Some notes on Derivational Lookahead in Mbe reduplication

Monosyllabic reduplicative affixation in Mbe, where the amount of material copied is predetermined by a subsequent phonological change, presents for the serial templatic approach to reduplication a lookahead problem that the parallel counterpart can successfully capture with global evaluation of phonotactic constraints (Wei & Walker 2020). I propose, however, that serial reduplication in Kavalan and Ilokano suggests that the lookahead effect is epiphenomenal and derivable if foot binarity is respected at the moraic level. Therefore, the prima facie lookahead in Mbe might no longer be probative in the assessment of the parallel versus serial theory of reduplication.

1 Introduction

The evaluation of Base-Reduplicant (BR) Correspondence Theory (McCarthy & Prince 1995), implemented in parallel Optimality Theory (P-OT, Prince & Smolensky 1993/2004), versus Serial Template Satisfaction (STS, McCarthy et al. 2012), couched within Harmonic Serialism (HS, McCarthy 2000, 2010), has been carried out in the context of the interplay between reduplication and phonology. In BR Correspondence Theory, simultaneous, multiple changes to the input of reduplication are permitted by GEN, the candidate generator; whereas in STS, serial evaluation includes intermediate levels of structure, of which GEN can only make one change at each derivational step.

Due to its inherent nature of *gradualness*, STS does not predict the existence of derivational lookahead, which is admitted by BR Correspondence Theory. However, recent studies have attested potential lookahead problems for STS. In Maragoli, for example, the ordering of reduplication and hiatus-driven glide formation unavoidably relies on lookahead reference to the surface reduplicative form (Adler & Zymet 2020). Moreover, Zukoff (2017) points out that certain mechanics employed by STS to account for partial onset skipping predicts coda skipping in reduplication. Wei & Walker (2020) also show that STS cannot tackle a lookahead pattern in Mbe reduplication that involves a lookahead pattern, where the amount of material copied is predetermined by a subsequent phonological change.

As per these recent studies, this paper offers STS analyses of weight-sensitive reduplication in two Austronesian languages, Kavalan and Ilokano, to pave the way for resolving the derivational lookahead problem in Mbe, raised in Wei & Walker (2020). The paper is organized as follows. Section 2 presents the basics of STS and section 3 reviews the lookahead problem in Mbe reduplication. Section 4 gives technical details of the STS accounts for, respectively, variable reduplication in Kavalan, and heavy syllable reduplication in Ilokano; while section 5 extends the analyses to address the lookahead problem in Mbe reduplication. Section 6 concludes the paper.

2 The basics of Serial Template Satisfaction

Serial Template Satisfaction (STS, McCarthy et al. 2012) is a theory of reduplication couched within Harmonic Serialism (HS, McCarthy 2000, 2010), where reduplication is *gradually* achieved by only one operation permitted by GEN at each step of the derivation. The theory has three fundamental components that in collaboration generate the ultimate reduplicative shape. The first is the template, an empty prosodic structure as per Prosodic Morphology Hypothesis (McCarthy & Prince 1986/1996).[1] The second component involves a family of markedness constraints, HEADEDNESS(X) (HD(X)), which demand that every prosodic constituent of type X must be headed by a category of type X−1. The last component contains two operations: COPY(X) and INSERT(X). The former, COPY(X), penalized by *COPY(X), copies from the stem *a contiguous string* of type X along with X's subconstituents to satisfy HD(X+1), as show in (1). The string-copying property of COPY(X) may violate COPY-LOCALLY(X), which accounts for the "edge-in" effect in reduplication (cf. Marantz 1982; McCarthy & Prince 1995, 1999), shown in (2). The other operation, INSERT(X), inserts an empty prosodic category of type X to simultaneously satisfy HD(X+1) and violate HD(X), as shown in (3).[2]

(1) COPY(X): X+1 = *ft*, X = σ
ft-(tu.la) $\rightarrow$ (tu)-(tu.la), (tu.la)-(tu.la), *(tul)-(tu.la)

(2) COPY-LOCALLY(X) (COPY-LOC(X))
To a candidate produced by COPY(X), assign as many violations as there are Xs intervening between the original X string and its copy:

The "edge-in" effect in STS

	$p_1i_2t_3b_4a_5r_6g_7u_8$	COPY-LOC(seg)
☞	$p_1i_2t_3b_4a_5$-$p_1i_2t_3b_4a_5r_6g_7u_8$	
	$b_4a_5r_6d_7u_8$-$p_1i_2t_3b_4a_5r_6g_7u_8$	3W($p_1i_2t_3$)

(3) INSERT(X): X+1 = *ft*, X = σ
ft-(ta.sa) $\rightarrow$ (σ)-(ta.sa)
*HD(*ft*) ✓HD(*ft*)
*HD(σ)

Consequently, the ultimate reduplicative pattern in a particular language is driven by both (i) the size of the prosodic template and (ii) the constraint interactions between HD(X), *COPY(X), COPY-LOC(X), and the general phonology of the language.

3 The lookahead effect in Mbe reduplication

Unlike Parallel-OT (P-OT), which evaluates the effects of phonological operations in one fell swoop, STS, with its built-in property of *gradualness*, ensures that only one operation can apply at each step of the derivation. Therefore, in STS the amount of material copied should not refer to its subsequent phonological operations. In other words, STS does not predict lookahead effects. However, recent studies have identified potential lookahead effects unresolvable in STS (Adler & Zymet 2020, Wei & Walker 2020, Zukoff 2017, inter alia). For example, the reduplicative

[1] See McCarthy et al. (2012) for discussion of prosodic words as templates.
[2] Whether INSERT(X) infringes faithfulness constraints is not crucial in STS (McCarthy et al. 2012: 180). Note, however, that if there is any faithfulness violation as such, it will go hand in hand with a HD(X) violation, but not the other way around.

imperative affixation in Mbe, spoken by the Mbube people of the Ogoja, Cross River State region of Nigeria, instantiates such problem (4).

(4) Mbe reduplicative imperative affixation (Wei & Walker 2020)

a.	rû	**rû**-rû	'pull'
b.	jú.bô	**jû**-jú.bò	'go out'
c.	só.rô	**sə**-só.rò	'descend'
d.	tá.rô	**tə**-tá.rò	'throw'
e.	tâŋ	**tən**-tâŋ	'teach'
f.	gbé.nô	**gbəŋm**-gbé.nò	'collide'
g.	púɔ.nî	**pûm**-pûɔ.nì	'mix'
h.	dzûɔŋ	**dzûn**-dzûɔŋ	'be higher'
i.	lúo.nî	**lûn**-lûo.nì	'repair'
j.	jíɔ.nî	**jîɲ**-jîɔ.nì	'forget'

As shown in (4), the reduplicant shape is CV when the stem has only oral consonants. However, (4) shows that the stem's second syllable's postvocalic nasal is copied into the reduplicant's coda position that is homorganic to the following onset. Note also that there are two vocalic simplifications. One is that the reduplicant's vowel is a schwa when the correspondent in the stem is nonhigh (4); the other is that when the stem contains a diphthong, only the first vowel is reduplicated (4).

Of particular interest here is that examples in (4) appear to require, *in one single step*, copying and assimilation of the postvocalic nasal from the stem, while only the first vowel of the diphthong in the stem is copied; that is, (4) presents a lookahead effect. Whereas a P-OT analysis, given its nature of global evaluation, faces no problem in capturing the pattern (Walker 2000), Wei & Walker (2020) point out that due to STS's inherent property of *gradualness*, the lookahead effect is underivable *without stipulated affix allomorphy and weight conditions*.[3] They demonstrate further that an alternative that assumes AFFIX ≤ σ (5), adapted from McCarthy & Prince (1994), and FT-BIN(σ), and a syllable-level version of FT-BIN (McCarthy & Prince 1986/1996), unavoidably leads to inconsistent readings of and a ranking paradox between the two constraints.

(5) AFFIX ≤ σ
Assign one violation mark to any affix whose phonological exponent is larger than a syllable.

The alternative, schematized in (6), assumes a foot template for the imperative affix and adopts a "copying + deletion" strategy. In step 1 of the derivation, a full copy of the stem is necessary because FT-BIN(σ) dominates both AFFIX ≤ σ and *COPY(σ). In step 2 the constraint NO-DIPH forces the second vowel in the diphthong to be ignored. In step 3 the vowel [i] in the second syllable of the reduplicant gets deleted to satisfy AFFIX ≤ σ. Note that concomitant (re)syllabification in

[3] See Wei & Walker (2020) for an analytical illustration. In short, no lexical specificity of the reduplication pattern is attested in Mbe imperative reduplication; the surface shape variation is phonologically predictable and conditioned by CODACOND (Ito 1989). Therefore, there is no motivation for positing allomorphic templates. Likewise, there is no evidence for stipulating a heaviness condition, either on the reduplicant itself or as a constraint on the template. I refer the reader to Wei & Walker for their detailed arguments against analyses that assume allomorphic templates and weight conditions.

step 3 accords with gradualness as it does not count as a distinct operation (McCarthy 2008). In step 4 the constraint *C-PL/X, which penalizes consonant clusters with separate place features, kicks in and the nasal coda in the reduplicant undergoes assimilation.

(6) a. Step 1: Syllable copying

i. HD(*ft*), FT-BIN(σ) >> *COPY(σ)

ft + *ft* σ σ Δ Δ pûɔ nì	HD(*ft*)	FT-BIN(σ)	*COPY(σ)
☞ *ft* + *ft* σ σ σ σ Δ Δ Δ Δ pûɔ nì pûɔ nì			1
ft + *ft* σ σ Δ Δ pûɔ nì	1W	1W	L

ii. FT-BIN(σ) >> AFFIX ≤ σ

ft + *ft* σ σ Δ Δ pûɔ nì	FT-BIN(σ)	AFFIX ≤ σ
☞ *ft* + *ft* σ σ σ σ Δ Δ Δ Δ pûɔ nì pûɔ nì		1
ft + *ft* σ σ σ Δ Δ Δ pûɔ pûɔ nì	1W	L

b. Step 2: Diphthong reduction

MAX$_{ROOT}$ >> NO-DIPH (Rosenthall 1997) >> MAX

ft + *ft* σ σ σ σ Δ Δ Δ Δ pûɔ nì pûɔ nì	MAX$_{ROOT}$	NO-DIPH	MAX
☞ *ft* + *ft* σ σ σ σ Δ Δ Δ Δ pû nì pûɔ nì		1	1
ft + *ft* σ σ σ σ Δ Δ Δ Δ pûɔ nì pɔ nì	1W	1	L
ft + *ft* σ σ σ σ Δ Δ Δ Δ pûɔ nì pûɔ nì		2W	L

c. Step 3: Affix size reduction

FT-BIN(σ) >> AFFIX ≤ σ >> HD(σ), *C-PL/X (Walker 2000), MAX

ft + *ft* σ σ σ σ Δ Δ Δ Δ pû nì pûɔ nì	FT-BIN(σ)	AFFIX ≤ σ	HD(σ)	*C-PL/X	MAX
☞ *ft* + *ft* σ σ σ σ Δ Δ Δ pûn pûɔ nì			1	1	1
ft + *ft* σ σ σ σ Δ Δ Δ Δ pûɔ nì pɔ nì		1W	L	L	L

d. Step 4: Place assimilation

*C-PL/X >> IDENT(PL)

ft + *ft* σ σ σ σ pûn pûɔ nì	*C-PL/X	IDENT(PL)
☞ *ft* + *ft* σ σ σ σ pûm pûɔ nì		1
ft + *ft* σ σ σ σ pûn pûɔ nì	1W	L

e. Step 5: Convergence

What is problematic concerns step 3 of the derivation where, to respect AFFIX ≤ σ, only one of the output's two syllable nodes is segmentally populated. This suggests that the evaluation of constraints involving prosodic constituency must be based on the prosodic categories realized at the segmental level, ignoring prosodic constituents without segmental realization. However, if both FT-BIN(σ) and AFFIX ≤ σ are sensitive to segmentally realized content then the output in step 3 should violate FT-BIN(σ), leading to a ranking paradox. That is, to trigger disyllabic copying in step 1, FT-BIN(σ) must outrank AFFIX ≤ σ, but this ranking will prohibit the output in step 3; and to restrict the size of the reduplicant in step 3, the output must violate FT-BIN(σ) in favor of AFFIX ≤ σ, yet this ranking will block disyllabic copying in step 1. Wei & Walker point out further that to carry the analysis through by allowing FT-BIN(σ) to check over the prosodic structure without reference to its segmental material, and AFFIX ≤ σ to be respected based on segmental realization and the affiliated prosodic structure, leads to stipulative, inconsistent interpretations of the foot template. In other words, to say that the two constraints are assessed at distinct prosodic levels, with the foot template in step 3 simultaneously obeying FT-BIN(σ) and AFFIX ≤ σ, is only sidestepping the lookahead problem rather than offering an account.

In section 4 I will give STS accounts for quantity-sensitive reduplication in Kavalan and Ilokano, to pave the way for section 5, which resolves the lookahead problem in Mbe reduplication reviewed in this section.

4 Eliminating weight conditions and affix allomorphy

In this section, I offer STS analyses of reduplication in two Austronesian languages, Kavalan and Ilokano, to show that under the traditional interpretation that FT-BIN is respected under a *syllabic* *or moraic* analysis, a foot template can be satisfied by an operation of either COPY(σ) or INSERT(σ). The analyses demonstrate that in STS whenever a monosyllabic reduplicant is required to be heavy, the heaviness requirement should be reduced to the basic machinery of STS and the language's phonology. This predicts that, in addition to invariable disyllabic reduplication, as in Yidiny (McCarthy et al. 2012: 194-196), a foot template can, result in variable reduplication, as in Kavalan, or invariable monosyllabic reduplication, as in Ilokano, depending on the level at which FT-BIN is respected via constraint interactions. Consequently, in STS there is motivation for the stipulation of syllable weight conditions (e.g. $\sigma_{\mu\mu}$ or RED=μμ) and affix allomorphy.

4.1 Variable reduplication in Kavalan

Given that coda consonants in Kavalan are moraic (Lin 2012), the generalization for bimoraic reduplication in Kavalan is that if reduplication of the stem's first syllable is enough to meet the bimoraicity, then the said syllable is copied (e.g. CVC) (7); otherwise, the reduplicant is (C)V(C)V (7).

(7) Continuative reduplication in Kavalan (Lin 2012: 1052-1057)

a. m-ʁi.-βa.u.-βa.ut	'to keep fishing'	CVV
b. m-u.ʁi.-u.ʁiŋ	'to keep weeping'	VCV
c. pu.ku.-pu.kun	'to keep hitting'	CVCV
d. tum.-tum.βəs	'to keep pulling'	CVC

Since STS assumes that a reduplicative affix is an underlying template, a satisfactory STS analysis must explain the conditions responsible for the variable reduplicative shapes, closed syllable reduplication in particular.[4] If a foot template will ultimately be realized as disyllabic, whereas a syllable template will surface as CV, or CVC if a certain heaviness requirement is specified (McCarthy et al. 2012: 224-225), then STS seems to require two moves to derive the reduplicative pattern in Kavalan. *First*, the theory might need to assume two allomorphic templates, a syllable and a foot, that are respectively responsible for monosyllabic and disyllabic reduplicative variants. *Second*, to derive the CVC variants, STS may have to impose some heaviness condition on the syllable template (cf., McCarthy et al. 2012: 197).

Two problems arise, however. *First*, given that the reduplicative variants in (7) all carry identical semantics, it is worth rethinking whether we really need to presume that some of the reduplicants start as a foot, while the others originate as a syllable. If the forms of the reduplicants are predictable from their phonological context, then lexically listing allomorphs would miss a generalization. *Second*, how the heaviness condition on the CVC variant can be formulated is unclear. Should the heaviness condition be stipulated on the template itself, namely $\sigma_{\mu\mu}$ (McCarthy and Prince 1986/1996, see also Marantz 1982, Thurgood 1997), or should it be formulated as a constraint on the reduplicant, such as RED=μμ (McCarthy and Prince 1993, see also Blevins 1996, Crowhurst 2004)? I argue, instead, that neither allomorphic templates nor weight conditions on the template are required for an STS analysis of the pattern in (7).

Since the reduplicant is bimoraic, the null hypothesis is that the template is a foot that may result in bimoraic variants, (C)V(C)V or CVC via constraint interactions. The question for the present analysis then is, given a foot template, how the violation of HD(*ft*) is remedied so that we

[4] See Lin (2012) for a P-OT analysis.

do not need to postulate an allomorphic syllable template, hence the elimination of unwarranted heaviness requirements on the syllable template. Since the second syllable of the (C)V(C)V variant in (7) does not contain a coda consonant, in step 1 of the derivation HD(*ft*) should be met by INSERT(σ), rather than by COPY(σ), which, would lead to total reduplication (8). Note also that HD(*ft*) must dominate HD(σ) for the derivation to harmonically proceed (8).

(8) Step 1: Syllable insertion

a. *COPY(σ) >> FT-BIN, HD(σ)

ft + *ft* σ σ Δ Δ pu kun	*COPY(σ)	FT-BIN	HD(σ)
☞ *ft* + *ft* σ σ σ Δ Δ pu kun		1	1
ft + *ft* σ σ σ σ Δ Δ Δ Δ pu kun pu kun	1W	L	L

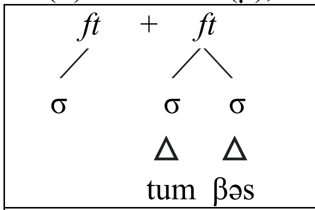
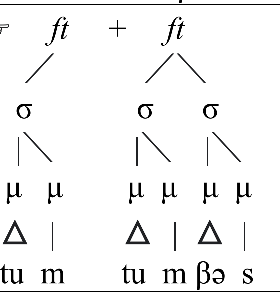
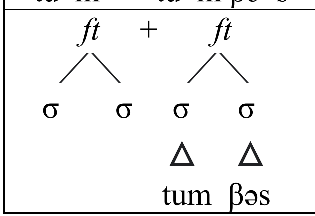
b. HD(*ft*) >> HD(σ)

ft + *ft* σ σ Δ Δ pu kun	HD(*ft*)	HD(σ)
☞ *ft* + *ft* σ σ σ Δ Δ pu kun		1
ft + *ft* σ σ Δ Δ pu kun	1W	L

If all segments in a syllable, including onset consonants, are immediate constituents of mora nodes (Hyman 1985; Ito 1986, 1989; McCarthy et al. 2012), HD(σ) must dominate *COPY(μ) and CODACOND to derive the CVC variant in step 2 (9).[5] Note that both candidates in (9) obey FT-BIN, with the winning candidate at the moraic level and the losing one at the syllabic level.

(9) Step 2 for the CVC variant: Mora copying

HD(σ) >> *COPY(μ), CODACOND

	HD(σ)	*COPY(μ)	CODACOND
			
☞ 		1	3
	1W	L	2L

However, when the stem is disyllabic, an application of COPY(μ) will not satisfy FT-BIN; therefore, both FT-BIN and COPY-LOC(μ) must outrank HD(σ) for the derivation to proceed and ultimately result in the (C)V(C)V variant (10).[6] Note that, in contrast to that in (9), the winning candidate in (10) respects FT-BIN at the syllabic level rather than under a moraic analysis. The derivation then converges in step 3 for the CVC variant.

[5] Coda consonants in the stem are protected by MAX_{ROOT}.

[6] Note that a candidate generated by copying of a string of two moras from the stem, namely [pu.ku-pu.kun], is harmonically bound by the losing candidate [pu-pu.kun] because the copied string in [pu.ku-pu.kun] contains two vowels, thus too big a structure for the existing syllable to accommodate. Consequently, the second mora in the copied string will be left unparsed and FT-BIN will still be violated.

(10) Step 2 for the (C)V(C)V variant: Syllable insertion

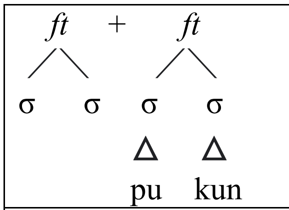
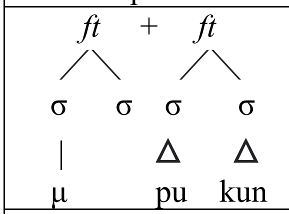
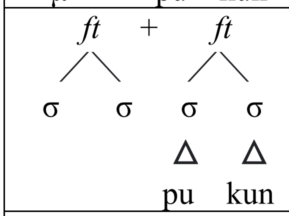
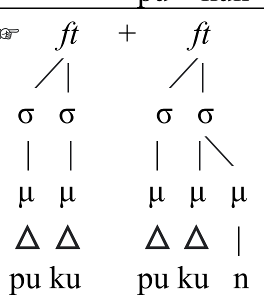
COPY-LOC(μ), FT-BIN >> HD(σ) >> *COPY(μ)

ft + *ft* σ σ σ Δ Δ pu kun	COPY-LOC(μ)	FT-BIN	HD(σ)	*COPY(μ)	HD(μ)
☞ *ft* + *ft* σ σ σ σ Δ Δ pu kun			2		
ft + *ft* σ σ σ Δ Δ pu kun		1W	1L		
ft + *ft* σ σ σ Δ Δ μ pu kun		1W	L		1W
ft + *ft* σ σ σ μ μ Δ Δ Δ kun pu pu		1W	L	1W	
ft + *ft* σ σ σ μ μ μ μ μ Δ Δ Δ ku n pu ku n	1W		L	1W	

Together, tableaux (8)-(10) illustrate why a foot template can result in heavy syllable reduplication. Since the constraint *COPY(μ) is ranked below HD(σ), in step 2 if the first syllable of a stem is CVC, COPY(μ) is a more optimal operation to meet FT-BIN. However, if the first syllable of the stem is not heavy the syllable will contain only one mora; thus, copying of the only mora in step

2 will not suffice to satisfy FT-BIN. Consequently, the only path for the foot template to eventually satisfy FT-BIN is via two applications of INSERT(σ) because *COPY(σ) outranks both FT-BIN and HD(σ), ultimately resulting in the (C)V(C)V variant (11), for which the ranking HD(σ) >> *COPY(μ) triggers copying a string of two moras from the stem and the derivation converges at step 4.

(11) Step 3 for the (C)V(C)V variant: Mora copying

	HD(σ)	*COPY(μ)	HD(μ)
	1W		1W
	2W	L	
☞ 		1	

4.2 Heavy syllable reduplication in Ilokano

Since a foot template, as shown by Kavalan, can eventually be realized as a heavy syllable, it is worth reexamining reduplicative patterns in other languages in which the reduplicant is invariably CVC or CV: and has been analyzed as involving a syllable template. One of such languages is Ilokano, where the reduplicant is invariable CVC (12).

(12) Heavy syllable reduplication in Ilokano (Hayes & Abad 1989)

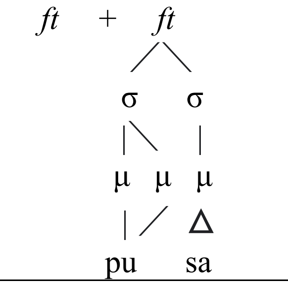
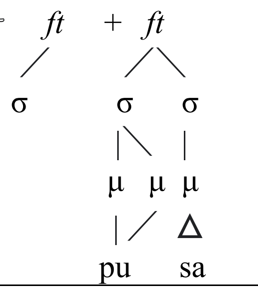
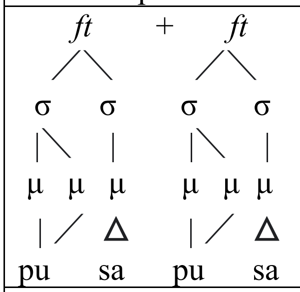
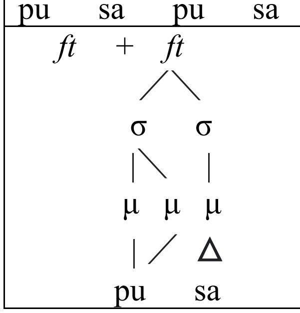
	a.	kal-kaldiŋ	'goat/pl.'
		pus-pu:sa	'cat/pl.'
		jyan-jyanitor	'janitor/pl.'
		yoy-yoyo	'yoyo/pl.'
	b.	naka-kut-kuttoŋ	'very thin'
		naka-but-buteŋ	'very afraid'
		na-pin-pintas	'prettier'
		na-lag-lagda	'more durable'

McCarthy et al. (2012) analyze the pattern as involving a syllable template with an imposed weight condition, which forces the template to ultimately be a heavy syllable. Yet, how to formulate the weight condition has not been clearly laid out (McCarthy 2012: 197). I argue instead that no such requirement is necessary; the fundamental apparatus of STS alone can derive the reduplicative pattern in (12).

Specifically, since coda consonants in Ilokano are moraic (Hayes and Abad 1989: 334), heavy syllable reduplication can be analyzed as involving an application of INSERT(σ) to fill a foot template, followed by two consecutive instances of INSERT(μ) to satisfy FT-BIN at the moraic level. And the two inserted moras are subsequently populated by an application of COPY(seg). In step 1 of the derivation HD(*ft*) is met by INSERT(σ) (13), because both HD(*ft*) and *COPY(σ) outrank HD(σ), which in turn dominates FT-BIN.

(13) Step 1: Syllable insertion

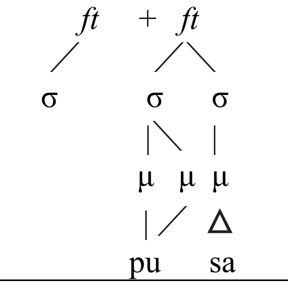
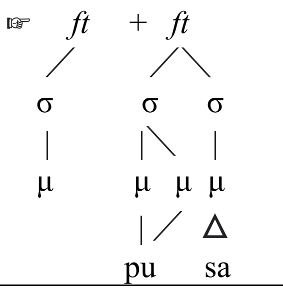
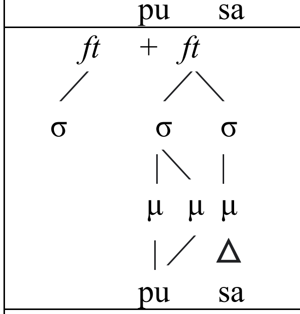
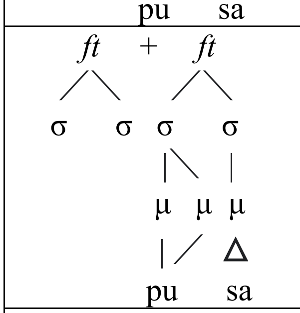
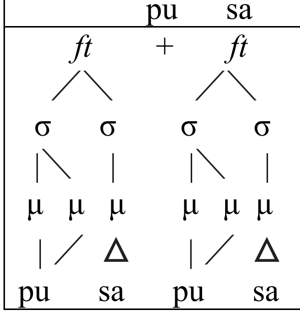
*COPY(σ), HD(*ft*) >> HD(σ) >> FT-BIN

	*COPY(σ)	HD(*ft*)	HD(σ)	FT-BIN
☞ 			1	1
	1W		L	L
		1W	L	1

Fulfillment of the inserted syllable and foot binarity is subsequently achieved via an application of INSERT(μ) each in step 2 (14) and step 3 (15), because both HD(σ) and *COPY(μ) dominates FT-BIN, which in turn outranks HD(μ).

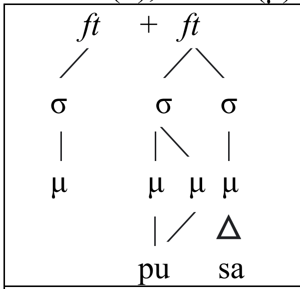
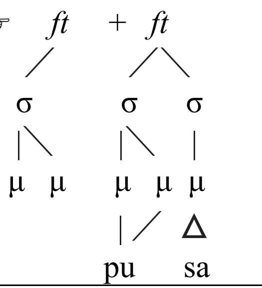
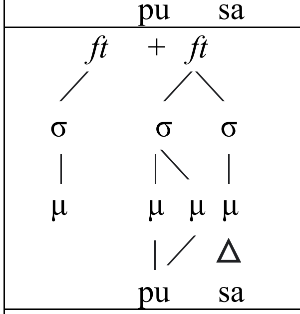
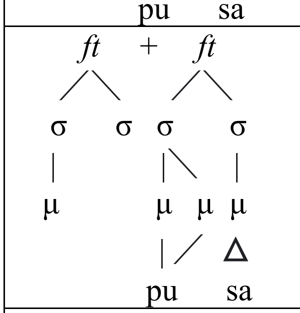
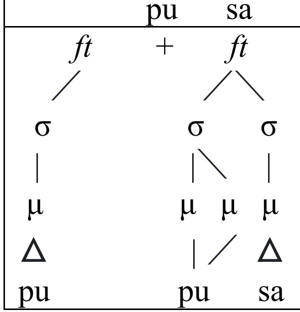
(14) Step 2: Mora insertion

HD(σ), *COPY(μ) >> FT-BIN, HD(μ)

	HD(σ)	*COPY(μ)	FT-BIN	HD(μ)
☞ 			1	1
	1W		1	L
	2W		L	L
		1W	L	L

(15) Step 3: Mora insertion

HD(σ), *COPY(μ) >> FT-BIN, HD(μ)

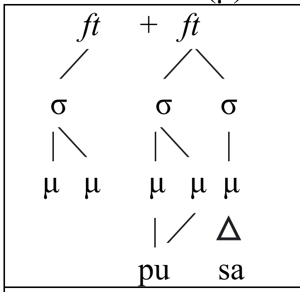
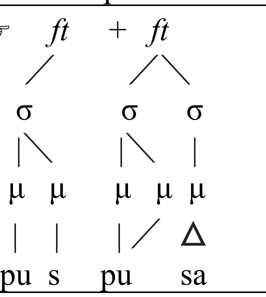
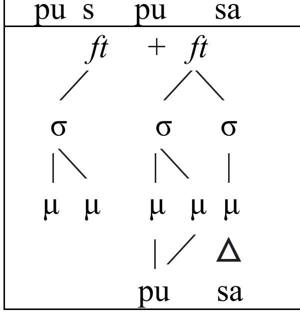
	HD(σ)	*COPY(μ)	FT-BIN	HD(μ)	*COPY(seg)
☞ 				2	
			1W	1L	
	1W			1L	
			1W	L	1W

In step 4, HD(μ) must dominate both *COPY(seg) and CODACOND to drive segment copying (16). In addition, NOLONG-V (Rosenthall 1994), which penalizes long vowels, must dominate

CODACOND for the winning candidate [pus-pu:sa] to win over [pu:-pu:sa] (16).[7] The derivation then converges at step 5 with [pus-pu:sa] as the ultimate output.

(16) Step 4: Segment copying

a. HD(μ) >> *COPY(seg), CODACOND

	HD(μ)	CODACOND	*COPY(seg)
☞ 		1	1
	2W	L	L

[7] Long vowels in the stem are protected by higher ranked faithfulness constraints (i.e., MAX_{ROOT}).

b. NOLONG-V >> CODACOND

	NOLONG-V	CODACOND
ft + *ft* σ σ σ μ μ μ μ μ Δ pu sa		
☞ *ft* + *ft* σ σ σ μ μ μ μ μ Δ pu s pu sa	1	1
ft + *ft* σ σ σ μ μ μ μ μ Δ pu pu sa	2W	L

In short, contra McCarthy et al. (2012: 197), the present analysis shows that invariable heavy syllable reduplication in Ilokano is derivable in STS if we assume that the template involved is a foot whose binarity condition is respected at the moraic level through two consecutive operations of INSERT(μ). It follows that no heaviness requirement on a syllable template should be stipulated.

4.3 Interim summary

This section has shown that, depending on the level where FT-BIN is respected via constraint interactions, a foot template can result in variable reduplication, as in Kavalan, or lead to invariable monosyllabic reduplication, as in Ilokano. Taking the two languages together with Yidiny, where invariable disyllabic reduplication is analyzed as involving a foot template populated via syllable copying (McCarthy et al. 2012: 194-196), we have a typology of the reduplicant size from foot affixation. In the next section I will show that Mbe reduplication fits into the typology.

5 Resolving lookahead in Mbe reduplication

We have seen that, without stipulative weight conditions and allomorphic templates, a foot template can result in variable reduplication, as in Kavalan, and invariable heavy syllable reduplication in Ilokano, depending on language-specific constraint rankings and under the traditional reading of FT-BIN (to be respected at either the syllabic or the moraic level). I propose that the same analysis can apply to Mbe reduplication, repeated below (17).

(17) Mbe reduplicative imperative affixation

a.	rû	**rû**-rû	'pull'
b.	jú.bô	**jû**-jú.bò	'go out'
c.	só.rô	**sə**-só.rò	'descend'
d.	tá.rô	**tə**-tá.rò	'throw'
e.	tâŋ	**tən**-tâŋ	'teach'
f.	gbé.nô	**gbəŋm**-gbé.nò	'collide'
g.	púɔ.nî	**pûm**-pûɔ.nì	'mix'
h.	dzûɔŋ	**dzûn**-dzûɔŋ	'be higher'
i.	lúo.nî	**lûn**-lûo.nì	'repair'
j.	jíɔ.nî	**jîɲ**-jîɔ.nì	'forget'

Specifically, the seeming lookahead effect can be resolved if FT-BIN is obeyed at the moraic level, rather than at the syllabic level. Like in Ilokano, the derivation starts with a foot template through the same derivation from step 1 to step 3, as in (13)-(15), where HD(*ft*) is satisfied by a syllable insertion and FT-BIN by two consecutive instances of mora insertion that also meet HD(σ). Tableaux (18)-(19), on the other hand, illustrate the derivations after step 3. As in Walker's (2000) analysis, *CORAL]$_\sigma$, which restricts oral consonants in coda position, dominates HD(μ), ensuring that the reduplicant is CV when the stem has only oral consonants (18); moreover, HD(μ) is also sacrificed in favor of NOLONG-V to rule out the reduplicant with a long vowel (i.e., a vowel bearing two moras). The derivations ultimately converge at step 6.

(18) Step 4 and 5 for (17)

$(\sigma_{\mu\mu})_{ft}$-STEM	*CORAL]$_{\sigma}$	ONSET	NO-DIPH	NOLONG-V	HD(μ)	COPY-LOC(seg)	*COPY(seg)	*C-PL/X
a. $(\sigma_{\mu\mu})_{ft}$-rû								
Step 4: ☞ **rû**$^{\mu}$-rû					1		1	
$(\sigma_{\mu\mu})_{ft}$-rû					2W		L	
rû$^{\mu\mu}$-rû				1W	L		1	
Step 5: ☞ **rû**$^{\mu}$-rû					1			
rû$^{\mu}$**r**$^{\mu}$-rû	1W				L	1W	1W	
b. $(\sigma_{\mu\mu})_{ft}$-jú.bô								
Step 4: ☞ **jû**$^{\mu}$-jú.bô					1		1	
jû$^{\mu}$**b**$^{\mu}$-jú.bô	1W				L		1	1W
jû$^{\mu\mu}$-jú.bô				1W	L		1	
$(\sigma_{\mu\mu})_{ft}$-jú.bô					2W		L	
Step 5: ☞ **jû**$^{\mu}$-jú.bô					1			
jû$^{\mu}$**j**$^{\mu}$-jú.bô	1W				L		1W	

Most crucial are the derivations in (19) because not only do they show how the stem's second syllable's postvocalic nasal is copied into the reduplicant's coda position that is homorganic to the following onset, but they illustrate how copying and assimilation of the postvocalic nasal can be teased apart, hence resolving the lookahead problem for STS.[8] As (19) shows, in step 4 NO-DIPH outranks HD(μ), hence the vocalic simplification: when the stem contains a diphthong, only the first vowel is reduplicated. However, in step 5, HD(μ) dominates COPY-LOC(seg), forcing the application of COPY(seg) to skip the intervening vowels and copy the nasal from the stem into the coda position. In contrast, COPY-LOC(seg) is not violated in step 4 in in (19) for the nasal to be copied, since there is no intervening vowel in the stem. In step 6 in (19) and step 5 in (19), delinking of the nasal's place feature is triggered because *C-PL/X, forbidding consonant clusters with separate place features, outranks HAVE/PL (Padgett 1995), which penalizes segments without any place feature. Subsequently in step 7 in (19) and step 6 in (19), the placeless nasal assimilates to the following onset as a consequence of HAVE/PL dominating DEP-LINK (Breteler 2018), which disfavors insertion of a new association link. The derivations eventually converge at step 8 for (19) and step 7 for (19).

[8] Recall that when the stem vowel is nonhigh, the vowel in the reduplicant will be subsequently reduced to a schwa. Due to limited space, I am not showing such reduction here, as it is not crucial to the current analysis.

(19) Step 4, 5, 6, and 7 for (17)

$(\sigma_{\mu\mu})_{ft}$-STEM	*CORAL]$_\sigma$	ONSET	NO-DIPH	NOLONG-V	HD(μ)	COPY-LOC(seg)	*COPY(seg)	*C-PL/X	HAVE/PL	DEP-LINK
a. $(\sigma_{\mu\mu})_{ft}$-púɔ.nî										
Step 4: ☞ **pû$^{\mu}$**-púɔ.nî					1		1			
pû$^{\mu}$ɔ$^{\mu}$-púɔ.nî			1W		L		1			
ɔ$^{\mu}$n$^{\mu}$-púɔ.nî		1W			L	2W	1	1W		
pû$^{\mu\mu}$-púɔ.nî				1W	L		1			
$(\sigma_{\mu\mu})_{ft}$-púɔ.nî					2W		L			
Step 5: **pû$^{\mu}$**-púɔ.nî					1W					
☞ **pû$^{\mu}$n$^{\mu}$**-púɔ.nî						3	1	1		
pû$^{\mu}$p$^{\mu}$-púɔ.nî	1W					L	1	L		
Step 6: **pû$^{\mu}$n$^{\mu}$**-púɔ.nî								1W	L	
☞ **pû$^{\mu}$N$^{\mu}$**-púɔ.nî									1	
Step 7: **pû$^{\mu}$N$^{\mu}$**-púɔ.nî									1W	L
☞ **pû$^{\mu}$m$^{\mu}$**-púɔ.nî										1
b. $(\sigma_{\mu\mu})_{ft}$-gbé.nò										
Step 4: ☞ **gbə$^{\mu}$n$^{\mu}$**-gbé.nò							1	1		
gbə$^{\mu}$-gbé.nò					1W		1	L		
$(\sigma_{\mu\mu})_{ft}$-gbé.nò					2W		L	L		
Step 5: **gbə$^{\mu}$n$^{\mu}$**-gbé.nò								1W	L	
☞ **gbə$^{\mu}$N$^{\mu}$**-gbé.nò									1	
Step 6: **gbə$^{\mu}$N$^{\mu}$**-gbé.nò									1W	L
☞ **gbə$^{\mu}$ŋm$^{\mu}$**-gbé.nò										1

In short, the current analysis assumes neither weight condition nor allomorphic templates. The template is a foot, and the reduplicative patter follows from constraint interactions in the language. To put it differently, the lookahead effect is only epiphenomenal at best, and derivable in STS.

6 Conclusion

In STS a foot template can be satisfied by either COPY(σ) or INSERT(σ) under the assumption that FT-BIN is respected under syllabic or moraic analysis. This predicts that, via constraint interactions, a foot template can, depending on the level at which FT-BIN is respected, result in invariable disyllabic reduplication, as in Yidiny, variable reduplication, as in Kavalan, or invariable heavy syllable reduplication, as in Ilokano. Therefore, there is no motivation to stipulate syllable weight conditions and affix allomorphy in STS. Most importantly, under the traditional interpretation of FT-BIN, the lookahead effect in Mbe reduplication is epiphenomenal and can be resolved if FT-BIN is obeyed at the moraic level. Given the STS analyses presented in this paper, the prima facie lookahead effect in Mbe reduplication might no longer be probative in the assessment of the P-OT and STS.

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