The absolutely neutralizing coalescence theory of mutation

Paul de Lacy
Rutgers University

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This talk argues that mutation is due to the coalescence of (parts of) fully segmentally specified morphemes. Absolute neutralization is crucial in accounting for the motivation and outcome of some types of mutation. There is no need for floating features, nor are there any constraints or mechanisms that are specifically devoted to mutation.

1. The smallest morpheme

(1) *What is mutation?*
(a) A morphological change is marked (at least partially) by a stem-internal phonological change that is not due to normal phonological processes.
(b) Irish 'eclipsis'
[bɑːd̪] 'boat' cf. [ə mɑːd̪] 'their boat'
(c) Full segments can sometimes appear; mutation can accompany full segments.
[uːl̪ə] 'apples' ~ [ə n̪uːl̪ə] 'their apples'

(2) *Minimal representation*
The Irish eclipsis morpheme would be something like /[+nasal]/ (more on this below).

(3) *Why a floating feature?*
(a) Visibility: Only a single phonological feature changes (at least most of the time).
(i) Therefore, the underlying form consists of only what can be seen to change: ie, a single feature.
(ii) Buttressed by views about economy of lexical representation, and perhaps learnability considerations (not clear on what learnability theory would predict featural morphemes, though).
(b) Motivation: a single phonological feature can't survive on its own, so it must join with some other segment, causing mutation.

(4) *Problems?*

(a) The original IDENT theory of faithfulness is *segment-based* – IDENT can't preserve features independent of their root node. (McCarthy & Prince 1995, 1997)

(i) Theories of floating features have required constraints that require feature-specific constraints; often these are proposed solely to deal with mutation (tone is a bit different).

(ii) Attempts to employ MAX-Feature constraints encounter problems (eg, Keer 1998, Struijke 2001).

(b) The theory of why floating features *survive* has relied on constraints that demand preservation of a morpheme's underlying material (eg, MORPHREAL).

(i) These constraints don't work if there's more than one segment in the morpheme, or if there's more than one feature in the morpheme (Piggott 2000; see attempts at correction by de Lacy 2002; Wolf 2005).

(c) There has been no demonstration that featural morphemes are *necessary* – ie, that mechanisms already available can do the job.

(5) *Proposal*

(a) All morphemes consist minimally of a segment; there are no floating features in morphemes.[1]

(b) Observation: Coalescence exists.

(c) Observation: Absolute neutralization exists.

(d) Effect: Mutation is caused by coalescing segments.

(i) Absolute neutralization can both motivate and condition the output of mutation.

2. Coalescence

(6) *What is coalescence?*

(a) Descriptively: A phonological condition forces two or more segments combine to make a single segment.

(b) Pāli (de Lacy 2006:ch.6 and refs. cited therein)

(i) /lab^{h}-tabːa/ → [lad:^{h}abːa] 'take-gerund'

(ii) /duɲ-ta/ → [du:^{h}a] 'milk-participle'

(iii) /ɟan-ja-ti/ → [ɟaɲːati] 'generate-3sg'

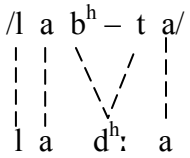
(iv) /vat:-ʃ-ti/ → [vat:^{h}i] 'turn-aorist-3sg'

(v) /sak-ʃːa-ti/ → [sakː^{h}ati] 'be able to-future-3sg'

(vi) /sak-ʃ-ti/ → [sakː^{h}i] 'be able-aorist-3sg'

[1] Alternatively, there may be floating features in underlying forms, but no faithfulness constraint will preserve them. Same effect.

(7) *Correspondence theory of coalescence*
(a) Two (or more) underlying segments are in a correspondence relation with a single segment on the surface.



(8) *Coalescence ranking*

/$b^h{}_1$-t_2/	NOCODA	DON'T DELETE	DON'T ADD	DON'T COALESCE
(a) $b^h{}_1.t_2$	*!			
(b) $b^h{}_1 i t_2$			*!	
(c) $b^h{}_1$		*!		
☞ (d) $d^h{}_{:1,2}$				*

(9) *Preservation in coalescence*

/$b^h{}_1$-t_2/	IDENT coronal	IDENT +voice	IDENT labial	IDENT –voice
(a) $b^h{}_{:1,2}$	*!			*
(b) $t^h{}_{:1,2}$		*!	*	
☞ (c) $d^h{}_{:1,2}$			*	*

• [αF] survives if IDENT[αF] » IDENT[–αF] (usually, but there are other ways for αF to survive; see de Lacy 2006 for details.)

(10) *Key ingredients of coalescence*
(a) Motivation: Coalescence is motivated by a phonotactic condition
(b) Outcomes: Other outcomes (deletion, epenthesis) are less desirable
(c) Preservation: Faithfulness determines which features are preserved.

(11) *Looking forward to mutation*
(a) In its *effect*, there's no surface difference between mutation and coalescence:
(b) In both, a single output segment shows featural changes.

3. Basic Mutation

(12) *Mutation as coalescence*
(a) Some morphemes are forced to coalesce in (almost) every environment…

(13) *Chaha 3p.sg.accusative.masculine (very famous case)*
(Rose 2006, Akinlabi 1996, Piggott 2000)

(a) Consists of surface [^{w}…n]

(b) [^{w}] lands on the rightmost non-coronal…

(i) [tɨkəf^{w}t-ɨn] ‘she opens it’ (iv) [kətəf^{w}ə-n] ‘chop’

(ii) [nək^{w}əsə-n] ‘bite’ (v) [səp^{w}ərə-n] ‘break’

(iii) [k’^{w}əsərə-n] ‘erect’ (vi) [kəfətx^{w}ənɨm] ?

(c) If all consonants are coronal, [^{w}] doesn’t appear

[sədədə-n] ‘chase’

(d) cf. feminine –na [jɨ-rəxɨβ-n-a] ‘he finds her’

(14) *Proposal:* /k^{w}n/

(a) k^{w}n# is phonotactically ill-formed, so something has to change

(b) So the /k^{w}/ coalesces.

(15) /k^{w}n/…

/kətəf$_1$ə-k^{w}$_2$n/	NO C CLUSTERS	DON’T DELETE	DON’T ADD	UNIFORMITY
(a) kətəf$_1$ən		*!		
☞ (b) kətəf^{w}$_{1,2}$ən				*
(c) kətəf$_1$ək^{w}$_2$n	*!			
(d) kətəf$_1$ək^{w}$_2$ɨn			*!	

• This ranking summarizes the general thrust of the analysis; the details are complex, taking into account epenthesis elsewhere in the language (eg, Rose 2000).

(16) *The output segment*

/kətəf$_1$ə-k^{w}$_2$n/	IDENT^{w}	ROOT -IDENT Fs
☞ (a) kətəf^{w}$_{1,2}$ən		
(b) kətəf$_{1,2}$ən	*!	
(c) kətək^{w}$_{1,2}$ən		**!

• ROOT-IDENT{*non-labialized*} is outranked by IDENT^{w}

(17) *Result*

The Chaha /k^{w}n/ morpheme can *never* surface faithfully. It requires that some phonological process occur to eliminate the /k^{w}/.

4. Non vacuous coalescence

(18) *Why should mutation show up?*
(a) Why should any features change under mutation?
(b) In some cases, it may be due to a faithfulness constraint: e.g. IDENT[^{w}] in Chaha, IDENT[retroflex] in Pāli.
(c) In other cases, realization of the affix's segment is due to a condition on coalescence...

(19) *The constraint*
(a) NO VACUOUS COALESCENCE (NVC)
Informally:
"If *x* and *y* coalesce to form *z*,
z must have some feature unique to *x* and some feature unique to *y*."

More precisely:
For every output segment *x*, there is some feature [αF]
s.t. *x′* is [αF]
and there is no *x″* that is [αF]
- *x* is an output segment
- *x′* is an input correspondent
- *x″* is another input correspondent (ie, not *x'*)

(b) Informally, NVC is a combination of feature faithfulness and avoidance of coalescence.
(c) Some languages obey this restriction; others don't
(d) e.g. /ap+t^{h}a/ → [apa] violates NVC; [ap^{h}a] doesn't.

(20) *Replaces*
NVC replaces constraints like
- de Lacy's (2002) MORPHDISF "Every morpheme has a unique faithful exponent"
- Wolf's (2005) NOVACDOC "Floating features cannot dock onto segments that bore the same feature value in the input"

- In their use, these constraints are fairly mutation-specific attempts to prevent underlying segments from being obscured.
- They differ from NVC in that NVC is segment-based (not feature based), and therefore applies to all coalescence, not just mutation.

5. Disjunctive mutation: NVC in Irish eclipsis

(21) *Disjunctive mutation*
(a) Some mutations require that one feature or another appear.
(b) These come about when the mutating morpheme has
(i) a single coalescing segment
(ii) the segment has two (or more) features that conflict with root specifications.
(iii) NVC is relevant.

(22) *Irish 'eclipsis'* (Pullman 2004 & refs cit.)

(a) [n̪] before vowels

[u:l̪ə] 'apples' [ə n̪u:l̪ə] 'their apples'

(b) Voiceless stops and fricatives become their voiced counterparts

[t̪ahi:] [d̪ahi:] 'experience'

[fʲiə] 'deer' [ə vʲiə] 'their deer'

- /s ʃ h/ have no surface voiced counterparts

(c) Voiced stops become nasal

[bɑ:d̪] 'boat' [ə mɑ:d̪] 'their boat'

[d̪u:n̪ən̪ t̪u:] 'you close' [gə n̪u:n̪ən̪ t̪u:] 'that you close'

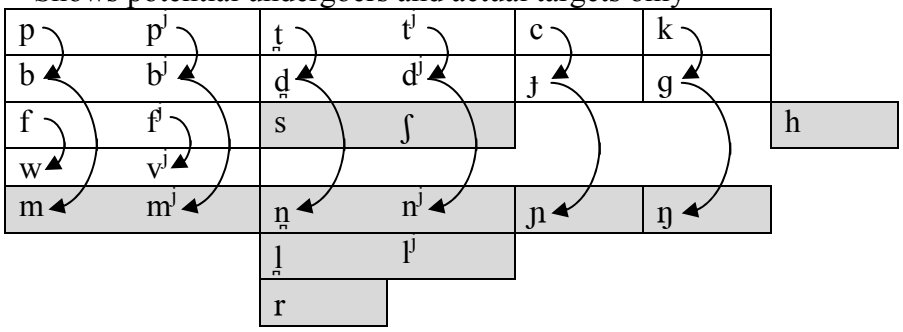
(d) Sonorants don't change

[n̪ə n̪avʲdʲɪ] 'the enemies' [n̪ə n̪avʲdʲɪ] 'of the enemies'

[l̪uəx] 'value' [ə l̪uəx] 'their value'

(23) *More precisely, adapted from Pullman (2004:table 1.1)*

- Shows potential undergoers and actual targets only



(24) *Proposal*:

(a) Morphemes with eclipsis have an /n̪/ (TO BE REVISED IN SECTION 6)

(b) Its potentially conflicting *and realizable* features are [+voice] and [+nasal]

(25) Before vowels, /n̪/ surfaces as [n̪]

/ n̪$_1$+ɑ:$_2$…/	UNIFORMITY
☞ (a) n̪ɑ:	
(b) ɑ̃:$_{1,2}$	*!

(26) Before consonants, NO C CLUSTERS and others force /n̪/ to coalesce

/n̪+t̪ahi:/	NO C CLUSTERS	DON'T ADD	DON'T DELETE	UNIFORMITY
☞ (a) d̪$_{1,2}$ahi:				*
(b) t̪ahi:			*!	
(c) n̪$_1$it̪$_2$ahi:		*!		
(d) n̪$_1$t̪$_2$ahi	*!			

(27) *Which part of /n̪/ survives?*

NVC only requires that *one* feature surface; IDENT-root will minimize change to the root.

/n̪$_1$ + p$_2$/	NVC	IDENT ROOT FS
(a) p$_{1,2}$	*!	
☞ (b) b$_{1,2}$		*
(c) m$_{1,2}$		* *!

- (a) violates NVC because [p] doesn't have any feature that's unique to /n̪/ but not /p/
- (b) doesn't violate NVC because [b] has a [+voice] feature which is found in /n̪/ but not in /p/ *and* the labial feature is unique to /b/ but not to /n̪/.
- (c) doesn't violate the NVC, but changes the root segment wantonly.

(28) *The surviving feature can change depending on NVC*

/n̪$_1$ + b$_2$/	NVC	IDENT ROOT FS
(a) p$_{1,2}$	*!	*
(b) b$_{1,2}$	*!	
☞ (c) m$_{1,2}$		*

- [p] doesn't realize any feature of /n̪/ that isn't also a feature of /b/.
- [b] doesn't realize any feature of /n̪/.
- [m] keeps the place of /b/ and the nasality of the /n̪/

(29) *Mutation is blocked when no non-coalescing change can occur*

/n̪$_1$ + n̪$_2$ …/	NVC	IDENT ROOT FS
(a) t̪$_{1,2}$	*	* *!
(b) d̪$_{1,2}$:	*	*!
☞ (c) n̪$_{1,2}$	*	

(30) *Mutation is blocked when there is no admissible counterpart*

• [z] is banned; [n̪ə saidʲuːrʲiː] ‘of the soldiers’

/n̪$_1$ + s$_2$ …/	*z	IDENT continuant	NVC	IDENT ROOT FS
☞ (a) s̪$_{1,2}$			*	
(b) z̪$_{1,2}$	*!			*
(c) n̪$_{1,2}$			*	* *
(d) d̪$_{1,2}$		*!		* *

(31) *Summary*

(a) Mutation is coalescence, forced by phonotactic constraints.
(b) The surviving features are controlled by NVC and featural faithfulness.
(c) NVC is responsible for the disjunctive nature of certain mutations.
(d) Without NVC, faithfulness would completely determine which feature emerges (as in Chaha).

6. Absolute Neutralization and Output Choice

(32) There is a problem with the analysis above:

/n̪$_1$+d̪$_2$/	NVC	IDENT ROOT FS
(a) t̪$_{1,2}$	*	*!
!☞ (b) d̪$_{1,2}$	*	
(c) n̪$_{1,2}$	*	*!

• (a) There is no feature in /t̪/ that is unique to /d̪/ but not to /n̪/.
• (b) ditto.
• (c) ditto.

The *same problem* will be faced with *all* choices of underlying segment with the right features:

i.e. /m/, /nʲ/, /ɲ/, /ŋ/

The solution?

(33) *Absolute neutralization*

(a) /N/ (uvular nasal)

/N$_1$+d̪$_2$/	NVC	IDENT ROOT FS
(a) t̪$_{1,2}$	*!	*
(b) d̪$_{1,2}$	*!	
☞ (c) n̪$_{1,2}$		*
(d) N$_{1,2}$	*!	* *

• /N/ isn’t allowed on the surface, so the problem in (32) won’t arise.

(34) *Still ok before vowels; /N/ neutralizes to [n̪]*

• /N/ is banned on the surface, so NO UVULAR » IDENT Place

/ N_1+ɑː$_2$…/	NO UVULAR	UNIFORMITY	IDENT Place
☞ (a) n̪ɑː			*
(b) ɑ̃ː$_{1,2}$		*!	
(c) Nɑː$_{1,2}$	*!		

(35) *Results*

(a) Disjunctive mutation is due to NVC.

(b) Absolute neutralization helps guide the mutated output.

(36) *Factors influencing the output of coalescence/mutation*

(a) If a mutating morpheme has a segment with a feature α that isn't permitted in the output, the morpheme cannot cause α to mutate.

(i) In general, if only feature α mutates, then such α-only mutation can be produced by an underlying segment that is composed of features {α,β,γ…} where all features except α have prohibited surface values.

(b) Faithfulness can prevent features from mutating.

(c) Markedness constraints on feature co-occurrence can block certain outputs (e.g. Chaha's ban on labialized coronals).

6.1 Is absolute neutralization believable?

(37) *Absolute neutralization*

(a) Where an underlying segment does not show up intact in *any* output environment.

(38) *Pāli absolute neutralization of retroflex* /ʂ/

(a) Pāli does not permit [ʂ] in any environment.

(i) The only retroflex is allows is [ʈ].

(b) However, /ʂ/ exists:

(i) /iʂ-ta/ → [iʈːʰa] 'wish-gerund'

(ii) /daʂ-tabːa/ → [daʈːʰabːa] 'see-gerund'

(iii) /daʂ-tvaː/ → [diʈːʰaː] 'see-absolutive'

(iv) /kiliʂ-ta/ → [kiliʈːʰa] 'be dirty-absolutive'

(c) Compare with /s/:

(i) /sis-ta/ → [sitːʰa] 'leave'

(ii) /vas-tabːa/ → [vatːʰabːa] 'live-gerund'

(iii) /vas-tum/ → [vatːʰum] 'live-infinitive'

(d) /ʂ/ doesn't show up when it can't coalesce with a stop

/daʂ-ja-ti/ → [disːati] 'see-passive-3sg'

/a-daʂ-ʃ-am/ → [adːasam] 'aorist-see-aorist-1sg'

(39) *Analysis*

(a) [ʂ] is banned, [ʈ] is permitted

/iʂ/	*ʂ	IDENT retroflex	*ʈ
(a) iʂaʈi	*!		
☞ (b) isaʈi		*	*
(c) isati		* *!	

(40) *Retroflex survives in stop coalescence because it can*

/iʂ$_1$-t$_2$a/	*ʂ	IDENT retroflex	*ʈ
(a) itː$_{1,2}$a		*!	
☞ (b) iʈː$_{1,2}$a			*

(41) *Famous absolute neutralizations*

(a) Maltese /ʕ/ never appears on the surface, but coalesces (after Brame 1972)

e.g. /nismi$_1$ʕ$_2$/ → [nisma$_{1,2}$] (/ʕ/ coalesces with a preceding vowel)

(b) Yawelmani: all /iː uː/ surface as [eː oː] (see Archangeli 1984)

(42) *Learning absolute neutralization*

(a) Merchant's (2008) allomorphy learning theory straightforwardly learns absolutely neutralizing segments.

6.2 Is absolute neutralization useful outside of mutation?

(43) *Absolute neutralization and morpheme-specificity in Yowlumni Yokuts (Yawelmani)*

(a) CV affixes appear faithfully

[talaap-ni] 'bow-IO'

[xataa-ni] 'food-IO'

(b) Except for *-m(i)* 'precative'

(i) [m] appears after Vs

[panaa] 'having approached' [panaa-m] *[panaa-mi]

(ii) [mi] only appears when the alternative is syllabically bad…

[amic] 'having arrived' [amic-mi] *[amic-m]

(44) *Issues*
(a) Why is *m(i)* special?
(b) Why does the [i] appear only under duress?

(45) *Not epenthesis*
(a) Could *m(i)* be /m/?
Problem: CC → CiC, not CCi, so /amic-m/ would → *[amicim]
e.g. /ʔidl/ → [ʔidil], *[ʔidli]
cf. /soonl/ + *m(i)* → [soonilmi], *[soonlim]!
(b) The challenge: There's something about the suffix's vowel that makes its faithful realization *inherently* undesirable.

(46) *Proposal*
(a) The precative is /mɨ/ (/ɨ/ = central unrounded high vowel)
(b) [ɨ] is banned on the surface (the only vowels allowed are [i e a o u])
(i) /ɨ/ *preferentially deletes*
(ii) Otherwise it *neutralizes* to [i]
(c) *Derivations*
(i) /panaa-mɨ/ → [panaam]
(ii) /amic-mɨ/ → [amic-mi]; *blocked* *[amicm]
(d) Analytically, the exact underlying vowel doesn't really matter as long as the ranking is such that it neutralizes to [i] and not some other vowel and the vowel is banned on the surface. The exact identity of the vowel will be determined by a learning theory.

(47) *OT: HoPHoT* 'Heterogeneity of Process, Homogeneity of Target'
(a) Deletion

/panaa-mɨ/	NO ɨ	NO C CLUSTERS	IDENT ɨ	DON'T DELETE
(a) panaamɨ	*!			
(b) panaami			*!	
☞ (c) panaam				*

(b) Else neutralization if deletion is blocked

/amic-mɨ/	NO ɨ	NO C CLUSTERS	IDENT ɨ	DON'T DELETE
(a) amicmɨ	*!			
☞ (b) amicmi			*	
(c) amicm		*!		*

• Why not [amic]? DON'T DELETE-C » IDENT-ɨ

(48) *It's all free*
(a) HoP-HoT is inherent to OT.
(b) Richness of the Base places no restrictions on inputs.

(49) *Is it learnable?*
(a) Merchant's (2007) theory could be extended to account for this case (Merchant's theory is currently limited to morphemes that alternate solely by feature change, not deletion).
(b) The allomorphs of the precative are [mi] and [m]. If we conceive of Merchant's algorithm as winnowing down possible allomorphs, the set of potential URs includes all /mV/, with all possible Vs. Of these, only a subset maps to [mi], and /mi/ does not. Therefore, the UR cannot be /mi/, but must map to [mi], which leaves – among others – /mi̵/.

(50) *The point*
(a) Absolutely neutralizing segments provide the motivation for a phonological change:
i.e. /i̵/ prompts deletion to apply wherever it can, otherwise neutralization.

7. Polarity mutation

(51) *What is morpho-phonological polarity?*
When a morphological change is marked by turning a feature from [αF] into [−αF].
(a) Assumption: no segment can be both [αF] and [−αF] underlyingly.
(b) Therefore, a polarizing morpheme must have two underlying segments.
(c) However, they have a disjunctive effect, so they must *conflict* on a particular feature.

(52) *DhoLuo genitive plural*
• Very controversial, but here goes…

(53) *Schematically*
The genitive plural replaces the final vowel with [ɛ] and…
(a) Root-final voiceless Cs change to voiced
[sandu<u>k</u>u] 'box' ~ [sandu<u>g</u>e] {gen.pl.}
(b) Root-final voiced Cs change to voiceless
[kɛ<u>d</u>i] 'twig' ~ [kɛ<u>t</u>ɛ] {gen.pl}

(54) *From what we know so far*
(a) We need *two* mutating segments that conflict in [voice]
e.g. /Gh/
(b) /d_1+G_2h_3/ → [$t_{1,2,3}$]
(i) [$t_{1,2,3}$]: coronal is unique to /d/; [−voice] is unique to /h/; *nothing* is unique to /G/, nor *can it be*: [d] has all features that [G] has apart from uvular, and uvular is banned in this language.
(c) /k_1+G_2h_3/ → [$g_{1,2,3}$]
(i) [$g_{1,2,3}$]: velar is unique to /k/; [+voice] is unique to /G/
(ii) [$ɣ_{1,2,3}$]: this would be perfect for NVC, but [ɣ] is banned!

(55) *Result*
Two coalescing segments that conflict in a feature can cause apparent polarity: the output has to choose which feature to realize, opting to realize the one that reflects an underlying segment uniquely.

7.1 Details

(56) *The genitive plural is far more complex than a simple exchange of [±voice]…*

(57) *Changes in the genitive*

labial	*dental*	*alveolar*	*palatal*	*velar*	*glottal*
p		t	c	k	
b		d	ɟ	g	
^{m}b		^{n}d	^{ɲ}ɟ	^{ŋ}g	
f	θ	s			h
	ð				
m		n	ɲ	ŋ	
		l	r		
w			j		

(58) *Generalizations*
(a) [αvoice] obstruent becomes [−αvoice]
(b) /N/ and liquids becomes [^{N}stop]
(c) glides become voiceless stops
(d) /c/ becomes a glide or deletes
(e) /^{N}C f s h/ don't change

(59) *Proposal*
(a) The genitive is /Gh/
(b) Only one consonant survives; the other deletes.
(c) The one that survives is determined by NVC.

(60) *NVC 1: –voice stop → +voice*

/t_1 + G$_2$h$_3$/	NVC	*Comment*
(a) $t_{1,2,3}$	* *!	coronal is unique to [t]
☞ (b) $d_{1,2,3}$	*	[+voice] is unique to [G] coronal is unique to [t]
(c) $ð_{1,2,3}$		[+voice] is unique to [G] coronal is unique to [t] [+cont] is unique to [h]. *However*, the root segment's alveolar PoA is not preserved!

(61) *NVC 2: +voice stop → –voice*

/d_1 + G_2h_3/	NVC	*Comment*
☞ (a) $t_{1,2,3}$	*	[–voice] is unique to [h] coronal is unique to [d]
(b) $d_{1,2,3}$	* *!	coronal is unique to [d]
(c) $s_{1,2,3}$	*	[–voice] is unique to [h] coronal is unique to [d] *But wanton violation of IDENT-ROOT-F* – no need for the output to have two unique features of /h/.

(62) *NVC 3: nasal → prenasalized stop*

• Generalization: the input always preserves its nasality

/n_1 + G_2h_3/	NO VOICELESS NASAL	IDENT ±NASAL	NVC	*Comment*
(a) $n_{1,2,3}$			* *!	nasal & coronal are unique to /n/
☞ (b) $^{n}d_{1,2,3}$			*	[–voice] is unique to /h/ nasal & coronal are unique to /n/
(c) $t_{1,2,3}$	*!	*!		coronal is unique to /n/ [–voice] is unique to /h/ [–sonorant] is unique to /G/
(d) $^{n}\underset{\circ}{d}_{1,2,3}$	*!	*!		coronal is unique to /n/ [–voice] is unique to /h/ [–sonorant] is unique to /G/

(63) *NVC 4: Glide to voiceless stop*

/w_1 + G_2h_3/	NVC	*Comment*
(a) $w_{1,2,3}$	* *!	labial is unique to /w/
(b) $b_{1,2,3}$	*!	labial is unique to /w/ [–continuant] is unique to /G/
☞ (c) $p_{1,2,3}$		labial is unique to /w/ [–continuant] is unique to /G/ [–voice] is unique to /h/.

(64) *Other segments*

(a) /θ/ and /ð/ alternate and /h/ and /f/ don't change because there's no other segment with the same major and minor PoA.

(b) /s/ doesn't alternate because it would lose [+strident].

(65) *Conclusion*

(a) DhoLuo is not a simple case of polarity. There are several interacting factors, including [voice] and [–sonorant].

(b) The full set of alternations follow with a morpheme with two underlying segments that partially conflict in feature values.

8. Conclusions

(66) *Nothing new*
(a) None of the constraints (except for NVC) are new.
(b) And the need for an NVC constraint has always been assumed in the coalescence literature.
(c) There is *no formal element* in the theory that is unique to mutation.
    (i) It maintains the segment-based theory of correspondence (M&P 1995).
    (ii) It does not require featural morphemes (after Keer 1998, Struijke 2001)
(d) Therefore, it is incumbent on theories that propose mutation-specific representations and constraints to show that the coalescence theory is inadequate.

(67) *How to prove the theory wrong*
(a) Since it's a concatenative theory, mutating morphemes can only have elements that are permissible in the lexicon.
    (i) i.e. segmental features, root nodes, moras, tone, (primary?) stress.
    (ii) Not prosodic *boundaries* or constituents (like Ft, etc.).
    (iii) So, show that some mutating change involves introduction of a prosodic boundary.
(b) Is there something a featural morpheme theory can do that the coalescing theory can't do?
    (i) Probably not.
    (ii) The coalescing theory can do more than most by allowing morphemes with both coalescing and non-coalescing segments.
    (iii) The challenge for featural morpheme theories is to show that the coalescing theory is inadequate.

(68) *What's next?*
(a) Extension of the coalescing idea to other domains
    (i) Morpheme-specific behavior (as in Yowulmni)
    (ii) Phonological subcategorization effects.
(b) Explore the predictions of the theory further
    (i) when there are multiple mutating morphemes
    (ii) in its predictions.

Paul de Lacy
Rutgers University
New Brunswick
NJ 07830
USA
delacy@rutgers.edu
http://ling.rutgers.edu/~delacy

References

Akinlabi, Akinbiyi (1996). "Featural affixation." Journal of Linguistics 32: 238-289.
Akinlabi, Akinbiyi (1996). Featural affixation. Journal of Linguistics 32: 238-289.

Alderete, John (2001). Dominance effects as transderivational anti-faithfulness. Phonology 19.2: 201-254.

Anderson, Stephen R. (1992). A-Morphous Morphology. Cambridge: Cambridge University Press.

Bye, Patrik (2005). Coaffixation and subcategorization in phonology: Unifying gaps, allomorphy, and crazy rules through morpholexical control. ms. University of Tromsø.

Bye, Patrik (2006). Eliminating exchange rules in Dholuo. ms. University of Tromsø.

de Lacy, Paul (2002a). Morpheme distinctiveness and feature exchange in DhoLuo. ms. University of Cambridge.

de Lacy, Paul (2002b). *The formal expression of markedness*. PhD dissertation, University of Massachusetts Amherst.

de Lacy, Paul (2006). *Markedness: Reduction and Preservation in Phonology*. Cambridge University Press.

Fitzpatrick, J., A. Nevins and B. Vaux (2004). Exchange rules and feature-value variables. Handout from NaPhC 2004.

Gregersen, Edgar A. (1972). Consonant polarity in Nilotic. In Erhard Voeltz (ed.) 3rd Annual Conference on African Linguistics. Bloomington, Indiana University

Horwood, Graham (2001). Anti-faithfulness and subtractive morphology. Rutgers Optimality Archive 446.

Howe, Darin Mathew (2000). Oowekyala segmental phonology. Doctoral dissertation, University of British Columbia.

Keer, Edward (1999). Geminates, the OCP and the nature of CON. Doctoral dissertation, Rutgers University. ROA 350.

Kurisu, Kazutaka (2002). The phonology of morpheme realization. Doctoral Dissertation, ROA 490, University of California at Santa Cruz.

Łubowicz, Anna (2002). Contrast preservation in phonological mappings. Doctoral dissertation. Rutgers Optimality Archive 554, University of Massachusetts Amherst.

MacBride, Alexander Ian (2004). A constraint-based approach to morphology. Doctoral dissertation, University of California Los Angeles.

McCarthy, John (1983). "Consonantal morphology in the Chaha verb". In M. Barlow, D. Flickinger and M. Wescoat (eds.). Proceedings of WCCFL 2. Stanford: Stanford Linguistic Association. pp. 176-188.

McCarthy, John (2003). OT constraints are categorical. Phonology 20: 75-138.

McCarthy, John and Alan Prince (1995). Faithfulness and Reduplicative Identity. In Jill Beckman, Suzanne Urbanczyk and Laura Walsh Dickey (eds.) University of Massachusetts Occasional Papers in Linguistics UMOP 18. Amherst, GLSA, pp.249-384.

Merchant, Nazarré (2008). Discovering underlying forms: Contrast pairs and ranking. Doctoral dissertation, Rutgers University.

Mortensen, David (2004). Abstracts scales in phonology. Rutgers Optimality Archive 667.

Nevins, Andrew, and Michael Wagner (2001). Backcopying, Shmackcopying: Correspondence Relations and Dissimilation in Echo Reduplication. Presented at the LOT Summer School, Nijmegen, July 9-20.

Okoth-Okombo, Duncan (1982). DhoLuo morphophonems in a generative framework. Berlin, Dietrich Reimer Verlag.

Omondi, Lucia Ndong'a (1982). The major syntactic structures of DhoLuo. Berlin, Dietrich Reimer Verlag.

Piggott, Glyne L. (2000). Against featural alignment. Journal of Linguistics 36: 85-129.

Pullman, Thomas (2004). The morphophonology of consonant mutations in Irish. MPhil thesis, University of Cambridge.

Rose, Sharon (2000). Epenthesis positioning and syllable contact in Chaha. *Phonology* 17: 397-425.

Rose, Sharon (2006). Chaha (Gurage) Morphology. In A.S. Kaye (ed.) Morphologies of Asia and Africa. Winona Lake, IN, Eisenbrauns, pp.399-424.

Samek-Lodovici, Vieri (1992). Universal constraints and morphological gemination: A crosslinguistic study, Rutgers University.

Samek-Lodovici, Vieri (1993). A unified analysis of crosslinguistic morphological gemination. Rutgers Optimality Archive 149.

Stafford, R.L. (1967). An elementary Luo grammar, with vocabularies. Nairobi, Oxford University Press.

Stewart, Thomas W. (2004). Mutation as morphology: Bases, stems, and shapes in Scottish Gaelic. Doctoral Dissertation, Ohio State University.

Stonham, John (1994). Combinatorial morphology. Amsterdam: John Benjamins.

Struijke, Caro (2000). Existential faithfulness: A study of reduplicative TETU, feature movement, and dissimilation. Doctoral dissertation, University of Maryland at College Park.

Trommer, Jochen (2006). Against antifaithfulness in Luo. Presentation at OCP 3, Budapest.

Trommer, Jochen (2007). Voicing and polarity in Luo. ms. University of Leipzig. http://www.uni-leipzig.de/~jtrommer/antiauto3.pdf

Tserdanelis, Georgios The role of segmental sandhi in the parsing of speech: Evidence from Greek. Doctoral Dissertation, Ohio State University.

Wolf, Matthew (2005). For an autosegmental theory of mutation. Rutgers Optimality Archive 754.

Yip, Moira (1998). Identity avoidance in phonology and morphology. In Steven Lapointe, Diane Brentari and Patrick Farrell (eds.) Morphology and its relation to phonology and syntax. Stanford, CSLI, pp.216-246.

Zoll, Cheryl (1996). Parsing below the Segment in a Constraint-based Framework. Doctoral dissertation, University of California, Berkeley.