Nathan Sanders
University of California, Santa Cruz
sanders@ling.ucsc.edu

WCCFL 18
University of Arizona, Tucson
10 April 1999

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)

ALIGN (Cat_1,$Edge_1$,Cat_2,$Edge_2$)
$\forall Cat_1$ $\exists Cat_2$ such that $Edge_1$ of Cat_1 and $Edge_2$ of Cat_2 coincide,
where Cat_1,Cat_2 $\in$ PCat $\cup$ MCat and $Edge_1$,$Edge_2$ $\in$ {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)

ALIGN-Edge (Cat_1,Cat_2)
$\forall Cat_1$ $\exists Cat_2$ such that Edge of Cat_1 and Cat_2 coincide,
where Cat_1,Cat_2 $\in$ PCat $\cup$ MCat and Edge $\in$ {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*).

---

[*] This research has benefited from the helpful comments and insight of Judith Aissen, Sandy Chung, Junko Itô, Kazu Kurisu, Armin Mester, Jaye Padgett, Adam Sherman, the audience at the 1999 Trilateral Phonology Weekend at Stanford University, and the participants in the UCSC Department of Linguistics Fall 1997 Linguistic Investigation class, Winter 1997 Research Seminar, and weekly Phonology Interest Group.

[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:

(3)

base form	*FSP form*	*gloss*
kapɑtid	tidkapɑ	'sibling'
magandɑ	dɑmagan	'beautiful'
kamatis	tiskamɑ	'tomato'
ʔito	toʔi	'this'
paŋit	ŋitpɑ	'ugly'
pandak	dakpan	'short'
nɑ	nɑ[2]	'already'

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

(4) /kapɑtid/ ⇒ [kapɑtid] 'sibling (normal form)'
/kapɑtid+LUD/ ⇒ [tidkapɑ] 'sibling (ludling form)'

The properties of LUD and its output realization is the focus of the next section.

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 /budogɑ+RED/ for a language with reduplication. Three possible candidates are:

(5)

candidates	*phonetic realization*	*phonological properties*
bubudogɑ	bubudogɑ	epenthesis of [bu] violates DEP, REALIZE MORPHEME, etc.
bubudogɑ	bubudogɑ	infixed reduplicant [bu] violates ALIGN, CONTIGUITY, etc.
bubudogɑ	bubudogɑ	prefixed reduplicant [bu]

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

---

[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: [parɑ̃]~[rɑ̃pa] 'parents' vs. [mɛk]~[kɛm] '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.

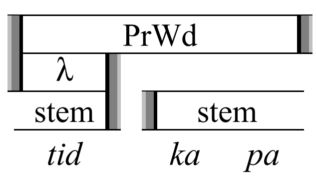
The analog of RED's reduplicant for LUD is the ***ludlingant*** (symbolized by λ). Like the reduplicant, λ is an abstract substring of the output which is sensitive to constraints that reference it (ALIGN, MAX, etc.).

- **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 $\alpha\Re\alpha'$, 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)


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)

ALIGN-Left (λ,PrWd) ≡ ALλW
∀λ ∃PrWd s.t. their left edges coincide

ALIGN-Right (λ,stem) ≡ ARλS
∀λ ∃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 α precedes β ($\alpha<\beta$), then $\beta' \not< \alpha'$

CONTIGUITY
If α and β are adjacent (α͡β), then α′͡β′

N.B. in all constraint definitions for this talk, α and β represent segments in the input, while α′ and β′ are their respective output correspondents.

ALλW, ARλS » LINEARITY, CONTIGUITY (*d* is the right edge of the stem for *kapatid*):

(10)

		/kɑpɑtid+LUD/	ALλW	ARλS	LIN	CONT
✔	a.	tidkɑpɑ			tid<kɑpɑ	ɑ͡t
	b.	kɑpɑtid		*!		
	c.	kɑpɑtid	*!			

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)

		/kɑpɑtid+LUD/	MAX-IO	LIN	CONT
✔	a.	tidkɑpɑ		tid<kɑpɑ	ɑ͡t
	b.	tid	kɑpɑ!		

Note that the reverse ranking yields the truncated form *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-Bλ, which maximizes segments from the base[3] to the ludlingant:

(13)

MAX-Bλ
If there is a ludlingant λ in the output, then every segment in the base must have a correspondent in λ

[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*:

(14)

	/kapatid+LUD/	ALλW	ARλS	MAX-IO	MAX-Bλ	LIN	CONT
✔ a.	tidkapa				kapa!	tid<kapa	a͡t
✘ b.	kapatid						

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

(15)

> **MORPHEMIC DISJOINTNESS**
> If $M_1 \neq M_2$, then $\mu_1 \neq \mu_2$
> where M_1 and M_2 are morphemes in the input, and μ_1 and μ_2 are any segments contained in their respective output realizations

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

(16)

	/kapatid+LUD/	MORPHDIS	MAX-Bλ	LIN	CONT
✔ a.	tidkapa	tid	kapa	tid<kapa	a͡t
b.	kapatid	kapatid!			
c.	patidka	patid!	ka	patid<ka	a͡p

This analysis also accounts for bisyllabic FSP forms in *baliktád*:

(17)

	/ʔito+LUD/	MAX-IO	MORPHDIS	MAX-Bλ	LIN	CONT
✔ a.	toʔi		to	ʔi	to<ʔi	i͡t
b.	ʔito		ʔito!			
c.	to	ʔi!	to			

(18)

	/ʔito+LUD/	ALλW	ARλS	MAX-Bλ	LIN	CONT
✔ a.	toʔi			ʔi	to<ʔi	i͡t
b.	ʔito		*!			
c.	ʔito	*!				

The monosyllabic *na* requires ALλW and ARλS to be ranked over MORPHDIS:

(19)

	/nɑ+LUD/	ALλW	ARλS	MORPHDIS
✔ a.	nɑ			nɑ
b.	nɑ		*!	n
c.	nɑ	*!		ɑ

Candidates like **na* and **an* can be ruled out by REALIZE MORPHEME and ONSET, respectively. This gives the following constraint ranking for *baliktád*:

(20) ALλW
ARλS
|
MORPHDIS MAX-IO
MAX-Bλ
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 *baliktád* (final syllable of the base form preposes in the ludling form):

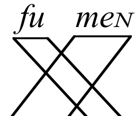
(21)

base form	*ZG form*	*gloss*
fumeN	meNfu	'musical score'
tɑkuʃiː	ʃiːtɑku	'taxi'
kɑnoː	noːkɑ	'possible'
koːhiː	hiːkoː	'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: *fu* *meN*



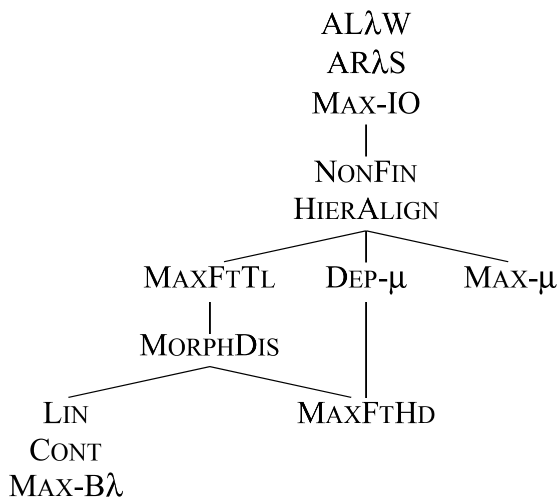
ZG: *meN* *fu*

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-σ_μ 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)



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

(25)

base form	*ZG form*	*gloss*
me	eːme	'musical score'
pɑɴ	ɴːpɑ	'taxi'
meʃi	ʃiːme	'possible'
kusuri	suriku	'coffee'
beːsu	suːbe	'bass'
bɑɴdo	doɴbɑ	'band'
komɑːʃɑru	ʃɑrukomɑ	'commercial'
tenisu	sunite	'tennis'

➢ **Problem:** Some words fail to undergo the ZG reversal:

(26)

base form	*ZG form*	*gloss*
kurisumɑsu	∅	'Christmas'
ɑkɑdemiː	∅	'academy'
suːpɑːmɑɴ	∅	'Superman'

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)

		/kurisumɑsu+LUD/	MAX-M	NONFIN	HIERALIGN
✔	a.	kurisumɑsu		*	*
	b.	kurisumɑsu	*!		
	c.	∅	**!		

(29)

		/ɑkademi:+LUD/	MAX-M	NONFIN	HIERALIGN
✔	a.	ɑkademi:		*	*
	b.	ɑkademi:	*!		
	c.	∅	**!		

- **Problem:** Predict double vowel-shortening for *su:pa:maN*:

(30)

		/su:pɑ:mɑN+LUD/	MAX-M	NONFIN	HIERALIGN	MAX-μ
✔	a.	su:pɑ:mɑN		*	*	
✘	b.	mɑNsupɑ				**
	c.	su:pɑ:mɑN	*!	*	*	
	d.	∅	**!			

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

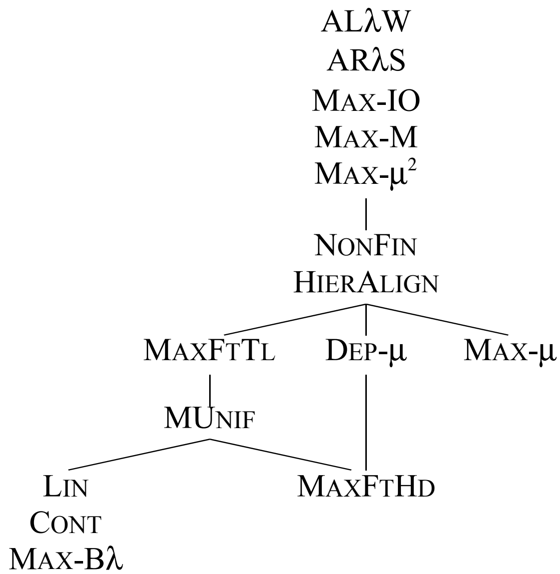
(31)

		/su:pɑ:mɑN+LUD/	MAX-μ^2	NONFIN	HIERALIGN	MAX-μ
✔	a.	su:pɑ:mɑN		*	*	
	b.	mɑNsupɑ	*!			**

This still allows the single vowel-shortening cases in (25), but rules out multiple shortenings, as would be required for *su:pa:maN* to satisfy the prosodic form constraints.

The final hierarchy for Japanese is:

(32)



5 Conclusions and Lingering Problems

Advantages of this analysis:

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

❷ 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;

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

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

❺ 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:

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

❷ 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.

❸ 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

Bagemihl, Bruce. 1989. "The Crossing Constraint and 'Backwards Languages'." *Natural Language and Linguistic Theory* 7:481–549.

Conklin, Harold C. 1986. "Tagalog Speech Disguise." *Language* 32:136–139.

Itô, Junko, and Armin Mester. 1996. "Rendaku I: Constraint Conjunction and the OCP." Handout of lecture for 1996 Kobe Phonology forum. [ROA-144-0996]

Itô, Junko, Yoshihisha Kitagawa, and Armin Mester. 1996. "Prosodic Faithfulness and Correspondence: Evidence from a Japanese Argot." *Journal of East Asian Linguistics* 5:217–294. [ROA-146-0996]

Laycock, Don. 1969. "Sublanguages in Buin: Play, Poetry, and Preservation." *Pacific Linguistics* A22:1–23.

———. 1972. "Towards a Typology of Play-Languages, or Ludlings." *Linguistic Communications* 6:61–113.

McCarthy, John. 1998. "Sympathy & Phonological Opacity." Manuscript, University of Massachusetts, Amherst. [ROA-252-0398]

——— and Alan Prince. 1993. "Generalized Alignment." In Geert Booij and Jaap van Marle, eds. *Yearbook of Morphology 1993*. Kluwer, Dordrecht. 79–153. [ROA-7-0000]

———. 1995. "Faithfulness and Reduplicative Identity." In Jill Beckman, Suzanne Urbanczyk, and Laura Walsh, eds. *University of Massachusetts Occasional Papers in Linguistics 18: Papers in Optimality Theory*. GLSA, Amherst, MA. 249–384. [ROA-60-0000]

Nelson, Nicole. 1998. "Right Anchor Aweigh." Ms., Rutgers University. [ROA-284-0998]

Prince, Alan and Paul Smolensky. 1993. "Optimality Theory: Constraint Interaction in Generative Grammar." Ms., Rutgers University and University of Colorado, Boulder.

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

Sherzer, Joel. 1976. "Play Languages: Implications for (Socio) Linguistics." In Barbara Kirshenblatt-Gimblett, ed. *Speech Play: Research and Resources for Studying Linguistic Creativity*. University of Pennsylvania Press. 19–36.

Smolensky, Paul. 1993. "Harmony, Markedness, and Phonological Activity." Handout of talk presented at Rutgers Optimality Workshop I, New Brunswick, NJ. [ROA-87-0000]

Spaelti, Philip. 1997. *Dimensions of Variation in Multi-Pattern reduplication*. PhD dissertation, University of California, Santa Cruz.