



**McCARTHY AND PRINCE (1993a)'S ANALYSIS<sup>1</sup>:**

- *-um-* is underlyingly a prefix.
  - It appears infix in consonant-initial roots in order to avoid creating unnecessary codas.
- (7) EDGEMOST(L, *um*)  
 The morpheme *um* is located at the left edge; is a prefix.  
 NOCODA  
 Syllables are open.
- (8) NOCODA >> EDGEMOST(L, *um*)

Candidates	NOCODA	EDGEMOST(L, <i>um</i> )
a. [- <b>um</b> .grad.wet.	***!	
b. [g- <b>um</b> .rad.wet.	***!	*
c. [gr- <b>u</b> .mad.wet.	**	gr
d. [grad.w- <b>u</b> .met.	**	gradw!

- In the case of vowel-initial stem, the focus marker appears prefixed since infixing *-um-* does not create more harmonic structure.
- (9) Candidates

Candidates	NOCODA	EDGEMOST(L, <i>um</i> )
a. [- <b>u</b> .ma.ral.	*	
b. [a- <b>um</b> .ral.	**!	a
c. [a.r- <b>u</b> .mal.	*	ar!
d. [a.ra- <b>uml</b> .	*	ara!
e. [a.ra.l- <b>um</b> .	*	aral!

**ADVANTAGES OF DISPLACEMENT THEORY:**

It provides a direct link between the shape of the infix and the location of realization (Anderson 1972, Cohn 1992):

- If the VC affix were to be prefixed to the stem, it would not only create an additional coda in the output, but also an onsetless initial syllable (e.g., \**um.grad.wet*). Since both codas and onsetless syllables are prosodically marked, both cross-linguistically and language internally, the infixing of the VC morpheme after the initial consonant is 'explained' as giving in to the pressure to improve syllable structure of the output.

<sup>1</sup> Alternative Displacement-Theoretic analyses of *-um-* infixation in Tagalog and Ilokano (e.g., the ONSET-driven account of Orgun and Sprouse 1999 and McCarthy 2002) have been proposed in the literature in recent years. However, for the sake of simplicity and avoidance of confusion in references, we shall report faithfully the analysis proposed in the work cited.

Displacement Theory also eliminates an embarrassing aspect of negative prosodic circumscription (McCarthy & Prince 1990)

- Under negative prosodic circumscription, the infixing of *-um-* is taken as the result of the circumscription of the initial consonant of the root (e.g., In Sundanese *-ar-* infixation: niʔis → (n)iʔis → (n)+ar+iʔis → nariʔis). The need to reference to the initial consonant is problematic for the Theory of Prosodic Morphology since it is not recognized as a prosodic unit under most theories of prosodic phonology.

**3. Displacement Theory: A critical assessment**

**3.1 How explanatory is the Displacement Theory?**

**THE MAIN CONTENTION OF THE DISPLACEMENT THEORY:**

It explains the location of infixation by direct reference to the shape of the infix itself.

**PREDICTION OF DISPLACEMENT THEORY:**

For a theory to be explanatory, it is not only important to demonstrate that an infix should be infix due to prosodic requirements, but also that other affixes CANNOT be infix due to no prosodic improvements can be gained.

Ilokano is an Austronesian language spoken in the Philippines.

(10) Ilokano *-um-* infixation (Vanoverbergh 1955:137; Zoll 1996)

isem umisem '(threatens to) smile'  
 kagat kumagat '(threatens to) bite'

Following M&P's treatment of *-um-* infixation in Tagalog, Zoll 1996 argues that *-um-* is infix in Ilokano due to the drive to avoid coda consonant.

(11) Ilokano *ag-* prefixation (Vanoverbergh 1955)

isem **ag**-isem '(actually) smiles' (132)  
 kagat **ag**-kagat '(actually) bites' (137)

**PROBLEM:** A VC affix is prefixed to the verb in Ilokano, even though infixing it would certainly reduce the number of coda consonants in the output.

**A SOLUTION?**

(12) ALIGN-*ag* >> NOCODA >> ALIGN-*um* (Zoll 1996)

In Pangasinan, an Austronesian language spoken in the Philippines, the placement of the *-in-* yields different semantic effects (Benton 1971:130-131).

- (13)a. Passive (intentional)  
**inpaltóg** 'was fired'  
**insúlat** 'was written (rather than e.g., read)'  
**inbása** 'was read (rather than, e.g., sung)'
- b. Benefactive  
**insoliwán** 'was bought for'  
**ingawaán** 'was done for'  
**impesakán** 'was laundered for'
- c. Passive (neutral)  
**pinaltóg** 'was shot'  
**sinúlat** 'was written'  
**binása** 'was read'  
**tináwag** 'was called'

In Atayal, another Austronesian language but spoken in Taiwan, both the actor focus marker and the reflexive marker are marked by the segment *-m-*. The actor focus marker is infix, while the reflexive marker is prefixed.

- (14) Atayal *-m-* infixation and prefixation (Egerod 1965)
- | Root   | Gloss          | Actor focus    | Reciprocal/Reflexive |
|--------|----------------|----------------|----------------------|
| Kaial  | 'talk'         | <b>kmaial</b>  | <b>mkaial</b>        |
| qul    | 'snatch'       | <b>qmul</b>    | <b>mqul</b>          |
| sbil   | 'leave behind' | <b>mbil</b>    | <b>msbil</b>         |
| siuk   | 'give back'    | <b>smiuk</b>   | <b>mssiuk</b>        |
| spuŋ   | 'measure'      | <b>smpuŋ</b>   | <b>mmpuŋ</b>         |
| suliŋ  | 'burn'         | <b>smuliŋ</b>  | <b>msuliŋ</b>        |
| hkaŋi? | 'search'       | <b>hmkaŋi?</b> | <b>mhkaŋi?</b>       |

**CONCLUSION:** The fact that two morphemes of the same shape appearing in different locations is most puzzling to any Displacement Theoretic approaches. Such a theory is incapable of providing a principled explanation as to why this state of affair should exist at all.

## 3.2 Problems of overgeneration: The (im)mobility of infixes

### 3.2.1 Infix immobility

**PREDICTION OF DISPLACEMENT THEORY:** An infix should always have a prefixing or suffixing counterpart.

Laotian Katu is a Mon-Khmer language. All data cited here comes from Costello 1998.<sup>2</sup>

- (15) Katu *r-*nominalization
- |         |                   |          |                           |
|---------|-------------------|----------|---------------------------|
| katas   | 'to name'         | kartas   | 'name'                    |
| kachet  | 'to kill'         | karchet  | 'dead'                    |
| mamong  | 'to be alive'     | marmong  | 'characteristics o. life' |
| saveeng | 'to be between'   | sarveeng | 'place between'           |
| totóng  | 'go one after o.' | tartóng  | 'one after the other'     |

- (16) Katu *r-*nominalization with vowel-initial forms<sup>3</sup>
- |           |                     |            |                     |
|-----------|---------------------|------------|---------------------|
| achia     | 'to advice'         | archia     | 'things given'      |
| aloom     | 'to offer gift'     | arloom     | 'gift offered'      |
| achɣng    | 'to make armspread' | archɣng    | 'armspread measure' |
| achuutung | 'to advise'         | archuutung | 'advice'            |

In Archi, a Daghestanian language spoken in the Caucasus, the number/class markers, which are *-w-*, *-r-*, or *-b-*, always appear after the initial vowel, whether the root is vowel-initial or vowel-final.

- (17) Archi
- |      |               |                           |                   |
|------|---------------|---------------------------|-------------------|
| daχi | <b>dabχdi</b> | 'to churn (AOR., III)'    | (K & K 1988:33)   |
| ak'a | <b>abk'u</b>  | 'to drive (AOR., III)'    | (K & K 1988:33)   |
| aχa  | <b>abχu</b>   | 'to lie down (AOR., III)' | (Kibrik 1998:458) |

<sup>2</sup> For reasons of ease of presentation, a more phonetic representation based on the phonetic characterization given on p. 32 of Costello 1998 of the forms are used here in lieu of the orthographic convention used in article itself.

<sup>3</sup> While the Cambodian-based script of Katu represents initial glottal stop in the orthography, unlike the initial glottal stop in Tagalog, there is evidence to suggest that, at least for the purpose of affixation, these forms are treated as if they are vowel-initial: in Laotian Katu, the initial glottal is not retained after affixation (e.g., /ayuoŋ 'to sour' → payuoŋ 'to make sour'; /at 'to remain' → pharat 'ritual', /a 'to judge' → ara 'judgment'). This can be contrasted with what happens in Tagalog where the phonemic initial glottal stop is retained even after prefixation (e.g., /aral 'to study' → mag/ara 'X studies').

Tagalog allows an optional pluralized verb formation that occurs only with a plural topic. The pluralized verbs are marked by either the prefixing of *magsi-* or the infixing of *-nga-* or both. The infix *-nga-* always appears after the initial vowel of the stem.

(18) Tagalog pluractional (Schachter & Otones 1972:335)			
mabulok	'get rotten'	mangabulok	'get rotten (pl.)'
magluto	'cook'	mangagluto	'cook (pl.)'
mag?aral	'study'	mangag?aral	'study (pl.)'
magsikanta	'sing (pl.)'	mangagsikanta	'sing (pl.)'
magsipangisda	'go fishing (pl.)'	mangagsipangisda	'go fishing (pl.)'

**NOTE:** Given the shape of the pluractional morpheme is CV, there is no prosody-improving motivation for the morpheme to 'migrate' inward.

### 3.2.2 Conflicted directionality in Infixation?

**OBSERVATION:** Several studies in recent years have pointed out the formal similarities between segmental infixation and featural affixation (Zoll 1996, 1997, 2001; Akinlabi 1996).

In Japanese mimetic palatalization (19), palatalization targets the rightmost non-*r* coronal consonant (19a), otherwise, the palatalizing feature links to the leftmost segment (19b).

(19) Japanese mimetic palatalization (Mester and Ito 1989)			
Palatalize the right most non- <i>r</i> coronal			
a.	/dosa/	doša-doša	'in large amounts'
	/toko/	čoko-čoko	'childish small steps'
Otherwise palatalize the initial consonant			
b.	/poko/	p <sup>l</sup> oko-p <sup>l</sup> oko	*pok <sup>l</sup> o 'flip-flop'
	/koro/	k <sup>l</sup> oro-k <sup>l</sup> oro	*kor <sup>l</sup> o 'look around indeterminately'

**ANALYSIS:** Zoll 1996, in the spirit of P >> M, analyzes this as a matter of a constraint that licenses the location of a complex segment outranking the alignment of the palatalizing feature.

**CLAIM:** The fact that Displacement Theory is able to provide a uniform characterization for two classes of seemingly unrelated phenomenon supports the theory.

**PREDICTION:** Segmental infixation should display the properties of conflicted directionality (Zoll 1997).

### HYPOTHETIC SITUATION: PSEUDO-TAGALOG

- Orgun and Sprouse 1999 report that labial sequences are banned in Tagalog, thus, no output is possible when *-um-* infixation violates this constraint.
- Supposed that in the grammar of pseudo-Tagalog, a potential optimal candidate can be generated, we would predict the following scenario to be possible:

(20) OCP[labial], DEP-C, ONSET >> NOCODA, ALIGN<sup>4</sup>

/um, wawan/	OCP	DEP-C	ONSET	*CODA	ALIGN
a. wumawan	*!				
b. ?umwawan		*!		*	
c. wawuman	*!				***
● <sup>sc</sup> d. wawanum				*!	*****

A similar problem appears in McCarthy and Prince (1993a)'s treatment of Dakota infixation. In Dakota, most personal agreement markers appear after the first syllable, which is always open. Some examples are given below:

(21) Infixation of *-wa-/-ma-* 'I' in Dakota (Shaw 1980)

pa-wa-xta	'I tie up'
ma-wa-ni	'I walk'
ma-wa-nø	'I steal'
na-wa-pca	'I swallow it'
na-wa-t <sup>h</sup> aka	'I lock (the door)'
la-ma-k <sup>h</sup> ota	'I am a Lakota'
?i-ma-ktomi	'I am Iktomi'

(22) ALIGN-ROOT (Dakota) (McCarthy & Prince 1993a:113)  
Align (Root, L, PrWd, L)

(23) ALIGN-IN-STEM (Dakota)  
Align ([AGR]<sub>AF</sub>, L, Stem, L)

paxta, -wa-	ONSET	ALIGN-RT	ALIGN-IN-STM
a. wa.pa.xta		*!	
b. pwa.a.xta	*!		p
☞ c. pa.wa.xta			pa

<sup>4</sup> This constraint ranking is based on McCarthy 2002 except for the fact that M-Parse taken out of the picture here.

**PROBLEM:** It predicts that, in the case of monosyllabic root, the agreement affixes should surface as suffixing.

(25) Evaluation of the 1SG form of the verb *tʰi*, ‘to dwell’ (Boas & Deloria 1941:76)

tʰi ‘to dwell’, -wa-	ONSET	ALIGN-RT	ALIGN-IN-STEM
a. wa.tʰi		*!	
b. tʰi.wa			tʰi

**FACT:** A typological survey of 130 cases of infixation patterns found no evidence to suggest that this type of infixation pattern exists.

**CONCLUSION:** Segmental infixation and featural affixation do not constitute a uniform phenomenon.<sup>5</sup>

### 3.3 The infix shape and location myth: A theory built on a false premise

**PREMISE OF DISPLACEMENT THEORY:** There is a causal relationship between the shape of an infix and where it surfaces (Anderson 1972, Cohn 1992, McCarthy & Prince 1993ab)

**PREDICTION OF DISPLACEMENT THEORY:** No infixation should yield more marked structures than its prefixing or suffixing potential counterparts.

<sup>5</sup> Is it a loss of generalization if these two classes of phenomenon should be treated differently? The answer is probably ‘NO’.

Notice that featural affixation always involves secondary features (e.g., labialization, palatalization, glottalization etc.). Given the fact that secondary features generally require a longer duration for realization (Stevens 1989; Stevens & Keyser 1989), it is not at all unexpected that listeners would have difficulties in localizing its source. This has given rise to instances of featural harmony, metathesis, dissimilations and featural affixation. In light of this, it is not surprising that featural affixation should seem ‘mobile’. The default location of featural affixation reflects the fact that featural affixation originates from segmental affixation at some point. This diachronic scenario thus explains the synchronic properties of conflicted directionality.

Infixation, one the other hand, does not share a similar diachronic history with featural affixes. Infixes are, after all, fixed segment, not secondary features. Thus, their recovery in the speech stream, while perhaps more difficult, is by-and-large no different from other form of fixed segment affixation processes. Thus, one should not expect infixes to be mobile. For a survey of the different diachronic pathways of infix genesis, see Yu (in progress).

(26) ‘Why aren’t there any CV infixes which occur after the onset?’ (Buckley 1994:14)

Leti, an Austronesian language spoken on the Island of Leti, just east of Timor.

(27) Nominalizing morpheme in Leti (Blevins 1999)

kaati	‘to carve’	k- <b>ni</b> -aati	‘carving’
kasi	‘to dig’	k- <b>ni</b> -asi	‘act of digging’
kakri	‘to cry’	k- <b>ni</b> -akri	‘act of crying’
pèpna	‘to fence’	p- <b>ni</b> -èpna	‘act of fencing, fence’
polu	‘to call’	p- <b>ni</b> -olu	‘act of calling, call’

In the Pingding dialect of Mandarin, the diminutive/hypocoristic affixation process is marked by infixing a retroflex lateral *-l-*, between the onset and the rhyme of a syllable, rather than the more common variety of *er*-suffixation in other Mandarin dialects.

(28) Pingding *l*-infixation (Xu 1981; Lin 2002)

mən	tʰɿŋ	+	l	→	mən	tʰlɿŋ	‘hole on the door’
l	tʰɿu	+	l	→	l	tʰlɿu	‘old man’
i	pɿŋ	+	l	→	i	plɿŋ	‘small notebook’
xɿu	mɿŋ	+	l	→	xɿu	mlɿŋ	‘back door’
i	kuɿ	+	l	→	i	klɿu	‘small wok’
xu ŋ	xu	+	l	→	xu ŋ	xlu	‘yellow flower’
	ŋɿ	+	l	→		ŋlɿ	‘moth’

In Budukh, a Daghestanian language spoken the Kubinsky region of Azerbaijan, the prohibitive marker *-mE-* is infixed after the initial vowel of the root.

(29) Budukh prohibitive (Alekseev 1994: 279)

Root	Gloss	Prohibitive
yeçi	‘to arrive’	yemeçi
y xər	‘to be’	y məxər
yuc’u	‘to give’	yumoc’u

In Hua, a Papuan language of the Eastern Highlands of New Guinea, the negative morpheme /a appears before the final syllable.

(30) Hua negative formation (Haiman 1980)

zgavo	zgaʔavo	‘not embrace’
harupo	haruʔapo	‘not slip’

**CONCLUSION:** Previous claims on the purported relationship between the location of an infix and its shape have no genuine empirical backing.<sup>6</sup>

### 3.4 P >> M revisited: Non-prosodic motivations for displacement

(31) **Prosodic Morphology within OT** (McCarthy & Prince 1993b)

- a. Prosodic Morphology Hypothesis  
Templates are constraints on the prosody/morphology interface, asserting the coincidence of morphological and prosodic constituent.
- b. Template Satisfaction Condition  
Templatic constraints may be undominated, in which case they satisfied fully, or they may be dominated, in which case they are violated minimally, in accordance with general principles of Optimality Theory.
- c. **Ranking Schema**  
**P >> M**

#### CLAIM OF DISPLACEMENT THEORY:

Infixation in general is a matter of prosodic constraints outranking morphological ones (e.g., in Tagalog, the *P-constraint*, NOCODA, outranks the *M-constraint*, ALIGN-*um*, which prompted the inward migration of the VC prefix).

In Mangarayi, an Aboriginal language spoken in the Northwest Territory of Australia, the VCC reduplicant appears after the initial consonant of the base (32).

(32) Mangarayi nominal reduplication (Kurusu & Sanders 1999)

<i>Base form</i>	<i>Gloss</i>	<i>reduplicated form</i>	<i>Gloss</i>
alwaji	'mud'	-alw-alwaji	'very muddy'
ba gal	'egg'	b-a g-a galji	'having a lot of eggs'
wa gi	'child'	w-a g-a gi	'children'
gu jag	'lily'	g-urj-urjag	'having a lot of lilies'

#### ANALYSES:

Kurusu and Sanders 1999: ANCHL-IO, which requires the left edges of the input and output to correspond, outranks AL(IGN)RW, which requires the left edge of the reduplicant to be aligned to the left edge of a prosodic word.

<sup>6</sup> To the extent that there might be a tendency for infixes to create less marked structure, it is best to view it as a reflection of the developmental history of infixation.

**PROBLEM:** ANCHL-IO is not a P-constraint!<sup>7</sup>

**REMEDY:** McCarthy and Prince 1993b propose ROOT-ALIGN:

(33) ROOT-ALIGN (Mangarayi)<sup>8</sup>

Left edge of ROOT coincides with the left edge of PrWd.

**NOTE:** ROOT-ALIGN, according to McCarthy and Prince (1993b), is a P-constraint, since it refers to a prosodic unit, namely, the Prosodic Word. Genuine M-constraints are either RIGHTMOST or LEFTMOST, which characterizes normal suffixing or prefixing behavior.

**PROBLEM:** The literature is unclear on what constitutes a P-constraint versus an M-constraint, even in the case of encoding the behavior of 'normal' suffixes and prefixes.

(34) ALIGN-*um* (McCarthy and Prince 1993a)

ALIGN ([um]Af, L, Stem, L)

(35) ALIGN-*um*-L (Kager 2002:122, citing Prince & Smolensky 1993)

Align the left edge of *-um-* with the left edge of the PrWd.

**SOLUTION:** The solution lies in the asymmetric nature of GA itself.

(36) Generalized Alignment

Align (Cat<sub>1</sub>, Edge<sub>1</sub>, Cat<sub>2</sub>, Edge<sub>2</sub>) =<sub>def</sub>

∇ Cat<sub>1</sub> ∃ Cat<sub>2</sub> such that Edge<sub>1</sub> of Cat<sub>1</sub> and Edge<sub>2</sub> of Cat<sub>2</sub> coincide.

Where Cat<sub>1</sub>, Cat<sub>2</sub> ∈ ProsCat ∪ GramCat

Edge<sub>1</sub>, Edge<sub>2</sub> ∈ {Right, Left}

**FACT:** Cat<sub>1</sub> is quantified universally (every Cat<sub>1</sub>), while Cat<sub>2</sub> existentially (some Cat<sub>2</sub>).

#### CONCLUSIONS:

*A P-constraint is a constraint on prosodic structures, such as ONSET and NOCODA. The category that is universally quantified should correspond to a prosodic constituent.*

<sup>7</sup> Similar constraints were appealed to in Stemberger & Bernhardt 1998.

<sup>8</sup> See similar constraints invoked in the M&P's treatment of Dakota infixation in section 3.2.2 above.

(37) ONSET and NOCODA reformulated in GA (M&P 1993a, Ito & Mester 1999)

ALIGN-LEFT ( $\sigma$ , C) ‘ONSET’  
ALIGN-RIGHT ( $\sigma$ , V) ‘NOCODA’

An *M*-constraint, which concerns the well-formedness of morphological structure, should have a morphological entity in its first argument.

#### IMPLICATIONS:

- ROOT-ALIGN is really a morphological constraint in disguise, since it concerns the well-formedness of roots. It mandates all roots be aligned to some prosodic word, rather than requiring the prosodic word to be aligned with a root.
- **The P >> M schema cannot be generalized to all cases of infixation!**<sup>9</sup>

### 3.5 Ultimate betrayal: Morpheme-specific constraints

**CLAIM OF GENERALIZED ALIGNMENT:** The categories subjected to Generalized Alignment (GA), in its ideal, intended, form, are supposed to be general prosodic and morphological primitives.

(38) Generalized Alignment

Align (Cat<sub>1</sub>, Edge<sub>1</sub>, Cat<sub>2</sub>, Edge<sub>2</sub>) =<sub>def</sub>

$\forall$  Cat<sub>1</sub>  $\exists$  Cat<sub>2</sub> such that Edge<sub>1</sub> of Cat<sub>1</sub> and Edge<sub>2</sub> of Cat<sub>2</sub> coincide.

Where Cat<sub>1</sub>, Cat<sub>2</sub>  $\in$  ProsCat  $\cup$  GramCat

Edge<sub>1</sub>, Edge<sub>2</sub>  $\in$  {Right, Left}

<sup>9</sup> Note that the edge-alignment-based Displacement Theory is not devoid of problems either. As already noted earlier in the case of Dakota, the edge-alignment approach incorrectly forces an infix to appear as suffixing in certain circumstances. In a language such as Kugu Nghanhara, a Middle Paman language of the Cape York peninsula in North Queensland, the initial vowel and the immediately following consonant(s) are reduplicated, similar to what we found in Mangarayi (e.g., *munji*  $\rightarrow$  *munjunji* ‘swim’; *yumpi*  $\rightarrow$  *yumpumpi* ‘do’). But unlike Mangarayi, in the case of vowel-initial stem, the reduplicant appears prefixing, contrary to the prediction of the edge-alignment based analysis (*iiru-ma*  $\rightarrow$  *iiriiru-ma* ‘here-EMPH’ not *\*iiruru-ma*; *ungpa*  $\rightarrow$  *ungkungpa* ‘break’ not *\*ungpangpa*).

(39) Prosodic Hierarchy (McCarthy & Prince 1986, 1993b)

Prosodic Word	PrWd
Foot	Ft
Syllable	$\sigma$
Mora	$\mu$

(40) Morphological Hierarchy (McCarthy & Prince 1993a)

MWd  $\rightarrow$  Stem\*  
Stem  $\rightarrow$  Stem, Affix  
Stem  $\rightarrow$  Root

(41) Affixation constraints

PREFIX: ALIGN-AFFIX

‘The right edge of an affix is aligned with the left edge of a PrWd.’

SUFFIX: ALIGN-AFFIX

‘The left edge of an affix is aligned with the right edge of a PrWd.’

**OBSERVATION:** The Displacement-Theoretic treatment of infixation not only violates the ‘generalized’ tenet of GA, it also defeats the purpose of couching GA within Optimality Theory, which is supposed to be a system of violable, but universal, constraints.

**REMEDY?** Kager 2000, while acknowledging the gravity of this problem, points out that one could take solace at the fact that these morphological constraints are based on one single Generalized Alignment template. Moreover, while the particularization of GA constraints is undesirable, the benefits of admitting these types of constraints outweigh the potential dangers of allowing the deviation from the ideal (i.e. language-specific constraints).

**PROBLEM:** One of the main benefits is, of course, that the relation between the form of an infix and its placement is supposed to be captured by the Displacement account. But this purported link is now shown to be unsubstantiated, thus, the force of Kager’s counter-argument is severely weakened.<sup>10</sup>

<sup>10</sup> Since there does not seem to be any theory-internal motivations to continue the practice of relativizing alignment constraint to specific morphemes, one might wonder whether such practice should not be abandoned all together. However, given the fact that individual infixes in languages with multiple infixes do not always have the same distribution (e.g., in Tagalog, the active focus marker *-um-* appears after the initial

### 3.6. A summary on the theoretical status of Displacement Theory (DT)

- DT is not an explanatory theory
- DT under- and over-generates
- DT was built on erroneous assumptions.
- $P \gg M$  cannot account for all instances of infixation
- DT weakens Prosodic Morphology in OT, and OT in general

CONCLUSION: *Displacement Theory should be abandoned!*

## 4. Infixation as *Phonological Subcategorization*

### (42) *Generalized Phonological Subcategorization (GPS)*

Align (Cat<sub>1</sub>, Edge<sub>1</sub>, Cat<sub>2</sub>, Edge<sub>2</sub>) =<sub>def</sub>

$\forall$  Cat<sub>1</sub>  $\exists$  Cat<sub>2</sub> such that Edge<sub>1</sub> of Cat<sub>1</sub> and Edge<sub>2</sub> of Cat<sub>2</sub> coincide.

Where Cat<sub>1</sub>  $\in$  GramCat {morpheme, morph}

Cat<sub>2</sub>  $\in$  PhonCat {ProsCat, C, V}

Edge<sub>1</sub>, Edge<sub>2</sub>  $\in$  {Right, Left}

NOTE: GPS is an extension of *prosodic subcategorization* (a.k.a. prosodic alignment (see section 2.1)) in that the units referred in such subcategorization requirement are not restricted to just a bona fide prosodic constituents, as licensed by the Prosodic Hierarchy.<sup>11</sup>

### (43) The plural infix *-ar-* in Sundanese

SUBCAT of *-ar-*: <sub>stem</sub>[C<sub>1</sub> \_\_\_\_

ALIGN (L, *ar*, R, C<sub>1</sub>)

'The left edge of the plural marker *-ar-* is aligned to the right edge of the initial consonant.'

consonant, while the plural verb marker *-nga-* comes after the initial vowel), the need for separate alignment requirements for morphemes must be maintained. However, the issue of whether such subcategorization requirements need to be part of the constraint ranking is much less clear.

<sup>11</sup> It is unclear at this point whether featural subcategorization should be banned. It might be required to limit this to segmental units (i.e. it must have a root-node in feature-geometric terms) eventually.

## 4.1 Evidence of sub-prosodic unit in phonology

### 4.1.1 Theory-external evidence for sub-prosodic units

#### (44) Consonantal exchange (Fromkin 1980)

*my **h**etter **b**aff (My **b**etter **h**alf)*

*Can I **m**orrow your **d**otes? (Can I **b**orrow your **n**otes?)*

*The **F**olden **G**leece award (The **G**olden **F**leece award)*

Vocalic exchange (Shattuck-Hufnagel 1986)

Error (target)

f[ ]t the b[i]ll (foot the bill)

st[ ]rred the sh[i]p (steered the ship)

al[i]minum an' st[u]l (aluminum an' steel)

ch[i]ps 'n tw[ ]ts (chirps 'n tweets)

#### (45) Alliteration:

In cliches: *sweet smell of success, a dime a dozen, bigger & better, jump for joy*

Wordsworth: *And sings a solitary song That whistles in the wind.*

Assonance:

'fleet feet sweep by sleeping geeks.'

- Language game and language disguise evidence are some of the most useful techniques in investigating cognitive representations in sound structures (Lehiste 1985, Vago 1985, Campell 1986, Hombert 1986, Bagemihl 1988). Such evidence has been argued as supporting the existence of sub-syllabic constituents (e.g., mora, onset/rhyme, CV skeleton).

#### (46) Tigrinya (Bagemihl 1988)

Natural Lg	Play Lg 1	Play Lg 2	
s'ä ifu	s'ägä igifugu	s'ägä igifugu	'he wrote'
bič' a	bi gīč' aga	bi gīč' aga	'yellow'
āntay	ā gīntagay	ā gīn gītagayī gī	'what'
k'arma	k'agarmaga	k'agai gīmaga	'gnat'

Hausa word game (Newman 2000:297)

gida	gibida	'house'
maski	mabāski	'oily'
Māimunà	Maibāimubūna	'Maimuna (name)'
hatsi	habātsi	'grain'
tabarma	tabababarma	'mat'

## (47) Segmental exchanges

Tagalog: **dito** > **doti** 'here' (Conklin 1956)  
 Javanese: **satus** > **tasus** '100' (Sadatano 1971)

## Sequence exchanges

Hanunoo: **rignuk** > **nugrik** 'tame' (Conklin 1959)  
 Thai: **khab rod** > **khod rab** 'to drive' (Surintramont 1973)  
 Mandarin: **ma** > **ma key** > **mey ka** (Yip 1982, Bao 1990)

**4.1.2 Theory-internal evidence for sub-prosodic units**

**OBSERVATION:** The need to refer to specific segmental units, like C and V, in the formulation of alignment is not new even within OT.<sup>12</sup>

## (48) ONSET/NOCODA in GA (P&amp;S 93, M&amp;P 93a, Ito &amp; Mester 1999)

ALIGN ( $\sigma$ , L, C, L) 'ONSET'  
 ALIGN-RIGHT ( $\sigma$ , R, V, R) 'NOCODA'

**4.2 Restricting Phonological Subcategorization****4.2.1 Positional prominence of pivots**

**OBSERVATION:** GPS is too powerful! (E.g., It predicts that an infix can subcategorize for the third consonant, or the fourth vowel).

**FACT:** A typological survey of more than 130 cases of infixation patterns revealed that infixes invariably appear near the edge of a stem or next to a stressed unit. Specifically, the edge pivots are always one unit away from the stem boundary.

(49) Potential pivots of infixation<sup>13</sup>*Edge pivots*

- Initial consonant/onset
- Initial vowel/nucleus
- Initial syllable
- Final syllable
- Final vowel/nucleus

<sup>12</sup> McCarthy 2002 has also introduced the ALIGN-BY-SEG (Cat<sub>1</sub>, Cat<sub>2</sub>, Edge) constraint, which basically says that no segment stands between the edge (left or right) of Cat<sub>1</sub> and Cat<sub>2</sub>.

<sup>13</sup> A PIVOT is defined as the unit an infix subcategorizes for. It differs from the notion of pivot in Kiparsky 1986 and Inkelas 1989, where it is defined as the portion of the stem that is 'skipped over' by or invisible to the infix.

*Prominence pivots*

- Stressed syllable
- Stressed vowel/nucleus

**REMEDY:** Edges and stressed syllables are psycholinguistically more prominent (cf. Shattuck-Hufnagel 1992, Beckman 1999). Thus, if a learner must rely on some fixed entity for the purpose of infix attachment, one would expect such an entity to be prominent somehow.

**4.2.2 On deriving the set of potential pivots: A learner's perspective****OBSERVATIONS:**

- The genesis of infixation comes from the reanalysis of ambiguous morphological structures (see Yu in progress)
- In the event of a failure to recover the morphological subcategorization of an affix, a phonological subcategorization may then be postulated.
- This phonological unit that serves as the new unit of subcategorization, however, must be retrievable syntagmatically.

**CLAIMS:**

- The task of a language learner is no different from the task facing the first speaker who encountered the ambiguous ancestral construction.
- A learner must make some hypothesis on where an infix might appear.
- Such a pivot must be consistently present in the input.<sup>14</sup>

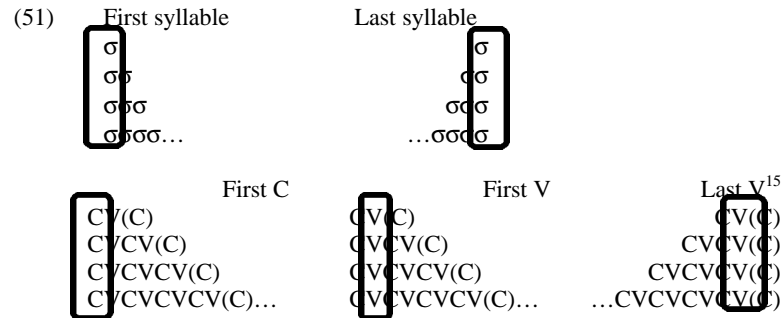
## (50) Subcategorization Well-formedness Condition (SWC)

- **Strict Phonological Subcategorization:** Infixes subcategorizes for phonological units, not morphological ones.
- **Surface Transparency:** Subcategorization requirements must be satisfied overtly.
- **Prohibition against Conditional Pivots:** The phonological units subcategorized must be uniform syntagmatically (= no negative circumscription)

<sup>14</sup> This view of morphological processing and subcategorization/schema formation is motivated by the Network Model of morphology proposed in Bybee 1995 and the template-model discussed in Pierrehumbert and Nair 1995. It is also compatible with current theories on speech perception (e.g., the Exemplar model; see references in Pierrehumbert 2001))

**Question:** Should we expect to find infixation that refers to the vowel of, say, the third syllables from the left?

**ANSWER:** SWC makes the prediction that if a language should have an infix at all, its pivot must refer to some unit at the periphery of a stem.



## 5. Conclusions

- Displacement Theory is not a tenable theory of infixation, for both theory-internal and empirical reasons.
  - It is based on false premise
  - It is simultaneously too weak and too powerful
- A novel theory of infixation is proposed
  - It unifies the treatment of infixation.
  - It incorporates insights from the literature on morphological acquisitions
  - It makes predictions on the set of possible pivots that is confirmed by the available typological data.

<sup>15</sup> Notice that SWC predicts that an infix that takes the final consonant as the pivot should be very rare, if not impossible. Such an infix can only develop in a language where all stems must end in a consonant. This prediction is so in line with the typological evidence.

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