Class 3
Prosodic Morphology and Axininca Campa
(McCarthy & Prince 1993)

9/28/17

1 Intro

- McCarthy & Prince (1993) develop a comprehensive analysis of the prosodic system of Axininca Campa, both with respect to its prosodic phonology and the interaction between prosody and morphology — especially reduplication.
- They argue that the general phonology of the language and the general properties of the phonology-morphology interface in the language largely determine the properties of reduplication.
- All constraints on reduplication are subordinated to all the other constraints active in the language.

- This is of course dependent on their particular analysis. A lot of their constraints are kind of weird from a modern perspective. Re-working their analysis with more familiar looking constraints may undermine that strong claim to some extent.

2 Phonotactics, epenthesis, and augmentation

2.1 Epenthesis

- The language doesn't allow hiatus (except kind of in certain reduplicated forms).
  - · ONSET is highly ranked. (Or maybe rather NOHIATUS; word-initial onsets are tolerated.)
  - · Hiatus at root/suffix + suffix boundary repaired through *t*-epenthesis.

⇒ MAX(-V)-IO, ONSET ≫ DEP(-C)-IO

(1) a. /i-N-koma+i/ → [iŋkoma*t*i] 'he will paddle' (p. 31)
b. /i-N-koma+ako+i/ → [iŋkoma*t*ako*t*i] 'he will paddle for'

- Interesting fact:
  - · *ai* and *oi* diphthongs and long vowels permitted morpheme-internally (and maybe across prefix + prefix/root boundary?).
  - · But we don't get *[iŋkomaa͡i], *[iŋkoma*t*ako͡i], *[iŋkomaa͡ako*t*i], etc.

- M&P's answer: stems (= morphemes?) want to align their right edge to the right edge of a syllable (p.38)

(2) "ALIGN": $]_{\text{STEM}} =]_{\sigma}$ [= ALIGN(STEM, R; σ, R)]

- On this constraint: $\{\{.\text{iŋ.ko.ma.}\}_{\text{STEM}}t\text{i.}\}_{\text{STEM}} \succ *\{\{.\text{iŋ.ko.ma}\}_{\text{STEM}}\text{i.}\}_{\text{STEM}}$
  - · Consonant epenthesis allows proper alignment, diphthongization does not.
  - · Under a certain interpretation, coalescence to a long vowel doesn't either; this could alternatively be ruled out by UNIFORMITY-IO and/or IDENT[long]-IO.

- We might be able to reanalyze this:
  - Only *ai, oi* diphthongs allowed at all: *DIPHTHONG[¬*ai*,*oi*] ≫ IDENT-IO/MAX-IO ≫ *[ai,oi]
  - *ai, oi* diphthongs **normally** repaired via epenthesis: *[ai,oi] ≫ DEP(-C)-IO
  - Epenthesis blocked morpheme-internally: CONTIG-IO ≫ *[ai,oi] ≫ DEP(-C)-IO
    - Requires that contiguity relationships not hold between different morphemes in input.
    - CONTIG-IO probably dominates *DIPHTHONG[¬*ai*,*oi*], because we don't see rampant *t*-epenthesis morpheme-internally
- If we use this approach, I think that all evidence for the need for "ALIGN" goes away; most of its functions overlap with another constraint (SUFFIX-TO-PROSODICWORD), which is harder to get rid of.

- The language doesn't allow codas, except for homorganic nasal + stop sequences within the prefix + root domain.
- In root + suffix domain, any would-be CC sequence resolved via *a*-epenthesis

⇒ MAX(-C)-IO, CODACOND ≫ DEP(-V)-IO

(3) /no-N-č^{h}ik+wai+i/ → [noñč^{h}ik*a*wai*t*i] 'I will continue to cut' (p. 30)

2.2 Augmentation

- Under a limited set of circumstances, you get epenthesis that doesn't seem to be for phonotactic reasons.
- These cases look more like a minimality condition:

(4) Augmentation facts (p. 48) [bold = root, italics = epenthetic, underlined = reduplicant]

Root		__+V...	__+C...	__+RED
/na/	Augmented	—	**na***ta*-piro-*t*aanc^{h}i	**na***ta*-<u>nata</u>-wai-*t*ak-i
	Epenthetic (*t*)	**na**-*t*aanc^{h}i	—	—
	Faithful	—	no-**na**-piro-*t*i	no-**na**-<u>nona</u>-wai-*t*i
/p/	Augmented	—	**p***aa*-piro-*t*aanc^{h}i	**p***aa*-<u>paa</u>-wai-*t*ak-i
	Epenthetic (*a*)	—	om-**p***a*-wai-*t*iroota	no-**w***a*-<u>nowa</u>-wai-*t*i
	Faithful	**p**-aanc^{h}i	—	—

- Roots don't augment before V-initial suffixes
  - We get hiatus-breaking *t*-epenthesis with V-final roots
- Roots don't augment when they are accompanied by a prefix containing a syllable
  - /C/ roots gain a *short* epenthetic vowel, but this is simply to avoid a coda
- In the absence of a prefix, roots **do** augment (via epenthesis) before C-initial suffixes, which includes reduplication
  - CV̆ roots augment to CV̆*ta* (consonant+vowel epenthesis)
  - C roots augment to C*aa* when unprefixed

⇒ Augmentation always trying to get to two moras

- Big questions:
  1. What mechanism triggers augmentation?
  2. How do we characterize the context for augmentation?

- M&P's analysis is as follows:
  1. All suffixes want to be attached directly to a prosodic word (5a).
  2. All prosodic words must contain a foot, and all feet must be minimally two moras (5b).
  3. Certain configurations of consonants and vowels at the root + suffix juncture make it impossible to satisfy (5a), so the root is parsed together with the suffix, so no minimality condition will hold of the root itself, therefore no augmentation.

(5) a. SUFFIX-TO-PROSODICWORD [**SFX-TO-PRWD**]: The Base of suffixation is a Prosodic Word.
b. FOOTBINARITY(MIN) [**FTBIN**]: Each Foot contains at least two moras.

- CVCV roots are basic case: they can be faithfully parsed as a bimoraic PWd
  · PARSESYLL is low ranked; unparsed syllables are tolerated

(6) CVCV root, C-initial suffix: faithful parsing

/koma, -piro-/		FTBIN	SFX-TO-PRWD	DEP-IO
a.	[(koma)-(piro)-]		*!	
b. ☞	[[(koma)]-(piro)-]			
c.	[[(koma)*ta*]-(piro)-]			*!*
d.	[[(koma)(*tata*)]-piro-]			*!***

- Root with less than two moras want to augment to get up this configuration.
- /CV/ roots do so by double epenthesis.
  · Prefer to epenthesize extra segment than change underlying vowel length

(7) CV root, C-initial suffix: *ta* augmentation (p. 54)

/na, -piro-/		FTBIN	SFX-TO-PRWD	IDENT[long]-IO	DEP-IO
a.	[(na-pi)ro-]		*!		
b.	[[(na)]-(piro)-]	*!			
c. ☞	[[(na*ta*)]-(piro)-]				**
d.	[[(na*tata*)]-(piro)-]				***!*
e.	[[(na*a*)]-(piro)-]			*!	

- /C/ roots do this by epenthesizing a long vowel.
  · Since there is no underlying vowel, there is no length value to be faithful to.
  · Epenthesizing one long vowel is a less costly violation of DEP than inserting two short vowels and a consonant.

(8) C root, C-initial suffix: *aa* augmentation

/p, -piro-/		FTBIN	SFX-TO-PRWD	IDENT[long]-IO	DEP-IO
a.	[(pa-pi)ro-]		*!		
b.	[[(p*a*)]-(piro)-]	*!			*
c.	[[(p*ata*)]-(piro)-]				**!*
d. ☞	[[(p*aa*)]-(piro)-]				*

- With V-initial suffix, it is impossible to perfectly align the suffix to a prosodic word.

- For CV root, the juncture of the root-final V with the suffix-initial V has to be resolved via *t*-epenthesis.
- If you try to parse the *t* inside a PWd with the root (to satisfy SFX-TO-PRWD), that *t* would have to be parsed as a coda, and thus you don't alleviate the ONSET violation, and additionally violate CODACOND.
- If you parse it outside the root's PWd, it intervenes between the suffix and that PWd, violating SFX-TO-PRWD.
- Since SFX-TO-PRWD can't be satisfied with a phonotactically licit string, it is preferable to not parse the root as a separate PWd and do the least amount of epenthesis possible.

(9) CV root, V-initial suffix: no separate PWd, just *t*-epenthesis (p. 56)

/na, -aanc^{h}i-/	ONSET	FTBIN	SFX-TO-PRWD	DEP-IO
a. [na.-aanc^{h}i-]	*!		*	
b. [[na.]-aanc^{h}i-]	*!	*!		
c. [[na*ta*.]-aanc^{h}i-]	*!			**
d. ☞ [na.*t*-aanc^{h}i-]			*	*
e. [[na.]*t*-aanc^{h}i-]		*!	*	*
f. [[na*ta*.]*t*-aanc^{h}i-]			*	*!**

- Same principles behind /C/ roots: can't satisfy SFX-TO-PRWD, so you minimize epenthesis, which here you can do totally.

(10) C root, V-initial suffix: no epenthesis (p. 56)

/p*a*, -aanc^{h}i-/	ONSET	FTBIN	SFX-TO-PRWD	DEP-IO
a. [p*a*.-aanc^{h}i-]	*!		*	
b. [[p*a*.]-aanc^{h}i-]	*!	*!		
c. [[p*ata*.]-aanc^{h}i-]	*!			**
d. ☞ [p*a*.*t*-aanc^{h}i-]			*	*
e. [[p*a*.]*t*-aanc^{h}i-]		*!	*	*
f. [[p*ata*.]*t*-aanc^{h}i-]			*	*!**
g. ☞ [p-aanc^{h}i-]			*	*

- SFX-TO-PRWD is crucial for analyzing reduplicant shape. I can't figure out an alternative.

3 Reduplication

- I'll go through the data and the generalizations, then M&P's analysis.
- Afterward, I'll show you the first parts of my alternative analysis (which hasn't gotten very far yet).

3.1 Data

- M&P organize the reduplication data into 8 types, based on (i) length of the root, (ii) whether the initial segment of the root is C or V, and (iii) whether there's a prefix on the root.
  - Also crucial: is root C-final or V-final?

- Epenthetic segments in italics; all reduplicated forms have suffixes; <VV> = [V:]

(11) Axininca Campa Reduplication: C-initial roots (p. 63)

	Root	Gloss	Red w/o prefix	Red w/ prefix
a.	C-initial Long Roots ($\geq \sigma\sigma$ — when including final epenthetic V): Total Reduplication of Root, excluding Prefix			
	/kawo(o)si/	'bathe'	kawosi-kawosi	noŋ-kawosi-kawosi
	/t^{h}aaŋki/	'hurry'	t^{h}aaŋki-t^{h}aaŋki	non-t^{h}aaŋki-t^{h}aaŋki
	/kint^{h}a/	'tell'	kint^{h}a-kint^{h}a	noŋ-kint^{h}a-kint^{h}a
	/č^{h}ik/	'cut'	č^{h}ik*a*-č^{h}ika	noñ-č^{h}ik*a*-č^{h}ika
	/tasoŋk/	'fan'	tasoŋk*a*-tasoŋka	non-tasoŋk*a*-tasoŋka
b.	C-initial Short Roots ($\leq \sigma$): Total Reduplication of Stem, including Prefix			
	/naa/	'chew'	naa-naa	no-naa-nonaa
	/na/	'carry'	na*ta*-nata	no-na-nona
	/t^{h}o/	'suck'	t^{h}ot*a*-t^{h}ota	non-t^{h}o-nont^{h}o
	/p/	'feed'	p*aa*-paa	no-w*a*-nowa

(12) Axininca Campa Reduplication: V-initial roots (p. 63)

	Root	Gloss	Red w/o prefix	Red w/ prefix
c.	V-initial Long Roots ($\geq \sigma\sigma\sigma$ — when including final epenthetic V): Total Reduplication of Root except initial syllable (= vowel/diphthong), excl. Prefix			
	/osaŋkina/	'write'	osaŋkina-saŋkina	n-osaŋkina-saŋkina
	/osampi/	'ask'	osampi-sampi	n-osampi-sampi
	/oiriŋk/	'lower'	oiriŋk*a*-riŋka	n-oiriŋk*a*-riŋka
	/aacik/	'stop'	aacik*a*-cika	n-aacik*a*-cika
	/amin/	'look'	amin*a*-mina	n-amin*a*-mina
d.	V-initial Short Roots ($\leq \sigma\sigma$): Total Reduplication of Stem, including Prefix			
	/asi/	'cover'	asi‖asi	n-asi-nasi
	/apii/	'repeat'	ap**i**‖apii	n-apii-napii
	/ook/	'abandon'	ook*a*‖ooka	n-ook*a*-nooka
	/ak/	'answer'	ak*a*‖aka	n-ak*a*-naka

3.2 Generalizations

- Bases containing epenthetic segments behave the same as bases of equivalent shapes where all material is underlying.

- The presence of the reduplicant can sometimes *trigger* epenthesis (/ augmentation): roots which are underlyingly $\leq$ two moras (including prefix material) augment to two moras in the base.

- C-initial roots
  1. Always reduplicate the entire root + epenthetic material in base.
  2. If the {root + epenthetic segments} string is $\geq$ two syll's, they don't copy a prefix if there is one.
  3. If the {root + epenthetic segments} string is < two syll's, they do a copy prefix if there is one.

- V-initial roots
  1. If the {root + epenthetic segments} string is longer than 2 sylls, they copy everything except the initial vowel; they don't copy prefixes, even if it could provide onset for their initial vowel.
  2. If there is a prefix and the {prefix + root + epenthetic segments} string is $\leq$ 2 sylls, they copy everything including the prefix.
  3. If there is no prefix and the {root + epenthetic segments} string is $\leq$ 2 sylls, base and reduplicant get treated as if they are separate prosodic words (according to M&P) — everything is copied, but the first member behaves like a prosodic word (stressed like a bimoraic word, word-final shortening)

4 M&P's analysis

4.1 C-initial long roots

- The basic case: roots beginning in a consonant and ending in a vowel which are two or more syllables long. Such roots always copy the entire root.

(13) C...V roots $\geq \sigma\sigma$ (p. 65)

Root	Gloss	Reduplicated form
/kawo(o)si/	'bathe'	kawosi-kawosi-wai-*t*ak-i
/t^{h}aaŋki/	'hurry'	t^{h}aaŋki-t^{h}aaŋki-wai-*t*ak-i
/kint^{h}a/	'tell'	kint^{h}a-kint^{h}a-wai-*t*ak-i
/koma/	'paddle'	koma-koma-wai-*t*ak-i

- We'll see that there looks to be a preference for reduplicants to be two syllables.
  · This shows that, at least under certain circumstances, reduplicants can be longer.
  · Indicates that MAX-BR is playing a role.

- For C...V roots $\geq \sigma\sigma$ that end underlyingly in a consonant, we see epenthesis in the base, which is copied into the reduplicant (even with V-initial suffixes; below).
  · E.g. /tasoŋk, RED, -wai-/ $\rightarrow$ [tasoŋk*a*-tasoŋka-wai-]
- This is driven primarily by the interaction of CODACOND & SFX-TO-PRWD.
  · PWds can't end in a consonant.
  · If the reduplicant copied everything but the root-initial consonant (i.e. started with the copy of the first root vowel), the final consonant of root could be syllabified with the reduplicant-initial consonant
  · Nut then the root-final consonant intervenes between the reduplicant (a suffix) and the root's PWd, violating SFX-TO-PRWD.

- If you epenthesize a vowel within the root's PWd, and copy the whole root, you can have a valid PWd boundary right before the reduplicant.
- The epenthetic vowel is now part of the base, so it must be copied (ANCHOR-R-BR is undominated).

(14) CVCVC(C) root: base-final epenthesis, copied into red.

/tasoŋk, RED, -wai-/		CODACOND	SFX-TO-PRWD	DEP-IO	MAX-BR
a.	[[tasoŋk]-tasoŋk]-wai-	*!*			
b.	[[tasoŋ]k-asoŋk]-wai-	*!	*!		*
c.	[[tasoŋ]k-asoŋk*a*]-wai-		*!	*	*
d.	[[tasoŋ]k-asoŋ]k*a*-wai-		*!*	*	*
e. ☞	[[tasoŋk*a*]-tasoŋka]-wai-			*(*)	
f.	[[tasoŋk*a*]-soŋka]-wai-			*(*)	*!*

- This ensures that all reduplicative bases will be vowel-final

- We know that the inclusion of the final epenthetic vowel in the reduplicant is not because of phonotactics with the suffix; it is copied even with V-initial suffixes, where there is additional *t*-epenthesis:

(15) Epenthesis in Base and Reduplicant: V-initial Suffixes (M&P:72)

a. /no-č^{h}ik-RED-akiri/ -č^{h}ik*a*-č^{h}i.ka.-*t*a.kiri 'I cut it and cut it' Spring (1990a: 109)
*-č^{h}ik*a*-č^{h}i.k-a.kiri

b. /noŋ-kow-RED-iro/ -kow*a*-ko.wa.-*t*i.ro 'I will search for it more and more'
*-kow*a*-ko.w-i.ro

- If we include ANCHOR-R-BR (which is a surface true constraint about reduplication in the language), ranked above DEP-IO, we generate this result.

(16) CVCVC(C) root, V-initial suffix: base-final epenthesis, copied into red., *t*-epenthesis before suffix

/tasoŋk, RED, -iro/		ONSET	ANCHOR-R-BR	SFX-TO-PRWD	DEP-IO	MAX-BR
a.	[[tasoŋk*a*]-tasoŋka]-iro	*!		*	*(*)	
b. ☞	[[tasoŋk*a*]-tasoŋka]-*t*iro			*	**(*)	
c.	[[tasoŋk*a*]-tasoŋ]k-iro		*!	*	*	*

4.2 V-initial long roots

- SFX-TO-PRWD induces failure to copy the initial vowel in long V-initial roots.
  - ONSET would be violated if it were copied.
  - *t*-epenthesis outside of the root's PWd would violate SFX-TO-PRWD.
  - It is preferable just not to copy it; i.e. start copying from the first consonant of the root.

(17) Long V-initial root: copy everything but initial vowel

/osampi, RED, -wai-/		ONSET	SFX-TO-PRWD	DEP-IO	MAX-BR
a.	[[[osampi]-osampi]-wai-]	**!			
b. ☞	[[[osampi]-sampi]-wai-]	*			*
c.	[[[osampi]-*t*osampi]-wai-]	*	*!	*	

- Word-initial onsetless syllables are tolerated because the root (and prefixes) want to be aligned to the left edge of the word.

(18) "ALIGN-L" = ALIGN(ROOT, L; PWD, L)

- If ALIGN-L ≫ ONSET, word-initial epenthesis will not be tolerated.

(19) Word-initial onsetless syllables permitted

/osampi, -V.../		ALIGN-L	ONSET	DEP-IO
a.	osampi.V...		**!	
b. ☞	osampi*t*V...		*	*
c.	*t*osampi*t*V...	*!		**

4.3 C-initial short roots

- Now let's look at the subminimal C-initial roots.

- First, CV roots.
  - If you just copy the root and parse the base and reduplicant together, you violate SFX-TO-PRWD (a).
  - If you just copy the root and parse the base and reduplicant separately, you violate FTBIN twice (b).
  - If you augment the root but don't copy both syllables (c), you end up with a FTBIN violation for the reduplicant; also MAX-BR violation (also ANCHOR-R-BR violation if you copy the root segments not the epenthetic segments).
  - You solve all the problems by augmenting and copying the augmented base (d).

(20) CV root: augment base and copy augmented base

INPUT: /t^ho, RED, -wai-/		FTBIN	SFX-TO-PRWD	DEP-IO	MAX-BR
a.	[[(t^ho-t^ho)]-wai-]		*!		
b.	[[[(t^ho)]-(t^ho)]-wai-]	*!*			
c.	[[[(t^ho*ta*)]-(t^ho)]-wai-]	*!		**	**
d. ☞	[[[(t^ho*ta*)]-(t^hota)]-wai-]			**	

- /C/ roots work the same way, except they get augmented with long vowel epenthesis rather than CV epenthesis.

4.4 Prefixed roots

- For C-initial roots which would have two syllables on the surface (including a potential final epenthetic vowel), prefixes are not copied.
  - This is due to some preference for not reduplicating prefixes / only reduplicating root segments.
  - M&P call the constraint "R≤ROOT": "The Reduplicant contains only the root." (p. 80)
  - I might identify it as INTEGRITY$_{\text{AFFIX}}$-IO: "No splitting of affix segments." This alleviates any questions about copying epenthetic segments.
- We can understand this as follows: if copying from just the {root + epenthetic segments} string can yield you a binary foot, don't copy any prefix segments.
  - INTEGAFX ≫ MAX-BR

(21) prefix + CVCV base: copy just the base

INPUT: /noN, koma, RED, -wai-/	FTBIN	INTEGAFX	MAX-BR
a. [[[(noŋ-ko)ma]-(noŋko)ma]-wai-]		*!**	
b. ☞ [[[(noŋ-ko)ma]-(koma)]-wai-]			***

- Same goes for long V-initial roots: don't copy the prefix, still don't copy root-initial V

(22) prefix + Long V-initial root: copy the whole root except initial vowel, don't copy prefix

/n, osampi, RED, -wai-/	ONSET	INTEG-AFX	MAX-BR
a. [[[(n-osam)pi]-(osam)pi]-wai-]	*!		*
b. ☞ [[[(n-osam)pi]-(sampi)]-wai-]			**
c. [[[(n-osam)pi]-(nosam)pi]-wai-]		*!	

- But if you are a subminimal root, and you can avoid epenthesis by copying prefix material, you do it.

(23) prefix + CV base: copy the base and the prefix

INPUT: /no, na, RED, -wai-/	FTBIN	DEP-IO	INTEGAFX	MAX-BR
a. ☞ [[[(no-na)]-(nona)]-wai-]			*!**	
b. [[[(no-na)]-(na*ta*)]-wai-]		*!*		**
c. [[[(no-na)*ta*]-(na*ta*)]-wai-]		*!*		**

4.5 Need for a disyllabic reduplicant

- Something weird happens with roots that are underlyingly CVV: they copy the prefix despite seemingly not needing it.

(24) prefix + CVV base: **copy the base and the prefix**

INPUT: /no, naa, RED, -wai-/	FTBIN	DEP-IO	INTEGAFX	MAX-BR
a. ☹ [[[no-(naa)]-no(naa)]-wai-]			*!*	
b. 💣 [[[no-(naa)]-(naa)]-wai-]				**

- M&P analyze this by positing a templatic-ish constraint:

(25) a. DISYLL (Informal) (p. 84)
The Reduplicant is minimally disyllabic.

b. DISYLL (Align Version) (p.87)
The left and right edges of the Reduplicant must coincide, respectively, with the left and right edges of different syllables.

(26) prefix + CVV base: **copy the base and the prefix**

INPUT: /no, naa, RED, -wai-/	DISYLL	FTBIN	DEP-IO	INTEGAFX	MAX-BR
a. ☞ [[[no-(naa)]-no(naa)]-wai-]				**	
b. [[[no-(naa)]-(naa)]-wai-]	*!				**

References

McCarthy, John J. & Alan Prince. 1993. Prosodic Morphology I: Constraint Interaction and Satisfaction. *Linguistics Department Faculty Publication Series* 14 (2001 version). http://scholarworks.umass.edu/linguist_faculty_pubs/14.