Prosodic residue in an a-templatic world

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1.0 Goals of Atemplaticism

- General goal of 'atemplaticism' is to derive the shapes of 'templates' from general principles of the morphological and phonological components

"Our goal, which is the same as the goal of all linguistic theory, is to achieve greater empirical coverage with fewer resources- maybe with no resources at all that are specific to the domain under investigation" (McCarthy and Prince 1994:B13).

The goal is "[t]o explain properties of morphology/phonology dependency in terms of *independent, general* properties" (McCarthy and Prince 1994:B1).

- Most attention in this endeavor has been focused on *reduplicative templates*, i.e. the descriptions of the repeated regions found in reduplication
- Very brief history of *reduplicative templates*...

(1) Heavy Syllable Reduplication in Agta (Marantz 1982)

takki	'leg'	tak-takki	'legs'
uffu	'thigh'	uf-uffu	'thighs'
bari	'body'	bar-bari	'my whole body'
na-wakay	'lost'	na-wak-wakay	'many things lost'

a.	Marantz (1982)	CVC
b.	McCarthy and Prince (1986)	$\sigma_{\mu\mu}$
c.	McCarthy and Prince (1993)	RED = $\sigma_{\mu\mu}$
d.	Hendricks (1999)	All-σ-Left >> BR-Faith

- Two current issues in this progression:

  (a) McCarthy (2003) argues for *categorical constraints* but Hendricks (1999) crucially relies on *gradient constraints.* Can atemplatic analyses in OT be categorical?

  (b) Is the atemplatic approach to reduplicative templates generalizable to other cases of 'non-concatenative morphology' such as infixation (and possible root and templates)?
- Outline of Talk:

  –Atemplaticism and categorical constraints are incompatable in OT as currently developed

  –Introduction to Anchor Point Theory (APT)

  –Theory specific instantiations of APT

  –Future prospects

2.0 Atemplaticism and categorical constraint evaluation

- There are multiple converging proposals on 'atemplatic reduplication' in Optimality Theory–McCarthy and Prince (1994), Urbanczyk (1996), Raimy and Idsardi (1997), Spaelti (1997), Hendricks (1999), etc.
- General approach among these proposals is that there is some constraint (or interaction of constraints) that will limit total reduplication
- All of the above approaches utilize *gradient constraints* in that multiple violations of a Generalized Alignment constraint crucially distinguishes between candidates
- Tableax in (2-4) show representative examples of this approach from Spaelti (1997) and Hendricks (1999) with the fundamental difference between the two approaches being whether syllables or segments are being counted for violations

(2) Foot reduplication in Fijian (Spaelti 1997:35)

input	/RED + talanoa/	Align-Left(RED,Foot)	Max-LS	All-Feet-R	Max-BR
a. ☞	[(**tala**)(tala)(noa)]			σ/σσσ	noa
b.	[**ta**(**lano**)(tala)(noa)]	*!		σ/σσσ	a
c.	[**tala**(**noa**)(tala)(noa)]	*!		σ/σσσ	
d.	[**ta**(tala)(noa)]	*!		σ	lanoa
e.	[(**tala**)(**noa**)(tala)(noa)]			σ/σσσ/σσσσ!	
f.	[(**tala**)**noa**(tala)(noa)]			σ/σσσσ!	

(3) Syllable copying in Sawai (Spaelti 1997:44)

input	/RED + tolɛn/	σ-Form	MaxLS	All-σ-R	NUVP	MaxBR	Dep
a. ☞	**tɛl**tolɛn			σ/σσ		***	*
b.	**tln**tolɛn	*!		σ		**	
c.	**tln**tln	*!	**				
d.	**tɛln**tolɛn	*!		σ/σσ		**	*
e.	**tɛlɛn**tolɛn			σ/σσ/σσσ!		**	**
f.	**tɛ**tolɛn			σ/σσ		****!	*

(4) Expressives in Semai (Hendricks 1999:76)

input: /RED + cayɛm/		Right-AnchorBR	Left-AnchorBR	Align-RED-L	Align-Root-L	MaxBR
☞	a. **cm**-cayɛm				cm	ayɛ
	b. **c**-cayɛm	*!			c	ayɛm
	c. **m**-cayɛm		*!		m	cayɛ
	d. **caym**-cayɛm				cay!m	ɛ
	e. **cam**-cayɛm				cam!	yɛ

- All of the approaches in (2-4) crucially rely on the gradient evaluation of a constraint:
  (2) All-Feet-Right: gives 'foot' template
  (3) All-σ-Right: gives 'syllable' template
  (4) Align-Root-Left: evaluated by segment gives bare consonant template
- McCarthy (2003) argues that all *gradient* constraints can be replaced by *categorical* constraints and this is warranted based on typological grounds among other things
- (5) presents general schema for categorical constraints- hierarchy of constraints based on some phonological structure, this example is based on the prosodic hierarchy and is used for the analysis of infixation

(5) Categorical constraints on affix position (McCarthy 2003:94)

a. Prefix (*-af-*)

i.e. -af- is not preceded by a segment within the prosodic word

b. Prefix/σ(-af-)

-af-/σ _ i.e. -af- is not preceded by a syllable within the prosodic word

c. Prefix/Ft(-af-)

-af-/Ft _ i.e. -af- is not preceded by a foot within the prosodic word

- We must translate the constraint types in (5) to range over root/stem in order to create 'template pressures' for reduplication- analogous to Hendrick's Align-Root-Right in (4)
- Translation is relatively straightforward with the following effects

(6) Categorical constraints for Reduplication

a. Prefix/(stem): the stem is not preceded by a segment within the prosodic word
   Effect: no reduplication within prosodic word

b. Prefix/σ(stem): the stem is not preceded by a syllable within the prosodic word
   Effect: reduplication is segment sized

c. Prefix/Ft(stem): the stem is not preceded by a foot within the prosodic word
   Effect: reduplication is syllable sized

- Constraints in (6) are empirically inadequate because a 'foot' reduplication pattern can not be produced

(7) Categorical version of Fijian reduplication

input	/RED + talanoa/	A-L(R,F)	MaxBR	Rt/*Ft	Rt/*σ
a.	[(**tala**)(tala)(noa)]		*!**	*	*
b.	[**ta**(**lano**)(tala)(noa)]	*!	*	*	*
c.	[**tala**(**noa**)(tala)(noa)]	*!		*	*
d.	[**ta**(tala)(noa)]	*!	*****		*
e. ☞!	[(**tala**)(**noa**)(tala)(noa)]			*	*

- Candidate (7e) is the most harmonic because:
  –it has no violations of A-L(R,F) and MaxBR
  –if Rt/*Ft >> A-L(R,F), MaxBR then (7d) wins because it does not violate Rt/*Ft
- Theoretical issue is that the categorical constraints act as 'delimiters' in that they indicate the higher boundary of displacement for the stem
- Thus, what is needed is a prosodic category above 'foot' which is no larger than 3 syllables… no likely candidate for this role
- Conclusion: atemplatic analyses in OT which use categorical alignment constraints are empirically inadequate
- Possibilities:
  (a) reject atemplaticism
  (b) reject McCarthy (2003) categorical constraint proposal
  (c) develop alternative theory of atemplaticism

3.0 Anchor Point Theory

- Yu (2003) argues for a set of 'pivot points' that describe where infixation can occur
- Main point of Yu (2003) is to argue against 'displacement theories' of infixation where an infix is understood as a prefix/suffix and then is displaced inside the stem due to some other pressure

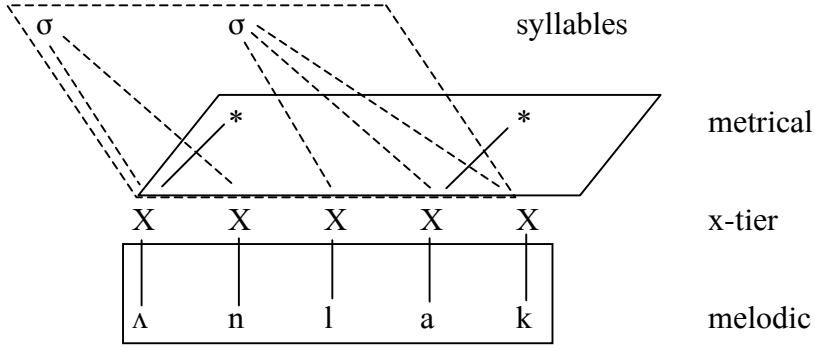
(8) Set of pivot points for infixation (Yu 2003:54-55)

BEFORE or AFTER	First consonant
	First vowel
	Final syllable
	Final vowel
	Stressed syllable
	Stressed vowel
	Stressed foot

- Pivot point set in (8) is unstructured and misses generalizations
- Raimy (2004) argues for a connection between the structural descriptions where infixation can occur and structural descriptions that can be used for reduplication
- General question is 'what are legitimate structural descriptions' for the purposes of infixation and reduplication (and phonology)

- Phonological representations are multi-dimensional (Halle 1985) in that calculations can be done on separate planes associated with metrical information, syllable structure and vowel-consonant planar separation on the melodic tier

(9) multi-dimensional phonology



- Phonology 'does not count' thus legitimate structural descriptions must be:
  –edge based: at beginning or end of representation
  –prominence based: some sort of special status in representation (i.e. head, stressed, onset)
- Building from these observations we can derive the Anchor Point parameter set as in (10)

(10) Anchor Point Theory parameters for structural description

Placement:	{at/before/after}
Count:	{first/last}
Plane:	{x-tier/metrical/syllable/consonantal}
Target:	{plain/stressed(head)/consonant}

- Intra-tier representations are simplified in (10) and will be discussed as they become relevant
- Structural descriptions created by APT are 'organic' to phonology in that all theories of phonology recognize the descriptions produced, thus, there is no 'reduplication specific' aspect of APT–utility for infixation further supports this claim

4.0 Complete reduplication patterns

- Halle and Harris (2005) introduce a useful and novel distinction within reduplication patterns:
  –'total reduplication' are patterns which respect 'Marantz's Generalization'
  –'partial reduplication' are patterns which do not
- Marantz's Generalization (informally):
  (a) reduplicant is a continuous substring of base
  (b) prefixing reduplicant is copied from L to R on the base
  (c) suffixing reduplicant is copied from R to L on the base
- Nomenclature is a confusing issue here so we will rename this observation
  –'complete reduplication' follows 'Marantz's Generalization'
  –'incomplete reduplication' does not
- Relevance of 'complete' vs. 'incomplete' distinction is important when we compare instantiations of APT within specific models of reduplication (sect. 6)
- For all complete reduplication patterns we need to specify the beginning (B) and end (E) of the region of the stem to be repeated

(11) Total reduplication in Indonesian (Sneddon 1996)

a.	buku	'book'	buku-buku	'books'
	singkatan	'abbreviation'	singkatan-singkatan	'abbreviations'
b.	*anchor points*			
	B:{at, first, x-tier, plain}		"first segment"	
	E:{at, last, x-tier, plain}		"last segment"	
c.	*stem demarcation*			
	{singkatan}			
c.	*reduplication*			
	singkatan-singkatan			

- Total reduplication appears to be the 'unmarked' form of reduplication in that:
  (a) if language has reduplication, it has total reduplication (Rubino 2005)
  (b) total reduplication may be a true language universal (Moravcsik1978)
- This suggests that parameter settings in (11b) are 'unmarked' or 'default'
- A different way of considering this observation is that the settings in (11b) are the most 'general' statements, other parameter settings are more specific in some manner

- This view is useful for selectionist learning (Yang 2002) and possible governing by the Elsewhere Condition (Kiparsky 1973, Halle and Idsardi 1997)

(12) Axininca Campa 'onset effect' (McCarthy and Prince 1994)

a. /kawosi/ kawosi-kawosi 'bathe'
   /osampi/ osampi-sampi 'ask'

b. *anchor point*
   B:{at, first, consonantal, plain} "first consonant"
   E:{at, last, x-tier, plain} "last segment"

c. *stem demarcation*
   o{sampi}

c. *reduplication*
   osampi-sampi

- Classic 'onset effect' in (12) does not require a 'prosodic analysis'– simply changing the Plane parameter to 'consonantal' in the Beginning anchor point produces the pattern
- Important theme which will be developed further is that APT can produce 'prosodic effects' without utilizing prosodic structure

4.1 Light syllable reduplication

- Light syllable 'prosodic target' is easily captured by APT in a non-prosodic way

(13) Light syllable reduplication in Ilokano (Hayes and Abad 1989:357)

a. liŋʔét 'perspiration' si-li-liŋʔét 'covered w. persp.'
   ǰyáket 'jacket' si-ǰya-ǰyaket 'wearing a jacket'

b. *anchor points*
   B: {at, first, x-tier, plain} "first segment"
   E: {at, first, metrical, plain} "first vowel"

c. *demarcation*
   {ǰya}ket

d. *reduplication*
   ǰya-ǰyaket

- The first element on the metrical tier will be the first vowel

- No cluster simplification occurs because the B anchor point is specified to the first segment
- Prefixing nature is due to the combination of anchor points being defined on the 'first' side of the stem
- Suffixing reduplication patterns result from anchor points being defined on the 'last' side of the stem

(14) Korean Ideophones (Kim 2001)

a.

culuk	culu-lu-k	'dribbling'
asak	asa-sa-k	'crunching'
acha	acha-cha	'Oops, I forgot! (error)'
ako	ako-ko	'Darn! (error)'

b. *anchor points*

B: {before, last, metrical, consonant}"consonant before last vowel" (_VC_0#)

E: {at, last, metrical, plain} "last vowel"

c. *demarcation*

a{sa}k

d. *reduplication*

asa-sa-k

- "last vowel" is straightforward because it is the last element on the metrical tier
- "consonant before last vowel" is more complicated because it involves transplanar information
  - –last vowel must be calculated
  - –consonant preceding this identified last vowel is targeted
  - –penultimate vowel ('before last vowel on metrical tier') is not the target
- A 'no coda' TETU effect is produced in this pattern due to the E anchor point being set to the 'last vowel'– no prosodic information is necessary
- Infixing in reduplication can result from a 'prominence based' anchor point

(15) Samoan infixing light syllable reduplication (Broselow and McCarthy 1983)

a.	táa	ta-táa	‘strike’
	nófo	no-nófo	‘sit’
	móe	mo-móe	‘sleep’
	alófa	a-lo-lófa	‘love’
	saváli	sa-va-váli	‘walk’
	malíu	ma-li-líu	‘die’

b. *anchor points*

B: {at, last, syllable, stressed} “beginning of stressed syllable”

E: {at, last, metrical, stressed} “last stressed vowel”

c. *demarcation*

a{ló}fa

d. *reduplication*

a-lo-lófa

- Beginning anchor point requires comment:
  –combination of {at} and {syllable} is interpreted as the ‘beginning of the syllable’
  –{stressed} indicates the syllable that contains the stressed vowel
  –{last} is superfluous for this data, only one stressed syllable/vowel
- Other ‘light syllable’ reduplication patterns are found in the appendix

4.2 Heavy syllable reduplication

- ‘light’ syllable pattern is created by the E anchor point specifying a vowel which eliminates any codas or vowel length if it is the ‘first vowel’
- ‘heavy’ syllable pattern requires phonological material past the ‘first vowel’

(16) Heavy syllable prefixing in Agta (Marantz 1982)

a.	takki	'leg'	tak-takki	'legs'
	uffu	'thigh'	uf-uffu	'thighs'
	bari	'body'	bar-bari	'my whole body'
	na-wakay	'lost'	na-wak-wakay	'many things lost'

b. *anchor points*

B : {at, first, x-tier, plain} "first segment"

E: {after, first, metrical, consonant} "consonant after first vowel"

c. *demarcation*

{bar}i

d. *reduplication*

bar-bari

- General analysis of 'heavy' syllable phenomenon is to make reference to what follows a vowel
- Microvariation is found in 'heavy syllable' patterns when language does not have an onset requirement– see Raimy (2000) for discussion and appendix for examples

4.3 Foot reduplication

- Data from Pazeh (Blust 1999) demonstrates important aspect of 'foot' reduplication patterns

(17) Pazeh foot reduplication patterns (Blust 1999:353-354)

a. *leftmost foot*

m-italam	'to run'	ma-ita-italam	'running contest, race'
m-ituku	'to sit'	ma-itu-ituku	'for everyone to sit at once'
pabared	'to answer'	ma-paba-pabared	'to answer each other'

b. *rightmostfoot*

kamalang	'sharp'	kamala-malang	'very sharp'
tabarak	'yellow'	tabara-barak	'very yellow'
pedesax	'bright, luminous'	pedesa-desax	'flickering, as a fire, twinkling, as stars'

- Difference in 'left' vs. 'right' foot reduplication patterns in Pazeh is based on 'stative' vs. 'dynamic' status of the root– not dependent on metrical pattern of the word
- Foot reduplication patterns like other ones do not show constituent copying effects; independent 'foot' is parsed for the reduplication pattern

(18) Leftmost foot reduplication in Pazeh

a.	m-italam	'to run'	ma-ita-italam	'running contest, race'
	m-ituku	'to sit'	ma-itu-ituku	'for everyone to sit at once'
	pabared	'to answer'	ma-paba-pabared	'to answer each other'

b. *anchor points*

B: {at, first, x-tier, plain} "first segment"

E: {after, first, metrical, plain} "peninital vowel"

c. *demarcation*

{itu}ku *prefixation* ma{itu}ku

d. *reduplication*

ma-itu-ituku

- Having 'plain' as Target parameter setting restricts the E anchor point calculation to the metrical plane thus deriving 'peninitial vowel'

(19) Rightmost foot reduplication in Pazeh (Blust 1999)

a.	kamalang	'sharp'	kamala-malang	'very sharp'
	tabarak	'yellow'	tabara-barak	'very yellow'

b. *anchor points*

B: {before, last, syllable, plain} "penultimate syllable"

E: {at, last, metrical, plain} "last vowel"

c. *demarcation*

ka{mala}ng

d. *reduplication*

kamala-malang

- There is an asymmetry between left and right foot reduplication in Pazeh
  –'left' pattern operates on metrical tier for 'right edge'
  –'right' pattern operates on syllable tier for 'left edge'

- B anchor point in (19b) identifies the beginning of the penultimate syllable
  –'plain' target on 'syllable' tier will be syllable initial segment
  –'consonant' Target on 'syllable' tier will be 'core onset' (Cairns and Feinstein 1982) and is utilized in some onset cluster simplification effects (see sect. xxx)

4.4 Non-prosodic complete reduplication patterns

- There are additional attested 'complete' reduplication patterns that defy a natural 'prosodic' analysis
- APT captures these patterns in a natural manner; actually predicts these patterns
- Prosodic unit based approaches (McCarthy and Prince 1986, 1993, 1994, McCarthy 2003) require additional mechanisms to account for these patterns

(20) VC(C) reduplication in Mangarayi (Merlan 1982)

a.

singular	*plural*	
gabuji	g-ab-abuji	'old person'
jimgan	j-img-imgan	'knowledgable one'

b. *anchor points*

B: {at, first, metrical, plain} "first vowel"

E: {after, first, syllable, plain} "beginning of peninitial syllable"

c. *demarcation*

j{img}an

d. *reduplication*

jimg-imgan

- E anchor point produces the first segment of the second syllable through principles governing interaction of 'syllable' and 'plain'
- Non-prosodic patterns can also be produced via prominence based calculations

(21) Reduplication in Malagasy (Keenan and Polinsky 1998:571-572)

a.

ló	'rotten'	lò-ló	'somewhat rotten'
lèhibé	'big'	lèhibè-bé	'biggish'
fótsy	'white'	fòtsi-fótsy	'whitish'
hadíno	'forget'	hadìno-díno	'forget a bit'
áloka	'shade'	/àloka-áloka/ >	àlok-áloka

b. *anchor points*

B: {at, last, syllable, stressed}

E: {at, last, x-tier, plain}

c. *demarcation*

lèhi{bé} ha{díno} {áloka}

d. *reduplication*

lèhibè-bé hadìno-díno àloka-áloka > [àlok-áloka]

5.0 Incomplete reduplication patterns

- Reduplication patterns in sect. 4 are 'complete' because they follow Marantz's Generalization
- Incomplete patterns of reduplication are well attested and violate Marantz's generalization in two possible ways:
  (a) repeated region is a noncontiguous string of base
  (b) repeated region is displaced from base in some manner
- Effect of these deviations from Marantz's Generalization will require either:
  (a) multiple regions specified by distinct anchor points
  (b) diacritic to mark displacement of repeated region (RED)
- Current symbology is not the best interpretation of APT, sect. 6 discusses which models of reduplication are capable of resolving the difficulties we see in this section

(22) Semai Contiuous Aspect reduplication (Diffolth 1976)

a.

dŋɔh	dh-dŋɔh	'appearance of nodding'
kmrʔɛ:c	kc-kmrʔɛ:c	'short, fat arms'

b. *anchor points*

I. B: {at, first, x-tier, plain} II. B: {at, last, x-tier, plain}

E: {at, first, x-tier, plain} E: {at, last, x-tier, plain}

PREFIX = {before, first, x-tier, plain}

c. *demarcation*

RED{k}mrʔɛ:{c}

d. *reduplication*

kc-kmrʔɛ:c

- Semai requires two sets of anchor points with one specifying the 'first segment' and the other specifying the 'last segment'
- Repeated region is prefixing
- Temiar is closely related language and shows a slightly different pattern which using current symbology requires allomorphy in the reduplicant
  –cannot give a single set of anchor points to describe the pattern
  –this will be remedied in sect. 6

(23) Temiar Continuous Aspect reduplication (Benjamin 1976)

a.	slɔg	s-g-lɔg	'to sleep with'
	kɔ̄w	kw-kɔ̄w	'to call'

b. *anchor points*

's-g-lɔg' 'kw-kɔ̄w'

B: {at, last, x-tier, plain} *Semai pattern in (22b)*

E: {at, last, x-tier, plain}

INFIX = {after, first, x-tier, plain}

c. *demarcation*

s-RED-lɔ{g}

d. *reduplication*

s-g-lɔg

- 'Complex onset effects' are also a source of incomplete reduplication patterns

(24) Recent perfective reduplication in Tagalog (McCarthy and Prince1986:13)

a.	ta-trabaho	'just finished working'
	ga-galit	'just got mad'
	bo-bloaut	'just gave a special treat'

b. *anchor points*

I. B: {at, first, syllable, consonant} II. B: {at, first, metrical, plain}

E: {at, first, syllable, consonant} E: {at, first, metrical, plain}

PREFIX = {before, first, x-tier, plain}

c. *demarcation*

RED{b}l{o}at

d. *reduplication*

bo-bloat

- Combination of {at, X, syllable, consonant} gives ‘core onset position’ (Cairns and Feinstein 1982) which is the core generalization about this type of complex onset effects
- Generalization about these examples so far is that discontiguous reduplication patterns appear to require diacritical marks to indicate where the repeated region should occur
- This aspect is not dependent on discontiguous reduplication patterns

(25) Creek plural reduplication (Riggle 2004)

a. a-cákh-i: a-cák-ca-h-í: ‘sticking in’
falápk-i: falap-fa-k-í: ‘split’ (as of wood)

b. *anchor points*
B: {at, first, x-tier, plain}
E: {at, first, metrical, plain}
INFIX = {before, last, x-tier, plain}

c. *demarcation*
{fa}lapREDk

d. *reduplication*
falap-fa-k *suffixation* falap-fa-k-i:

- Another common source of incomplete reduplication patterns is prespecified material

(26) Ca reduplication in Pazeh (Blust 1999)

a. mu-hium ‘to blow on s.t.’ ha-hium ‘bamboo tube...’
mu-kuxus ‘to shave’ ka-kuxus ‘a razor’

b. *anchor points*
B: {at, first, x-tier, plain}
E: {at, first, x-tier, plain}
PREFIX = {before, first, x-tier, plain} and PREFIX = /a/

c. *demarcation*
RED-a-{h}ium

d. *reduplication*
h-a-hium

- Observations about 'incomplete' reduplication patterns:
  –same use of anchor points as complete patterns
  –may require diacritic to mark placement of repeated region
  –may require multiple sets of anchor points

6.0 Theory specific instantiations

- Complete reduplication patterns that are also describable with a 'authentic unit of prosody' are accounted for by all models of reduplication
- How a model of reduplication accounts for non-prosodic 'complete' and 'incomplete' reduplication patterns differentiate between different models of reduplication
- Adoption of APT in all models of reduplication does acheive the goal of categorical statements as proposed by McCarthy (2003)
- Whether a model achieves the goals of 'no reduplication specific mechanisms' depends on the model

6.1 Precedence Model (Raimy 2000)

- Raimy (2000) proposes that precedence in phonological representations is encoded as a directed graph
- A directed graph as a data structure allows for non-linear representations such as 'loops' and 'detours'
- Reduplication is the result of having a loop in the precedence structure
- The anchor points proposed in all of these analyses can be directly translated into descriptions of precedence links to be added to a stem
- The B(eginning) anchor point specifies what is preceded and the E(nd) anchor point specifies what is followed

(27) General schema for anchor point translation

$X \rightarrow Y$ = 'X precedes Y'

X = E(nd) anchor point

Y = B(eginning) anchor point

(28) Indonesian

a. *total reduplication*

{at, last, x-tier, plain} → {at, first, x-tier, plain}

'the last segment precedes the first segment'

b. *stem*

→ b → u → k → u → %

c. *reduplicated form*

d. *linearization*

→ b → u → k → u → b → u → k → u → %

- Linearization is a process that eliminates non-linear structures in phonology
- Linearization is the result of a *bare output condition* (Chomsky 1995) in that the phonetics-phonology interface can not interpret non-linear representations
- There is a connection to linearization in syntax (Kayne 1994) in that the output of both the phonology and syntax must be asymmetrical, see Raimy (2004) for a discussion of the different 'repairs' based on phonology and syntactic representations
- Linearization IS NOT reduplication specific! It is required for infixation (Raimy 2000), language games (Nevins and Vaux 2003 Idsardi and Raimy 2005) and geminate structures (Raimy 2000)
- Linearization is also cross-linguistically fixed in that it is provided by UG and the principles do not vary across languages
- All complete reduplication patterns in sect. 4 only require a single precedence link to be added and use the identified anchor points
- Incomplete reduplication patterns require multiple precedence links to be added but do not require a diacritic to mark where the repetition occurs

(29) Temiar (Raimy 2000:149-150)

a. I. {at, first, x-tier, plain} → {at, last, x-tier, plain}
'the first segment precedes the last segment'
II. {at, last, x-tier, plain} → {at, last, syllable, consonant}
'the last segment precedes the last core onset'

b. *stems*
→ s → l → ɔ → g → % # → k → ɔ̄ → w → %

c. *reduplicated structures*

d. *linearization*
→ s → g → l → ɔ → g → % # → k → w → k → ɔ̄ → w → %

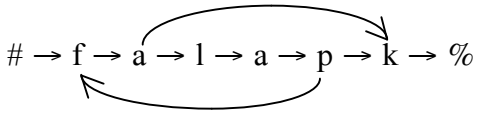
- Analysis of Temiar does not require stipulation of where repeated region occurs nor does it require allomorphy

(30) Creek plural reduplication

a. I. {before, last, x-tier, plain} → {at, first, x-tier, plain}
'the penultimate segment precedes the first segment'
II. {at, first, metrical, plain} → {at, last, x-tier, plain}
'the first vowel precedes the last segment'
falápk-i: falap-fa-k-í: 'split' (as of wood)

b. *stem*
→ f → a → l → a → p → k → %

c. *reduplicated structure*



d. *linearization*
→ f → a → l → a → p → f → a → k → %

- Again, the placement of the repeated region is derived from linearization
- Segmental material may occur with the precedence links just as in any other affix

(31) Pazeh Ca reduplication

a. {at, first, x-tier, plain} → a → {at, first, x-tier, plain}
'the first segment precedes /a/ which precedes the first segment'

b. *stem*
→ h → i → u → m → %

c. *reduplicated structure*
→ h → i → u → m → %
a

d. *linearization*
→ h → a → h → i → u → m → %

- Prespecification in reduplication is accounted for by including segmental material along with precedence links; this makes 'prespecified reduplication' a kind of infixation...
- Adding material to the precedence links is the basis for the analysis of infixation within this framework

(32) Sundanese infixation (Raimy 2000:71-74, Robins 1957)

a.	moekən	m-ar-oekən	'to dry'
	niis	n-ar-iis	'to cool oneself'

b. *anchor points*
{at, first, x-tier, plain} → a → r → {after, first, x-tier, plain}
'/ar/ follows the first segment and precedes what follows the first segment'

c. *stem*
→ n → i → i → s → %

d. *infixation*
→ n → i → i → s → %
a → r

e. *linearization*
→ n → a → r → i → i → s → %

- Once directed graphs are adopted as the basis of phonological structures and APT is implemented we achieve the goals mentioned at the beginning of this talk
  –reduplicative templates are derived from general properties of representation in the phonology
  –same representations provide analysis for infixation, prefixation and suffixation
  –the prosodic status of 'reduplicative templates' is epiphenomenal which allows for natural analyses of all the patterns discussed in this handout

6.2 Distributed Reduplication (Frampton 2002)

- Frampton (2002) implicitly adopts APT in where *t-junctures* may be inserted
- *t-junctures* are of two types: ']' for repetition and '>' for skipping and there is a general 'Default Closure' rule that matches these junctures

(33) Indonesian

a. Ø →] / _# 'insert] at the end of the word'

b. *t-juncture insertion*
   buku]

c. *default closure*
   [buku]

d. *transcription*
   bukubuku

- Complete reduplication patterns are captured in roughly equivalent way in Frampton (2002) due to inherent APT
- The connection between infixation and reduplication is captured also
- Incomplete reduplication patterns do not work as well

(34) Creek plural reduplication

a. Ø →] / _ X # 'insert] before last segment'
   Ø → > / _ X # 'insert > before last segment'
   Ø →] / # …V_ 'insert > after the first vowel'

b. *t-juncture insertion*
   fa]lap>]k

c. *default closure*
[< [fa]lap >]k

d. *transcription*
falapfak

- Analysis of Creek works under the following understanding:
  –‘]’ junctures embedded within ‘ > ’ junctures cause transcription (universal)
  –for Creek ‘skipping’ must be on ‘second time’ through - language specific because of >] sequence
- Temiar (Frampton 2002:156-157) follows similar analysis for infixation of reduplication but implicitly invokes allomorphy for the pattern

(35) Temiar

a. i. Ø →] / # X _ only within last CVC
   ii. Ø →] / _ #
   iii. Ø → > / _ X #

b. *t-juncture insertion*
   k]ɔ̄ > w] slɔ > g]

c. *default closure* (delimited to last CVC)
   [< [k]ɔ̄ > w] s[< lɔ > g]

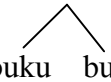
d. *transcription*
   kwkɔ̄w] sglɔg

- Problem with analysis in (35) is the ad hoc restriction of (35ai) and Default Closure to ‘last CVC’ which basically implements an ‘allomorphy’ analysis of the data
- Raimy analysis does not require allomorphy which suggests that the Frampton analysis is missing a generalization

6.3 Morphological Doubling Theory (Inkelas and Zoll 2005)

- MDT proposes that reduplication is the doubling of morpho-semantic bundles

(36) Indonesian

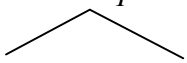


buku buku

- For reduplication patterns that do not repeat morphological constituents, *truncation* is invoked to delete additional phonological material
- APT can provide the formal underpinning of this truncation device in that the regions identified in sects. 4-5 can serve as 'non deletion' regions with all material outside of the markings deleted (similar idea to Prosodic Licensing, Ito xxx)
- Three difficulties in MDT analysis in general
  –difficulties in capturing 'incomplete reduplication patterns' in sect. 5 appear
  –additional infixing is required thus no connection between infixation and reduplication is achieved
  –reduplication specific truncations occur in that certain APT settings only occur in reduplication constructions which is contrary to claims in Inkelas and Zoll (2005)

(37) Creek plural formation

a. *APT mark up*



[fa]lapk [falapk]

b. *truncation*

fa falapk

c. *infixation*

APT = {before, last, x-tier, plain}

falap-fa-k

(38) Temiar

a. *APT mark up*

[kɔ̄][w] [kɔ̄w] slɔ[g] [slɔg]

b. *truncation*

kw kɔ̄w g slɔg

c. *infixation*

none s-g-lɔg

d. *surface*

kw-kɔ̄w s-g-lɔg

- Analysis of Temiar shows inherent requirement of allomorphy in the analysis
  –APT markup is distinct between two stems
  –infixation occurs in one, prefixation occurs in the other

6.4 Correspondence Theory

- APT could be implemented in OT as a theory of what the 'base' is
- Idsardi and Raimy (to appear) argue for dynamic base evaluation in OT in that base is best derived from the interaction of constraints, not from morphological structure
- This proposal eliminates 'Hamilton-Kager' conundrum and implementation of APT provides natural analysis of 'non-prosodic' templates
- APT also provides a 'categorical constraint' analysis of reduplication for OT along the lines of infixation proposed by Yu (2003)
- OT would still require some sort of BR-Faith constraints but they could possibly be reduced to a simple MaxBR…

7.0 The prosodic residue and future prospects

- Anchor Point Theory implemented within Raimy (2000) proposals provides the following results:
  –categorical analysis of reduplication
  –connection between reduplication, infixation, geminates
  –atemplatic analysis of these non-concatenative morphology effects
  –analyses that only utilize general properties and principles of the domains involved
- Atemplatic aspect of these analyses calls into question the utility of the 'prosodic hierarchy' (McCarthy and Prince 1986) in the analysis of reduplication
- The prosodic residue is the fact that APT crucially has access to syllable structure and metrical structure though- this can not be eliminated
- Future prospects:

(1) Acquisition and Learnability

Iba and Nevins (2004) implemented a selectionist learner computational model of Raimy (2000). Chinn and Raimy (in prep) revise this computational model to reflect current APT proposals and provide a computationally tractable learning algorithm

(2) Combinatorics of APT

Must further document examples of attested anchor points. Primary issue is not single instances of anchor points but what are the attested pairings, what unattested pairings are likely gaps and what unattested pairings can be eliminated from other resources.

(3) Non-concatenative morphology in general

Is APT theory applicable to 'root and template' morphology? The idea is that 'root and template' morphology is just massive infixation. Question is not whether APT can describe the patterns but whether the morpho-syntax supports the morpho-phonology of APT?

(4) Parameterization

APT is presented in a parameterized manner here. Is this necessary? Structural descriptions produced by parameterized APT are 'organic' to phonology in that they are directly provided by the representations. Structural descriptions could be simply generated in this manner. Or, structural descriptions used by APT could be 'cashed' along the lines suggested in Chomsky (1975)…

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