Class 8
Reduplication-Phonology interactions in STS, and another look at the data

5/30/2023

1 Reduplication-phonology interactions

- Last time, we saw that BRCT and STS don't make as different predictions as we might have thought.

⋆ One domain in which BRCT and STS *do* make substantially different predictions is in regards to reduplication-phonology interactions.

- These differences stem largely (entirely?) from the fact the McCarthy, Kimper, & Mullin (2012) [MKM] deny the existence of BR correspondence.
  - This seems to be a programmatic decision as much as an empirical one.
    - HS basically does away with correspondence entirely, replacing it with the idea of operations.
    - It certainly gets rid of all non-IO correspondence.

  → But it seems to me theoretically possible to have HS with surface correspondence, including BR correspondence, so this continues to be an empirical question.
  - Yang (2022) proposes such a model.

- BRCT (McCarthy & Prince 1995, 1999), specifically the BR correspondence aspect of it, is motivated largely by reduplication-phonology interactions that cannot be captured in ordering theories:
  - Back-copying overapplication
  - Overapplication of a process at the base-reduplicant juncture
  - Look-ahead effects(?)

  → Also TETU effects, but we've seen that there are other ways to capture these (see Struijke 2002, Saba Kirchner 2010).

- Without BR correspondence, STS (or indeed virtually any other alternative framework) cannot generate these patterns.

  ⇒ Therefore, whether or not these patterns (or other types of interactions that require BR correspondence) truly exist should determine whether or not BR correspondence is part of the grammar (whatever else it looks like).

2 Predictions of STS

- MKM (Ch. 6) identify four types of interactions (plus the reduction facts discussed last time) which have been claimed in the literature:

  1. Ordinary overapplication
  2. Back-copying overapplication
  3. Underapplication
  4. Look-ahead

- They claim that STS can generate certain types of ordinary (i.e. non–back-copying) overapplication, but not the other three.
- They work hard to say that actually none of the other types actually exist, ergo STS is right.
  - A lot of their claims seem fairly reasonable, but some really don't.

2.1 Ordinary overapplication

2.1.1 STS can derive the basic type

- STS can derive (certain types of) non–back-copying overapplication in an equivalent way to rule ordering approaches.
  - A phonological process applies to the base before copying occurs, so the result of the process is copied into the reduplicant.
  - In STS, this is achieved by having the markedness constraint driving the process ranked above the HEADEDNESS constraint driving copying.

- The two examples MKM focus on are Chumash coalescence and Javanese *h*-deletion.
  - They only give the full analysis for Chumash, but Javanese is more straightforward (mostly).

- In Javanese, *h* deletes intervocalically.
- *h*'s which delete before a vowel-initial suffix have no BR-correspondent (unclear which copy is base and which copy is red).

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

	Stem	i. _+C	ii. _+V	iii. *"Expected" Red*	Gloss
a.	anɛh	anɛh-ku	anɛ.-e	—	'strange'
b.	bəɖah	bəɖah-bəɖah	bəɖa-bəɖa.-e	*bəɖa[h]-bəɖa.-e	'broken'
c.	ɖajɔh	ɖajɔh-ɖajɔh	ɖajɔ-ɖajɔ.-e	*ɖajɔ[h]-ɖajɔ.-e	'guest'

- Assuming the "reduplicant" is the lefthand copy (and not worrying about what constituent is actually being copied; probably *root* or *stem*), we generate the pattern by forcing deletion to occur before copying:

(2) Step 1: *h*-deletion

/RED-bəɖah-e/	*VhV	MAX[h]	*HEADEDNESS(X)	*COPY(X–1)
a. RED-bəɖah-e	*!		*	
b. ☞ RED-bəɖa-e		*	*	
c. bəɖah-bəɖah-e	*!			*

(3) Step 2: copying *h*-less constituent [then convergence]

//RED-bəɖa-e//	*VhV	MAX[h]	*HEADEDNESS(X)	*COPY(X–1)
a. RED-bəɖa-e			*!	
b. ☞ bəɖa-bəɖah-e				*
✗ bəɖah-bəɖa-e				*

⋆ This still works even if the righthand copy is the reduplicant, as long as we assume that there is segmental adjacency across empty prosodic structure, which is what we need to say for Chumash.

- Chumash shows coalescence of a root-initial laryngeal and a prefix stop, with the result appearing in both base and reduplicant.

(4) C + laryngeal coalescence in Chumash (MKM:202): /k+RED+ROOT/

ʔaniš	→	kʔan-kʔaniš	*kʔan-ʔaniš	'my paternal uncles'
hawaʔ	→	khaw-khawaʔ	*khaw-hawaʔ	'my maternal aunts'

- Their analysis:
  - The reduplicative morpheme is an underlying empty syllable: /σ/.
  - The (underlying?) morpheme order is prefixal k + reduplicative syllable + root.
    - If there is no material in the empty syllable, the k and the root count as being adjacent (5b).
  - This violates the highest ranked (markedness) constraint (*C+LAR) and has to be resolved first.
    - *C+LAR violations are normally resolved through coalescence (violating UNIFORMITY).
    - (Properly anchored/local) copying would introduce a new locus of *C+LAR violation (prefix+red juncture; (5c)), so copying cannot alleviate the violation.

→ Coalescence happens first (i.e. before copying), even though it leaves a HEADEDNESS(σ) violation.
  - The HEADEDNESS(σ) violation can be resolved on the next step, but the string available for copying includes the coalesced segment, so that is what is copied.

(5) Chumash overapplication: Step 1 (coalescence)

/k-σ-hawaʔ/	*C+LAR	HEAD(σ)	UNIFORMITY	*COPY(seg)
a. ☞ σ + σ σ (△ △) khawaʔ		*	*	
b. k + σ + σ σ (△ △) haʔ	*!	*		
c. k + σ (△) haw + σ σ (△ △) haʔ	*!			*

- Weird/problematic things about this analysis:
  - It requires that the k and the root are adjacent even though there is syllabic structure in between.
    - In (b) and (c), MKM don't show any syllabic affiliation for the k.
  - No mention of how morpheme order is established, and what ramifications coalescing across the red syllable has.

- The existence of overapplication cases like these is not in dispute.
- Since STS can capture them, this is fine for STS.

2.1.2 Potential types of overapplication that would be problematic for STS

- There are two types of non–back-copying overapplication that STS cannot deal with:

(6) a. Overapplication of a process conditioned by the base-reduplicant juncture
b. Overapplication of a purely allophonic process

- The problem with (6a) is easy to conceptualize:
  - In STS, overapplication happens because a process applies to the base before copying.
  - If the process is conditioned at the base-reduplicant juncture, copying necessarily already happened.
  - There is no way for the effects of that process to be transferred to the copy, because the copy is now a separate part of the input.

⋆ This property of the system is due to the rejection of BR correspondence as much as it is due to the architecture of the STS framework.

- There are claimed cases of this sort, e.g. Malay nasal harmony; so MKM argue that all of them are spurious.
  - Among the ones they talk about, nothing they say seems unreasonable to me.

- The problem with (6b) takes a little more leg work to demonstrate.
  - MKM construct a hypothetical example:

- Nasalization of vowels is in complementary distribution:

(7) Distribution of nasalization

a.	Nasal before nasal stops	/pani/ → [pãni], *[pani]	/pãni/ → [pãni], *[pani]
b.	Oral elsewhere	/kati/ → [kati], *[kãti]	/kãti/ → [kati], *[kãti]

- In either HS or POT, this can be derived using the allophonic ranking schema $\mathbb{M}_{spec} \gg \mathbb{M}_{gen} \gg \mathbb{F}$:

(8) Ranking: *VN ≫ *$\tilde{\text{V}}$ ≫ IDENT[nas]

(9) Allophonic nasalization (with maximally unfaithful inputs)

i. Before a nasal

/pani/	*VN	*$\tilde{\text{V}}$	IDENT[nas]-IO
a. pani	*!		
b. ☞ pãni		*	*

ii. Before an oral C

/kãti/	*VN	*$\tilde{\text{V}}$	IDENT[nas]-IO
a. ☞ kati			*
b. kãti		*!	

- Assume this language has a prefixal CV reduplication process.

- In BRCT, if IDENT[nas]-BR ≫ *$\tilde{\text{V}}$, then you can get nasalization outside of the _N environment, contrary to the normal distribution, shown in (10).
  - Note that this holds regardless of our assumptions about correspondence between reduplicant the input, and the definition of the IO faithfulness constraints.
  - The only crucial ingredient is BR faithfulness.

(10) Overapplication of allophonic nasalization in BRCT

/RED, pani/		IDENT[nas]-BR	*VN	*Ṽ	IDENT[nas]-IO
a.	pa-pani		*!		
b.	pa-pãni	*!		*	*
c. ☞	pã-pãni			**	*(*)
d.	pã-pani	*!	*!	*	(*)

- In STS, where there's no BR faithfulness, only process ordering, it's not going to work this way.
  - If HEADEDNESS(σ) $\gg$ *VN, copying will take place *before* allophonic nasalization, and so nasalization will have no chance to get into the reduplicant.
  - But, if *VN $\gg$ HEADEDNESS(σ), nasalization will take place first, and this will get copied into the reduplicant:

(11) STS Step 1: nasalization

/σ, pani/		*VN	HEADEDNESS(σ)	*Ṽ	IDENT[nas]
a.	σ-pani	*!	*		
b. ☞	σ-pãni		*	*	*
c.	pa-pani	*!			
✗	pã-pãni			**	*

(12) STS Step 2: copying (nasalization gets copied)

//σ-pãni//		*VN	HEADEDNESS(σ)	*Ṽ	IDENT[nas]
a.	σ-pãni		*!	*	
b.	σ-pani	*!	*		*
c. ☞	pã-pãni			**	
✗	pa-pãni			*	

→ The allophonic pattern re-asserts itself after copying

(13) STS Step 3: denasalization of reduplicant

//pã-pãni//		*VN	HEADEDNESS(σ)	*Ṽ	IDENT[nas]
a.	pã-pãni			**!	
b. ☞	pa-pãni			*	*
c.	pã-pani	*!		*	*

- This problem does not arise if it is a *neutralizing* distribution.

(14) Neutralizing distribution of nasalization

	Underlyingly oral	Underlyingly nasal
Nasal before nasal stops	/pani/ → [pãni], *[pani]	/pãni/ → [pãni], *[pani]
Contrast elsewhere	/kati/ → [kati], *[kãti]	**/kãti/ → *[kati], [kãti]**

- In either HS or POT, this can be derived using the neutralization ranking schema $\mathbb{M}_{spec} \gg \mathbb{F} \gg \mathbb{M}_{gen}$:

(15) Ranking: *VN $\gg$ IDENT[nas] $\gg$ *Ṽ

- For BRCT, the difference in ranking between the lower two constraints has no effect on overapplication (cf. (10)). But for STS, this difference is crucial:

(16) Neutralizing ranking STS Step 3: **convergence** (cf. (13))

//pã-pãni//	*VN	HEADEDNESS(σ)	IDENT[nas]	*Ṽ
a. ☞ pã-pãni				**
b. pa-pãni			*!	*
c. pã-pani	*!		*	*

- Because the contrast is normally permitted, there is no $\mathbb{M} \gg \mathbb{F}$ ranking to force a change after copying.
  - So, STS allows transfer of process application to the reduplicant only when the result is a phonotactically licit structure.

→ This is not the case for BRCT, where BR faithfulness constraints can introduce otherwise illegal structures.
  - There lots of claimed cases of this type (MKM:208).
  - ⇒ MKM have to deny all of them; I'm not convinced. More on this below.

2.2 Back-copying overapplication

- Back-copying overapplication refers to cases where a phonological property of the reduplicant is transferred back to the base.

- A standard hypothetical example is nasal place-assimilation:
  - Prefixal CVC reduplication pattern.
  - Nasals must agree in place with following stops (AGREE[place] ≫ IDENT[place]-IO), so a reduplicant-final nasal will assimilate to a root-initial heterorganic stop.
  - If IDENT[place]-BR ≫ IDENT[place]-IO, the assimilated place will be copied back into the root.

(17) Back-copying assimilated place (hypothetical) in BRCT (MKM:209)

/RED$_{cvc}$-panit/	AGREE[place]	IDENT[place]-BR	IDENT[place]-IO
a. pan-panit	*!		
b. pam-panit		*!	(*)
c. ☞ pam-pa**m**it			*(*)

⋆ Additional weird predictions arise for cases where the root nasal is pre-consonantal:
  - In the basic case, you predict that back-copying of place would affect not only the root nasal but also the stop that follows it:

(18) Back-copying plus assimilation in √CVNTX

/RED$_{cvc}$-panti/	AGREE[place]	IDENT[place]-BR	IDENT[place]-IO
a. pan-panti	*!		
b. pam-panti		*!	(*)
c. pam-pa**m**ti	*!		*(*)
d. ☞ pam-pa**mp**i			**(*)

  - If the language allows for nasal place to change but not stop place (i.e. IDENT[place]/[-nasal]-IO ≫ IDENT[place]/[+nasal]-IO), back-copying could be blocked just in case the nasal was pre-stop:

(19) Back-copying blocked in √CVNTX

/RED$_{cvc}$-panti/		Id[place]/[-nas]-IO	Agr[place]	Id[place]-BR	Id[place]/[+nas]-IO
a.	pan-panti		*!		
b. ☞	pam-panti			*	(*)
c.	pam-pa**m**ti		*!		*(*)
d.	pam-pa**mp**i	*!			*(*)

- Back-copying can't arise in STS, because it lacks BR correspondence.
  - *Again, it's really the lacking BR correspondence part, not the HS/STS part.*
  - Once copying takes place, there is no link between the "reduplicant" and the base.
  - Any process (whose context is not met in the base) which applies to the reduplicant subsequent to copying [by definition, in STS, processes can only apply to the reduplicant after copying] will thus have no way of affecting the base.

- MKM argue (without much detail) that all the putative cases of back-copying are spurious.
  - It's not obvious that their wrong...

2.3 Underapplication

- In BRCT, underapplication = blocked overapplication:

(20) Underapplication ranking schema:
BR-Faithfulness + Blocker ≫ Markedness ≫ IO-Faithfulness

- Once you eliminate BR correspondence, underapplication is predicted to be impossible.

- The distribution of *g* vs. *ŋ* in Japanese mimetic reduplication looks like it might be underapplication:

(21) Normal distribution of Japanese g/ŋ (McCarthy & Prince 1995:105)

g initially		*ŋ* medially	
geta	'clogs'	ka**ŋ**i	'key'
giri	'duty'	oyo**ŋ**u	'to swim'
garasu	'glass'	oru**ŋ**aN	'organ'
		tomodachi-**ŋ**a	'friend-NOM'
		isshuukaN-**ŋ**urai	'one week-approximately'
gai-koku	'foreign country'	koku-**ŋ**ai	'abroad'
gaku-sei	'student'	suu-**ŋ**aku	'mathematics'

(22) Mimetic reduplication (apparently) shows medial [g] (McCarthy & Prince 1995:106)

gara-**g**ara	(*gara-**ŋ**ara)	'rattle'
geji-**g**eji	(*geji-**ŋ**eji)	'centipede'
gera-**g**era	(*gera-**ŋ**era)	'laughing'

- M&P (1995) analyze this as a BR-faithfulness effect (≈ underapplication of //g// → [ŋ]).

- Normal distribution determined by the ranking in (23) (fully allophonic, so IO faith irrelevant).

(23) Allophonic distribution: *#ŋ ≫ *g ≫ Ident[nas]-IO

- Mimetic reduplication subject to undominated IDENT[nas]-BR:

(24) Underapplication in Japanese mimetic reduplication in BRCT

/RED, gara/		IDENT[nas]-BR	*#ŋ	*g
a. ☞	gara-gara			**
b.	gara-ŋara	*!		*
c.	ŋara-gara	*!	*!	*
d.	ŋara-ŋara		*!	

- Without BR faithfulness, STS can't generate this; it reduces to the same derivation as the allophonic overapplication case.
  - Even if the wrong allophone pops up at some point in the derivation, it will eventually get replaced by the correct one.

- MKM argue that each of the claimed cases of underapplication is actually some completely different effect.

- The Japanese case is (rightly) re-analyzed as a two-prosodic-words effect (MKM:211).
  - Mimetic reduplication shows a separate main stress on each member: *gara-gara* is [gará-gará].
  - The *g*∼*ŋ* alternation is about initial vs. medial, so if the two members are in different domains ((P)words), we expect *g* not *ŋ* in the second member as well: {gará}$_{\text{PWd}}$-{gará}$_{\text{PWd}}$

- There aren't that many claimed cases. The only one that seems like there might be something to it is Akan palatalization, but the whole thing is pretty complicated to begin with.

2.4 Look-ahead

- One additional type of interaction that only becomes an issue when thinking about serial derivation is "look-ahead effects".
  - Look-ahead in reduplication would be a case where "copying seems to look ahead to the results of a subsequent phonological process" when determining what/how much to copy (MKM:213).

- This is not an obvious thing to be worried about when thinking just about parallel OT, because it is intrinsic to the model that what/how much you copy is dynamically determined based on the total result.

→ MKM obviously claim these don't exist.

- Their hypothetical example is place-assimilation dependent copying:

- The language has the following properties:
  - It only allows homorganic nasals as codas (and has evidence of nasal place assimilation alternations; maybe this isn't necessary).
  - It has a monosyllabic prefixal reduplicant.

- The shape of the reduplicant depends on whether there's a post-vocalic nasal:
  - You only get a coda if the base has a nasal (even if its an onset nasal), even if it has to change its place when it's in the reduplicant.

(25) Assimilation-dependent copying (MKM:213)

pa.ta	→	pa-pa.ta
pa.na	→	pa*m*-pa.na

- In BRCT, it's no problem to do "copying" and assimilation at once.
  - Assume CodaCondition assigns violations to any coda which isn't a nasal that matches the place of the following consnant.
  - We might want to break this into two markedness constraints. I don't think this makes a difference.

(26) Assimilation dependent copying in BRCT

i. CVTV roots

RED_σ-pata		Ident[nasal]-BR	CodaCond	Max-BR	Ident[place]-BR
a. ☞	pa-pata			**	
b.	pat-pata		*!	*	
c.	pan-pata	*!	*!	*	
d.	pam-pata	*!		*	*

ii. CVNV roots

RED_σ-pana		Ident[nasal]-BR	CodaCond	Max-BR	Ident[place]-BR
a.	pa-pana			**!	
b.	pat-pana	*!	*!	*	
c.	pan-pana		*!	*	
d. ☞	pam-pana			*	*

- But these constitute two different operations in STS, and thus can't happen on a single step.
  - i.e., candidate (d) is not available on Step 1.

- If the problem with *[pa*t*-pa.ta] is CodaCondition (i.e. place specification in coda), then copying the nasal (//pa*n*-pa.na//) should be equally as bad, and thus the nasal shouldn't get copied either.
  - The nasal only gets copied because it can later change to a consonant that is licensed in coda position.

→ It's "looking ahead" when determining what to copy.

(27) No copying in PVNV roots in STS: Step 1

σ-pana		CodaCond	Hd(σ)	Ident[place]	*Copy(Seg)
a.	σ-pana		*!		
b. 💣	pa-pana				*
c.	pat-pana	*!			*
d.	pan-pana	*!			*
✗ ☹	pam-pana			*	*

- But wait, what about the CVC requirement?
  - In BRCT, you could (maybe?) get it with just Max-BR.
  - The constraints we just used for STS can't replicate this:

(28) Copying in PVMV roots in STS: Step 1 (to be revised)

σ-pama		CodaCond	Hd(σ)	Ident[place]	*Copy(Seg)
a.	σ-pama		*!		
b. 💣	pa-pama				*
d. ☞	pam-pama				*

- The way STS gets heavy syllable reduplicants is via a foot template + FOOT-BIN.
  - To get copying that is sensitive to segmental properties, we need to do σ-insertion first and then segment copying:
  - *COPY(σ) ≫ HEADEDNESS(foot) ≫ FOOT-BINARITY ≫ HEADEDNESS(σ) ≫ *COPY(seg)

(29) Copying in PVMV roots in STS: Step 2 (after syllable insertion on Step 1)

$[\sigma]_{ft}$-pama		HD(*ft*)	CODACOND	FTBIN	HD(σ)	IDENT[place]	*COPY(Seg)
a.	$[\sigma]_{ft}$-pama			*!	*		
b.	$[\sigma\sigma]_{ft}$-pama				*!*		
c.	$[[\text{pa}]_{\sigma}]_{ft}$-pama			*!			*
d. ☞	$[[\text{pam}]_{\sigma}]_{ft}$-pama						*

- Now it's clear that we don't predict CV copying for PNVN roots, we actually predict CVCV copying:

(30) No coda copying in PVNV roots in STS: Step 2 (after syllable insertion on Step 1)

$[\sigma]_{ft}$-pana		HD(*ft*)	CODACOND	FTBIN	HD(σ)	IDENT[place]	*COPY(Seg)
a.	$[\sigma]_{ft}$-pana			*!	*		
b. ☞	$[\sigma\sigma]_{ft}$-pana				**		
c.	$[[\text{pa}]_{\sigma}]_{ft}$-pana			*!			*
d.	$[[\text{pan}]_{\sigma}]_{ft}$-pana		*!				*

→ CVCV copying on Step 3 to satisfy HD(σ).

- In any event, it seems (for now) like STS won't this CV∼CVN look-ahead alternation.

- And since it seems like you can't do this in STS, MKM say it doesn't exist.
  - There weren't any super convincing cases when MKM wrote the paper.

- But Wei & Walker (2017, 2020) have recently shown that Mbe (cf. Walker 2000) does exactly this.
  - See also Adler & Zymet (2021) for other cases of look-ahead that are hard for HS.

(31) Look-ahead in Mbe (Wei & Walker 2017)

i.	No post-vocalic nasal → CV reduplicant			
	a.	rû	rû-rû	'pull'
	b.	jú.bò	jû-jú.bò	'go out'
	c.	só.rò	sə̂-só.rò	descend'
	d.	tá.rò	tə̂-tá.rò	'throw'
ii.	Post-vocalic nasal → CVN reduplicant			
	e.	tâŋ	tə̂n-tâŋ	'teach'
	f.	g͡bé.nò	g͡bə̂ŋm̀-g͡bé.nò	'collide'
	g.	pûɔ.nì	pûm-pûɔ.nì	'mix'
	h.	ʤûɔŋ	ʤûn-ʤûɔŋ	'be higher'
	i.	lúo.nî	lûn-lûo.nì	'repair'
	j.	jíɔ.nî	jîŋ-jîɔ.nì	'forget'

- If STS can't derive this, then they're in trouble.

- Wei & Walker explore a Copy + Deletion approach, and conclude that it doesn't really work.
  - At best, it requires an output with an empty syllable, and a weird contradiction about how to evaluate Foot-Bin vs. Affix≤σ.

- But I think there may be a different way to save it, if we use a constraint other than (or in addition to) CodaCondition:

(32) ***C$_{[-nas]}$]$_\sigma$:** No non-nasal coda consonants.

- It seems like we may need this in the first place to explain why non-nasals can't be saved in the coda via place assimilation.
  - I don't think this can be reduced to a no-geminate constraint, because liquids aren't allowed before stops either.

- If this outranks Foot-Bin, and Foot-Bin outranks CodaCond, then I think you could derive the difference between nasals and non-nasals.

- But this might not be compatible with the facts about diphthongs:
  - Root diphthongs correspond to singletons in the reduplicant: e.g. l**úo**.nî → l**û**n-lûo.nì
  - This inherently requires copy + deletion (à la onset reduction in Sanskrit).
  - ⋆ But if you normally copy the extra consonant to satisfy Foot-Bin, this should be unnecessary when you already have a diphthong.
    - Since you can satisfy Foot-Bin without the consonant, the consonant's CodaCond violation, even if low ranked, would be enough to prevent its copying.

  ⇒ This then is a look-ahead effect of its own.

- If there isn't a way to solve this, it would be a serious problem for STS.
  - Note that this is a consequence of the serial architecture of STS, not the absence of BR correspondence, so this would be a *real* argument against STS *per se*.

⋆ But Lamont (2022) has a solution: copy two different times.
  - His analysis is ridiculously complex (and I'm not sure how well it really works), but basically:

(33) Lamont's analysis (tones suppressed)

	Input:	/*ft*-jiɔ.ni/
Step 1	Syllable Insertion	σ_{ft}-jiɔ.ni
Step 2	Heavy Syllable Copying	**jiɔ**-jiɔ.ni
Step 3	Vowel reduction	jiə-jiɔ.ni
Step 4	Schwa deletion	ji-jiɔ.ni
Step 5	Nasal Copying	ji**n**-jiɔ.ni
Step 6	Coda Place Deletion	jiN-jiɔ.ni
Step 7	Coda Place Assimilation	jiŋ-jiɔ.ni
	Output:	[jiŋ-jiɔ.ni]

→ Conclusion: it's not look-ahead because we can do it in STS in a way that doesn't look like look-ahead.
  ≈ *are these theories unfalsifiable?*

3 Looking more carefully at some of the data

3.1 General thoughts

- MKM say everything works out just the way they need it to.

- I'm relatively on board with their claims that:
  - The underapplication cases are not underapplication,
  - Cases of overapplication of a process at the base-reduplicant juncture probably don't hold up,
  - Cases of back-copying are seriously dubious

- The things that I'm not on board with:
  - Their claim that there's no allophonic overapplication
  - Their claim that there's no look ahead effects (see Mbe above)
  - Their claim that they don't predict medial coda skipping (see last time).

- If this is the right breakdown, then this actually points towards something legitimate:
  - Their untenable claims are all consequences of the architecture of STS (and/or HS generally)
  - Their tenable claims are all consequences of jettisoning BR correspondence

⇒ If this is the right way to be looking at the data, this is suggestive evidence for getting rid of BR correspondence.
  - ⋆ Note though that this would just be an argument via overgeneration.
  - If any other types of effects (or indeed any new real instances of these kinds of effects) could be found that requires BR faithfulness to analyze, then BR correspondence needs to be back on the table.

- To my mind, if there's evidence for surface correspondence in other domains, it would be super weird if it doesn't hold in reduplication.
- I'm also not fully convinced that arguments based solely on overgeneration are *a priori* valid.
- My conclusion then is: the evidence for BR correspondence may be shakier than we might have thought, and we should seriously consider getting rid of it...but this isn't a necessity yet.

3.2 Some of the data

3.2.1 Javanese *a*∼*ɔ* (supposed allophonic overapplication)

- Dudas (1976) argues that *a* is in complementary distribution with *ɔ* in Javanese:

(34) a. *ɔ* / _#
b. *ɔ* / _C*ɔ*
c. *a* elsewhere

- There is evidence from alternations under suffixation:

(35) Distribution of *a* vs. *ɔ* in Javanese

STEM	GLOSS	DERIVED
djaksɔ	public prosecutor	*djaksa-ne*
djɔkɔ	young man	*djaka-ne*
djarwɔ	meaning	*djarwa-ne*
djɔrɔ	drill	*djara-ne*
karjɔ	work	*karja-ne*
kɔrɔ	climbing vine	*kara-ne*
warnɔ	sort, variety	*warna-ne*
wɔrɔ	say, speak	*mara-ʔake*

- This doesn't hold in reduplication:
  - Whichever quality is proper to the righthand copy is found also in the lefthand copy.

(36) Misapplication in reduplication (Dudas 1976:206)

STEM	GLOSS	DOUBLED	DOUBLED AFFIXED
dongɔ	'prayer'	*dongɔ-dongɔ*	*donga-donga-ne*
dɔwɔ	'long'	*dɔwɔ-dɔwɔ*	*dawa-dawa-ne*
medjɔ	'table'	*medjɔ-medjɔ*	*medja-medja-ne*

→ This is overapplication because we get red-final [ɔ] in doubled unaffixed 'prayer' and 'table' despite there not being a following [Cɔ].
  - We can't account for this by positing separate P-Words (like we did for Japanese underapplication), because then we'd expect final [ɔ] in the first members of the doubled affixed forms.

⋆ **Caveat 1:**
  - (34b) is a sort of vowel harmony rule.
  - If this doesn't actually require syllable adjacency (i.e. it's driven by an unbounded, non-local constraint), then we expect [ɔ] in the first copy.
    - This would (unproblematically) require adding an additional condition to the distribution:

(37) a / _ C]$_\sigma$

  - To test this, we'd need a 3-syllable stem of the shape C{a/ɔ}CVC{a/ɔ}.
    - This predicts that the two should co-vary: both [ɔ] in the bare form, both [a] in the suffixed form.
  - I haven't found any stems of this shape (they're normally disyllabic).

⋆ **Caveat 2:**
  - [o] also alternates with [ɔ] according to more general tense/lax alternations.
  - It seems like there's enough alternating environments for both pairs to usually tell which it is, but this requires more careful examination of Dudas than I've done.

- Assuming that the harmony rule is not long distance, and thus cannot explain the misapplication in reduplication ("overapplication of /a/ → [ɔ]"), this would seem to constitute allophonic overapplication.

- MKM (208) say that it's not allophonic because there are "final *a*'s in loanwords and two native words (Poedjosoedarmo 1969:167)", meaning that [a] and [ɔ] are actually contrastive.

→ Here's what Poedjosoedarmo (1969) actually says:

> "Word-final [orthographic] *a* is pronounced /ô/ [= ɔ] except in *ora* 'no', *mboja* 'no', and in some non-Javanese place names. In these cases, it is pronounced /a/."

  - Using the words for 'no' as evidence of regular phonology is wrong.
  - Using place names as evidence for the regular phonology is super dubious.

⇒ Dudas's generalization is correct.

- Pending the long-distance harmony story, and maybe other complications with the /o/ alternations, I think this is decent evidence of allophonic overapplication, requiring BR correspondence.

- Javanese seems to also have allophonic overapplication of tense/lax alternations (at least for high vowels) in exactly the same direction.
  - These alternations appear to be overridden in the ELATIVE, which looks like its specifically marked by changing the final vowel to a tense vowel (Dudas 1976:Ch. 5, Archangeli 1995).
  - MKM claim that this means that tenseness is generally contrastive for high vowels.
  - I find this dubious — this seems like special faithfulness to a floating property of a morpheme, or maybe even a REALIZE MORPHEME type of effect for a null morpheme.
    - I haven't looked at this carefully enough yet to say anything definitive.
  - I take this case to still be an open question vis-à-vis allophonic overapplication.

3.2.2 Luiseño *č*~*š* (supposed allophonic overapplication)

- Munro & Benson (1973) claim that *č* and *š* are in complementary distribution in Luiseño.
  - Basically, *č* in onset, *š* in coda:

(38) a. č → š / _#
b. č → š / _[−cont] (where *l*, *r*, and nasals have to be [−cont])
c. č → č elsewhere (i.e. _[+cont])

(39) Alternation examples (Munro & Benson 1973:17)

téːŋališ	medicine	téːŋaličum	medicines
qéːŋiš	squirrel	qéːŋičum	squirrels
kíːča	house (abs.)	kíš	house (acc)
waníːča	river (abs.)	waníš	river (acc.)
ʔéːči	above	ʔéːškawis	upper lip
móči-	to weave	móšlat	belt
néːču-	to become an old woman	néšmal	old woman

- The rule fails to apply in at least one of the language's reduplicated formations:

(40) Misapplication in reduplicated adjectives

čára-	'to tear'	čará-**č**ra-š	(*čará-**š**ra-š)	'torn'
čóka-	'to limp'	čoká-**č**ka-š	(*čoká-**š**ka-š)	'limping'
[čáku-]	not attested	čakú-**č**ku-š	(*čakú-**š**ku-š)	'crest on roadrunner'
[číŋi-]	not attested	čiŋí-**č**ŋi-š	(*čiŋí-**š**ŋi-š)	aboriginal Luiseño god

- Exactly what sort of interaction this is depends on what we identify as the reduplicant, and how we formalize the allophony.

- But Marantz (1982:461f.) finds some data that seems to show that č → š is a neutralizing process not pure allophony.

(41) Contrast in the rule application environment (Marantz 1982:462)

č			š			
po-xečla	'its point, of an arrow'	vs.	pušla	'eye' (nom.)	∼ pučil	'eye' (obj.)
			moš-la-t	'belt'	∼ moči	'to weave'
čačmis	'a stone tool'	vs.	paːŋawišmi	'them of the water'	∼ paːŋgawiči	'him of the water'
			neš-ma-l	'old woman'	∼ neːču-	'to become an o.w.'

- There also appear to be some consonant-initial suffixes that fail to condition the rule even though they are of the right phonological type (Marantz 1982:464).

- Marantz analyzes this as a (morphologically) derived environment effect: the rule only applies at (specified) morpheme boundaries (rather, some morpheme boundaries block).
- In the reduplicated forms, the environment for the rule is created by syncope, not by morpheme concatenation, and therefore does not apply.
- This type of analysis requires a theory of derived environment effects that substantially differentiates phonologically derived environments from morphologically derived environments.

- One would need to actually do the work to show that this pattern could be gotten in STS (or BRCT for that matter) without appeal to BR faithfulness, but it looks like it could be possible given the right theory of derived environment effects.

3.2.3 Akan palatalization (supposed underapplication)

- McCarthy & Prince (1995) claim that the lack of palatalization in some reduplicated words of Akan is the result of underapplication.

(42) Akan palatalization (Schachter & Fromkin 1968:162)

(Dialect(s))	Root		Reduplicated			Gloss
	gya	[d͡jəʔ]	*gyigya*	[d͡ji-d͡jəʔ]		'accompany'
	hye	[çɪʔ]	*hyehye*	[ç-çɪʔ]		'burn'
	kye	[tçɛ(ʔ)]	*kyekye*	[t͡ç-t͡çɛ(ʔ)]		'divide'
	twa	[t͡çɥəʔ]	*twitwa*	[t͡çɥi-t͡çɥəʔ]		'cut'
	ka	[kaʔ]	*keka*	[kɪ-kaʔ]	(*[t͡çɪ-kaʔ])	'bite'
(Ak-Fa[1])	*haw*	[hawʔ]	*hehaw*	[hɪ-hawʔ]	(*[ç-hawʔ])	'trouble'
(As-Fa[2])	*ha*	[haʔ]	*heha*	[hɪ-haʔ]	(*[ç-haʔ])	"

- Palatalization rule described in Schachter & Fromkin (1968:§3.6 (89f.)):

> "In all dialects, the [+Back] non-vowels [k, g, w, h, ŋw (or [w̃])] are palatalized, in syllable-initial position, when they occur immediately before the [+Palatal] vowels /I/ and /E/, and are realized phonetically as [tç, dj, ɥ, ç, ɲɥ (or ɥ̃)], respectively. Thus /kɛ/ → [tçɛ] (*kye*) 'divide', /gɛ/ → [djɛ] (*gye* 'receive'), /wɪ/ → [ɥɪ] (*we* 'nibble'), /hɪ/ → [çɪ] (*hye* 'border'), and /wĩd/ (after becoming [ŋwĩn] through the application of other P-rules) → [ɲɥĩn] (*nwen(e)* 'weave'). (The labialized [+Back] non-vowels [kw, gw, hw], which may, as a result of the [U]-deletion rule, P xvi (Section 3.50), occur immediately before [+Palatal] vowels, are also palatalized in all dialects, being realized as [tçɥ, djɥ, çɥ] respectively — cf. Section 3.61 for details.) There is one major exception to this generalization: palatalization does not occur if the following syllable (within the same morpheme) begins with /t/ or /s/. Thus /kɛtɛ/ 'mat' is realized phonetically as [kɛtɛ], not [tçɛtɛ], while /kɛsɪ/ 'big' is realized phonetically as [kɛsɪ], not [tçɛsɪ]."

- MKM (211–212) argue that palatalization is not an active process of (contemporary) Akan.
  - Loanwords freely have dorsal + front vowel sequences.

- "Palatalization" rather seems to be a static property of roots.
  - This must be the result of a previously productive palatalization process which has run its course.
  - Some of the palatalization in roots might actually be opaque (it's hard to tell from Schachter & Fromkin 1968 what forms are actual surface forms and which are derivationally intermediate forms).

- So MKM's claim is reasonable for contemporary Akan.
  - I wonder what Akan reduplication looked like when the palatalization process was active...

3.3 Overapplication of nasal harmony in Johore Malay reduplication: irrefutable evidence for BR correspondence...if it's true

- Johore Malay has a process of rightward nasal spreading (Onn 1976:§2.3) that is claimed to interact in a complex way with reduplication (Onn 1976:180, Kenstowicz 1981).
- If it works the way that was originally claimed, there is no way to avoid positing BR correspondence or something equivalent.
- But there may be some evidence that it doesn't actually work that way after all...

3.3.1 Nasalization

- Johore Malay has an allophonic distribution of nasalization on vowels and approximants (i.e. it lacks a nasalization contrast).

(43) a. Vowels and approximants (w, y, h, ʔ) are generally oral
b. Vowels immediately following a nasal stop or a nasalized approximant are nasalized
→ i.e., *iterative rightward nasal spreading blocked by consonantal segments*

⋆ Onn does not mark approximants as undergoers, but rather treats them as transparent. I'll assume (following McCarthy & Prince 1995:42) that they are undergoers.

(44) Distribution of nasalized vowels in Johore Malay (Onn 1976:69, 70)

'to drink'	mĩnõm	
'to eat'	mãkan	*mãk**ã**n, *m**a**kan
'to rise'	baŋõn	*b**ã**ŋõn, *baŋ**o**n
'to be luxurious'	mẽw̃ãh̃	(← /mewah/)
'supervision'	pəŋãw̃ãsan	(← /pəŋ-awas-an/)
'central focus'	pənõŋãh̃ãn	(← /pəŋ-təŋah-an/)

- We can generate the distribution with the following constraints and ranking:

(45) a. *[+nas][−nas,−cons] (*NV): Assign a violation * for each non-nasal vowel or approximant which immediately follows a nasal(ized) segment.
b. *[+nas,−cons] (*Ṽ): Assign a violation * for each nasalized vowel or approximant.

(46) **Ranking:** IDENT[±nas]/[+cons]-IO, *NV ≫ *Ṽ ≫ IDENT[±nas]/[−cons]-IO

- *NV ≫ *Ṽ ensures that nasalized vowels/approximants only appear in the post-nasal environment:

(47) Nasalization in Johore Malay (w/ maximally unfaithful input)

/makãn/		IDENT[±nas]/[+cons]-IO	*NV	*Ṽ	IDENT[±nas]/[−cons]-IO
a.	makan		*!		*
b. ☞	mãkan			*	*
c.	makãn		*!	*	
d.	mãkãn			**!	*
e.	bakan	*!			*

- Nasalization will spread throughout an entire approximant span, because stopping in the middle would only move the locus of the *NV violation, not get rid of it.

(48) Iterative nasal spreading in Johore Malay

/mewah/		IDENT[±nas]/[+cons]-IO	*NV	*Ṽ	IDENT[±nas]/[−cons]-IO
a.	mewah		*!		
b.	mẽwah		*!	*	*
c. ☞	mẽw̃ãh̃			****	****
d.	bewah	*!			

3.3.2 Nasalization in reduplication

- If nasal spreading applied normally in reduplication, we would expect that nasal vowels/approximants should only appear when there is a nasal stop preceding the span to initiate spreading.
  ⇒ This appears *not* to be the case:

(49) Nasalization in Johore Malay reduplication (Onn 1976:180; McCarthy & Prince 1995:42)

a.	hamə̃	**h̃ãm**ə̃-h̃ãmə̃	'germ/germs'
b.	waŋĩ	**w̃ã**ŋĩ-w̃ãŋĩ	'fragrant/(intensified)'
c.	aŋãn	**ãŋ**ãn-ãŋãn	'reverie/ambition'
d.	aŋẽn	**ãŋ**ẽn-ãŋẽn	'wind/unconfirmed news'

- The initial vowel (49c,d) or the initial approximant+vowel (49a,b) are nasalized despite not being preceded by a nasal stop.

⋆ **How does this nasalization come to be?** *It would have to be some sort of overapplication.*

- This is easily derived in BRCT with a high-ranked IDENT[±nas]-BR constraint:

(50) Overapplication of nasalization in Johore Malay reduplication

/RED, hamə/		IDENT[±nas]-BR	*NV	*Ṽ
a.	hamə-hamə		*!* (mə, mə)	
b.	hamə-hamə̃	*! (ə)	*! (mə)	*
c.	hamə̃-hamə̃		*! (ə̃-h)	**
d.	hamə̃-h̃ãmə̃	*!* (ha)		****
e. ☞	h̃ãmə̃-h̃ãmə̃			******

⋆ Unlike most other overapplication cases, this pattern **cannot** be derived using rule ordering or the like (McCarthy & Prince 1995:43ff.; though see Frampton 2009).

- A rule ordering account derives overapplication by ordering a phonological process before the copying rule, such that the result of the process is transferred to the reduplicant.
  → In this case, the relevant process applies *across the juncture*, triggered by the content of the reduplicant.
    ∘ i.e., the nasalization on the first two segments of the base is triggered by the presence of the [m] in the reduplicant.

- Therefore, copying must take place **before** the first two segments of the base are nasalized.
  → But if copying has already taken place, the results of this nasalization can't be transferred back to the reduplicant, so there is no way to account for nasalization on the first two segments of the reduplicant.

(51) Attempting rule ordering (with persistent nasalization)

Input	/ RED-hamə /
Rule 1: Nasalization	RED-ham**ə̃**
Rule 2: Copy	**hamə̃**-hamə̃
Rule 3: Nasalization	hamə̃-**h̃ãm**ə̃
Output:	[ha mə̃-h̃ãmə̃]

⇒ Therefore, if this data is correct, then the grammar must contain a mechanism like BR correspondence that ensures identity between base and reduplicant.

3.3.3 But...

- Kiparsky (2010), MKM (p. 203), and others think the data isn't actually correct.

- In all of the examples that Onn provides for this pattern (49), the unexpected nasalized span immediately precedes a nasal. This leads Kiparsky (p.3) to say:

> "It is important to rule out the possibility that the putative back-copying nasalization is just a coarticulation effect due to the fact that the entire rest of the word is nasal. The crucial evidence will have to come from longer examples, which allow a bit more separation between the nasal and oral spans."

- So Kiparsky went out and did a little bit of mini-fieldwork. He constructed examples where the would-be over-nasalized span is separated from the trigger nasal by a blocker:

(52) a. (warna bajunya) ke-*hitam-hitam*-an
'(the color of the dress) is blackish'
b. (taman bunganya terasa) ke-*harum-harum*-an
'(the garden terrace) is full of fragrance'

- In examples like these, predictions of the two interpretations diverge:
  - Back-copying predicts nasalization on the initial span, because of its presence in the base.
  - "Coarticulation" predicts that there should not be nasalization on the initial span, because it is not immediately followed by a nasal.
    - Instead, we'd (presumably) expect nasalization on the vowel immediately *preceding* the reduplicant-final nasal.

(53) Predictions

Back-copying	vs.	Coarticulation
kə-**h̃ĩ**tam-h̃ĩtam-ãn	vs.	kə-**hi**tãm-h̃ĩtam-ãn
kə-**h̃ã**rum-h̃ãrum-ãn	vs.	kə-**ha**rũm-h̃ãrum-ãn

- Kiparsky (p. 4) says:

> "I heard no nasality in this part of the words in the speech of any of the informants, however. Therefore, until solid phonetic evidence is produced I will assume that the report of back-copying in Malay is erroneous, conceivably due to the interpretation of phonetic coarticulation as phonological back-copying."

- This isn't enough information for me to be completely convinced.
  - He doesn't give transcriptions of the elicited forms. Crucially, he doesn't say anything about whether nasalization is working as expected in the rest of the word.
  - It appears as though [h] is not generally allowed following a nasal (or any consonant, for that matter). So it's not obvious that nasalization should be expected to spread onto the base.

- What we actually need are examples like these that have a vowel following the nasal:
  - $\surd$HVCVNV → HVCVNV-HVCVNV (e.g. hitama), or
  - $\surd$VCVN → VCVN-VCVN (e.g. arum)

- Also, "coarticulation" is a strange claim here, since it would have to be extending through two segments, not just one.

- Maybe it's actually emergent leftward nasal spreading in reduplication, but I don't think this works.
  - IDENT[±nas]/[−cons]-IO ≫ *VN ≫ IDENT[±nas]/[−cons]-BR
  - But since we already know that *$\tilde{V}$ ≫ IDENT[±nas]/[−cons]-IO, then by transitivity *$\tilde{V}$ ≫ *VN.
- This ranking would rule out leftward nasal spreading.

- Until we know how these examples work, and get more systematic fieldwork, this remains an open question.

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