Class 6
Minimal Reduplication (Saba Kirchner 2010, 2013) and Kwakwala: What's in the UR?

5/9/2023

1 Minimal Reduplication

- Saba Kirchner (2010, 2013) proposes a "new" theory of reduplication: "Minimal Reduplication".

Basics of the theory: Reduplication actually isn't anything special; there should be no special mechanisms in the grammar that are unique to reduplication.

- **Main thing:** there's no such thing as a RED morpheme.
  - It would be nice to eliminate this, as it certainly is specific to reduplication and comes out of nowhere from the point of view of the rest of the grammar.
  - Getting rid of it would bring us closer to homology between the input and the output (the input doesn't contain things which necessarily are not part of the output, and vice versa).

- She argues that we should replace underlying RED with (un(der)specified/partially specified) prosodic categories, e.g. μ, σ, $\sigma_{\mu\mu}$, $[\text{iː}]_{\sigma}$, etc.
  - Impressionistically/aesthetically, floating moras don't seem like a weird thing to me.
  - But floating syllables, especially ones that are specified for moraic content, seem super weird to me.
- This is basically a return to prosodic templates (à la McCarthy & Prince 1986), but with a clearer idea of how to implement template satisfaction:
  - Faithfulness to the elements of the input coupled with constraints enforcing (non-vacuous) docking of "floating" material.

→ Kwakwala is a case where sometimes the floating elements can be realized non-vacuously on the root (thus no "reduplication") but other times they can't, so reduplication happens in order to host it.

⋆ I think that the intuition behind this can be implemented equally well if not better without specifying prosodic structures in the input, but simply through requirements of morpheme realization (Kurisu 2001).
  - I'll sketch that out at the end.

- **Tangential claim:** She also claims that there shouldn't be any BR correspondence.
  - She mainly makes this move for philosophical reasons (and because she doesn't need it for the patterns she's focused on): she thinks BR correspondence counts as a "special mechanism" unique to reduplication, so it should be done away with.

- But the idea of surface correspondence isn't remotely unique to reduplication.
  - Struijke (2002) posits that BR correspondence is just a special (i.e. morphologically defined) case of general surface correspondence between outputs corresponding to the same input (see also Stanton & Zukoff 2016); correspondence is determined by structural relations.

- ◦ Stanton & Zukoff (2018, 2021) (following Kitto & de Lacy 1999) posit that correspondence holds generally between epenthetic vowels and some surface host.
- ◦ Zuraw (2002) argues that there's a drive for similar output sequences to be put into surface correspondence, which is how to explain "aggressive reduplication" patterns (e.g. *orangutan* → *orangutang*, *pompon* → *pompom*, etc.).
- ◦ "Agreement By Correspondence" (Rose & Walker 2004, Hansson (2010), Bennett 2015, *a.o.*) takes this even further and uses surface correspondence to explain assimilation and dissimilation patterns more generally.

- So it's not necessary to do away with BR correspondence on the grounds that it's some special mechanism.
  - ◦ It would be justifiable to get rid of it on empirical grounds if it turns out to make bad predictions elsewhere, but this question is orthogonal to Saba Kirchner's actual proposal.

2 Saba Kirchner on Kwakwala

> ***NB:*** *Some of the data in Saba Kirchner (2010, 2013) and Struijke (2002), including about the composition of reduplicants and bases, seems to be inconsistent with the data from Kalmar (2003), which appears to be the most recent extensive fieldwork.*
> - *Besides these questions of shape, Kalmar also differs in that she claims that there actually isn't a vowel length distinction, though maybe stressed vowels get lengthened slightly.*
> - *This has big ramifications for the stuff we looked at last time, where weight and stress determined where consonants and long vowels end up in reduplicated forms.*
> - *There's also significant disagreement about where the stresses are (even more than I realized before).*
> - *So a lot of the stuff I say (and have said) about Kwakwala needs to be seen as preliminary.*

- According to Saba Kirchner (abbrev. SK), the underlying representation of the suffix(es) for *mut* forms is:

(1) UR: /Ⓜ -muːt/ (a floating mora plus the segmental suffix)

- Rather than generating reduplication via an inherent requirement for reduplication (i.e. an underlying RED morpheme and/or some constraint penalizing the absence of reduplication in the output), this derives reduplication as a **repair strategy** to host the floating mora when it cannot dock on the root for independent reasons (namely, when it would create a superheavy syllable).

- The rationale behind this approach is seen most clearly in CəO roots (≈ underlyingly monomoraic roots).
  - ◦ For SK, these represent the basic case, whereas for Struijke they were the complicated case.
  - ◦ These roots exhibit lengthening (according to SK's interpretation; but not Struijke's, or Kalmar's), without reduplication (that part Struijke at least agrees on).
  - ◦ According to SK, this is because this is the preferred way to realize the suffix, and these roots can do so without creating a *superheavy syllable*.

(2) Behavior of CəO roots

	Struijke (2002:65)		Saba Kirchner (2010)		
	Root	*mut* form	Root	*mut* form	Gloss
a.	ʔax	ʔax-m'úːt	ʔəx	ʔaːx-m'úːt	'waste left after some work'
b.	q'əx	q'ax-m'úːt	q'əx	q'aːx-m'úːt	'piece bitten out'
c.	ʔaχʷ	ʔaχʷ-m'úːt	ʔəχʷ	ʔaːχʷ-m'úːt	'waste scum'
d.	ts'əx	ts'ax-m'úːt	ts'əx	ts'aːx-m'úːt	'hair singed off'
e.	y'əxʷ	y'axʷ-m'úːt	y'əxʷ	y'aːxʷ-m'úːt	'high water mark'

2.1 How SK deals with floating moras

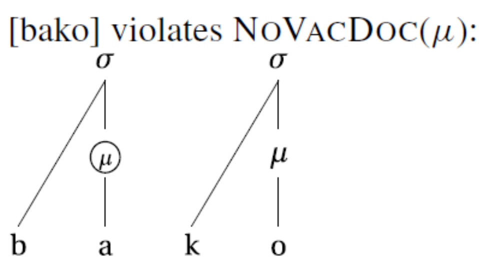
- Floating moras have to be realized somewhere in the output, and this realization has to have a *non-vacuous* effect: NoVacDoc(μ) (3).

(3) **NoVacuousDocking(μ) [NoVacDoc(μ)]** (Saba Kirchner 2013:233, based on Wolf 2007)
Informally:
Assess one violation for any underlying floating mora which docks to an output segment, if that segment is not also dominated by some other prosodic unit.

Formally:
$\forall \mu \in I$, where μ is a mora:
If
$[\neg[\exists s \in I$ such that s is a segment and μ is attached to $s]]$ (μ is floating in the input)
&
$[\exists \mu' \in O$ & $\mu \Re \mu'$ & $\exists t$, where t is a segment such that μ' directly dominates $t]$
(μ has an output correspondent that docks to a segment)
Then
$[\exists p$ where p is a prosodic unit which directly dominates t & $\mu' \neq p]$

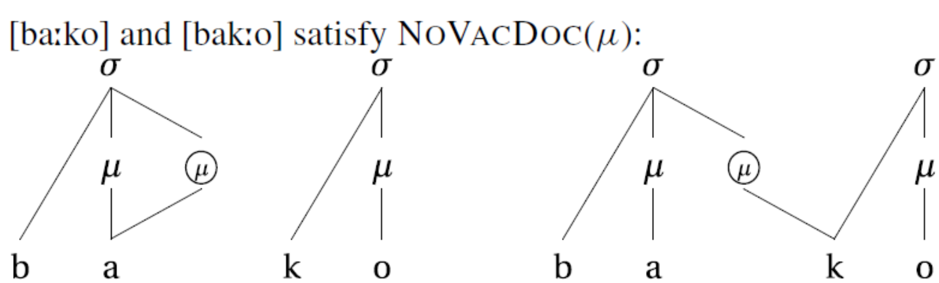
→ Essentially, floating moras have to create long vowels, geminates, or — according to SK — *splitting* (i.e. reduplication).
  - The idea: when a floating mora is the only prosodic unit dominating a vowel (e.g.), we can't tell that it was a floating mora and not a regular mora (i.e. the one underlyingly attached to the vowel or one assigned regularly in the output).

(4) Violation of NoVacDoc(μ) for /bako + μ/ (Saba Kirchner 2013:233)



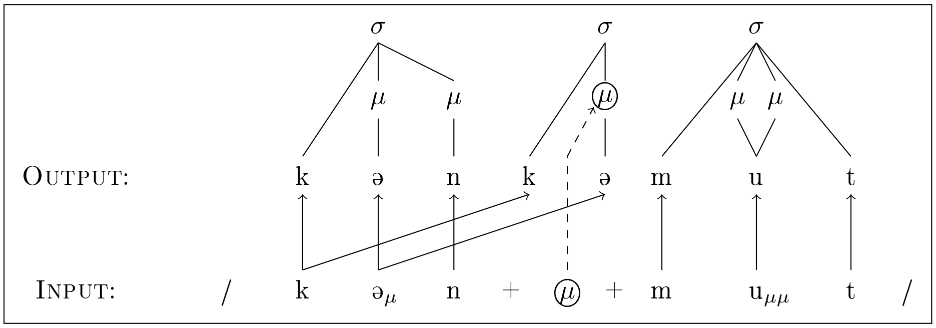
  - When there's a long vowel or geminate in correspondence with a singleton in the input, then it must(/could) be the case that a floating mora is responsible for the lengthening.

(5) Satisfaction of NoVacDoc(μ) for /bako + μ/ (Saba Kirchner 2013:233)



- Does reduplication actually help satisfy NoVacDoc?

(6) Floating moras and reduplicative outputs



⋆ It doesn't matter whether (μ) is the one attached to the first ə or the second ə.

- If we assume that the two ə's in the output are distinct segments (i.e. different t's from the definition in (3)), then this shouldn't actually help.
  - Each ə is dominated by a single mora and nothing else.

- If we assume that NoVacDoc is somehow treating the two ə's as *the same* segment (i.e. a single t), then this actually should yield satisfaction.
  - "The ə" is dominated by both (μ) and another μ, albeit in different syllables.

- The obvious way to fix the definition to accommodate this would be to make reference to the input.
  - Here's my best shot:

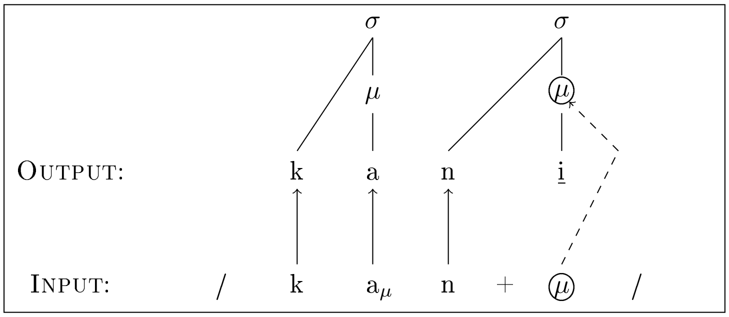
(7) Revised: **NoVacuousDocking(μ) [NoVacDoc(μ)]**

Informally:
Assess one violation for any underlying floating mora which docks to an output segment, if that segment does not stand in correspondence with an input segment which has an output correspondent which is not dominated by some other prosodic unit.

Formally:
$\forall\mu \in I$, where μ is a mora:
If
[$\neg$[$\exists s \in I$ such that s is a segment and μ is attached to s]]
&
[$\exists\mu' \in O$ & $\mu\Re\mu'$]
&
[$\exists t \in I$ such that t is a segment & $\exists t' \in O$ such that t' is a segment & $t\Re t'$]
&
[μ' directly dominates t']
Then
[$\exists t'' \in O$ such that t'' is a segment & $t\Re t''$] (t'' may equal t')
&
[$\exists p$ where p is a prosodic unit which directly dominates t'' & $\mu' \neq p$]

⊗ I think that (either definition of) NoVacDoc(μ) might pose problems with epenthetic vowels (at least under the usual understanding of how epenthetic vowels work).
  - Saba Kirchner (2013:235) implicitly assumes that a floating mora can dock to an epenthetic vowel and not violate NoVacDoc(μ).
  - If we spelled out the autosegmental structure for this situation, we'd get the following:

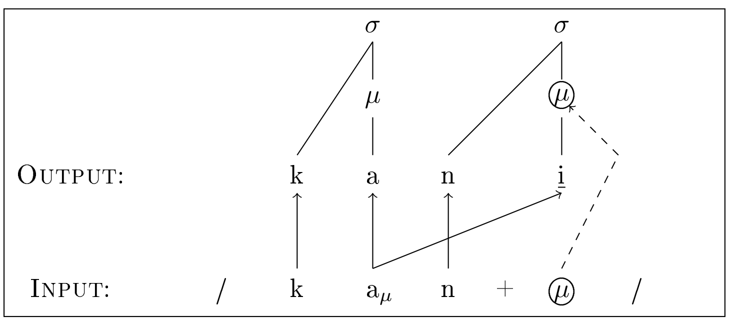
(8) Floating moras and epenthetic vowels



- Here, we have a floating mora uniquely dominating a segment (the epenthetic vowel). This should violate NoVacDoc(μ).

- However, if we treated epenthesis (whether default or copy) as *splitting* of an input segment (à la Stanton & Zukoff 2016, 2021; cf. Kitto & de Lacy 1999, Stanton & Zukoff 2018), then the revised definition of NoVacDoc(μ) in (7) would not be violated by an epenthetic mapping.
  → Epenthesis is *exactly* the same as reduplication.

(9) Floating moras if epenthesis is splitting



- If you buy this adjustment, then SK's basic approach works: reduplication is a repair mechanism to host a floating mora.

2.2 SK's analysis of *-muːt* reduplication

- SK treats CəO roots as the basic case.
  - Since they are underlyingly monomoraic, they can incorporate the floating mora (10c) without creating a superheavy syllable.
  - Docking to the root vowel without splitting violates (something like) Ident[length], but that can be low ranked.

(10) CəO roots

/y'əx, $\textcircled{\mu}$, m'uːt/		*Superheavy	Max-μ	NoVacDoc	Integrity	Ident[length]
a.	y'$ə_\mu$x-múːt		*!			
b.	y'ə$\textcircled{\mu}$x-múːt			*!		
c. ☞	y'$a_\mu$$\textcircled{\mu}$x-múːt					*
d.	<u>y'ə$\textcircled{\mu}$</u>-y'$ə_\mu$x-múːt				*!*	

- The reduplicative candidate (10d) is suboptimal because it incurs unnecessary INTEGRITY violations.
  - In this model, INTEGRITY (11) penalizes each underlying segment that ends up having a correspondent in both base and reduplicant (≈ "reduplication"). It functions essentially as a size restrictor constraint.
  - As long as INTEGRITY outranks IDENT[length], we correctly select docking without splitting.

(11) **INTEGRITY-IO:** Assign one violation * for each input segment which stand in correspondence with multiple output segments. (cf. McCarthy & Prince 1995)

- For CəR roots, *SUPERHEAVY blocks the docking without splitting candidate (12c), because the coda [n] needs to be moraic (see last week's handout): *SUPERHEAVY ≫ INTEGRITY.
  - As long as MAX-μ outranks INTEGRITY, it will be worse to delete the floating mora (12a) than to split.
  - As long as NOVACDOC outranks INTEGRITY, it will be worse to dock on the root vacuously (12b) than to split.

(12) CəR roots

/kən, $\textcircled{\mu}$, m'uːt/			*SUPERHEAVY	MAX-μ	NOVACDOC	INTEG	ID[length]
a.		kə$_\mu$n$_\mu$-múːt		*!			
b.		kə$_{\textcircled{\mu}}$n$_\mu$-múːt			*!		
c.		ka$_{\mu\textcircled{\mu}}$n$_\mu$-múːt	*!				*
d.	☞	<u>kə$_\mu$n$_\mu$</u>-kə$_{\textcircled{\mu}}$-múːt				**	

- To derive the placement of [n], we can still use the combination of *CLASH and WSP, as long as the first syllable is actually stressed in the winning candidate (SK seems to assume it isn't?).
  - Maybe also with Root-faithfulness, if we assume that the first copy is the "base" and the second is the "reduplicant", but this would monkey with the Cə(S)O' roots from last time, which needed to treat the second one as the root.

ast (Possible) Problem: SK's analysis predicts lengthening in CəC' roots (or actually maybe just epenthesis...).

- As far as I can tell, there's only one example, but it doesn't work this way:
  - √*ts'əm'* → [<u>ts'ə</u>-ts'əm'ə-múːt] 'left after melting'

(13) CəC' roots

/ts'əm', $\textcircled{\mu}$, m'uːt/			*LAR]$_\sigma$	MAX-μ	*SPRHVY	NOVACDOC	INTEG	ID[lng]
a.		ts'a$_{\mu\textcircled{\mu}}$m'-muːt	*!					
b.	💣	ts'a$_{\mu\textcircled{\mu}}$m'ə-muːt						*
c.	☹	<u>ts'ə$_{\textcircled{\mu}}$</u>-ts'ə$_\mu$m'ə-muːt					*!*	

- But CəD roots and SSP-violating CəCC roots do apparently work the expected way:
  - √*g*^{w}*əd* → g^{w}aːdəmuːt
  - √ *k'*^{w}*əsx* → k'^{w}aːsxəmuːt (Saba Kirchner 2010:46)

- So it might not be unreasonable to treat [<u>ts'ə</u>-ts'əm'ə-múːt] as an exception, or say there's something weird about [m'].

- But even if we assume the lengthening forms are the default behavior here, we have a problem with the epenthetic candidate (14d).

(14) Problem with epenthesis

/gʷəd, (μ), m'uːt/			*LAR]$_\sigma$	MAX-μ	*SPRHVY	NOVACDOC	INTEG	ID[lng]
a.		gʷa$_\mu$(μ)d-muːt	*!					
b.	☹	gʷa$_\mu$(μ)də-muːt						*!
c.		gʷə(μ)-gʷə$_\mu$də-muːt					*!*	
d.	💣	gʷə$_\mu$də(μ)-muːt						

- If we allow for the epenthetic vowel to be moraic, and we buy into the analysis of epenthesis as splitting and the redefintion of NOVACDOC in (7), then it should be possible for the floating mora to dock on the epenthetic vowel without violating NOVACDOC.
  - If this is true, then keeping the base vowel as [ə] will be preferred because it alleviates the IDENT[length] violation caused by docking to the root vowel (14b).

- SK suggests (somewhere) that these epenthetic vowels *are* really split vowels coming from the root vowel.
  - This would make it all the more clear that this candidate should satisfy NOVACDOC, because this is exactly what we were trying allow with the redefinition.

- The way out, it seems, is to require that these epenthetic schwas can't host a mora at all (SK says this).
  - This would be reasonable; epenthetic vowels prefer to be short (Steriade 2009).
  - But the evidence for their being non-moraic is based on their supposed stress properties, which appear to only have ramifications for footing, not actual stress placement; so I'm not sold on this.

- The point is: I think we still don't have exactly the right view of NOVACDOC.
  - This question is going to still be there in my reanalysis without NOVACDOC per se.

3 Dealing with Kwakwala's multiple reduplication patterns

- One argument that RED by itself is not sufficient to describe reduplication in Kwakwala is that there are multiple different kinds of reduplication patterns (at least five, some of which are tied to sets of particular suffixes).
  - If there were no difference in underlying representation, we should not be able to generate distinct contrasting patterns. So, the URs must be more complex than just /RED/.

(15) Kwakwala reduplication patterns (Saba Kirchner 2013:236)

	Meaning	Form	Example	Gloss
a.	Plural	Ciː-	p'iːp'əsp'əy'uː	'ears'
b.	Diminutive	Caː-	baːbəgʷanəm	'little boy'
c.	"Too much"	Cə-	məmiːχkən	'sleep too much'
d.	Distributive	*variable*	waːwapstoːla	'watery eyes'
e.	Repetitive	total	d͡ləniːxd͡ləniːka	'keep locking the door'

⋆ Saba Kirchner (2013:238–239) claims that Alderete et al.'s (1999) analysis of fixed segmentism can't generate these facts. That's not true. Their schema for "phonological" fixed segmentism can't, but they also propose a schema for "morphological" fixed segmentism to deal with cases exactly of this sort.

- Saba Kirchner (2013) goes in for different kinds of (partially) un(der)specified prosodic structures as the URs.
  - (c) and (d) are fully empty σ and μ, respectively.
  - (a) and (b) are syllables which are pre-linked to moraic and segmental content (namely, two moras connected to a vowel)

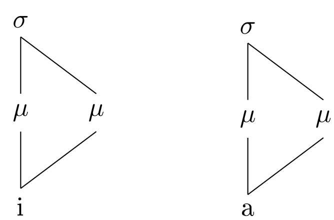
- I think that this approach is sufficient, but maybe still more complicated than necessary.
- I think we can make it work by just specifying the segmental content, and viewing "reduplication" as completely epiphenomenal in all cases.
  → Note that this is actually the goal that SK is setting out to achieve.

(16) Possible underlying representations for reduplication patterns

	Meaning	Form	SK UR	Alternative UR
a.	Plural	Ciː-	Syllable with fixed *iː*	/iː/
b.	Diminutive	Caː-	Syllable with fixed *aː*	/aː/
c.	"Too much"	Cə-	Empty syllable (/σ/)	/ə/
d.	Distributive	*variable*	Empty mora (/μ/)	/Ø/
e.	Repetitive	total	Syntactic	Syntactic

(17) SK representations of URs w/ fixed segments

a. b.



- First order of business: Kwawkala strictly forbids onsetless syllables (Saba Kirchner 2013:238).
  - SK posits the ranking ONSET ≫ INTEGRITY to rule out candidates that copy just a vowel to fill the empty structures in (16c) and (16d).

⇒ If we assume the alternative URs in (16a,b,c), then positing this same ranking will generate phonological copying to alleviate the onset violations that faithful realization of the prefix would otherwise cause.

(18) *Caː-* (diminutive?) reduplication with the suffixes *-kən* "be somewhere at the same time" and *-kəna* "do at the same time" (Saba Kirchner 2013:238, from Boas 1947:356)

Stem	Suffixed form	Suffixed form gloss
kaːt	kaːkaːtkən	'a long thing is there at the same time'
m'ək^w	m'aːm'əx^{w}kən	'a round thing is there at the same time'
t'əmq'	t'aːt'əmχkəna	'pin somebody else also'

(19) Phonological copying to alleviate onset violations

/kaːt$_{RT}$, aː$_{DIM}$, kən$_{SameTime}$/	Onset	Dep-C	Align-Dim-L	Integrity
a. aː-kaːt-kən	*!			
b. ʔaː-kaːt-kən		*!	*	
c. kaːt-aː-kən			**!*	
d. ☞ k̲aː-kaːt-kən			*	*

- ◦ Making sure that the [aː] ends up at the left and not towards the right will be easier if it belongs to a separate morpheme than the suffix, but its still not impossible.

- It would be worth checking what sorts of alternations we observe when vowels would come together through concatenation (I think these should exist).
  - ◦ This analysis would be consistent with saying vowel deletion is the general repair, but you can't delete a vowel if it is the only exponent of a morpheme (Realize Morpheme; Kurisu 2001).
  - ◦ If so, the prediction via Richness of the Base would be that underlying root-initial vowels delete, not that there is phonological copying to save them.

4 A Realize Morpheme-based analysis of the distributive

- SK's insight about the distributive, which includes the *mut* forms, (given her interpretation of the facts) is that roots that can lengthen without creating a superheavy syllable lengthen, otherwise they "reduplicate".
  - ◦ Following Struijke (and sort of following SK), variation in the shape of the reduplicated word in these cases is determined by prosodic factors (namely *Clash).
- SK's analysis is that the distributive has a UR consisting of a floating mora, and that it's faithfulness to this mora that triggers these two types of behaviors.
- However, we can also understand this in terms of faithfulness without any reference to a floating mora:

⇒ The UR is null but there needs to be a phonological exponent (because of Realize Morpheme).

⇒ Lengthening is the least costly faithfulness violation, splitting is the next least costly.

(20) **Realize Morpheme** (RM; Kurisu 2001:39)
Formally: Let α be a morphological form, β be a morphosyntactic category, and F(α) be the phonological form from which F($\alpha+\beta$) is derived to express a morphosyntactic category β. Then RM is satisfied with respect to β iff $F(\alpha+\beta) \neq F(\alpha)$ phonologically.

Informally: All morphemes in the input must contribute phonological content to the output (where deletion and truncation count as phonological content).

- ◦ **N.B.:** Conceptually, RM is basically a Base-Derivative "anti-faithfulness" constraint (Alderete 2001; see also Crosswhite 1999).
- ◦ The formal definition may be a little tricky to deal with for these forms, because the morpheme that's causing the changes doesn't (always) appear independently of a suffix.

- The faithful realization of the root will violate RM. This means that the root must undergo *some* change (but RM doesn't care what it is).
  - ◦ If Integrity ≫ Ident[length], then the preferred unfaithful mapping will be lengthening (≈ "non-vacuous docking of a floating mora").
  - ◦ If Integrity is dominated by all other relevant faithfulness constraints, splitting (i.e. "reduplication") will be used whenever lengthening is blocked, e.g. by *Superheavy.

(21) RM analysis of CəO roots

/y'əx, Ø$_{\text{DIST}}$, m'uːt/	RM	Ident[F]	*Superheavy	Integrity	Ident[length]
a. y'əx-m'uːt	*!				
b. **y**əx-m'uːt		*!			
c. ☞ y'**aː**x-m'uːt					*
d. <u>y'əy</u>'əx-m'uːt				*!*	

(22) RM analysis of CəR roots

/kən, Ø$_{\text{DIST}}$, m'uːt/	RM	Ident[F]	*Superheavy	Integrity	Ident[length]
a. kən-m'uːt	*!				
b. **k'**ən-m'uːt		*!			
c. k**aː**n-m'uːt			*!		*
d. ☞ <u>kən</u>kə-m'uːt				**	

- We still have the epenthesis problem that we ran into with NoVacDoc.
  - We can't allow the epenthetic vowel to be parsed as the exponent of the underlying /Ø$_{\text{DIST}}$/, or else no other stem change would be called for by RM.

(23) *mut* forms with post-root epenthesis

√*gʷəd*	→	gʷaːdəmuːt	not *gʷəd[-ə$_{\text{DIST}}$-]muːt
√ *k'ʷəsx*	→	k'ʷaːsxəmuːt	not *k'ʷəsx[-ə$_{\text{DIST}}$-]muːt
√*ts'əm'*	→	<u>ts'ə</u>ts'əm'əmuːt	not *ts'əm'[-ə$_{\text{DIST}}$-]muːt

- The intuition is that a property which is called for by the regular phonology is not suitable for marking a stem change w.r.t. RM.
  - I ran into the same issue in my analysis of the Gothic preterite system (Zukoff 2017:Ch. 4; cf. Zukoff & Sandell 2015).

- The main thing to worry about when putting together a thoroughgoing RM analysis is that it is consistent with the rankings needed for other processes in the language.
  - I think we're pretty safe in this case, but it's worth thinking about more.

5 A potential way to distinguish between RM and SK's analysis

- In the RM analysis I'm proposing, the "Too Much" pattern is /ə/.
  - This means that the "reduplicant" vowel derives from the UR of the affix, and thus is not in IO-correspondence with the root vowel.
- SK identified it as /σ/.
  - This means that the [ə] is a "copy" of the root vowel, and thus in IO-correspondence with the root vowel not the affix vowel.

- SK thus predicts that the weight alternation between base and reduplicant that we observe in the distributive should also be observable in "Too Much" reduplication, if we ever got heavy (stressed) syllables following the first root vowel (either as part of the root or from a suffix).
  - This is because existential faithfulness will only allow for (and thus require) freedom in the placement of segments for prosodic improvement if there is multiple correspondence.

- From what I can glean, we don't observe the alternation in this category (...but I'm not certain that the right conditions hold):

(24) "Too Much" reduplication (Kalmar 2003:5, from Boas 1947:356)
 a. mə-míx-kən (*mí-məx-kən) (SK's *m̲ə̲miːχkən*)
 b. kʷə-kʷə́nx-kən (*kʷə́n-kʷəx-kən)

- In the distributive, we would expect the full/long vowel in (a) and the sonorant coda in (b) to appear in the first copy not the second, *if* the suffix can be stressed (it is a heavy syllable, but there seem to be some morphological conditions on stress too).

→ If we do indeed get the behavior in the distributive that SK and Struijke describe (there seem to be some things that look like counterexamples in Kalmar), but we don't get equivalent behavior in the "Too Much" category, then we know that the vowel in "Too Much" is not in correspondence with the root.

- Nothing precludes SK from specifying ə in the UR of the "Too Much" pattern; however, it would reduce the difference between the analysis down to just the distributive, where RM might be preferred due to parsimony and the weirdness of NoVacDoc.

6 Summary

- So, subject to these little details, it looks like you can derive Kwakwala without *any* prosodic specification of inputs **and** without the use of RED morpheme.
  - In three of the patterns, consonant copying is motivated just by Onset.
    ↪ Compare Yu's (2005) proposal for "compensatory reduplication".
  - This analysis then contradicts Kawahara's (2007) claim that "copy epenthesis" of consonants never occurs to satisfy a phonotactic requirement (cf. Stanton & Zukoff 2018).

- This also suggests that a lot of cases with fixed segmentism could be reanalyzed in this same way: some melodic material is specified, and copying takes place to fix the resulting syllable structure.

(25) Tigre frequentative formation (Saba Kirchner 2010:130, from Rose 2003)

Regular form	Frequentative	Frequentative gloss
gərf-aː	ger[aːr̲ə]f-aː	'whip a little'
kətb-aː	ket[aːt̲ə]b-aː	'write a little'
nəsħ-aː	nes[aːs̲ə]ħ-aː	'advise a little'
məzz-aː	məz[aːz̲ə]z-aː	'give a little responsibility'

(26) Analysis of Tigre frequentative

/grf$_{\text{RT}}$, e$_{\text{AV}}$, aːə$_{\text{FREQ}}$, aː$_{\text{AGR}}$/	Onset	Align-Rt-L	Align-AV-L	Integ	Align-Freq-L
a. ge.aː.ərf-aː	*!*				**
b. ge.aːrəf-aː	*!				**
c. ☞ geraːr̲əf-aː				*	***
d. gaːr̲əref-aː			*!	*	*

- Something additional will need to be used to distinguish *geraːr̲əf-aː* from **geg̲aːrəf-aː*.

⋆ **Big question going forward:** how many reduplication patterns could be generated from
 (i) a null UR + RM + low-ranking Integrity, and/or
 (ii) a segmentally-specified UR + phonotactics + low-ranking Integrity?

7 Realize Morpheme and the Gothic strong verbs

- Turns out, Gothic is a lot like Kwakwala, even though it looks quite different. (It's also quite like Klamath...)
  → We can use REALIZE MORPHEME to analyze a complicated system of morphophonological marking in the preterite, including reduplication, which is dependent on the phonological properties of roots.

7.1 Background

- In English, as well as most (all?) of the Germanic languages, the past tense is regularly marked with the "dental preterite suffix" /-d/. (Regular verbs are referred to as "weak verbs".)
- But English, and all of the other Germanic languages, also have small classes of irregular verbs — "strong verbs" — which form their past tense by changing the vowel of the verbal root ("ablaut").

(27) Some English strong verb alternations

Present			Past	
bite	[baɪt]	∼	*bit*	[bɪt]
take	[teɪk]	∼	*took*	[tʊk]
drive	[draɪv]	∼	*drove*	[droʊv]
lead	[lid]	∼	*led*	[lɛd]
sing	[sɪŋ]	∼	*sang*	[seŋ]

- These patterns largely trace back to patterns in Proto-Germanic, where the system is far more regular.

- Here's what some of the data looks like in Gothic (the earliest attested Germanic language).
  - There are three contrasting stem categories (the distinct preterite categories have merged in surviving Germanic languages), represented by the forms in the three different columns.
  → **Each verb is representative of a class of verbs, describable in terms of the root's phonological shape.**

(28) Example Gothic strong verb paradigms

Root Shape	1SG.PRES		3SG.PRET		3PL.PRET		Gloss
/CiRC/	*binda*	[bind-a]	*band*	[band]	*bundun*	[bund-un]	'bind'
/CiC/	*giba*	[giv-a]	*gaf*	[gaf]	*gebun*	[geːv-un]	'give'
/CaC/	*fara*	[far-a]	*for*	[foːr]	*forun*	[foːr-un]	'travel'
/CaRC/	*halda*	[hald-a]	*haihald*	[hɛhald]	*haihaldun*	[hɛhald-un]	'hold'
/CV:C/	*floka*	[floːk-a]	*faiflok*	[fɛfloːk]	*faiflokun*	[fɛfloːk-un]	'bewail'

- At first glance, the ways in which the categories differ from one another within each paradigm seems completely inconsistent, perhaps even random.
  - There is clearly no single affix (or even small set of affixes) which could reasonably derive all forms of a certain stem type across the different root shapes.

⋆ **Proposal:** We can understand the whole system using the same kind of recipe as we did for Kwakwala:
  → Null morphemes + REALIZE MORPHEME + run-of-the-mill constraint interaction

7.2 All the data

7.2.1 Gothic

- In Gothic, there are (depending on how you count) between 4 and 10 different surface patterns of "allomorphy" among 3 stems:

(29) Contrasting stems in Gothic

a. *Present* [overall default, same as infinitive; ≈ root]
b. *Preterite plural* [really preterite default, also found in preterite subjunctive]
c. *Preterite singular* [only found in preterite singular indicative]
d. (*Preterite participle* [equivalent to preterite plural stem in all but one case; I'll ignore it])

- The patterns (in Gothic terms) are shown in (30). [Don't worry about all the details here.]
  - The important point is that each pattern of allomorphy (each "Class") is associated with a particular phonological root shape.
  - → **Generalization:** The phonological shape of the preterite stems is predictable from the phonological shape of the root, once we know what the patterns are.

(30) Gothic strong verbs paradigms — surface forms (data from Lambdin 2006)

Class	Root Shape	1SG.PRES		3SG.PRET		3PL.PRET		Gloss
I	CijC	*beita*	[biːt-a]	*bait*	[bɛːt]	*bitun*	[bit-un]	'bite'
II	CiwC	*kiusa*	[kiu̯s-a]	*kaus*	[kɔːs]	*kusun*	[kus-un]	'choose'
III	Ci{N,L}C	*binda*	[bind-a]	*band*	[band]	*bundun*	[bund-un]	'bind'
IV	CiR	*nima*	[nim-a]	*nam*	[nam]	*nemun*	[neːm-un]	'take'
V	CiT	*giba*	[giv-a]	*gaf*	[gaf]	*gebun*	[geːv-un]	'give'
VI	CaC	*fara*	[far-a]	*for*	[foːr]	*forun*	[foːr-un]	'travel'
VIIa	CaRC	*halda*	[hald-a]	*haihald*	[h̲ɛ̲hald]	*haihaldun*	[h̲ɛ̲hald-un]	'hold'
VIIb	CeːC	*slepa*	[sleːp-a]	*saislep*	[s̲ɛ̲sleːp]	*saislepun*	[s̲ɛ̲sleːp-un]	'sleep'
VIIc	CoːC	*floka*	[floːk-a]	*faiflok*	[f̲ɛ̲floːk]	*faiflokun*	[f̲ɛ̲floːk-un]	'bewail'

- **The other important take away:** there is no overt affix, nor consistent featural change, which can derive the full set of preterite forms from the respective inputs.
  - i.e., it may be more parsimonious to claim we are dealing with a complex system of root/stem allomorphy than selection from different morphs for PRETERITE and SINGULAR.

7.2.2 Reconstructing back

- A lot of the complications result from sound changes in the late pre-history of Gothic/Proto-Germanic.
  - Once we do some shallow reconstruction and account for a few sound changes (especially PGmc. */e/ > Goth. /i/), the picture becomes much clearer.

(31) Pre-Proto-Germanic strong verbs paradigms — stem patterns

Root Shape	Class	PRES	PRET.SG	PRET.PL	
/CeRC/	I	bejt-	bajt-	bit-	(= //bj̩t-//)
	II	kews-	kaws-	kus-	(= //kw̩s-//)
	III	bend-	band-	bund-	(= //bn̩d-//)
/CeC/	IV	nem-	nam-	neːm-	
	V	geb-	gab-	geːb-	
/CaC/	VI	far-	foːr-	foːr-	
/CaRC/	VIIa	hald-	hehald-	hehald-	
/CVːC/	VIIb	sleːp-	sesleːp-	sesleːp-	
	VIIc	floːk-	fefloːk-	fefloːk-	

- We can now easily extract the generalizations:

(32) Allomorphy patterns by class (*pres* ∼ *pret.sg* ∼ *pret.pl*)

a. **Class I–III:** *e* ∼ *a* ∼ *Ø* (→ *post-nuclear sonorants vocalize in pret.pl; nasals/liquids realized as [uR]*)
b. **Class IV–V:** *e* ∼ *a* ∼ *eː*
c. **Class VI:** *a* ∼ *oː* ∼ *oː* (→ *[oː] is lengthened correspondent of [a] (there's no short [o] or long [aː])*)
d. **Class VII:** --- ∼ RED ∼ RED

- None of these patterns reflects the regular phonology of the language (...some of it reflects the regular phonology of an earlier stage, as is typical with these sorts of problems).
- Likewise, there is still no obvious set of affixes which can economically derive this system, even given a powerful system of allomorph selection.

7.3 Proposal

7.3.1 Basic components

1. The underlying representations of the preterite morpheme and the singular morpheme (in the appropriate morphosyntactic contexts) are phonologically null.

(33) Relevant Vocabulary Insertion rules

a. PRET ↔ /Ø/
b. SG ↔ /Ø/

2. There are constraints which call for phonological contrast between stems standing in particular morphosyntactic relations: REALIZE MORPHEME constraints (cf. (20)).
   - The only non-standard piece will be splitting up RM into constraints on specific morphemes.

→ Phonological exponence in the preterite is the result of unfaithful mappings driven by the operation of REALIZE MORPHEME constraints, and their interaction with markedness and faithfulness constraints.

7.3.2 Using RM for this case

- There are two broad generalizations that hold across the entire verbal system, encompassing both the strong verbs and the weak verbs:

⋆ For every verb in the language, there is a different phonological form for the preterite stem(s) than the present (default) stem (see, e.g., Meid 1971).
  - We already saw that this is true of strong verbs.
  - This is also true of weak verbs, whose preterite is marked by the dental preterite suffix.

⋆ There is also a strong tendency for the stem of the (indicative) preterite singular to be distinct from the stem of the preterite plural
  - This universally holds of the weak verbs, reflected in the number-conditioned allomorphy of the dental suffix: plural /-deːd-/ vs. singular /-d-/.
  - It holds also of the strong verbs of Classes I–V, which each have [a] in the preterite singular, but some other phonological differentiation from the present stem in the preterite plural.
  - → Strong Classes VI and VII do not follow this generalization, but for principled reasons.

- We can use RM to capture these generalizations, if we assume the right constellations of morphosyntactic features in the output of the morphological derivations for different stem forms:

(34) Morphosyntactic features present at the output of the morphological derivation (in the indicative)
  a. *Preterite singular*: {ROOT, PRET, SG}
  b. *Preterite plural*: {ROOT, PRET} [~~NUM~~]
  c. *Present singular/plural*: {ROOT} [~~TENSE~~, ~~NUM~~]

  - W.r.t. the feature PRET, RM will ensure that both types of preterite stems are distinct from their related present stems.
  - W.r.t. the feature SG, RM will ensure that preterite singular stems are distinct from their related preterite plural stems (also from their related present stems, but this is already taken care of by PRET).

→ Problem is, the first distinction is always true, but the second one is false in a phonologically well-defined environment (see below).

- We can fix this by positing RM constraints on individual features, rather than having one blanket constraint:

(35) a. **Realize Morpheme: preterite (RM:pret)**
  Assign a violation mark * for any preterite stem which is not phonologically distinct from the default stem (i.e. the present stem) formed from the same root.

  b. **Realize Morpheme: singular (RM:sg)**
  Assign a violation mark * for any preterite indicative singular stem which is not phonologically distinct from the default preterite stem (i.e. the preterite plural stem) formed from the same root.

- By ranking these two constraints in different places in the phonological constraint ranking (CON), we will be able to derive the differing scope of their effects.

∗ *Caveat*: We probably want some impoverishment rules to make sure that the relevant features are unspecified in the output of the morphology, allowing for the *base (subset)* ∼ *derivative (superset)* feature relations.

7.4 Analysis

- The allomorphy patterns we are trying to explain are (again) the following:

(36) Allomorphy patterns by class (*pres* ~ *pret.sg* ~ *pret.pl*)
  a. **Class I–III:** *e* ~ *a* ~ Ø
  b. **Class IV–V:** *e* ~ *a* ~ *eː*
  c. **Class VI:** *a* ~ *oː* ~ *oː*
  d. **Class VII:** --- ~ RED ~ RED

How the analysis works:

- In the derivation for the preterite plural (default preterite stem), the faithful candidate gets blocked by RM:PRET.
  - The phonological evaluation then selects the *most optimal unfaithful candidate*.
  - Which candidate this is depends on how the underlying phonological structure of the root interacts with markedness and faithfulness constraints.

- In the derivation for the preterite **singular**, the faithful candidate gets blocked by RM:PRET **and** the normally optimal unfaithful candidate is additionally penalized by RM:SG.
  - If there is another candidate which does not violate any constraints which outrank RM:SG, that candidate is selected.
    - This ends up being the case in Class I–III and Class IV–V.
  - If all other candidates do violate a constraint(s) which outrank RM:SG, the normally optimal unfaithful candidate is chosen, failing to instantiate a contrast between singular and plural.
    - This ends up being the case in Class VI and Class VII.

- Preview of the details: order of unfaithful mappings
  1. *Vowel-deletion* (only /e/): /e/ → Ø
  2. *Vowel-lengthening*: /V̆/ → [Vː]
  3. *Vowel-backing* (only short vowels): /e/ → [a]
  4. *Reduplication*: /...ROOT/ → [$\underline{C_1 e}$-ROOT]

7.4.1 Strong Class I–III Preterite Plurals

- The optimal strategy for marking the preterite in the strong verbs is *vowel deletion*.
- This is observed in the basic case of the preterite plurals of Classes I–III.
  - For example: Class II √*kews* → PRET.PL *kus-* (//kw̩s-//)

- I will first focus on what the change is and what's driving it, and then turn to the question of how to select particular changes over others in the appropriate contexts.

- Deletion is preferable to faithful realization because RM:PRET ≫ MAXV-IO.

(37) **MAXV-IO**
Assign one violation mark * for each vowel in the input which lacks a correspondent in the output.

(38) **New Rankings:** RM:PRET ≫ MAXV-IO

(39) Preterite Plural of Class II (also Class I & III)

INPUT: /kews, Ø$_{\text{PRET}}$/ BASE: PRES [kews-]	RM:PRET	MAXV-IO
a. kews-	*!	
b. ☞ kus- (← //kws-//)		*

- Deletion is also preferable to (e.g.) *vowel backing*, which we know is one of the other options employed in the system. (I assume [e] and [a] are both [-high], but un(der)specified for [±low].)
  - This is explainable via the relative ranking of faithfulness constraints: DEP[+back]-IO ≫ MAXV-IO

→ For reasons which will become apparent later, I will use MAXFEATURE and DEPFEATURE constraints to regulate feature changes (cf. Casali 1996, *et seq.*).
  - These are constraints that reference specified feature values, and take the feature as the locus of correspondence.
  - The segment remains a unit of correspondence as well, just not the one which is relevant for these constraints.

(40) **DEP[+back]-IO**
Assign one violation mark * for each [+back] feature in the output which was not present in the input.

(41) **New Rankings:** DEP[+back]-IO ≫ MAXV-IO

(42) Ruling out alternative mappings for Class II preterite plurals

INPUT: /kews, Ø$_{\text{PRET}}$/ BASE: PRES [kews-]	RM:PRET	DEP[+back]-IO	MAXV-IO
a. kews-	*!		
b. ☞ kus- (← //kws-//)			*
c. kaws-		*!	

7.4.2 Strong Class IV & V Preterite Plurals

- In Classes IV & V, the preterite plural is formed not by vowel deletion, but rather by *vowel lengthening*.
  - For example: Class V $\sqrt{}$*geb* → PRET.PL *geːb-*

- *Why do these forms not show deletion like Class I–III?* This behavior can be attributed to an emergent markedness pressure against creating new consonant clusters.

(43) ***CLUSTER (*CC)**
Assign a violation * for each sequence of two adjacent non-syllabic consonants in the output.

- Class IV & V roots are /CeC/.
  - When you try to perform vowel deletion on them, you get a new cluster: /CeC-/ ↛ *[CC-]

- Class I–III roots, on the other hand, are /Ce**R**C/.
  - When you perform vowel deletion on them, you can syllabify the post-vocalic sonorant, avoiding new clusters: /CeRC-/ → [CR̩C-]

→ If *CC is ranked sufficiently high, it can explain this difference.

- *CC evidently does divert the derivation away from the deletion mapping, in favor of the lengthening mapping (penalized by DEP[+long]-IO). This can be generated with the ranking in (45).

(44) **DEP[+long]-IO**
Assign one violation mark * for each [+long] feature present in the output which was not present in the input.

(45) **New Rankings:** RM:PRET, *CC, DEP[+back]-IO ≫ DEP[+long]-IO

(46) Preterite Plural of Class V (also Class IV)

INPUT: /geb, $Ø_{\text{PRET}}$/ BASE: PRES [geb-]	RM:PRET	*CC	DEP[+back]	DEP[+long]	MAXV
a. geb-	*!				
b. gb-		*!			*
c. gab-			*!		
d. ☞ ge:b-				*	

- We couldn't do lengthening in Class I–III because it would have created a superheavy syllable, which is not allowed. More on this below.

7.4.3 Strong Class I–V Preterite Singulars

- While Class I–III and Class IV–V have distinct patterns for the preterite plural, they converge on *vowel-backing* for their preterite singulars.
  - Class V √*geb* → PRET.SG *gab-*
  - Class II √*kews* → PRET.SG *kaws-*

- In both cases, this is because:
  (i) The preterite plural has already claimed the optimal unfaithful mapping,
  (ii) RM:SG disallows selection of the same stem form, and
  (iii) Markedness prevents each from selecting the other type's preferred unfaithful mapping.

- For Class IV–V:
  - We already know that *CC blocks the possibility of vowel deletion (49b).
  - RM:SG prevents selection of the normally optimal unfaithful mapping, vowel lengthening (49c).
  - As long as DEP[+back]-IO is the next lowest ranked faithfulness constraint, we will select vowel backing (49d) here over some other conceivable unfaithful mapping, e.g. vowel raising (49e), which violates (evidently higher-ranked) DEP[+high]-IO.

(47) **DEP[+high]-IO**
Assign a violation * for each [+high] feature in the output which was not present in the input.

(48) **New Rankings:** RM:PRET, RM:SG, DEP[+high]-IO, *CC ≫ DEP[+back]-IO

(49) Preterite Singular of Class V (also Class IV)

INPUT: /geb, Ø$_{PRET}$, Ø$_{SG}$/ BASES: PRES [geb-], PRET.PL [geːb-]		RM:PRET	DEP[+high]	*CC	RM:SG	DEP[+back]	DEP[+long]	MAXV
a.	geb-	*!						
b.	gb-			*!				*
c.	geːb-				*!		*	
d. ☞	gab-					*		
e.	gib-		*!					

- Given just this ranking, we would expect the Class I–III preterite singulars (or indeed the preterite plurals) to show not vowel backing but rather vowel lengthening.
  - RM:SG here rules out vowel deletion (because it's been claimed by the preterite plural).
  - But we don't (yet) have any constraint to rule out lengthening; i.e. nothing equivalent to *CC in the Class IV–V derivation.

(50) Preterite Singular of Class II (also Class I–III)

INPUT: /kews, Ø$_{PRET}$, Ø$_{SG}$/ BASES: PRES [kews-], PRET.PL [kus-]		RM:PRET	*CC	RM:SG	DEP[+back]	DEP[+long]	MAXV
a.	kews-	*!					
b.	kus- (← //kws-//)			*!			*
c. 💣	keːws-					*	
d. ☹	kaws-				*!		

- It turns out, though, that there's a reasonable constraint that can do *CC's job:

(51) ***V:RC**
Assign one violation mark * for each output V:RC sequence (≈ *SUPERHEAVY).

- There's evidence that a constraint like this is active within the history of Germanic (and even stronger evidence in related IE languages) in the form of "Osthoff's Law" (cf. Collinge 1985:127–131).
  - Long vowels before sonorants in medial closed syllables are not allowed in Proto-Germanic. (They do get re-introduced later through syncope processes.)
  - Some historical evidence that long vowels which entered this environment actually shortened.

- This constraint would be violated by lengthening in CV̌RC roots.
  → Therefore, this constraint can divert away from the vowel lengthening mapping and towards the vowel backing mapping in Class I–III.

(52) **New Rankings:** *V:RC ≫ DEP[+back]-IO (≫ DEP[+long]-IO)

(53) Preterite Singular of Class II (also Class I–III)

INPUT: /kews, Ø$_{PRET}$, Ø$_{SG}$/ BASES: PRES [kews-], PRET.PL [kus-]		RM:PRET	*V:RC	RM:SG	DEP[+back]	DEP[+long]	MAXV
a.	kews-	*!					
b.	kus- (← //kws-//)			*!			*
c.	keːws-		*!			*	
d. ☞	kaws-				*		

7.4.4 Strong Class VI Preterite Singulars and Plurals

- Class VI roots are of the shape /CaC/, i.e. have the same segmental shape as Class IV–V just with a different vowel quality.
- In the preterite plural, they show vowel lengthening like Class IV–V, just with a different vowel quality (as we might expect).
  - For example: Class VI $\sqrt{}$*far* → PRET.PL *foːr-*

- Because the vowel for these roots is underlyingly [+back], rather than all the previous types which were [−back], we now need to consider an additional mapping type: *vowel fronting*.
  - In the MAX/DEPF approach, we could potentially use either DEP[−back]-IO or MAX[+back]-IO to rule this out.
  - MAX[+back]-IO is what we'll need (because of Class VIIa below).

- As long as MAX[+back]-IO ≫ DEP[+long]-IO, lengthening will still be preferable to fronting.

(54) **MAX[+back]-IO**
Assign one violation mark * for each [+back] feature in the input which is not present in the output.

(55) **New Rankings:** MAX[+back]-IO ≫ DEP[+long]-IO

(56) Preterite Plural of Class VI

INPUT: /far, ØPRET/ BASE: PRES [far-]	RM:PRET	*CC	MAX[+back]	DEP[+high]	DEP[+back]	DEP[+long]	MAXV
a. far-	*!						
b. fr-		*!	*!				*
c. ☞ foːr- (← //faːr-//)						*	
d. fer-			*!				
e. fur-				*!			

- Unexpected given all that we have seen thus far, the preterite singular **also** displays vowel lengthening, not some other unfaithful mapping which could have differentiated it from the preterite plural.
  - For example: Class VI $\sqrt{}$*far* → PRET.SG *foːr-* (= PRET.PL)

- This tells us that RM:SG — the constraint advocating for different preterite singular and plural stems — must rank *below* all further faithfulness constraints (e.g., DEP[+high]-IO) that could be violated to generate a distinct output form.
  - One more such faithfulness constraint is INTEGRITY-IO, which actually will be violated in Class VII.

- So, note that, for the first time, the optimal output in these cases (59c) bears a RM:SG violation.
  → This is what motivates separating RM into constraints on particular features.

(57) **INTEGRITY-IO**
Assign one violation mark * for each segment in the input which stands in correspondence with multiple segments in the output.

(58) **New Rankings:** RM:PRET, MAX[+back]-IO, INTEGRITY-IO, DEP[+high]-IO ≫ RM:SG

(59) Preterite Singular of Class VI

INPUT: /far, $Ø_{PRET}$, $Ø_{SG}$/ BASES: PRES [far-], PRET.PL [foːr-]		RM:PRET	*CC	MAX[+back]	DEP[+high]	INTEGRITY	RM:SG	DEP[+long]	MAXV
a.	far-	*!							
b.	fr-		*!	*!					*
c. ☞	foːr- (← //faːr-//)						*	*	
d.	fer-			*!					
e.	$f_i e_j f_i a_j$r-					*!*			
f.	fur-				*!				

7.4.5 Strong Class VII Preterite Singulars and Plurals

- Lastly, we turn to the Class VII strong verbs, which form their preterites (both singular and plural) through *reduplication* (or, more precisely, phonological copying/splitting).

- Class VII cover roots of two types:
  a. Class VIIa = roots with underlying root vowel /a/ followed by two consonants (specifically *sonorant + obstruent*)
  b. Class VIIb–d = roots with underlying long vowels
     - /oː/ in Class VIIc
     - /eː/ in Class VIIb and Class VIId (which I'm going to continue to hide from you; see Zukoff 2017:Ch. 4.7 for a non-solution).

- What these different types have in common is:
  1. If they underwent lengthening, this would result in (roughly) a superheavy syllable, and
  2. They contain an underlying prominent feature which is not allowed to be changed.

→ Given these conditions, they (and they alone) are allowed to reduplicate to satisfy RM:PRET.

Strong Class VIIa Preterite Singulars and Plurals

- Class VIIa forms both its preterite plurals and its preterite singulars with *reduplication*.
  - For example: √*hald* → PRET.PL *hehald-*, PRET.SG *hehald-*.

- The roots of Class VIIa are of the shape /CaRC/.
  - This shape is the same as Class I–III (/CeRC/), modulo the quality of the vowel.
  - The two are equivalent w.r.t. the (im)possibility of vowel lengthening, as they would both equally violate the constraint *VːRC if lengthening were to occur.

→ The current constraint ranking properly derives reduplication, once we fix the ranking of INTEGRITY-IO as the lowest among previously undominated constraints.

(60) **New Rankings:** RM:PRET, *VːRC, MAX[+back]-IO, DEP[+high]-IO ≫ INTEGRITY-IO

(61) Preterite Plural of Class VIIa

INPUT: /hald, $Ø_{PRET}$/ BASE: PRES [hald-]			RM:PRET	*V:RC	MAX[+back]	DEP[+high]	INTEGRITY	RM:SG	DEP[+long]	MAXV
a.		hald-	*!							
b.		hoːld- (← //haːld-//)		*!					*	
c.		huld- (← //hl̩d-//)			*!					*
d.		held-			*!					
e.	☞	$h_ie_jh_ia_j$ld-					**			
f.		huld-				*!				

- MAX[+back]-IO plays an even more crucial role here than in Class VI.
  - Like in Class VI, it rules out the fronting candidate (61d).
  - Unlike in Class VI, it must also be responsible for eliminating the deletion candidate (61c), because there are no markedness constraints (i.e. *CC) which penalize the deletion candidate.

→ This is why we need MAX[+back]-IO rather than DEP[−back]-IO, and indeed why we need MAX/DEPF constraints in the first place.

> ⋆ Note that "reduplication" is emerging as a phonological repair for a RM:PRET violation, without the presence of a /RED/ morpheme in the input.
>   - This pattern is thus more aptly be understood as *phonological copying* than reduplication proper, insofar as there is a difference (cf. Yu 2005).
>
> - This is quite interesting from a diachronic perspective, because in earlier stages of the language (Proto-Indo-European), reduplication was morphological and obligatory on all preterite (then "perfect") stems, not just those which become Class VII (see Sandell & Zukoff 2014, 2017, Zukoff 2017).

- Class VII, like Class VI, does not show a stem contrast between preterite plural and preterite singular.
  - This follows from the currently established ranking: RM:SG is ranked below all the faithfulness constraints whose violation could be employed to effect stem contrast.
  - INTEGRITY-IO is violated again (equally) in the derivation of the preterite singular, but still in service of RM:PRET not RM:SG.

(62) Preterite Singular of Class VIIa

INPUT: /hald, $Ø_{PRET}$, $Ø_{SG}$/ BASE: PRES [hald-], PRET.PL [hehald-]			RM:PRET	*V:RC	MAX[+back]	DEP[+high]	INTEGRITY	RM:SG	DEP[+long]	MAXV
a.		hald-	*!							
b.		hoːld- (← //haːld-//)		*!					*	
c.		huld- (← //hld-//)			*!					*
d.		held-			*!					
e.	☞	$h_ie_jh_ia_j$ld-					**	*		
f.		huld-				*!				

Strong Class VIIb,c Preterite Singulars and Plurals

- Class VIIb & Class VIIc preterite singulars and plurals are likewise all formed through reduplication, with no differentiation between singular and plural.
  - Class VIIb are roots with underlying long /eː/.
    - For example: √*sleːp* → PRET.PL *sesleːp-*, PRET.SG *sesleːp-*
  - Class VIIc are roots with underlying long /oː/.
    - For example: √*floːk* → PRET.PL *fefloːk-*, PRET.SG *fefloːk-*

- In both cases:
  - Lengthening can be ruled out by a constraint against trimoraic/overlong vowels, which plays exactly the same role as *Vː RC in Class VIIa.
  - ∗ I think I split these two up because there's some weird issues with syllabification and cyclicity...so I couldn't quite use a regular *SUPERHEAVY.

(63) ***V$_{\mu\mu\mu}$**
Assign one violation mark * for each trimoraic vowel in the output.

- Deletion can be ruled out with a constraint against deletion/shortening of long vowels.

(64) **MAX[+long]-IO:**
Assign one violation mark * for each [+long] feature in the input that is not present in the output.

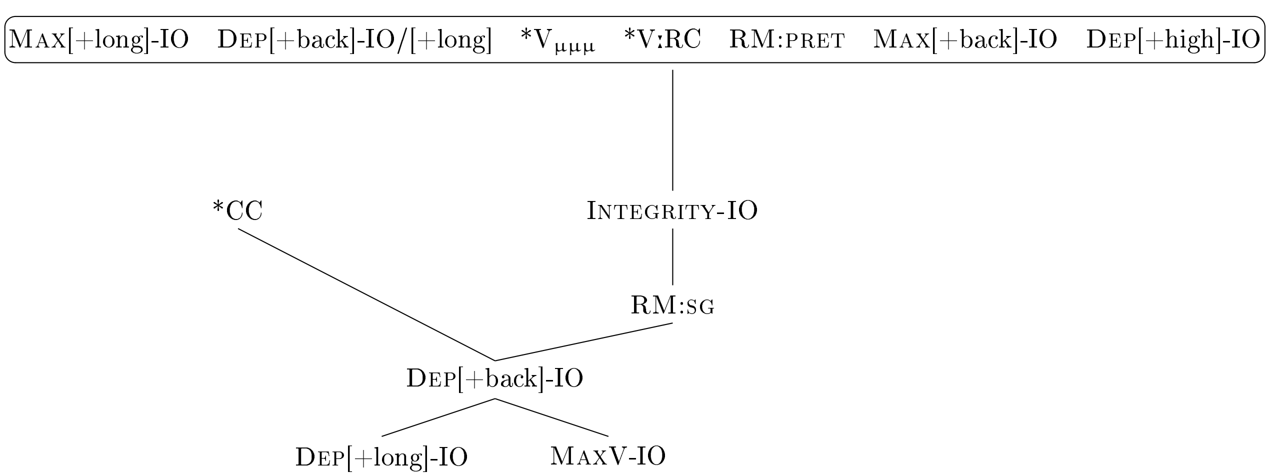
- For Class VIIc (/oː/), fronting is ruled out if MAX[+back]-IO ≫ INTEGRITY-IO.
- For Class VIIb (/eː/), however, ruling out backing is non-trivial.
  - With short vowels, backing is a licit repair for RM:PRET, and normally preferred to reduplication.
  - But this is evidently reversed if the vowel is underlyingly long.
  - → We might speculate that this is a sort of P-map effect (Steriade 2009), where backing is more noticeable on long vowels than short vowels, and thus can be penalized by a higher-ranked faithfulness constraint:

(65) ≈ **DEP[+back]-IO/[+long]:**
Assign a violation mark * for each [+back] feature in the output which
a. was not present in the input, and
b. coincides with a [+long] feature.

- When all these constraints outrank INTEGRITY-IO, we will derive the right results.
  ↪ I'll leave that as an exercise for the reader.

7.4.6 Summary of Analysis

(66) **Hasse diagram of rankings**



⋆ **Moral of the story:** RM is great for generating phonologically-driven alternations between "reduplication" and other morphophonological marking.

→ We should go out and see how much reduplication we can capture from this perspective.

◦ Think about Diyari and Ponapean: can we generate them by saying the language needs to realize one more stressed in that category?...

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