Class 6
Reduplication and Correspondence

10/19/17

1 One last thought on Axininca Campa short roots

- There may be a way to do without DISYLL after all.
- If the reduplicant can be faithful to the *morphological base* directly, then a requirement that stressed vowels in the MBase have a correspondent in the reduplicant can explain:
  1. Copying the prefix in short prefixed roots
  2. Copying the initial vowel in short unprefixed V-initial roots (but not in long ones)

(1) MAX-V́-B_MR
Assign one violation mark * for each stressed vowel in the morphological base (B_M) which does not have a correspondent in the reduplicant.

- There is though a problem with long V-initial roots that start in a long vowel or diphthong...

1.1 Data

- Here's the data again, but with the MBases for the unprefixed and prefixed forms, given with their stress patterns
  - Bolded forms present potential problems

(2) Axininca Campa Reduplication: C-initial roots (McCarthy & Prince 1993:63)

	Root	Gloss	Red w/o prefix	MBase w/o prefix	Red w/ prefix	MBase w/ prefix
a.	C-initial Long Roots ($\geq \sigma\sigma$ — when including final epenthetic V):					
	/kaawosi/	'bathe'	kaawosi-kaawosi	káawosi	noŋ-kaawosi-kaawosi	**noŋ**-káawosi
	/t^{h}aaŋki/	'hurry'	t^{h}aaŋki-t^{h}aaŋki	t^{h}áaŋki	non-t^{h}aaŋki-t^{h}aaŋki	**non**-t^{h}áaŋki
	/kint^{h}a/	'tell'	kint^{h}a-kint^{h}a	kínt^{h}a	noŋ-kint^{h}a-kint^{h}a	**noŋ**-kínt^{h}a
	/č^{h}ik/	'cut'	č^{h}ik*a*-č^{h}ika	č^{h}íka	noñ-č^{h}ik*a*-č^{h}ika	**noñ**-č^{h}íka
	/tasoŋk/	'fan'	tasoŋk*a*-tasoŋka	tasóŋka	non-tasoŋk*a*-tasoŋka	**non**-tasóŋka
b.	C-initial Short Roots ($\leq \sigma$)					
	/naa/	'chew'	naa-naa	náa	no-naa-nonaa	nó-na
	/na/	'carry'	na*ta*-nata	náta	no-na-nona	nó-na
	/t^{h}o/	'suck'	t^{h}o*ta*-t^{h}ota	t^{h}óta	non-t^{h}o-nont^{h}o	nón-t^{h}o
	/p/	'feed'	p*aa*-paa	páa	no-w*a*-nowa	nó-wa

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

	Root	Gloss	Red w/o prefix	MBase w/o prefix	Red w/ prefix	MBase w/ prefix
c.	V-initial Long Roots (≥ $\sigma\sigma\sigma$ — when including final epenthetic V):					
	/osaŋkina/	'write'	osaŋkina-saŋkina	osáŋkina	n-osaŋkina-saŋkina	n-osáŋkina
	/osampi/	'ask'	osampi-sampi	osámpi	n-osampi-sampi	n-osámpi
	/oiriŋk/	'lower'	oiriŋk*a*-riŋka	**óiriŋka**	n-oiriŋk*a*-riŋka	**n-óiriŋka**
	/aacik/	'stop'	aacik*a*-cika	**áacika**	n-aacik*a*-cika	**n-áacika**
	/amin/	'look'	amin*a*-mina	amína	n-amin*a*-mina	n-amína
d.	V-initial Short Roots (≤ $\sigma\sigma$)					
	/asi/	'cover'	asi‖asi	ási	n-asi-nasi	n-ási
	/apii/	'repeat'	api‖apii	ápi	n-apii-napii	n-ápi
	/ook/	'abandon'	ook*a*‖ooka	óoka	n-ook*a*-nooka	n-óoka
	/ak/	'answer'	ak*a*‖aka	áka	n-ak*a*-naka	n-áka

1.2 Prefix copying in C-initial roots

- When there's a prefix, if the root is C(V(V)), the MBase will be $\acute{\sigma}$CV, where $\acute{\sigma}$ is the prefix.
  - ⇒ This will require that the prefix be copied, because it contains the stressed vowel.

(4) Short C-initial roots

INPUT: /non, tʰo, RED, -wai-/ MBASE: [nóntʰo]	MAX-V́-B$_M$R	INTEG AFX	MAX-BR
a. ☞ non-tʰo-nontʰo-wai-		***	
b. non-tʰo-tʰo-wai-	*!		***

- When the root is longer, the prefix will not be stressed, so INTEGAFX causes it not to be copied.

(5) Long C-initial roots

INPUT: /non, koma, RED, -wai-/ MBASE: [noŋkóma]	MAX-V́-B$_M$R	INTEG AFX	MAX-BR
a. noŋ-koma-noŋkoma-wai-		*!**	
b. ☞ noŋ-koma-koma-wai-			***

- **Caveat:** CVN syllables sometimes attract stress.
  - This particular prefix apparently surfaces as [noN] before stop-initial roots ([no] before other C-initial roots, [n] before V-initial roots).
  - It is unclear if this prefix attracts stress when it is [noN] (I can't find examples of exactly this sort, though I did see one example of stressed #CVN not belonging to a prefix).
  - It's conceivable that NONINITIALITY outranks the WSP constraint that attracts stress to CVN.
- If these bear stress, then this solution won't work without further amendment (if then).

1.3 Prefix copying in V-initial roots

- The same approach works for prefixed V-initial roots (with another, more significant caveat)

(6) Short V-initial roots

INPUT: /n, apii, RED, -wai-/ MBASE: [nápi]	IDENT [CV trans]-BR	MAX-V́-B_MR	INTEG AFX	MAX-BR
a. ☞ n-apii-napii-wai-			*	
b. n-apii-apii-wai-	*!			*
c. n-apii-pii-wai-		*!		**

(7) Long V-initial roots

INPUT: /n, osampi, RED, -wai-/ MBASE: [nosámpi]	IDENT [CV trans]-BR	MAX-V́-B_MR	INTEG AFX	MAX-BR
a. ☞ n-osampi-nosampi-wai-			*!	
b. n-osampi-osampi-wai-	*!			*
c. n-osampi-sampi-wai-				**

- **Problem:** falls apart if initial vowel is long/diphthong, because it will then be stressed

(8) Long V-initial roots with initial long vowel

INPUT: /n, aacik, RED, -wai-/ MBASE: [náacika]	IDENT [CV trans]-BR	MAX-V́-B_MR	INTEG AFX	MAX-BR
a. 💣 n-aacika-naacika-wai-			*	
b. n-aacika-aacika-wai-	*!			*
c. ☹ n-aacika-cika-wai-		*!		**

1.4 Hiatus in unprefixed V-initial roots

- MAX-V́-B_MR can force hiatus given a relatively low ranking of ONSET:

(9) ALIGN-ROOT-L, IDENT[CV trans]-BR, MAX-V́-B_MR $\gg$ ONSET

(10) Short V-initial roots

INPUT: /asi, RED, -wai-/ MBASE: [ási]	ALIGN ROOT-L	IDENT [CV trans]-BR	MAX-V́-B_MR	ONSET	MAX-BR
a. ☞ asi-asi-wai-				**	
b. asi-si-wai-			*!	*	*
c. *t*asi-tasi-wai-	*!				
d. asi-*t*asi-wai-		*!		*	

(11) Long V-initial roots

INPUT: /osampi, RED, -wai-/ MBASE: [osámpi]	ALIGN ROOT-L	IDENT [CV trans]-BR	MAX-V́-B_MR	ONSET	MAX-BR
a. osampi-osampi-wai-				**!	
b. ☞ osampi-sampi-wai-				*	*
c. *t*osampi-tosampi-wai-	*!				
d. osampi-*t*osampi-wai-		*!		*	

- Initial long vowels still don't work

(12) Long V-initial roots w/ initial long V

INPUT: /aacik, RED, -wai-/ MBASE: [áacika]	ALIGN ROOT-L	IDENT [CV trans]-BR	MAX-V́-B_MR	ONSET	MAX-BR
a. 💣 aacik*a*-aacika-wai-				**	
b. ☹ aacik*a*-cika-wai-			*!	*	*
c. *t*aacik*a*-taacika-wai-	*!				
d. aacik*a*-*t*aacika-wai-		*!		*	

- It's not inconceivable that the language could treat long vowels different than short vowels in hiatus, and that this could effect this derivation, but I'm not sure exactly what this would look like.

2 Overapplication, Underapplication, and Normal Application in Reduplication

- Early generative phonology assumed that phonological processes (which include distributional restrictions) should apply equally to reduplicants as to unreduplicated words.
  - ○ Assumption is that reduplicative copying happens first, then phonological process should apply.
- Wilbur (1973) first observed that this is not always the case.
- McCarthy & Prince (1995) first observed that all such cases promote identity between base and reduplicant.
  - ⇒ Motivation for positing BR correspondence.

⋆ Caveat: a lot of this data has been challenged since it was first used as evidence for these sorts of interactions.
  - ○ We'll start looking deeper at some of these challenges over the next few weeks.
  - ○ The validity of this data is crucial to adjudicating between different frameworks for reduplication.

2.1 Normal Application

- "Normal application" refers to cases where the process/distribution that holds generally of the language holds also in reduplication.
  - ○ The distribution of [d] ∼ [ɾ] in Tagalog is one such example.

- Tagalog has an intervocalic flapping process.

(13) a. /d/ → [ɾ] / V_V
b. /d/ → [d] elsewhere (namely, #_ & C_)

- This distribution does hold in reduplication, even if it means that a [d] corresponds to a [ɾ]:

(14) Flapping in Tagalog (McCarthy & Prince 1995:3; Carrier 1979:150)

	Stem	Reduplicated			Gloss
a.	datiŋ	d̲-um-ā̲-ɾatiŋ	*ɾ̲-um-ā̲-ɾatiŋ	*d̲-um-ā̲-datiŋ	'arrive'
b.	diŋat	ka-ɾiŋat-diŋat	*ka-ɾiŋat-ɾiŋat	*ka-diŋat-diŋat	'suddenly'

- In (14a):
  - The reduplicant-initial consonant is not intervocalic, so (13a) should not apply to it, i.e. it should surface as [d].
    - It is [d], therefore *normal application*.
  - The root-initial consonant is intervocalic, so (13a) should apply to it, i.e. it should surface as [ɾ].
    - It is [ɾ], therefore *normal application*.
- In (14b), the contexts are reversed, but both still exhibit the expected outcomes of (13), therefore *normal application*.

2.2 Overapplication

- In terms of rule application, "overapplication" refers to cases where a phonological rule appears to apply in the reduplicant even though the environment for the rule is not met by the reduplicant.
  - The environment for the rule *is* met in the base, and it applies there as expected.
- The distribution of [h] in Javanese is such a case.

- Javanese has a deletion process that deletes *h* intervocalically:

(15) a. /h/ → Ø / V_V
b. /h/ → [h] elsewhere (namely, _C)

- The application of these rules outside of reduplication is illustrated by (16a).

(16) Javanese *h* deletion (McCarthy & Prince 1995:2)

	Stem	i. _+C	ii. _+V	iii. *"Expected" Red*	Gloss
a.	anɛh	anɛh-ku	anɛ.-e	—	'strange'
b.	bəḍah	bəḍah-bəḍah	bəḍa-bəḍa.-e	*bəḍa[h]-bəḍa.-e	'broken'
c.	ḍajɔh	ḍajɔh-ḍajɔh	ḍajɔ-ḍajɔ.-e	*ḍajɔ[h]-ḍajɔ.-e	'guest'

- This distribution doesn't fully hold in reduplication (16b,c).
    - I assume the reduplicant is the first copy not the second, but this ultimately makes little difference.
  - When the base is followed by a consonant or nothing (column i.), [h] appears in both copies.

- In both positions, it should not be subject to the deletion rule (15a), and it evidently is not.
- When the base is followed by a V-initial suffix (column ii.), the second copy meets the context for the deletion rule (15a), so we expect deletion, and we get it.
  - However, the context at the juncture between the copies has not changed — it does not meet the environment for the deletion rule (15a) — so we should not expect the deletion rule to apply.
  - Yet it does appear to "apply", since the *h* appears to be "deleted".

- This is "**overapplication**" because the deletion rule has seemingly applied outside of its context.

- This case at least can be analyzed through rule ordering, assuming that reduplicative copying is a rule that can be ordered, and it is ordered after *h*-deletion.

(17) Copying rule ≈ if you have RED, copy the root material present at that stage of the derivation

(18) Javanese rule ordering

		/anɛh-ku/	/anɛh-e/	/RED-bəḍah/	/RED-bəḍah-e/
Rule 1.	*h*-deletion	—	anɛ.-e	—	RED-bəḍa-e
Rule 2.	Copying	—	—	bəḍah-bəḍah	bəḍa-bəḍa-e
		[anɛhku]	[anɛ.e]	[bəḍahbəḍah]	[bəḍabəḍa.e]

- This is essentially a counterbleeding interaction, because *h*-deletion would not have applied if the order were reversed.
  - Overapplication can thus be thought of as a type of opacity

(19) Javanese rule ordering reversed — wrong outcome

		/anɛh-ku/	/anɛh-e/	/RED-bəḍah/	/RED-bəḍah-e/
Rule 2.	Copying	—	—	bəḍah-bəḍah	bəḍah-bəḍah-e
Rule 1.	*h*-deletion	—	anɛ.-e	—	bəḍah-bəḍa-e
		[anɛhku]	[anɛ.e]	[bəḍahbəḍah]	*[bəḍahbəḍa.e]

- McCarthy & Prince (1995:2) define overapplication independent of framework as:

  "A phonological mapping will be said to overapply when it introduces, in reduplicative circumstances, a disparity between the output and the lexical stem that is not expected on purely phonological grounds."

- Put another way, overapplication means that the reduplicant resembles the base more than the root.
  - "*h*-deletion" "applies" in the reduplicant because it applied in the base.
  - This is at the heart of the rule ordering analysis
    - The reduplicant copies a constituent which has already undergone the process.
    - It does not undergo the process *per se*.

2.3 Underapplication

- Underapplication is the opposite, but notionally equivalent.
- In terms of rule application, "underapplication" refers to cases where a phonological rule *fails* to apply in the reduplicant even though the environment for the rule *is* met in the reduplicant.
  - The environment for the rule *is not* met in the base, and it does not apply there, as expected.
- Akan reduplication is an example.

- Akan has a CV reduplicant, where the V is always [ɪ], regardless of the base vowel.
- Akan disallows velars and *h* (maybe others) before high front [ɪ] (and maybe others):

(20) a. /k,h/ → [tɕ,ç] / _ ɪ
b. /k,h/ → [k,h] elsewhere

⋆ N.B.: McCarthy, Kimper, & Mullin (2012:211–212) argue this isn't an active phonological process.

- This distribution does not hold in reduplication
  - The palatalization process fails to apply — i.e. "underapplies" — in the reduplicant.

(21) Akan palatalization (M&P:3)

	Stem	Reduplicated	"Expected"	Gloss
a.	kaʔ	<u>kɪ</u>-kaʔ	*<u>tɕɪ</u>-kaʔ	'bite'
b.	hawʔ	<u>hɪ</u>-hawʔ	*<u>çɪ</u>-hawʔ	'trouble'

- This sort of underapplication is also amenable to a rule ordering analysis.
  - If the palatalization rule applies before the reduplicant [ɪ] is introduced into the derivation, palatalization will be *counterfed*.
  - Underapplication can therefore also be view as an opaque interaction.

(22) Akan rule ordering 1

		/RED-kaʔ/	/kɪʔ/ (hypothetical)
Rule 1.	Palatalization	—	tɕɪʔ
Rule 2.	Reduplication w/ [ɪ]	<u>kɪ</u>-kaʔ	—
		<u>kɪ</u>-kaʔ	[tɕɪʔ]

(23) Akan rule ordering 2

		/RED-kaʔ/	/kɪʔ/ (hypothetical)
Rule 1.	Reduplication	<u>ka</u>-kaʔ	—
Rule 2.	Palatalization	—	tɕɪʔ
Rule 3.	Reduction to [ɪ]	<u>kɪ</u>-kaʔ	—
		<u>kɪ</u>-kaʔ	[tɕɪʔ]

- McCarthy & Prince (1995:3) describe underapplication independent of framework as:

  "...the general phonological pattern of the language leads us to expect a disparity between the underlying stem (with *k*) and the reduplicant (where we ought to see *tɕɪ*), and we do not find it. The effect is to make the actual reduplicant more closely resemble the stem."

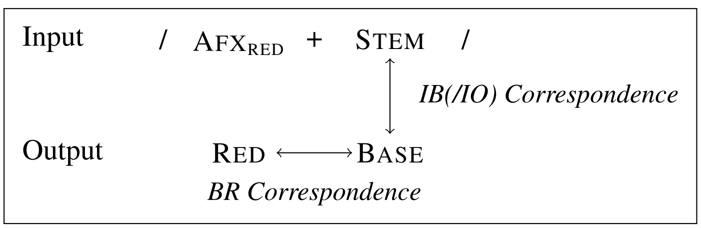
- Therefore, both overapplication and underapplication seem to be operating so as to make the base and reduplicant more similar.

3 Base-Reduplicant Correspondence Theory

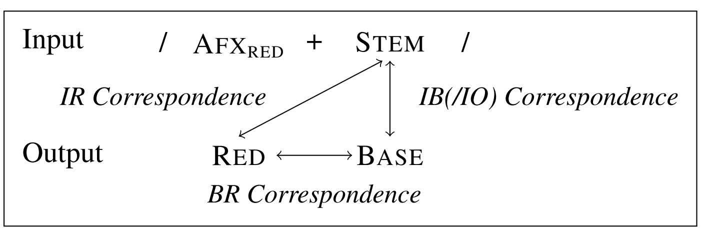
- The fact that overapplication and underapplication exist, and that they can be characterized as enhancing the similarity between base and reduplicant, led McCarthy & Prince (1995) to propose the notion of **Correspondence** between base and reduplicant, and indeed along other dimensions.

(24) Base-Reduplicant Correspondence Theory (McCarthy & Prince 1995:4)

a. Basic Model



b. Full Model



- Faithfulness constraints are defined over each correspondence relation
  - In theory, *the same* faithfulness constraints should be definable across all correspondence relations
  - → The theory of faithfulness constraints is independent of the theory of correspondence relations
- Faithfulness constraints along any correspondence dimension may be freely ranked with respect to faithfulness constraints along any other (or the same) correspondence dimension
  - There may need to be restrictions on IR faithfulness...
- To derive standard cases of normal application, overapplication, and underapplication, we just need three types of constraints:

1. Markedness constraints
2. IO faithfulness constraints
3. BR faithfulness constraints

- IR faithfulness constraints are only necessary to model different / more complicated cases.

- In all cases where we are dealing with some kind of "application", we necessarily have a phonological process.
  - Phonological processes entail the ranking MARKEDNESS ≫ IO-FAITHFULNESS
- The main question, then, is how do BR faithfulness constraints rank relative to this ranking fragment?
  - Also: what happens when there are additional markedness constraints and/or IO faithfulness constraints in play?

3.1 Analyzing normal application

- Tagalog shows normal application:

(25) a. /d/ → [ɾ] / V_V
b. /d/ → [d] elsewhere (namely, #_ & C_)

(26) Flapping in Tagalog (McCarthy & Prince 1995:3; Carrier 1979:150)

	Stem	Reduplicated			Gloss
a.	datiŋ	d-um-ā-ɾatiŋ	*ɾ-um-ā-ɾatiŋ	*d-um-ā-datiŋ	'arrive'
b.	diŋat	ka-ɾiŋat-diŋat	*ka-ɾiŋat-ɾiŋat	*ka-diŋat-diŋat	'suddenly'

- First, let's pin down the ranking for the allophonic distribution.
  - Fully allophonic distributions are characterized by $\mathbb{M}_1 \gg \mathbb{M}_2 \gg$ FAITH-IO

(27) Flapping ranking: *[VdV] ≫ *[ɾ] ≫ IDENT[F]-IO

- [F] could be [±continuant], [±sonorant], maybe others.
- If the markedness constraints were more general (i.e. not restricted to coronal place and [+voice]), other constraints would be needed to rule out alternations at other places/values for voicing.

(28) Intervocalic flapping (w/ maximally unfaithful input)

/ada/	*[VdV]	*[ɾ]	IDENT[F]-IO
a. ada	*!		
b. ☞ aɾa		*	*

(29) Non-intervocalic [d] (w/ maximally unfaithful input)

/ɾa/	*[VdV]	*[ɾ]	IDENT[F]-IO
a. ☞ da			*
b. ɾa		*!	

- **Questions:**
  1. Where must IDENT[F]-BR rank to derive normal application?
  2. What would the results be if IDENT[F]-BR ranked somewhere else?

- **Answer to Q1:** IDENT[F]-BR has to rank below *both* markedness constraints.
  - This ensures that it will play no role in determining which segment appears in any given position.
  - Only markedness will play a role, therefore normal application.

(30) Normal application in reduplication

/ka, RED, diŋat/	*[VdV]	*[ɾ]	IDENT[F]-IO	IDENT[F]-BR
a. ka-diŋat-diŋat	*!			
b. ka-ɾiŋat-ɾiŋat		**!	*	
c. ☞ ka-ɾiŋat-diŋat		*		*
d. ka-diŋat-ɾiŋat	*!	*	*	*

(31) Normal application in reduplication

/um, RED, datiŋ/	*[VdV]	*[ɾ]	IDENT[F]-IO	IDENT[F]-BR
a. d-um-ā-datiŋ	*!			
b. ɾ-um-ā-ɾatiŋ		**!	*	
c. ɾ-um-ā-datiŋ	*!	*		*
d. ☞ d-um-ā-ɾatiŋ		*	*	*

- What if IDENT[F]-BR ranked between the two markedness constraints?
  ⇒ **Overapplication and Back-Copying Overapplication**

(32) Back-copying overapplication

/ka, RED, diŋat/	*[VdV]	IDENT[F]-BR	*[ɾ]	IDENT[F]-IO
a. ka-diŋat-diŋat	*!			
b. ☞ ka-ɾiŋat-ɾiŋat			**	*
c. ka-ɾiŋat-diŋat		*!	*	
d. ka-diŋat-ɾiŋat	*!	*	*	*

  - Back-copying is when a process applies normally to the reduplicant, and overapplies in the base due to BR-faithfulness.

(33) Overapplication

/um, RED, datiŋ/	*[VdV]	IDENT[F]-BR	*[ɾ]	IDENT[F]-IO
a. d-um-ā-datiŋ	*!			
b. ☞ ɾ-um-ā-ɾatiŋ			**	*
c. ɾ-um-ā-datiŋ	*!	*	*	
d. d-um-ā-ɾatiŋ		*!	*	*

- What if IDENT[F]-BR ranked above the top markedness constraint?
  ⇒ Same thing — **Overapplication and Back-Copying Overapplication**

(34) Back-copying overapplication

/ka, RED, diŋat/	IDENT[F]-BR	*[VdV]	*[ɾ]	IDENT[F]-IO
a. ka-diŋat-diŋat		*!		
b. ☞ ka-ɾiŋat-ɾiŋat			**	*
c. ka-ɾiŋat-diŋat	*!		*	
d. ka-diŋat-ɾiŋat	*!	*	*	*

(35) Overapplication

/um, RED, datiŋ/	IDENT[F]-BR	*[VdV]	*[ɾ]	IDENT[F]-IO
a. d-um-ā-datiŋ		*!		
b. ☞ ɾ-um-ā-ɾatiŋ			**	*
c. ɾ-um-ā-datiŋ	*!	*	*	
d. d-um-ā-ɾatiŋ	*!		*	*

3.2 Analyzing overapplication

- Javanese was a case of overapplication
  - Since there is no obvious way to distinguish which copy is the base and which is the reduplicant, we don't know if it's back-copying or regular overapplication.

(36) a. /h/ → Ø / V_V
b. /h/ → [h] elsewhere (namely, _C)

(37) Javanese *h* deletion (McCarthy & Prince 1995:2)

	Stem	i. _+C	ii. _+V	iii. *"Expected" Red*	Gloss
a.	anɛh	anɛh-ku	anɛ.-e	—	'strange'
b.	bəḍah	bəḍah-bəḍah	bəḍa-bəḍa.-e	*bəḍa[h]-bəḍa.-e	'broken'
c.	ḍajɔh	ḍajɔh-ḍajɔh	ḍajɔ-ḍajɔ.-e	*ḍajɔ[h]-ḍajɔ.-e	'guest'

- This is a neutralizing distribution (the contrast between *h* and Ø is neutralized intervocalically, but maintained elsewhere).
  - Neutralization is characterized by the ranking $\mathbb{M}_1 \gg$ FAITH-IO $\gg \mathbb{M}_2$

(38) *h*-deletion Ranking: *[VhV] ≫ MAX[h]-IO ≫ *[h]

(39) Intervocalic *h*-deletion

/anɛh-e/		*[VhV]	MAX[h]-IO	*[h]
a.	anɛhe	*!		*
b. ☞	anɛ.e		*	

(40) /h/ retained elsewhere

/anɛh-ku/		*[VhV]	MAX[h]-IO	*[h]
a. ☞	anɛhku			*
b.	anɛku		*!	

- The relevant BR-faithfulness constraint is DEP-BR.
- If this ranks above the IO-faithfulness constraint, we derive overapplication
  - This is what we saw with the ranking permutations for Tagalog: we derived overapplication when the BR-faithfulness constraint outranked at least the second constraint in the ranking that determined the normal distribution.

(41) Overapplication of *h*-deletion

/RED-bəḍah-e/		*[VhV]	DEP[h]-BR	MAX[h]-IO	*[h]
a.	bəḍah-bəḍah-e	*!			**
b.	bəḍah-bəḍa-e		*!	*	*
c. ☞	bəḍa-bəḍa-e			*	
d.	bəḍa-bəḍah-e	*!			*

- Notice that none of these constraints promote having [h] in the reduplicant when it is deleted in the base.
  - MAX-**IR** would do so.
  - Therefore, we know that DEP[h]-BR ≫ MAX[h]-IR

(42) Overapplication of *h*-deletion

/RED-bəḍah-e/		*[VhV]	DEP[h]-BR	MAX[h]-IR
a.	bəḍah-bəḍah-e	*!		
b.	bəḍah-bəḍa-e		*!	
c. ☞	bəḍa-bəḍa-e			*
d.	bəḍa-bəḍah-e	*!		*

- But MAX[h]-IR must dominate *[h], or else it would not surface in the reduplicant in the general case.

(43) *h*-retention in the general case

/RED-bəḍah/	*[VhV]	DEP[h]-BR	MAX[h]-IO	MAX[h]-IR	*[h]
a. ☞ bəḍah-bəḍah					**
b. bəḍah-bəḍa		*!	*		*
c. bəḍa-bəḍa			*!	*!	
d. bəḍa-bəḍah				*!	*

- In this case, ANCHOR-R-BR could replace MAX[h]-IR in enforcing *h*-copying, because [h] is the right-most segment of the base.

3.3 Analyzing underapplication

- Underapplication can't be derived from these types of constraints alone.
  - Underapplication requires there to be another (markedness) constraint that penalizes overapplication.
  - Underapplication results when BR-faithfulness must be satisfied and that other constraint blocks over-application.

- Akan is our example of underapplication:

(44) a. /k,h/ → [tɕ,ç] / _ ɪ
b. /k,h/ → [k,h] elsewhere

(45) Akan palatalization (M&P:3)

	Stem	Reduplicated	"Expected"	Gloss
a.	kaʔ	kɪ-kaʔ	*tɕɪ-kaʔ	'bite'
b.	hawʔ	hɪ-hawʔ	*çɪ-hawʔ	'trouble'

- M&P (1995) assume that palatalization in Akan is fully allophonic (albeit without alternations), which would require the same sort of ranking as in Tagalog.

(46) Palatalization (w/ maximally unfaithful input)

/kɪ/	*[kɪ]	*[tɕ]	IDENT[F]-IO
a. kɪ	*!		
b. ☞ tɕɪ		*	*

(47) No palatals elsewhere

/tɕa/	*[kɪ]	*[tɕ]	IDENT[F]-IO
a. ☞ ka			*
b. tɕa		*!	

- Underapplication occurs to render the base and reduplicant more similar.
  - But we don't get underapplication when we just add IDENT[F]-BR to the top of the ranking.

◦ Instead we just get overapplication.

(48) Underapplication of palatalization fails

/RED, kaʔ/	IDENT[F]-BR	*[kɪ]	*[tɕ]	IDENT[F]-IO
a. ☹ kɪ-kaʔ		*!		
b. tɕɪ-kaʔ	*!		*	
c. 💣 tɕɪ-tɕaʔ			**	*

- To get underapplication, we need another constraint that penalizes the overapplication candidate.
- M&P propose OCP-PAL, which penalizes two palatals in a row.

(49) Underapplication of palatalization succeeds

/RED, kaʔ/	OCP-PAL	IDENT[F]-BR	*[kɪ]	*[tɕ]	IDENT[F]-IO
a. ☞ kɪ-kaʔ			*		
b. tɕɪ-kaʔ		*!		*	
c. tɕɪ-tɕaʔ	*!			**	*

- Notice now that placing IDENT[F]-BR *between* the two allophonic markedness constraint rather than *above* them both reverts back to normal application.

(50) Normal application with blocker

/RED, kaʔ/	OCP-PAL	*[kɪ]	IDENT[F]-BR	*[tɕ]	IDENT[F]-IO
a. kɪ-kaʔ		*!			
b. ☞ tɕɪ-kaʔ			*	*	
c. tɕɪ-tɕaʔ	*!			**	*

3.4 General recipes for different types

(51)
a. Normal application
MARKEDNESS ≫ IO-FAITHFULNESS ≫ BR-FAITHFULNESS
b. Overapplication
BR-FAITHFULNESS, MARKEDNESS ≫ IO-FAITHFULNESS
c. Underapplication
BR-FAITHFULNESS + BLOCKER ≫ MARKEDNESS ≫ IO-FAITHFULNESS

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