

“Surface opacity of metrical structure in Optimality Theory”

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1. Introduction

(1) ‘Opacity’ in derivational terms:

- a. After a phonological rule has applied, its context is destroyed. Result is ‘over-application’, e.g. n-Deletion in *hymning* /hɪm-n-ɪŋ/ [hɪmɪŋ].
- b. After a phonological rule could have applied, its context is created. Result is ‘under-application’, e.g. lack of Prevoiced Lengthening before a flap that is derived from an unvoiced stop in *latter* [lætɾə] vs. *ladder* [læ:ɾə].

(2) Why are prosodically governed processes interesting to the opacity problem?

- a. Context of application may not be retrievable from the **input**. Prosody is typically *derived*, instead of listed in lexical representation (this goes for syllable structure, and in many languages, for metrical structure as well).
- b. Context of application may not be retrievable from the **output**. Prosody-dependent processes may *destroy their own context of application*. E.g. foot-governed syncope affects syllable number, hence foot structure.

Can OT handle cases in which contexts are not retrievable from input nor output?

(3) *Derivational theory*: Rules have access to lexical representation only *indirectly*, i.e. and cannot distinguish ‘derived’ from ‘non-derived’ properties. *No globality!* (The obvious exception is ‘strict cyclicity’, which inspects the lexical input.)

(4) Trans-derivational preservation of derived properties requires *cyclicity*:

In morphologically complex words, linearly ordered rules (R₁-R_n) first apply to the minimal domain, and then to successively larger domains. E.g. English footing and vowel shortening, targeting at a (LL) foot (/æ/ is extrametrical, /ɪk/ is not):

a.	<i>cycle</i>	[(sɪ:k) l]	b.	<i>tribe</i>	[(trɪ:ɪ) b]
	<i>cycl-ic</i>	[(sɪ klɪ) k]		<i>trib-al</i>	[(trɪ:ɪ) bæɪ]
	<i>cyclic-ity</i>	[sɪ (klɪsɪ) tɪ]		<i>tribal-ity</i>	[(trɪ:ɪ)(bæɪlɪ) tɪ]

The metrical context of vowel shortening (head of a binary foot, Myers 1987) has disappeared at the surface. This is *surface opacity* of metrical structure.

- (5) Derivational theory also requires *level-ordering*. E.g., n-Deletion is a Level-2 rule. Hence it fails to apply at cycle 1 of Level-1, before /-æɫ/ is attached, but it applies at cycle 1 of Level-2, before /-ɪŋ/ is attached (Kiparsky 1982):

		/hɪmɪn-æɫ/	/hɪmɪn-ɪŋ/
Level-I	cycle 1	hɪmɪn	hɪmɪn
	(-æɫ/, no n-Deletion) cycle 2	hɪm.næɫ	
Level-II	cycle 1		hɪm
	(-ɪŋ/, n-Deletion) cycle 2		hɪ.mɪŋ

- (6) *Correspondence Theory* (McCarthy & Prince 1995): Constraint-based evaluation of an output form may have direct access to its input lexical representation.

I/O correspondence

Given two strings S_1 and S_2 , **correspondence** is a relation \mathfrak{R} from the elements of S_1 to those of S_2 . Segments α (an element of an *input* string S_1) and β (an element of an *output* string S_2) are referred to as **correspondents** of one another when $\alpha\mathfrak{R}\beta$.

- a. **DEPENDENCE**: Every element of S_2 has a correspondent in S_1 .
- b. **MAXIMALITY**: Every element of S_1 has a correspondent in S_2 .
- c. **IDENTITY**(γF): Let α be a segment in S_1 and β be a correspondent of α in S_2 .
If α is $[\gamma F]$, then β is $[\gamma F]$.

- (7) ***B/O-Correspondence***: Constraint evaluation of an output candidate may have access to the output of a morphologically related output form - called ‘**base**’ because of strong similarities to reduplication and truncation (Benua 1995, McCarthy 1995, Burzio 1995):

- (8) n-Deletion ‘over-applies’ to *hymning* because of its relationship to *hymn* [hɪm]:

- a. [hɪ.mɪŋ] > [hɪm.nɪŋ] DEP(B/O) » MAX(I/O)
- b. [hɪm] > [hɪmɪn] *NN-CODA » MAX(I/O)

- (9) Benua (1995) argues that Class-2 affixation involves B/O correspondence, while Class-1 affixation involves I/O correspondence only (hence *hymnal*).

a.	<i>BO-Identity</i>	b.	
	[hɪm] ----- [hɪ.mɪŋ]		[hɪmɪnæɫ]
<i>IO-Faith</i>		<i>IO-Faith</i>	
	/hɪmɪn/		/hɪmɪn-æɫ/

- (10) Claims to be made below:

- a. For the evaluation of an output form, both its base and its lexical input are accessible simultaneously. Hence **parallelism**, instead of serialism.
- b. As would be expected under parallelism, interaction between I/O and B/O faithfulness constraints is due to regular constraint **ranking**.
- c. The base in B/O correspondence is a **compositionally related, free form**.

2. B/O correspondence: Syncope and stress in Palestinian Arabic

(11) *Verb plus subject suffix* (Brame 1974, Kenstowicz & Abdul-Karim 1980)

a.	/fihim/		‘to understand (=verb stem)’
b.i	/fihim/	fihim	‘he understood’
b.ii	/fihim-na/	fhím-na	‘we understood’
b.iii	/fihim-u/	fihm-u	‘they understood’

(12) **i-Syncope**

i [-stress] → ∅ / ___ CV

(13) *Stress* (simplified, see section 3): on a heavy penult, otherwise on the antepenult.

	/fihim/	/fihim-na/	/fihim-u/
Stress	fihim	fhím-na	fihim-u
i-Syncope	---	fhím-na	fihm-u
	[fihim]	[fhím-na]	[fihm-u]

(15) *Verb plus accusative suffix* (Brame 1974, Kenstowicz & Abdul-Karim 1980)

a.	/fihim/	fihim		‘he understood’
b.i	/fihim-ak/	fihm-ak		‘he understood you m.’
b.ii	/fihim-ik/	fihm-ik		‘he understood you f.’
b.iii	/fihim-u/	fihm-u		‘he understood him’
c.i	/fihim-ni/	fhím-ni	*fhím-ni	‘he understood me’
c.ii	/fihim-ha/	fhím-ha	*fhím-ka	‘he understood her’
c.iii	/fihim-na/	fhím-na	*fhím-na	‘he understood us’

(17) *Possessives* (Kenstowicz & Abdul-Karim 1980):

a.	/birak/	bírak		‘pools’
b.	/birak-u/	bírak-u		‘his pools’
c.	/birak-na/	birák-na	*brák-na	‘our pools’

(18) *Cyclic analysis* (Brame 1974):

Input		[fihim-na] _{Subj}	[fihim-u] _{Subj}	[[fihim]na] _{Acc}	[[fihim]u] _{Acc}
<i>Cycle1</i>	Stress	fhím-na	fihim-u	fihim	fihim
<i>Cycle2</i>	Stress			fhím-na	(vacuous)
<i>Postcyclic</i>	i-Syncope	fhím-na	fihm-u	<i>blocked</i>	fihm-u
	Destressing	<i>n.a.</i>	<i>n.a.</i>	fhím-na	<i>n.a.</i>
Output		fhímna	fihmu	fhímna	fihmu

- (19) Generalisation: Syncope ‘under-applies’ only if there is a ‘base’, defined as:
- There exists a form that is *compositionally related* to the affixed word in a morphological and semantic sense (Benua 1995 on B/O in English).
 - The related form is an output itself, hence a free form, i.e. a *word*.

In a broader sense, these are the characteristics of *Base/Output Correspondence*.

(20) *I/O Correspondence*

- | | | | |
|-------|-------------------------------|----|-------------------------------|
| a.i | /fihim/ ‘he understood’ | ←→ | [fihim] ‘he understood’ |
| a.ii | /fihim-u/ ‘they understood’ | ←→ | [fíhm-u] ‘they understood’ |
| a.iii | /fihim-na/ ‘we understood’ | ←→ | [fhím-na] ‘we understood’ |
| a.iv | /fihim-u/ ‘he understood him’ | ←→ | [fíhm-u] ‘he understood him’ |
| a.v | /fihim-na/ ‘he understood us’ | ←→ | [fihím-na] ‘he understood us’ |
| b.i | /birak/ ‘pools’ | ←→ | [bírak] ‘pools’ |

B/O Correspondence

- | | | | |
|------|-------------------------|----|-------------------------------|
| c.i | [fihim] ‘he understood’ | ←→ | [fihím-na] ‘he understood us’ |
| c.ii | [fihim] ‘he understood’ | ←→ | [fíhm-u] ‘he understood him’ |
| d.i | [bírak] ‘pools’ | ←→ | [birák-na] ‘our pools’ |

No B/O correspondence relationship holds between [fihim] ‘he understood’ and [fhím-na] ‘we understood’, since these forms are not compositionally related.

- | | | | | |
|---------|---------------------|----|---------------------|---------------------------|
| (21) a. | ‘he understood us’ | b. | ‘we understood’ | |
| | / f i h i m - n a / | | / f i h i m - n a / | Input |
| | | | | <i>I/O Correspondence</i> |
| | [f i h í m - n a] | | [f h í m - n a] | Output |
| | | | | <i>B/O Correspondence</i> |
| | [f í h i m] | | | Base |
| | ‘he understood’ | | | |

- (22) Correspondence-based perspective: Syncope ‘underapplies’ in the accusative and possessive because the relevant vowels have *stressed correspondents* in the base.

- (23) HEAD-MAX(B/O) (cf. McCarthy 1995, Benua 1995)
Every segment in the **base prosodic head** has a correspondent in the **output**.

- (24) NO [i] (cf. Orgun 1995)
/i/ is not allowed in unstressed open syllables.

- (25) MAX(I/O) (cf. McCarthy & Prince 1995)
Every segment in the **input** has a correspondent in the **output**.

- (27) *Stress*, HEAD-MAX(B/O) » NO [i] » MAX(I/O)

(28)	/fihim, -na/	Stress	HEAD-MAX(B/O)	No [i]	MAX(I/O)
a.	[fí.him.na]	*!			
b.	☞ [fi.hím.na]			*	
c.	[fhím.na]		*!		*

(29)	/fihim, -na/	Stress	HEAD-MAX(B/O)	No [i]	MAX(I/O)
a.	[fí.him.na]	*!			
b.	[fi.hím.na]			*!	
c.	☞ [fhím.na]				*

(30) Conclusions reached so far:

- a. Notion of ‘base’ in B/O correspondence firmly linked to compositionality.
- b. ‘Under-application’ of deletion of unstressed vowels in contexts of opaque stress due to ranking: *Stress*, HEAD-MAX(B/O) » NO [i] » MAX(I/O).
- c. But since I/O correspondence is dominated, the argument for parallelism is not yet complete. To complete it, we turn to another dialect - Tripoli.

3. I/O and B/O correspondence in parallel: Syncope and epenthesis in Tripoli

(31) Three rules of Tripoli (Levantine) Arabic (after Kenstowicz & Abdul-Karim 1980)

- a. **a-Syncope** a [-stress] → ∅ / ___ C + V ‘non-cyclic suffix’
- b. **i-Syncope** i [-stress] → ∅ / ___ CV
- c. **i-Epenthesis** ∅ → i / C ___ C {C, #}

(32) a-Syncope applies to forms (a.ii-iii, c.ii), which have no base, but ‘underapplies’ to the accusatives and possessives (b.i, d.i-ii):

a.i	/ḍarab/	ḍarab		‘he hit’
a.ii	/ḍarab-it/	ḍarb-et		‘she hit’ (/ -it/ → [et] / ___ #)
a.iii	/ḍarab-na/	ḍráb-na		‘we hit’
b.i	/ḍarab-ik/	ḍarab-ik	*ḍarb-ik	‘he hit you f.’
b.ii	/ḍarab-ni/	ḍaráb-ni	*ḍráb-ni	‘he hit me’
c.i	/baʔar/	báʔar		‘cattle’
c.ii	/baʔar-a/	báʔr-a		‘a cow’
d.i	/baʔar-i/	báʔar-i	*báʔr-i	‘my cattle’
d.ii	/baʔar-na/	baʔár-na	*bʔár-na	‘our cattle’

(33) a.	/ḍ a r a b - i k /	b.	/ḍ a r a b - i t /	I
	[ḍ a r a b - i k]		[ḍ a r b - e t]	O
	[ḍ á r a b]			B

(34) **MAX(B/O)** Every segment in the **base** has a correspondent in the **output**.

(36) **No [a]** [a] is not allowed in unstressed open syllables.

(37) *Stress*, MAX(B/O) » No [a] » MAX(I/O)

(38)	/ðarab-ik/	MAX(B/O)	No [a]	MAX(I/O)
a.	[ðár.bik]	*!		*
b.	☞ [ðá.ra.bik]		*	

(39)	/ðarab-it/	MAX(B/O)	No [a]	MAX(I/O)
a.	☞ [ðár.bet]			*
b.	[ðá.ra.bet]		*!	

(40) **i-Epenthesis** produces opaque stress (see section 4 below):

a.i	/tɪfl/	tɪfl			‘child, m.’
a.ii	/tɪfl-i/	tɪfl-i	*tɪfl-i		‘my child, m.’
a.iii	/tɪfl-na/	tɪfl-na	*tɪfl-na	*tɪfli-na	‘our child, m.’
b.	/madrs-e/	máðrs-e	*madrs-e	*máðris-e	‘school’

(41) ***CCC** No triconsonantal clusters.
(Probably reducible to *COMPLEXMARGIN)

(42) **No [i]** [i] is not allowed in unstressed open syllables.

(43) *CCC, No [i] » MAX(B/O)

Note: The locus of i-epenthesis follows from NO [i], which guarantees that the epenthetic vowel, which happens to be [i], surfaces in a closed syllable.

(44)	/tɪfl-i/	*CCC	No [i]	MAX(B/O)
a.	☞ [tɪf.li]		*	*
b.	[tɪ.fi.li]		**!	

(45)	/tɪfl-na/	*CCC	No [i]	MAX(B/O)
a.	☞ [tɪ.fil.na]			
b.	[tɪf.li.na]		*!	*
c.	[tɪfl.na]	*!		*

(46)	a.	/tɪfɪl-na/	b.	/b a ? a r -n a /	Input
		[tɪfɪl-na]		[b a ? á r -n a]	Output
		[tɪfɪl]		[b á ? a r]	Base

(47) HEAD-DEP(O/I) (cf. Alderete 1995; this conference)
Every vowel in the **output prosodic head** has a correspondent in the **input**.

(48) HEAD-DEP(O/I) » *Stress* (tífil-na > *tífíl-na)

(49) **Parallellism**: Both I/O correspondence and B/O correspondence are active:
*CCC, NO [i], HEAD-DEP(I/O) » *Stress* » MAX(B/O) » NO [a] » MAX(I/O)

(50)	I: /madr̥s-e/ B: none	*CCC	No [i]	HEAD- DEP (O/I)	<i>Stress</i>	MAX (B/O)	No [a]	MAX (I/O)
a.	☞ [má.dír.se]				*			
b.	[ma.dír.se]			*!			*	
c.	[mad.rí.se]			*!	*			
d.	[mád.ri.se]		*!					
e.	[mádr̥s.se]	*!						

(51)	I: /tífl-na/ B: [tíf.il]	*CCC	No [i]	HEAD- DEP (O/I)	<i>Stress</i>	MAX (B/O)	No [a]	MAX (I/O)
a.	☞ [tí.fíl.na]				*		*	
c.	[tíf.lí.na]			*!	*	*	*	
b.	[ti.fíl.na]		*!	*			*	
d.	[tíf.li.na]		*!			*	*	
e.	[tífl.na]	*!				*	*	

(52)	I: /baʔar-na/ B: [bá.ʔar]	*CCC	No [i]	HEAD- DEP (O/I)	<i>Stress</i>	MAX (B/O)	No [a]	MAX (I/O)
a.	☞ [ba.ʔár.na]						**	
b.	[bʔár.na]					*!	*	*
c.	[bá.ʔar.na]				*!		*	
d.	[bá.ʔír.na]				*!	*	*	*
e.	[ba.ʔír.na]			*!		*	**	*
f.	[bʔír.na]			*!		*	*	**
g.	[baʔ.rí.na]			*!	*	*	*	*
h.	[báʔ.ri.na]		*!			*	*	*

(53) Interaction of i-Syncope and i-Epenthesis in possessives of f. nouns ‘in construct’:

a.i	/tɪfl-e/	tɪfl-e		‘child, f.’
a.ii	/tɪfl- <u>it</u> -i/	tɪfɪl-t-i	*tɪf.li.ti	‘my child, f.’
a.iii	/tɪfl- <u>it</u> -na/	tɪfl-ít-na		‘our child, f.’
b.i	/madrs-e/	mádɪrs-e	*mád.ri.se	‘school’
b.ii	/madrs- <u>it</u> -i/	madrís-t-i	*ma.dír.si.ti	‘my school’
b.iii	/madrs- <u>it</u> -na/	madɪrs-ít-na	*mad.rís.ti.na	‘our school’
c.i	/taawl-e/	táawl-e		‘table’
c.ii	/taawl- <u>it</u> -i/	taawíl-t-i	*táaw.li.ti	‘my table’
c.iii	/taawl- <u>it</u> -na/	taawl-ít-na	*taa.wíl.ti.na	‘our table’

Notes: - As predicted by the ranking NO [i] » MAX(B/O), *i-Syncope* applies even though the deleted /i/ has a correspondent in the base.
- Opaque stress in [tɪfɪl-t-i] addressed below!

(54) Interaction of a-Syncope, i-Syncope, and i-Epenthesis in 3 sg. f. perfects:

a.i	/ɖarab-it/	ɖár ab -et		‘she hit’
a.ii	/ɖarab- <u>it</u> -u/	ɖár ib -t-u	*ɖár.bi.tu	‘she hit him’
a.iii	/ɖarab- <u>it</u> -na/	ɖarb-ít-na		‘she hit us’
b.i	/baarak-it/	báark-et		‘she blessed’
b.ii	/baarak- <u>it</u> -u/	baar ík -t-u	*báar.ki.tu	‘she blessed him’
b.iii	/baarak- <u>it</u> -na/	baark-ít-na		‘she blessed us’
c.i	/ʔallam-it/	ʔállm-et		‘she taught’
c.ii	/ʔallam- <u>it</u> -u/	ʔall ím -t-u	*ʔáll.mi.tu	‘she taught him’
c.iii	/ʔallam- <u>it</u> -na/	ʔallm-ít-na		‘she taught us’

(55) Interaction of a-Syncope, i-Syncope and i-Epenthesis in possessives of f. nouns:

a.i	/baʔar-a/	báʔr-a		‘cow’
a.ii	/baʔar- <u>it</u> -i/	báʔ ir -t-i	*báʔ.ri.ti	‘my cow’
a.iii	/baʔar- <u>it</u> -na/	baʔr-ít-na		‘our cow’
b.i	/maktab-e/	mák it b-e	*mák.ti.be	‘library’
b.ii	/maktab- <u>it</u> -i/	makt íb -t-i	*ma.kít.bi.ti	‘my library’
b.iii	/maktab- <u>it</u> -na/	makitb-ít-na	*mak.ti.bít.na	‘our library’

(56) Generalization: i-Syncope *always* avoids unstressed [i] in a non-final open syllable, even if that would have resulted in a positional correspondent to an input vowel:

a.i	/ḍarab- <u>it</u> -u/	→	ḍarbtu	→	[ḍá.ri b .tu]	*ḍár.bi.tu
a.ii	/baʔar- <u>it</u> -i/	→	baʔrti	→	[bá.ʔir.ti]	*báʔ.ri.ti
b.i	/tífl- <u>it</u> -i/	→	tífti	→	[tí.fil.ti]	*tíf.li.ti
b.ii	/maktāb- <u>e</u> /	→	maktbe	→	[má.kit.be]	*mák.ti.be
c.i	/baarak- <u>it</u> -u/	→	baarktu	→	[baa.rík.tu]	*báar.ki.tu
c.ii	/maktāb- <u>it</u> -i/	→	maktbti	→	[mak.tíb.ti]	*mak.tí.bi.ti

Conclusion: Locus of i-epenthesis follows from NO [i], the *same* constraint that is responsible for i-syncope. This result requires the identification of the epenthetic vowel as [i], as in correspondence theory, while arguing against an *empty nucleus* analysis of epenthesis (cf. Prince & Smolensky 1993).

(57) Further observation on (55-56): Opaque stress induced by a ‘non-correspondence’ of the output prosodic head with a vowel in the **base**:

a.	/ḍ a r a b -i t -u/	b.	/ḍ a r a b -i t -u/	Input
	[ḍ á r i b t -u]		[ḍ a r í b t -u]	Output
	[ḍ á r b -e t]		[ḍ á r b -e t]	Base

(58) HEAD-DEP(O/B)

Every vowel in the **output prosodic head** has a correspondent in the **base**.

(59) HEAD-DEP(O/B), HEAD-DEP(O/I) » *Stress*

(60)	HEAD-DEP(O/B)	HEAD-DEP(O/I)	<i>Stress</i>
a.i ☞ [tí.fil.na]			*
a.ii [ti.fíl.na]		*!	
b.i ☞ [ḍá.ri b .tu]			*
b.ii [ḍa.rí b .tu]	*!		
c.i [bá.ʔar.na]			*!
c.ii ☞ [ba.ʔár.na]			

- (71) K&A's second ('surface-oriented') observation:
Epenthetic [i] is stressed if and only if *a heavy syllable precedes*.
- (72) Moraic trochee (Hayes 1995, Dresher & Lahiri 1991, Kiparsky 1995):
- | | | | | |
|----|------------|---------------|--------------|----------------------|
| a. | 'Pure' | (H) | (LL) | but <i>not</i> *(HL) |
| | | [(wór).du] | [(wé.ru).du] | [(níi).(tè.nu)] |
| b. | 'Resolved' | (LH) | | but <i>not</i> *(HH) |
| | | [(fæ.rel).du] | | [(fúl).(wìh).tu] |
- (73) Ideas: i. *(HL), *(HH) due to undominated FT-FORM (licensing H, LL, LH).
ii. In epenthetic cases, (LH) > L(H) is due to HEAD-DEP(O/I), (O/B).
iii. Elsewhere, L(H) > (LH) is due to WSP.
- (74) Generalisation: WSP may be violated to satisfy HEAD-DEP(O/I, O/B), except when this would violate FT-FORM.
- FT-FORM » **HEAD-DEP(O/I), (O/B)** » WSP
- (75) Stress in Tripoli non-epenthetic forms. Stress falls on the penult if it is heavy, and otherwise on the antepenult. Final consonants are disregarded for quantity count:
- | | | | | | |
|----|-------------------|------|-----------|----------------|--------------|
| a. | <i>Penult</i> | i. | [(LL)] | [(ðá.rab)] | 'he hit' |
| | | ii. | [(H) L] | [(mák).tab] | 'office' |
| | | iii. | [L (H) L] | [ða.(ráb).ni] | 'he hit me' |
| | | iv. | [H (H) L] | [mak.(táb).na] | 'our office' |
| b. | <i>Antepenult</i> | i. | [(LL) L] | [(rí.ka).bi] | 'my knees' |
| | | ii. | [(H) L L] | [(mák).ta.bi] | 'my office' |
- (76) Evidence that footing is *non-iterative*:
- | | |
|-----|---|
| a. | Reduction /a/ → [i] in unstressed closed syllables (K & K-A 1980:60): |
| i. | /kallam/ kál.lam 'he spoke' |
| ii. | /kallam-na/ kil.lám.na 'we spoke' |
| b. | Syncope in /CvC.Cv.Cv/ (CvC).Cv.Cv *(CvC).(Cv.Cv) |
- (77) Constraints (cf. Prince & Smolensky 1993, McCarthy & Prince 1993)
- | | | |
|----|-------------|--|
| a. | FT-FORM | Feet are moraic trochees (H), (LL) or (LH). |
| b. | NONFINALITY | No foot is final in the word. |
| c. | ALL-FT-R | Every foot is at the right edge of the PrWd. |
| d. | WSP | Heavy syllables are stressed. |
| e. | PARSE-SYLL | Syllables are parsed by feet. |

- (78) All rankings are deducible from non-epenthetic forms:
- a. FT-FORM » ALL-FT-R [(mák).ta.bi] > [mak.(tá).bi]
 - b. NONFINALITY » ALL-FT-R [(rí.ka).bi] > [ri.(ká).bi]
 - c. NONFINALITY » PARSE-SYLL [(mák).ta.bi] > [mak.(tá).bi]
 - d. ALL-FT-R » WSP [mak.(táb).na] > [(màk).(táb).na]
 - e. WSP » PARSE-SYLL [ḍá.(ráb).ni] > [(ḍá.rab).ni]

(79) FT-FORM, NONFINALITY » ALL-FT-R » WSP » PARSE-SYLL

(80)	/maktabi/	FT-FORM	NON-FINALITY	ALL-FT-R	WSP	PARSE-SYLL
a.	☞ [(mák).ta.bi]			ta.bi		**
b.	[(màk).(tá).bi]		*!	ta.bi		
c.	[mak.(tá).bi]		*!		*	*
d.	[(mák.ta).bi]	*!		bi		*

(81)	/maktabna/	FT-FORM	NON-FINALITY	ALL-FT-R	WSP	PARSE-SYLL
a.	☞ [mak.(táb).na]			na	*	
b.	[(mák).tab.na]			tab.na!	*	
c.	[(màk).(táb).na]			na, tab.na!		
d.	[(mák.tab).na]	*!		na	*	


(82)	/ḍarabni/	FT-FORM	NON-FINALITY	ALL-FT-R	WSP	PARSE-SYLL
a.	☞ [ḍa.(ráb).ni]			ni		**
b.	[(ḍá.rab).ni]			ni	*!	*
c.	[ḍa.(ráb.ni)]	*!	*			*


(83) ‘Opaque’ stress forms allow a precise ranking of HEAD-DEP(O/I), (O/B) w.r.t. the stress constraints:


- a.i HEAD-DEP(O/I) » WSP [(má.ḍír).se] > [ma.(ḍír).se]
- a.ii HEAD-DEP(O/B) » WSP [(ḍá.ríb).tu] > [ḍa.(ríb).tu]
- b.i ALL-FT-R » HEAD-DEP(O/I) [mad.(rís).ti] > [(mád).rís.ti]
- b.ii ALL-FT-R » HEAD-DEP(O/B) [baa.(rík).tu] > [(báa).rík.tu]

(84) FT-FORM, NONFINALITY » ALL-FT-R » **HEAD-DEP(O/I), (B/O)** » WSP » PARSE-SYLL

(85)	I: /mads-e/ B: none	*CCC, No [i], FT-FORM, NON-FINALITY	ALL-FT-R	HEAD-DEP (O/I)(O/B)	WSP	MAX (B/O)	NO [a]	PARSE-SYLL
a.	☞ [(má.ḍír).se]		se		*			
b.	[ma.(ḍír).se]		se	I/B!				
c.	[(mád).rís.se]	*No [i]	rís.se					**
d.	[mad.(rís).se]	*NONFINALITY		I/B!	*			*

(86) I: /madrs-it-i/ B: [(má.dir).se]	*CCC, No [i], FT-FORM, NON-FINALITY	ALL-FT-R	HEAD-DEP (O/I)(O/B)	WSP	MAX (B/O)	NO [a]	PARSE- SYLL
a.  [mad.(rís).ti]		tí	I/B	*	**		**
b. [(mád).ris.ti]		ris.ti!		*	**		**
c. [ma.(díř).si.ti]	*No [i]		I				***
d. [(mád.ris).ti]	*FT-FORM			*	**		*

(87) I: /ḍarab-it-u/ B: [(ḍár).bet]	*CCC, No [i], FT-FORM, NON-FINALITY	ALL-FT-R	HEAD-DEP (O/I)(O/B)	WSP	MAX (B/O)	NO [a]	PARSE- SYLL
a.  [(ḍá.rib).tu]		tu		*	*	*	*
b. [(ḍá.rab).tu]		tu		*	*	***!	*
c. [ḍa.(rīb).tu]		tu	B!		*	*	**
d. [ḍa.(ráb).tu]		tu	B!		*	**	**
e. [(ḍár).bī.tu]	*No [i]	bī.tu				*	**
f. [ḍar.(bí.tu)]	*NONFINALITY			*		*	*

(88) I: /baarak-it-u/ B: [(báar).ket]	*CCC, No [i], FT-FORM, NON-FINALITY	ALL-FT-R	HEAD-DEP (O/I)(O/B)	WSP	MAX (B/O)	NO [a]	PARSE- SYLL
a.  [baa.(rík).tu]		tu	B	*	*		**
b. [baa.(rák).tu]		tu	B	*	*	*!	**
c. [(báa).rik.tu]		rik.tu!		*	*		**
d. [(báa.rik).tu]	*FT-FORM	tu		*	*		*
e. [(báar).ki.tu]	*No [i]	ki.tu					**
f. [(báark).tu]	*CCC	tu			*		*

4. Conclusions

- (89) a. Correspondence theory has advantages over derivational theory:
- NO [i] identifies both the targets of syncope and the locus of epenthesis, which argues for featurally specified epenthetic vowels, in constraint-based analysis. Purely rule-based analyses cannot derive this result.
 - Underapplication of ‘a-Syncope’ in [báʔar-i], depending on base [báʔar], is strong support for B/O correspondence. Can level-ordering do it?
 - No use of abstract intermediate levels of representation in accounting for opaque stress (as in rule-based analyses).
- b. Definition of ‘base’ as a compositionally related, free form.
- c. *Parallellism* in B/O and I/O correspondence, ruling out serial evaluation.
- (90) Possibly problematic aspects of this analysis:
- a. Use of levels in constraint definition (NO [a]) introduces great descriptive power to the theory. Is it excessive?
- b. Account of [baa.(rík).tu] rests entirely on [LH] vs. *[HH] contrast.

References

- Alderete, John (1995), *Faithfulness to Prosodic Heads*. Ms., University of Massachusetts, Amherst. (Presented at Tilburg Conference on *The Derivational Residue in Phonology*.)
- Al-Mozainy, Hamza Q., Robert Bley-Vroman, and John McCarthy (1985), "Stress shift and metrical structure", *Linguistic Inquiry* **16**, 135-144.
- Benua, Laura (1995), "Identity effects in morphological truncation", in J. Beckman, S. Urbanczyk & L. Walsh (eds.), *University of Massachusetts Occasional papers in Linguistics 18: Papers in Optimality Theory*. Amherst, MA: Graduate Linguistic Student Association. [Available from ROA-74.]
- Brame, Michael (1973), "On stress assignment in two Arabic dialects". In S. Anderson & P. Kiparsky (eds.), *A Festschrift for Morris Halle*. New York: Holt. 14-25.
- Broselow, Ellen (1992), "Parametric variation in Arabic dialect phonology", in E. Broselow, M. Eid, & J. McCarthy (eds.), *Perspectives on Arabic Linguistics IV. Papers from the Fourth Annual Symposium on Arabic Linguistics*. Amsterdam-Philadelphia: John Benjamins.
- Buckley, Eugene (1995), "Cyclicity and correspondence", abstract submitted to the Tilburg Conference on *The Derivational Residue in Phonology*.
- Burzio, Luigi (1995), *Principles of English Stress*. Cambridge University Press.
- Dresher, Elan, and Aditi Lahiri (1191), "The Germanic foot: Metrical coherence in Old English", *Linguistic Inquiry* **22**, 251-286.
- Hayes, Bruce (1995), *Metrical Stress Theory: Principles and Case Studies*. Chicago: The University of Chicago Press.
- Irshied, Omar, & Michael Kenstowicz (1984), "Some phonological rules of Bani-Hassan Arabic: A Bedouin dialect", *Studies in the Linguistic Sciences* **14.1**, 109-147.
- Kager, René (1993), "Alternatives to the Iambic-Trochaic Law", *Natural Language and Linguistic Theory* **11**, 381-432.
- Kenstowicz, Michael & Kamal Abdul-Karim (1980), "Cyclic stress in Levantine Arabic", *Studies in the Linguistic Sciences* **10.2**, 55-76.
- Kiparsky, Paul (1982), "From cyclic phonology to Lexical Phonology", in H. van der Hulst and N. Smith (eds.), *The Structure of Phonological Representations*, Part 2. Dordrecht: Foris.
- Kiparsky, Paul (1995), *Livonian Stød*. Handout of presentation at workshop on Diachrony and Prosodic Theory, University of Nijmegen, September 6, 1995.
- McCarthy, John (1995a), *Extensions of Faithfulness: Rotuman Revisited*. Ms., University of Massachusetts, Amherst. [Available from ROA-64.]
- McCarthy, John (1995b), "Remarks on phonological opacity in Optimality Theory", to appear in J. Lecarme, J. Lowenstamm & U. Shlonsky (eds.), *Proceedings of the Second Colloquium on Afro-Asiatic Linguistics* (Sofia Antipolis, June 1994). [Available from ROA-79.]
- McCarthy, John, and Alan Prince (1993), "Generalized alignment", *Yearbook of Morphology* **XX**, 79-153.
- McCarthy, John & Alan Prince (1995), "Reduplicative identity", to appear in R. Kager, H. van der Hulst & W. Zonneveld (eds.), *The Prosody Morphology Interface*. [Available from ROA-60.]
- Myers, Scott (1987), "Vowel shortening in English", *Natural Language and Linguistic Theory* **5.4**, 485-518.
- Orgun, Orhan (1995), *Correspondence and Identity Constraints in Two-Level Optimality Theory*. Ms., University of California, Berkeley. [Available from ROA-62.]
- Piggott, G.L. (1995), "Epenthesis and syllable weight", *Natural language and Linguistic Theory* **13.2**, 283-326.