicking the bucket
- Sue’s breaking the ice
- John’s spilling the beans
- Mary’s reading the book

Passive:
- The bucket was kicked by Bill
- The ice was broken by Sue
- The beans were spilled by John
- The book was read by Mary

Action nominalization:
- Bill’s kicking of the bucket
- Sue’s breaking of the ice
- John’s spilling of the beans

Wh-Movement:
- Which bucket did Bill kick?
- Which ice did Sue break?
- Which beans did John spill?
- Which book did Mary read?

Clefting:
- It’s the bucket that Bill kicked
- It’s the ice that Sue broke
- It’s the beans that John spilled
- It’s the book that Mary read

Internal modification:
- Bill kicked a second bucket
- Sue broke the thin ice
- John spilled the new beans (but cf. They left no legal stone unturned)
- Mary read a new book

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” (Frazer (1970, 23)).

Idiom classes in German:
- Opaque VPs:
  - Fersengeld geben, Fraktur reden, Bauklöße staunen
- Semi-opaque VPs:
den Stier bei den Hörnern packen, die Flinte ins Korn werfen, Feuer fangen, den Vogel abschießen, ins Gras beißen, den Löffel abgeben
c. *Semi-transparent VPs:
en einen Korb geben, goldene Brücken bauen, die Suppe versalzen, ins Handwerk pfuschen
d. *Transparent VPs:
   (i) light verb constructions: zur Aufführung bringen, in Verbindung stehen, Prüfung unterziehen
   (ii) reanalysis constructions: Buch lesen (vs. zerstören), Film sehen (vs. widmen)

(19) *Topicalization:
a. (?)Fersengeld$^1$ hat der Fritz $t_1$ gegeben
   heel money has ART Fritz given
b. Den Stier$^1$ hat sie $t_1$ bei den Hörnern gepackt
   the bull has she at the horns seized
c. Einen Korb$^1$ hat sie ihm $t_1$ gegeben
   a basket has she him given
d. Ein Buch$^1$ hat Maria $t_1$ gelesen
   a book has Maria read

(20) *Passive:
a. *daß Fersengeld$^1$ vom Fritz $t_1$ gegeben wurde
   that heel money by ART Fritz given was
b. daß der Stier$^1$ von ihr $t_1$ bei den Hörnern gepackt wurde
   that the bull by her at the horns seized was
c. daß ihm ein Korb$^1$ von ihr $t_1$ gegeben wurde
   that him a basket by her given was
d. daß ein Buch$^1$ von Maria $t_1$ gelesen wurde
   that a book by Maria read was

(21) *Internal modification:
a. *daß Fritz geliehenes Fersengeld gegeben hat
   that Fritz borrowed heel money has given has
b. *daß sie den großen Stier bei den Hörnern gepackt hat
   that she the big bull at the horns seized has
c. *daß sie ihm einen ganz schönen Korb gegeben hat
   that she him a quite nice basket given has
d. daß Maria ein neues Buch gelesen hat
   that Maria a new book read has

(22) *Wh-Movement:
a. *Was für ein Fersengeld$^1$ hat der Fritz $t_1$ gegeben?
   what for a heel money has ART Fritz given
b. *Was für einen Stier$^1$ hat sie $t_1$ bei den Hörnern gepackt?
   what for a bull has she at the horns seized
c. (?)Was für einen Korb hat sie ihm t₁ gegeben?
    what for a basket has she him given
d. Was für ein Buch hat Maria t₁ gelesen?
    what for a book has Maria read

(23) Left dislocation:
    a. *Fersengeld₁ das wollte der Fritz t₁ geben
       heel money that wanted ART Fritz give
    b. *Den Stier₁ den hat sie t₁ bei den Hörnern gepackt
       the bull that has she at the horns seized
    c. *Einen Korb₁ den hat sie ihm t₁ gegeben
       a basket that has she him given
    d. Ein Buch₁ das hat Maria t₁ gelesen
       a book that has Maria read

Analysis:
The constraints that trigger the respective transformations are interspersed with
the subconstraints of C_{aff.} that was created by harmonically aligning the Opacity
hierarchy and the (binary) Integrity Hierarchy.

(24) Ranking in German:

\[
\begin{array}{c}
\text{TOP} \gg \text{Passive} \gg \text{WHMove, MOD} \gg \text{LeftDis} \gg \\
\text{XP_{op/aff.}} \gg \text{XP_{s-op/aff.}} \gg \text{XP_{s-tr/aff.}} \gg \text{XP_{tr/aff.}}
\end{array}
\]

\[T₁: \text{Passive and opaque VPs}\]

<table>
<thead>
<tr>
<th>Input: VP_{op}, Pass., ...</th>
<th>*XP_{op/aff.}</th>
<th>*XP_{s-op/aff.}</th>
<th>*XP_{s-tr/aff.}</th>
<th>*XP_{tr/aff.}</th>
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</thead>
<tbody>
<tr>
<td>O₁: Fersengeld V_{passive}</td>
<td>*!</td>
<td></td>
<td></td>
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<tr>
<td>O₂: Fersengeld V_{active}</td>
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\[T₂: \text{Passive and semi-opaque VPs}\]

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<td>*</td>
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</tr>
<tr>
<td>O₂: Stier V_{active}</td>
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<td>*!</td>
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\[T₃: \text{Wh-Movement and semi-opaque VPs}\]

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<th>*XP_{s-tr/aff.}</th>
<th>*XP_{tr/aff.}</th>
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<tbody>
<tr>
<td>O₁: was für einen Stier V</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O₂: den Stier V</td>
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4. Final Remarks

Harmonic alignment captures implications: If a given item $\alpha$ on a scale $\Sigma$ has property $\delta$, then any item $\beta$ that is lower on $\Sigma$ than $\alpha$ also has $\delta$.

Dividing lines across idioms:

a. Topicalization: all
b. Passive: opaque vs. semi-opaque, semi-transparent, transparent
c. Wh-Movement: opaque, semi-opaque vs. semi-transparent, transparent
d. Left dislocation: opaque, semi-opaque, semi-transparent vs. transparent