From Strings to Loops & Back

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Goals

- To constrain Raimy's (1999, 2000) theory of precedence loops
- To apply Mailhot & Reiss' (2007) SEARCH & COPY to morphology: affixation, reduplication, subtractive, templatic, metathesis
- To understand how, when, and why loops are created/destroyed
- Samuels (2009): all phonological processes via SEARCH, COPY, DELETE

Typology

/kæt/ is shorthand for: # → k → æ→ t → %
or as ordered pairs: (#, k), (k, æ), (æ, t), (t, %)

Reduplication
Add (t, k): # → k → æ→ t → % = /kætkæt/

Affixation & Templatic Morphology
→ w → a → n → t → %
e → d → %

Subtractive Morphology
Add (o, %): # → g → o → l → o → n → %

Metathesis

Add: (#, B), (A, C), C, A): # → A → B → C → % = BCA

Anchor Points
{First, second, stressed} element of type {X, C, V, foot} from {%, #}

Search & Copy

SEARCH algorithm (Mailhot & Reiss 2007:30)

1. Find all x in Σ subsumed by ς and index them:
   $\varsigma_0, \varsigma_1, \ldots, \varsigma_n$
2. For each $i \in \{0, \ldots, n\}$:
   (a) Proceed from ς_i through Σ in the direction δ until an element subsumed by γ is found
   (b) Label this element γ_i
3. Return all pairs of coindexed standards and goals, (ς_i, γ_i)

COPY algorithm (Mailhot & Reiss 2007:32)
Identify αF on γ_i and assign αF to ς_i if the set of conditions C on γ_i are satisfied

Wolof [ATR] harmony (Mailhot & Reiss 2007:38)

a.	toxi-lEEn	[toxileen]	'go and smoke' (imper.)
b.	tɛkki-lEEn	[tɛkkilɛɛn]	'untie' (imper.)
c.	seen-uw-OOn	[seenuwoon]	'tried to spot'
d.	tɛɛr-uw-OOn	[tɛɛruwɔɔn]	'welcomed'

ς (initiator of SEARCH): ∀V
γ (target of SEARCH): [-HI, αATR]
δ (direction of SEARCH): L COPY [αATR] to ς

Affixation

Tzeltal intransitivization (Yu 2007:102)

a.	puk	'to divide among'	pu-h-k 'to spread the word'
b.	kuč	'to carry'	ku-h-č 'to endure'
c.	k'ep	'to clear away'	k'e-h-p 'to be clear'

Σ (string in the active workspace): # → p → u → k → %
ς (initiator of SEARCH): ς_i → h → ς_j
γ (target of SEARCH): γ_i = First V; γ_j = First X
δ (direction of SEARCH): R
β (beginning of SEARCH): β_i = #; β_j = γ_i

→ p → u → k → %
h

Reduplication

Σ (string in the active workspace): # → f → a → n → c → y → %
ς (initiator of SEARCH): ς_i → sh → m → ς_j
γ (target of SEARCH): γ_i = First X; γ_j = First V
δ (direction of SEARCH): δ_i = L; δ_j = R
β (beginning of SEARCH): β_i = %; β_j = #

→ f → a → n → c → y → %
m ← sh

Kamaiurá aspectual reduplication (Yu 2007:111)

	Singular	*Plural*	
a.	omokon	omoko-moko-n	'he swallowed it (frequently)'
b.	ohuka	ohuka-huka	'he (kept on) laughing'
c.	jeumirik	jeumiri-miri-k	'I tie up (repeatedly)'

Σ (string in the active workspace): # → o → m → o → k → o → n → %
ς (initiator of SEARCH): ς_i → ς_j
γ (target of SEARCH): γ_i = First V; γ_j = Second C
δ (direction of SEARCH): L
β (beginning of SEARCH): β_i = %; β_j = γ_i

→ o → m → o → k → o → n → %

Linearization

To linearize, use Idsardi & Shorey's (2007) algorithm, based on Dijkstra (1959):

Vertices: {#, k, æ, t, %}
Initial queue:
1) t → k
2) # → k
3) k → æ
4) æ→ t
5) t → %

Step 1 (begin at #)
Traverse path: # → k
→ k
1) t → k
2) k → æ
3) æ→ t
4) t → %
5) # → k

Step 2 (begin at /k/)
Traverse path: k → æ
→ k → æ
1) t → k
2) æ→ t
3) t → %
4) # → k
5) k → æ

Step 3 (begin at /æ/)
Traverse path: æ→ t
→ k → æ→ t
1) t → k
2) t → %
3) # → k
4) k → æ
5) æ→ t

Step 4 (begin at /t/)
Traverse path: t → k
→ k → æ→ t → k
1) t → %
2) # → k
3) k → æ
4) æ→ t
5) t → k

Step 5 (begin at /k/)
Traverse path: k → æ
→ k → æ→ t → k → æ
1) t → %
2) # → k
3) æ→ t
4) t → k
5) k → æ

Step 6 (begin at /æ/)
Traverse path: æ→ t
→ k → æ→ t → k → æ→ t
1) t → %
2) # → k
3) t → k
4) k → æ
5) æ→ t

Step 7 (begin at /t/)
Traverse path: t → %
→ k → æ→ t → k → æ→ t → %
Algorithm halts.

Overapplication

Malay nasalization with reduplication (Raimy 2000:16) → rule ordering will not suffice

a.	hamə̃	'germ'	hãmə̃-hãmə̃	'germs'
b.	waŋĩ	'fragrant'	wãŋĩ-wãŋĩ	'fragrant (intens.)'
c.	aŋãn	'reverie'	ãŋãn-ãŋãn	'ambition'
d.	aŋẽn	'wind'	ãŋẽn-ãŋẽn	'unconfirmed news'

Chumash aspiration with reduplication (Wilbur 1973:26) → aspirate, then reduplicate

a.	s-soyin	s^hoy-s^hoyin	'it is very black'
b.	ma-k-hatinet	ma-k^hat-k^hatinet	'my joints'

Chaha dissimilation (Kenstowicz & Banksira 1999) → degemination, not dissimilation

	Root	*Imperfect*	*Perfect*	*Imperative*	
a.	/sxr/	yi-t-sikakər	tə-skakər	tə-sxaxər	'act naughtily'
b.	/mxr/	yi-ti-mkakər	tə-mkakər	tə-mxaxər	'advise each other'
c.	/rxβ/	yi-ti-rkəkəβ	tə-rkəkəβ	tə-rxəxəβ	'show up'

Underapplication

Akan palatalization with reduplication (McCarthy & Prince 1995) → palatalize, then reduplicate

	Actual	*Expected*	
a.	dɛɪ-dɛe	dɛɪ-dɛe	'receive'
b.	tɕɥi-tɕɥeʔ	tɕɥi-tɕɥeʔ	'cut'
c.	kɪ-kaʔ	*tɕɪ-kaʔ	'bite'
d.	hɪ-hawʔ	*çɪ-hawʔ	'trouble'

Luiseño deverbal adjectives (Wilbur 1973) → loops can't help

	Expected	*Actual*
Reduplication	čaračara-i-č	čaračara-i-č
Stress assignment	čáračaraič	čáračaraič
Stress retraction	čaráčaraič	čaráčaraič
Syncope	čaráčraič	čaráčraič
Hiatus resolution	čaráčrač	čaráčrač
/č/ → [š]	*čarášraš	čaráčraš

Conclusions

- Morphophonology & phonological rules can be captured with the same simple procedure
- SEARCH gives local relations without tiered representations
- Loops are destroyed as soon as they are created

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