Same-Edge Alignment with Opposite-Edge Effects*

1 Introduction and Background

Generalized Alignment (McCarthy and Prince 1993) (GA): either edge of any category (phonological or morphological) can be aligned to either edge of any other category.

(1) \[
\text{ALIGN(Cat}_1,\text{Edge}_1,\text{Cat}_2,\text{Edge}_2) \\
\forall \text{Cat}_1 \exists \text{Cat}_2 \text{ such that Edge}_1 \text{ of Cat}_1 \text{ and Edge}_2 \text{ of Cat}_2 \text{ coincide,} \\
\text{where Cat}_1,\text{Cat}_2 \in \text{PCat} \cup \text{MCat and Edge}_1,\text{Edge}_2 \in \{\text{Right,Left}\}
\]

➢ Problem: GA is too powerful; few cases of opposite-edge alignment (Edge$_1 \neq$ Edge$_2$).

➢ Proposal: Restrict GA to same-edge alignment (Edge$_1 =$ Edge$_2$). (cf. Spaelti 1997)

(2) \[
\text{ALIGN-Edge(Cat}_1,\text{Cat}_2) \\
\forall \text{Cat}_1 \exists \text{Cat}_2 \text{ such that Edge of Cat}_1 \text{ and Cat}_2 \text{ coincide,} \\
\text{where Cat}_1,\text{Cat}_2 \in \text{PCat} \cup \text{MCat and Edge} \in \{\text{Right,Left}\}
\]

➢ Purpose of this research: To show how Restricted GA (RGA) can account for opposite-edge effects, such as reversal processes in some ludlings\(^1\), using only same-edge alignment:

• motivate a shift from GA to RGA, which simplifies the predicted grammar by eliminating half of the alignment constraints (the opposite-edge constraints);

• bring ludlings more in line with natural language, mirroring their frequency and learnability (reversal ludlings can be found in practically any language, and they are quickly learned, often used by children);

• eliminate some meta-linguistic processes, simplifying the overall language capacity;

• help unify reversal ludlings with other semantically- and phonetically-empty phonological processes, such as morphological truncation (e.g. hypocoristics: Richard~Rich).

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\(^1\) Ludlings are 'systematic deformations of ordinary language' (Laycock 1969), characterized by one or more productive phonological processes which are, generally speaking, semantically empty. Ludlings are also known in the literature as language games, speech disguises, play languages, argots, etc. See Laycock (1972) and Bagemihl (1989) for comprehensive discussion of ludlings in their various forms.
2 The Baliktád Ludling in Tagalog

Baliktád is the name of a group of different ludling processes in Tagalog (Conklin 1956). I am concerned here with the final syllable preposing (FSP) sub-ludling used in modern Tagalog. The preposed syllable is underlined in the FSP form:

<table>
<thead>
<tr>
<th>base form</th>
<th>FSP form</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>kapatíd</td>
<td>tidkapa</td>
<td>‘sibling’</td>
</tr>
<tr>
<td>maqanda</td>
<td>damqan</td>
<td>‘beautiful’</td>
</tr>
<tr>
<td>kamatís</td>
<td>tiskama</td>
<td>‘tomato’</td>
</tr>
<tr>
<td>?ito</td>
<td>to?i</td>
<td>‘this’</td>
</tr>
<tr>
<td>pandák</td>
<td>dakpan</td>
<td>‘ugly’</td>
</tr>
<tr>
<td>na</td>
<td>na²</td>
<td>‘short’</td>
</tr>
</tbody>
</table>

The input must contain some distinguishing marker to distinguish the base form from the FSP form. I notate this morpheme as LUD.

3 Intra-Representational Correspondence and the Ludlingant

The output realization of the reduplication morpheme RED is the reduplicant, a substring of the output with only abstract (phonological) properties. Consider an imaginary input /budóga+RED/ for a language with reduplication. Three possible candidates are:

<table>
<thead>
<tr>
<th>candidates</th>
<th>phonetic realization</th>
<th>phonological properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>bubudóga</td>
<td>bubudóga</td>
<td>epenthes of [bu] violates DEP, REALIZE MORPHEME, etc.</td>
</tr>
<tr>
<td>bubudóga</td>
<td>bubudóga</td>
<td>infixed reduplicant [bu] violates ALIGN, CONTIGUITY, etc.</td>
</tr>
<tr>
<td>bubudóga</td>
<td>bubudóga</td>
<td>prefixed reduplicant [bu]</td>
</tr>
</tbody>
</table>

Despite having identical phonetic realizations, these three candidates have different phonological properties.

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2 The FSP and base forms of monosyllabic words are phonetically identical. This can be thought of as vacuous preposing. This contrasts with the French reversal ludling verlan, which reverses syllables as well, but for monosyllables, the segments are reversed: [par]~[rap]‘parents’ vs. [mek]~[kem]‘guy’.
Proposal: Extend base-reduplicant correspondence (McCarthy and Prince 1995) to allow any input (not just those with RED) to have candidates subject to intra-representational correspondence (IRC). In particular, phonetically-empty morphemes like LUD will generally have winning outputs which utilize IRC, as they have no other way to be expressed.

The analog of RED’s reduplicant for LUD is the ludlingant (symbolized by λ). Like the reduplicant, λ is an abstract substring of the output which is sensitive to constraints that reference it (ALIGN, MAX, etc.).

Assumption: The preposed syllable in baliktád is the ludlingant corresponding to LUD. This means that the underlining in (3) represents the ludlingant, so tidkapa is the winning candidate with λ = tid.

Because reversal ludlings involve massive violations of LINEARITY, it is important to keep an abstract record of input linearity of the base morpheme in the output.

Definition: Let the stem be the output realization of the base morpheme, preserving the edgehood of the input in an abstract manner. That is, if α is the rightmost segment of the base morpheme in the input and αRα’, then α’ will be considered the right edge of the stem for purposes of alignment, regardless of α’’s actual position in the output.

Relevant PCats and MCats for tidkapa:

(6) PrWd
    λ

stems
    tid ka pa

From (6), it is clear that:

(7) a. λ is left-aligned with the prosodic word
    b. λ is right-aligned with the stem

Within OT (Prince and Smolensky 1993), the facts in (7) can be accounted for by high-ranking of the following RGA constraints:

(8) \[ \text{ALIGN-Left (λ,PrWd)} \equiv \text{AL}_{\lambda\text{W}} \]
    \[ \forall \lambda \exists \text{PrWd s.t. their left edges coincide} \]

\[ \text{ALIGN-Right (λ,stem)} \equiv \text{AR}_{\lambda\text{S}} \]
    \[ \forall \lambda \exists \text{stem s.t. their right edges coincide} \]

Satisfaction of alignment comes at the price of violating input linear order (LINEARITY) and input segmental adjacency (CONTINGUITY), formalized below (cf. McCarthy and Prince 1995):
(9) **LINEARITY**
If \( \alpha \) precedes \( \beta \) (\( \alpha < \beta \)), then \( \beta' < \alpha' \)

**CONTIGUITY**
If \( \alpha \) and \( \beta \) are adjacent (\( \alpha \beta \)), then \( \alpha' \beta' \)

N.B. in all constraint definitions for this talk, \( \alpha \) and \( \beta \) represent segments in the input, while \( \alpha' \) and \( \beta' \) are their respective output correspondents.

**ALW**, **ARLS** \( \Rightarrow \)** **LINEARITY**, **CONTIGUITY** (\( d \) is the right edge of the stem for \( \text{kapatid} \)):

(10) \[
\begin{array}{|c|c|c|c|}
\hline
& /\text{kapatid+LUD}/ & \text{ALW} & \text{ARLS} & \text{LIN} & \text{CONT} \\
\hline
\checkmark a. & \text{tidkapa} & & & \text{tid<kapa} & \text{\( \sim \text{at} \)} \\
\checkmark b. & \text{kapatid} & *! & & & \\
\checkmark c. & \text{kapatid} & *! & & & \\
\hline
\end{array}
\]

All segments in the input have output correspondents (no deletion), so **MAX-IO** is high-ranked:

(11) **MAX-IO**
\( \forall \alpha \exists \alpha' \)

MAX-IO must also be ranked over **LINEARITY** and **CONTIGUITY**:

(12) \[
\begin{array}{|c|c|c|c|}
\hline
& /\text{kapatid+LUD}/ & \text{MAX-IO} & \text{LIN} & \text{CONT} \\
\hline
\checkmark a. & \text{tidkapa} & & \text{tid<kapa} & \text{\( \sim \text{at} \)} \\
\checkmark b. & \text{tid} & \text{kapa!} & & \\
\hline
\end{array}
\]

Note that the reverse ranking yields the truncated form \( \text{tid} \). Other factors must also hold, but simple constraint re-ranking seems to be the only theoretical difference between reversal ludlings and truncation in this analysis (see Sanders (1999) for further discussion).

**MAX-BR** has an analog, **MAX-B\( \lambda \)**, which maximizes segments from the base\(^3\) to the ludlingant:

(13) **MAX-B\( \lambda \)**
If there is a ludlingant \( \lambda \) in the output, then every segment in the base must have a correspondent in \( \lambda \)

---

\(^3\) It is unimportant for these data whether the base is taken to be the input, an independent output, or the stem, as the segmental content of each of these is identical.
Problem: The candidate *kapatid, with a maximal ludlingant, perfectly satisfies all of the constraints discussed so far, beating the correct output tidkapa:

<table>
<thead>
<tr>
<th></th>
<th>/kapatid+LUD/</th>
<th>ALlàW</th>
<th>ARlàS</th>
<th>MAX-IO</th>
<th>MAX-Blà</th>
<th>LIN</th>
<th>CONT</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>tidkapa</td>
<td></td>
<td></td>
<td>kapa!</td>
<td>tid&lt;kapa</td>
<td>ât</td>
<td></td>
</tr>
<tr>
<td>✗</td>
<td>kapatid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In *kapatid, the ludlingant and the stem coincide — a violation of McCarthy and Prince’s (1995) constraint MORPHEMIC DISJOINTNESS:

MORPHDIS must outrank MAX-Blà, LINEARITY, and CONTIGUITY to rule out *kapatid and any other non-minimal ludlingant:

<table>
<thead>
<tr>
<th></th>
<th>/kapatid+LUD/</th>
<th>MORPHDIS</th>
<th>MAX-Blà</th>
<th>LIN</th>
<th>CONT</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>tidkapa</td>
<td>tid</td>
<td>kapa</td>
<td>tid&lt;kapa</td>
<td>ât</td>
</tr>
<tr>
<td>✓</td>
<td>kapatid</td>
<td>kapatid!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>patidka</td>
<td>patid!</td>
<td>ka</td>
<td>patid&lt;ka</td>
<td>âp</td>
</tr>
</tbody>
</table>

This analysis also accounts for bisyllabic FSP forms in baliktàd:

<table>
<thead>
<tr>
<th></th>
<th>/?ito+LUD/</th>
<th>MAX-IO</th>
<th>MORPHDIS</th>
<th>MAX-Blà</th>
<th>LIN</th>
<th>CONT</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>to?i</td>
<td>to</td>
<td>?i</td>
<td>to&lt;?i</td>
<td>â?i</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>?ito</td>
<td>?ito!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>to</td>
<td>?i!</td>
<td>to</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(18) /?ito+LUD/ | ALlàW | ARlàS | MAX-Blà | LIN | CONT |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>to?i</td>
<td></td>
<td>?i</td>
<td>to&lt;?i</td>
<td>â?i</td>
</tr>
<tr>
<td>✗</td>
<td>?ito</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✗</td>
<td>?ito</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The monosyllabic na requires ALlàW and ARlàS to be ranked over MORPHDIS:
Candidates like *na and *an can be ruled out by REALIZE MORPHEME and ONSET, respectively. This gives the following constraint ranking for baliktad:

(20) AL\(\lambda\)W
    AR\(\lambda\)S
    MORPHDIS
    MAX-IO
    MAX-B\(\lambda\)
    LIN
    CONT

4 Re-analysis of the Zuuja-go Ludling in Japanese

Zuuja-go (ZG) is a reversal ludling in Japanese (Itô, Kitagawa, and Mester 1996) (IKM) similar in form to baliktad (final syllable of the base form preposes in the ludling form):

(21) | base form | ZG form | gloss |
    |----------|---------|-------|
    | fumen    | menfu   | ‘musical score’ |
    | takuji:i | i:taku  | ‘taxi’      |
    | kano:    | no:ka  | ‘possible’ |
    | ko:hii:  | hiko:  | ‘coffee’    |

IKM’s analysis relies on the constraint CROSS ANCHOR, which has two requirements:

- a leftmost string of the base form must correspond to a rightmost string of the ZG form (fu in (22)), and
- a rightmost string of the base form must correspond to a leftmost string of the ZG form (men).

(22) base: \(\times\)\(\times\)\(\times\)

ZG requires certain constraints and rankings from IKM’s analysis independent of their formulation of CROSS ANCHOR:
(23) a. ZG only has Ft-Ft or Ft-σ₃ prosodic shapes (NONFIN, HIERALIGN);
b. Vowel-lengthening and vowel-shortening are allowed for satisfying (23a) (low ranking of INTEGRITY, MAX-μ, DEP-μ);
c. Foot-heads and non-foot-heads tend to correspond between base and ZG forms (MAXFOOTHEAD, DEPFOOTHEAD, MAXFOOTTAIL, DEPFOOTTAIL), but not at the expense of prosodic form or moraic faithfulness.

These constraints and their rankings as derived by IKM are not in dispute, so I incorporate them into my analysis directly:

(24) ALW
ARSl
MAX-IO
NONFIN
HIERALIGN
MAXFTTL
DEP-μ
MAX-μ
MORPHDIS
LIN
CONT
MAX-Bλ

This hierarchy accounts for the data in (21) and (25), which I will not analyze here:

(25) | base form | ZG form | gloss |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>me</td>
<td>e:me</td>
<td>‘musical score’</td>
</tr>
<tr>
<td>pan</td>
<td>n:pa</td>
<td>‘taxi’</td>
</tr>
<tr>
<td>meji</td>
<td>fi:me</td>
<td>‘possible’</td>
</tr>
<tr>
<td>kusuri</td>
<td>suriku</td>
<td>‘coffee’</td>
</tr>
<tr>
<td>besu</td>
<td>su:be</td>
<td>‘bass’</td>
</tr>
<tr>
<td>bando</td>
<td>donba</td>
<td>‘band’</td>
</tr>
<tr>
<td>komafaru</td>
<td>furukoma</td>
<td>‘commercial’</td>
</tr>
<tr>
<td>tenisu</td>
<td>sunite</td>
<td>‘tennis’</td>
</tr>
</tbody>
</table>

➤ Problem: Some words fail to undergo the ZG reversal:

(26) | base form   | ZG form | gloss |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>kurisumasu</td>
<td>Ø</td>
<td>‘Christmas’</td>
</tr>
<tr>
<td>akademi:</td>
<td>Ø</td>
<td>‘academy’</td>
</tr>
<tr>
<td>supaman</td>
<td>Ø</td>
<td>‘Superman’</td>
</tr>
</tbody>
</table>
IKM analyze these forms as having a null ZG form. Rather than follow them on this point, I assume these bases have ZG forms that are (phonetically) identical to the bases themselves.

(27) **MAX-MORPHEME**
Every morpheme in the input has at least one segment in its output realization.

Any candidate without a ludlingant (or a stem) will violate MAX-M. I assume MAX-M is undominated, preventing null parses from being selected as the correct output, as well as forcing the winning candidate to have a ludlingant.

This constraint will not affect the previous analysis, since all of the winners satisfy it. Ranking MAX-M over the prosodic form limiters NONFIN and HIERALIGN yields the correct results for two of the three troublesome forms:

(28) /kurisumAsu+/LUD/
<table>
<thead>
<tr>
<th></th>
<th>MAX-M</th>
<th>NONFIN</th>
<th>HIERALIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>kurisumasu</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>kurisumAsu</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>Ø</td>
<td>**!</td>
<td></td>
</tr>
</tbody>
</table>

(29) /akAdemi:+LUD/
<table>
<thead>
<tr>
<th></th>
<th>MAX-M</th>
<th>NONFIN</th>
<th>HIERALIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>akAdemi:</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>akAdemi:</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>Ø</td>
<td>**!</td>
<td></td>
</tr>
</tbody>
</table>

**Problem:** Predict double vowel-shortening for *supa:ma:n*:

(30) /su:pA:ma:n+/LUD/
<table>
<thead>
<tr>
<th></th>
<th>MAX-M</th>
<th>NONFIN</th>
<th>HIERALIGN</th>
<th>MAX-µ</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>supa:ma:n</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>man:supa</td>
<td>*</td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>c.</td>
<td>supa:ma:n</td>
<td>*!</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>d.</td>
<td>Ø</td>
<td>**!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Proposal:** Constraint conjunction of MAX-µ with itself (cf. Smolensky 1993 which discusses conjunction of markedness constraints), out-ranking prosodic form constraints.

(31) /su:pA:ma:n+/LUD/
<table>
<thead>
<tr>
<th></th>
<th>MAX-µ²</th>
<th>NONFIN</th>
<th>HIERALIGN</th>
<th>MAX-µ</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>supa:ma:n</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>man:supa</td>
<td>*!</td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

This still allows the single vowel-shortening cases in (25), but rules out multiple shortenings, as would be required for *supa:ma:n* to satisfy the prosodic form constraints.
The final hierarchy for Japanese is:

(32) \[ \text{ALW} \]
    \[ \text{ARAS} \]
    \[ \text{MAX-IO} \]
    \[ \text{MAX-M} \]
    \[ \text{MAX-\(\mu\)} \]
    \[ \text{NONFIN} \]
    \[ \text{HIERALIGN} \]
    \[ \text{MAXFTTL} \]
    \[ \text{DEP-\(\mu\)} \]
    \[ \text{MAX-\(\mu\)} \]
    \[ \text{MUNIF} \]
    \[ \text{MAXFTHD} \]
    \[ \text{LIN} \]
    \[ \text{CONT} \]
    \[ \text{MAX-B\(\lambda\)} \]

5 Conclusions and Lingering Problems

Advantages of this analysis:

1. It avoids opposite-edge constraints, simplifying the grammar by restricting the predictive power of Generalized Alignment;

2. It brings ludlings in from the fringe of phonology, providing a theoretical correlation to the frequency and learnability of ludlings and leaving less to be explained by meta-linguistics;

3. It lays the groundwork for unifying all phonetically-empty morphology (reduplication, ludlings, and truncation);

4. It accounts for the same range of data as an opposite-edge analysis;

5. By “reversing the polarity” of the alignment constraints, it predicts the existence of mirror-image reversal ludlings, in which initial syllables are moved to the end of the word, like sorsik summake in Cuna (Sherzer 1976).

Concerns requiring further study:

1. Some words in Japanese, like kudeta: ‘coup d’état’, do not have ZG forms, though this analysis predicts they do (*taakude in this case). IKM, through very careful requirements on what strings are allowed to correspond for CROSS ANCHOR, obtain the correct results.

2. Given the prominence of left-edges over right-edges, there might be an asymmetry in reversal ludlings between preposing and postposing. Empirical research would need to be
done to locate such an asymmetry if it exists. However, this analysis treats left and right edges as equals (predicting no asymmetry), which runs counter to Nelson (1998) in which right edges in ANCHOR constraints are eliminated in favor of a more general ANCHOR-Edge constraint.

How can this analysis be adapted, if at all, to account for infixing ludlings, such as Op in English (bat~bopat, hello~hopellopo), or those such as Pig-Latin which combine reversal with other processes (affixation): bat~atbay, hello~ellohay?

References


Sanders, Nathan. 1999. “Intra-Representational Correspondence and Truncation.” Talk presented at Linguistics at Santa Cruz, University of California, Santa Cruz.

