A Lookahead Effect in Mbe Reduplication: Implications for Harmonic Serialism

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Various phenomena involving the interaction of reduplication and phonology have been brought to bear on evaluating parallel versus serial theories of phonology. In Base-Reduplicant (BR) Correspondence Theory (McCarthy and Prince 1995), implemented in the classic parallel version of Optimality Theory (P-OT; Prince and Smolensky 1993/2004), the mapping from the underlying representation to the surface output is direct, without intermediate stages. In P-OT, the candidate-generating function Gen can simultaneously introduce multiple changes to the input. In contrast, the theory of Serial Template Satisfaction (STS; McCarthy, Kimper, and Mullin (MKM) 2012) is an approach to reduplication couched within Harmonic Serialism (McCarthy 2000 et seq.), a version of OT with serial evaluation that includes intermediate levels of structure. In Harmonic Serialism, Gen is restricted to making no more than one change at each derivational step, a property known as *gradualness.*

An argument put forth in favor of STS is that it does not admit a number of reduplicative patterns that MKM claim are unattested, which are otherwise predicted by BR Correspondence Theory in P-OT (MKM 2012:225). Among these are patterns formerly interpreted as overapplication, backcopying, and underapplication. While such patterns previously served as arguments *for* BR Correspondence Theory (McCarthy and Prince 1995, 1999), MKM reexamine those cases and conclude that they do not provide solid evidence against a serial approach. Among the remaining patterns, coda-skipping reduplication and derivational lookahead appear to offer the strongest arguments in favor of STS. These are the two patterns for which the parallel and serial versions of OT make quite distinct predictions. However, recent studies have called the status of arguments involving both patterns into question. Zukoff (2017) shows that STS does not actually exclude coda-skipping reduplication, because certain mechanics that STS employs to account for attested partial onset skipping would predict coda skipping. Adler and Zymet (2017) identify a reduplication pattern in Maragoli that poses a type of lookahead problem for STS: the ordering of reduplication and hiatus-driven glide formation depends on lookahead to the surface form of the reduplicant, which favors a simple onset.

In light of the ongoing discussion on these issues, this squib focuses on another kind of lookahead effect in reduplication where the amount of material copied would depend on a subsequent phonological change in the setting of a serial evaluation. Due to the stepwise gradual change in Harmonic Serialism, STS predicts that lookahead effects are not possible, while the potential for multiple, simultaneous changes

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in P-OT predicts that they exist. In this squib, we argue that a reduplicative affixation in Mbe instantiates a lookahead effect—specifically, one that closely resembles a hypothetical pattern that MKM identify as a problem for STS, were it to be attested. Furthermore, the variation in reduplicant size is arguably a case of "simple-syllable reduplication," a pattern claimed not to be predicted by STS. This reduplicative pattern in Mbe is straightforwardly accounted for in P-OT. However, in STS the pattern cannot be understood as a lookahead phenomenon, which gives rise to a treatment with unwanted stipulations and complications. We consider three alternatives in STS involving allomorphy or different templatic approaches, but find shortcomings in each.

1 STS and Lookahead Effects

To begin, we briefly review the basic mechanisms of STS and a hypothetical lookahead effect discussed in MKM 2012. STS has three primary components. First, reduplicative affixes are represented underlyingly as templates in the form of empty prosodic constituents (e.g., syllable, foot, or PWd (Prosodic Word)), rather than consisting of a RED morpheme, as in P-OT. Second, the empty template is satisfied through one of two operations applied in GEN: (a) Insert(X), which inserts an empty prosodic constituent of type X and integrates it into the template, or (b) Copy(X), which copies a continuous string of constituents of type X (including segments) with their contents and places them within the template. Third, a family of constraints, HEADEDNESS(X) (HD(X) for short), requires a given prosodic category X to have a head of type X − 1. The operation, Insert(X), inserting an empty node of type X, gives rise to a violation of HD(X). The alternative template-filling operation, Copy(X), is penalized by a constraint, *COPY(X). Copy(X) must ultimately apply to provide segmental content to the template, though possibly through copy at a higher level of structure. The ranking of constraints from the HD(X) and *COPY(X) families decides whether Insert(X) or Copy(X) is applied first to satisfy the template. Consequently, the surface shape of the reduplicant is determined collectively by the shape of the underlying prosodic template and the constraint ranking.

In MKM 2012:184–186, a reduplication pattern in Balangao illustrates the workings of these operations and constraints, which we briefly recapitulate here. In Balangao, the reduplicative affix is a foot (*ft*) template, but reduplication omits copying a coda consonant in the second syllable, as in *ma-**tay.na**-tay.nan* 'repeatedly be left behind' (Shetler 1976). The Copy(σ) operation, which must copy entire syllables including the coda, cannot generate this surface shape. Instead, Insert(σ) builds the prosodic structure of the *ft* template, and then a string of segments is copied. As shown in tableau (1), *COPY(σ) is top-ranked in Balangao to block syllable copying. This rules out (1c), which copies two syllables from the stem. Note that copying of a contiguous string of Xs of any length incurs a single violation of *COPY. Applying Insert(σ) provides the foot template with a syllable head in (1a), which is favored over the faithful candidate in (1b). (For expository purposes, we omit the nonreduplicative *ma-* affix.) Note that for reasons discussed below, a syllable-level version of Ft-Bin is assumed for Balangao in MKM 2012, requiring that feet contain two syllables.

(1) Step 1: Syllable insertion for Balangao *ma-**tay.na**-tay.nan* (MKM 2012:185)

ft + ft (σ σ) tay.nan	*Copy(σ)	Hd(ft)	Ft-Bin(σ)	Hd(σ)	*Copy(seg)
→ a. ft + ft (σ) (σ σ) tay.nan			1	1	
b. ft + ft (σ σ) tay.nan		1W	1	L	
c. ft + ft (σ σ) (σ σ) tay.nan tay.nan	1W		L	L	

In step 2, the template is further populated by inserting another syllable node, as in (2a), which satisfies Ft-Bin (Prince and Smolensky 1993/2004). Candidate (2b) copies the segment string *ta* from the stem to satisfy Hd(σ). However, as Hd(σ) is dominated by Ft-Bin, (2a) is preferred. Notice that the syllable-level version of Ft-Bin is crucial to rule out (2c), which would otherwise be optimal by satisfying Ft-Bin on the moraic level.

(2) Step 2: Syllable insertion repeated

ft + ft σ σ σ tay.nan	*Copy(σ)	Hd(ft)	Ft-Bin(σ)	Hd(σ)	*Copy(seg)
→ a. ft + ft σ σ σ σ tay.nan				2	
b. ft + ft σ σ σ ta tay.nan			1W	L	1W
c. ft + ft σ σ σ tay tay.nan			1W	L	1W

In step 3, Copy(seg) fills in the empty syllables, satisfying Hd(σ) with a single operation. To select ***tay.na***-*tay.nan* over ***tay.nan***-*tay.nan*, the analysis in MKM 2012 calls on NoCoda. The Copy operation must copy a continuous string, ruling out ***ta.na***-*tay.nan.*

In STS, reduplication is achieved by the operation Copy(X) in Gen along with operations that insert, delete, spread, or change phonological elements. In P-OT, the effects of all these operations are evaluated in one fell swoop. By contrast, in STS, because of the built-in property of gradualness, only one operation can apply at each step of the derivation. Therefore, STS does not predict lookahead effects where the amount of material copied depends on its possible subsequent phonological manipulation. In MKM 2012, a hypothetical pattern is used to illustrate a lookahead effect. Suppose that a language allows a coda only if it is a nasal homorganic with a following onset. Suppose further that this language exhibits a reduplication where the reduplicant form is CVC when a nasal can be copied and place-assimilated (3a); otherwise, it takes the form CV (3b).

(3) *Assimilation-dependent copying* (MKM 2012:213)
  a. pa.na **pam**-pa.na
  b. pa.ta **pa**-pa.ta

As MKM show, P-OT predicts this hypothetical case to be possible. The constraints and ranking in tableau (4) are used by MKM to illustrate that reduplication and place assimilation can proceed in parallel to derive this pattern.

(4) Assimilation-dependent copying in P-OT (adapted from MKM 2012:213)

	Coda-Cond	Max-BR	Ident-BR(Place)
→ a. **pa**-pa.ta		2	
b. **pat**-pa.ta	1W	1L	
→ a. **pam**-pa.na		1	1
b. **pa**-pa.na		2W	L

However, the pattern in (3) presents a derivational paradox for STS: the nasal cannot be copied unless it is assimilated, but it cannot assimilate until it has been copied; copying and assimilation cannot apply in the same derivational step. Selective copying of a nasal coda but not other consonants requires lookahead to see whether the copied coda consonant can subsequently undergo assimilation. STS thus predicts lookahead effects to be impossible, and the discussion in MKM 2012 notes that their existence would present a serious challenge to STS.

2 The Lookahead Effect in Mbe Reduplicative Imperative Affixation

Mbe (Benue-Congo, Nigeria) presents a syllable-size reduplication pattern in which a nasal coda appears in the reduplicant when the stem contains a postvocalic nasal. The copied nasal is homorganic with the following onset. Similarly to the hypothetical language in (3), Mbe restricts coda content to nasals that are place-assimilated with a following consonant, with the exception of root-final position, where oral and nasal codas are allowed. In substance, this pattern closely resembles the lookahead nasal assimilation described in the previous section. The data and description are drawn from Bamgboṣe 1966, 1967a,b,c, 1971.

Verbs in Mbe are categorized into two classes (Class 1 and Class 2), and imperative I affixation (noncontinuous) has two realizations: reduplicated or simple (nonreduplicated). The pattern of reduplication for Class 2 imperative I singular verbs results in a prefix with the form CV or CVN (Bamgboṣe 1967c:185–186). When the stem contains only oral consonant(s), the reduplicant shape is CV, without copying of the second syllable's onset into the reduplicant coda (5a–d). However, the presence of a postvocalic nasal in the stem triggers the presence of a nasal coda in the reduplicant that is homorganic to the following onset (5e–j). In each case, the corresponding simple form is shown at the left.

(5) *Class 2: Reduplicative imperative singular*

a.	rû	**rû**-rû	'pull'
b.	jú.bô	**jû**-jú.bò	'go out'
c.	só.rô	**sə̂**-só.rò	'descend'
d.	tá.rô	**tə̂**-tá.rò	'throw'
e.	tâŋ	**tə̂n**-tâŋ	'teach'
f.	gbé.nô	**gbə̂ŋm**-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'

Class 2 imperative singular reduplication is accompanied by two vocalic simplifications. When the stem vowel is high, the vowel in the reduplicant is identical (5a–b), but when the stem vowel is nonhigh, the vowel in the reduplicant is [ə] (5c–f). When the stem contains a diphthong, only the first vowel is copied (5g–j).

A P-OT analysis of this pattern was provided in Walker 2000, though derivational lookahead was not explicitly at issue there. We review elements of that account relevant to the lookahead effect. In Walker's analysis, the coda condition is broken down by manner and place. $*C_{oral}]_\sigma$ restricts oral consonants in coda position, and *C-PL/X prohibits consonant clusters with separate place features. A positional faithfulness constraint for the right edge of roots yields root-final coda content exceptions. A ranking like that in (4) for the hypothetical lookahead case obtains the Mbe pattern. For ease of comparison with the ranking in MKM 2012, we use CODA-COND (Itô 1989) in place of $*C_{oral}]_\sigma$ and *C-PL/X. Tableau (6) illustrates the evaluation for an input without a stem nasal. CODA-COND rules out copying of postvocalic /r/ (6b), resulting in a CV reduplicant, which incurs two violations of MAX-BR (6a). The vocalic changes and syllable-size restriction in reduplication are analyzed as an emergence of the unmarked in Walker 2000, to which we refer the reader for the details.

(6) [**tə̂**-tárò] 'throw'

RED + tárò	CODA-COND	MAX-BR	IDENT-BR(Place)
→ a. **tə̂**-tá.rò		2	
b. **tə̂r**-tá.rò	1W	1L	

Tableau (7) shows the evaluation for a stem with a postvocalic nasal. Because MAX-BR dominates IDENT-BR(Place), the nasal is copied at the expense of violating place identity, and the reduplicant surfaces with a CVC shape (compare (7a–b)). The fell-swoop change (copy and place assimilation) in the winner is critical for the copied nasal to escape a violation of CODA-COND, which would otherwise block nasal copy (7c).

(7) [**pûm**-pûɔnì] 'mix'

RED + pûɔnì	CODA-COND	MAX-BR	IDENT-BR(Place)
→ a. **pûm**-pûɔ.nì		2	1
b. **pû**-pûɔ.nì		3W	L
c. **pûn**-pûɔ.nì	1W	2	L

STS faces difficulty in capturing nasal copy in Mbe. Because the surface shape of the reduplicative prefix is either CV or CVC, it is reasonable to assume a σ template for the reduplicative affix. Before illustrating this, we note that an attempt to copy nasals but not oral consonants to form a coda in the reduplicant, deployed with a heavy-syllable template and separate constraints for oral codas and heterorganic clusters, runs into empirical and theoretical problems, as we discuss in section 3. Returning to a σ template, the output is derived in two steps when there is no nasal in the stem. The first step copies segments from the stem to satisfy undominated HD(σ), as in (8a). Candidate (8b) copies the onset of the second syllable in the stem, which fatally violates CODA-COND. Candidate (8c) makes no change, thus obeying *COPY(seg) but violating higher-ranked HD(σ).

(8) Step 1 of [jû-jú.bò]

σ + σ σ jú.bò	HD(σ)	CODA-COND	*COPY(seg)
→ a. σ + σ σ jû jú.bò			1
b. σ + σ σ jûb jú.bò		1W	1
c. σ + σ σ jú.bò	1W		L

With this ranking, however, STS would generate the wrong output for a stem containing a nasal. Consider the stem [-gbé.nò] 'collide'. In the first step, illustrated in (9), segment copying provides the empty syllable template with a head, satisfying HD(σ). Copying the nasal in (9a) fatally violates CODA-COND.

(9) Step 1 of [gbə̂ŋm-gbé.nò]

σ + σ σ gbé.nò	Hd(σ)	Coda-Cond	*Copy(seg)
a. σ + σ σ gbên gbé.nò		1W	1
☹ b. σ + σ σ gbê gbé.nò			1
c. σ + σ σ gbé.nò	1W		L

Note that the candidate [**gbêŋm**-gbé.nò], which simultaneously copies the nasal and changes its place to obey Coda-Cond, is not available in STS. This is because gradualness prevents copying of the stem nasal /n/ and change of its features in a single derivational step. Thus, (9b) [**gbê**-gbé.nò] is the most harmonic intermediate output in step 1. In (9), the copying operation is triggered by Hd(σ), requiring the syllable template to be headed. This constraint is not in conflict with Coda-Cond because Hd(σ) can be satisfied by copying a CV segment string, without a coda that potentially infringes upon Coda-Cond. Since there is no pressure for a faithful mapping between the base and the reduplicant (given that BR correspondence does not exist in STS), the CV-shaped reduplicant would always be more harmonious than a CVC one. To ensure that the nasal is copied in the step where Copy(X) applies, there must be some requirement from the template itself or a high-ranked constraint that can only be satisfied by copying the nasal or the segment string that contains it. We consider some alternatives of this kind in the next section.

3 Alternatives

We consider three alternative analyses of the Mbe pattern within STS. The first treats the surface shape variation as allomorphs. MKM offer a reanalysis of reduplication in Southern Paiute (Uto-Aztecan), previously taken as an instance of lookahead effects in support of P-OT (McCarthy 2002). Reduplication in Southern Paiute exhibits a CV reduplicant (10a) (Sapir 1930:291) as well as a CVC reduplicant with an assimilated nasal (10b) (Sapir 1931:618).

(10) a. **ma**-ma.qa 'to give'
b. **pim**-pin.ti 'to hang on to'

MKM argue that these differences in reduplicant shape are not conditioned by a coda restriction (CODA-COND). Instead, Southern Paiute has two distinct reduplicative affix allomorphs: a σ template for CV reduplication and a *ft* template for CVC reduplication. The key argument for this proposal is that the choice between the CV and CVC shapes is unpredictable and thus lexically idiosyncratic. To illustrate, the two stems in (11) both contain a medial nasal, but only (11b) (Sapir 1931:618) copies the nasal and assimilates it. In (11a) (Sapir 1930: 257), the nasal is not copied, and the stem-initial obstruent stop is spirantized. If the contrast did not result from distinct allomorphic templates, we would expect (11a) to also copy a CVC string and become *[pim-pin.wa].

(11) *Unpredictability of CV vs. CVC template*

a.	pin.wa	**pi**-vin.wa	'wife'	(CV)
b.	pin.ti	**pim**-pin.ti	'to hang on to'	(CVC)

However, the lexical specificity of the reduplication pattern in (11) is not attested in Mbe imperative reduplication. In Mbe, whether a given verb root will reduplicate as CV or CVC is fully predictable. Therefore, the surface shape variation is phonologically predictable and conditioned by CODA-COND; it cannot be viewed as on a par with the allomorphy in Southern Paiute.

The second alternative is based on the intuition that there is a heavy syllable requirement that leads to the CVC-shaped reduplicant. STS does not offer a built-in mechanism for such a requirement, but it could be achieved through various means: (a) a heaviness requirement stipulated in the template itself, (b) a stipulated constraint on the template, or (c) constraint interaction (MKM 2012:197). Here we concentrate on the first two possibilities. Suppose that a heaviness requirement is stipulated in the template $\sigma_{\mu\mu}$. This runs into immediate difficulty with a CV stem where the reduplicant is a CV syllable (e.g., **rû**-rû 'pull'). There is no evidence that a CV syllable is heavy: to satisfy the $\sigma_{\mu\mu}$ template, it would be necessary to modify the reduplicant, but this is not reported.

Turning to the second route: a heaviness requirement could perhaps instead be enforced by a constraint on the reduplicative affix, which we will call RED $=\sigma_{\mu\mu}$ or RED = CVC (though RED itself has no status in STS). Such a constraint would be violated by CV reduplicants. Using the separate coda constraints of Walker 2000, $*C_{oral}]_{\sigma}$ would block copying of an oral consonant into a coda. To derive the CVN reduplicant, the challenge lies with disyllabic verb stems where the target nasal is in the onset of the second syllable while the first syllable contains a diphthong, as in forms like (5g) [**pûm**-pûɔ.nì] 'mix'. The constraint RED = $\sigma_{\mu\mu}$ would enforce copying of the diphthong to satisfy the heaviness requirement. The heavy status of syllables with diphthongs is supported by tonal patterns. Vowels in open syllables with monophthongs lengthen under high tone in certain verb forms (e.g., [tá:lì] 'touch'); however, diphthongs and vowels in closed syllables do not lengthen in this context (e.g., [táblì] 'follow', [júorì] 'sit' (imperative I plural; Bamgboṣe 1967c:176–177)). Copying of the nasal following the diphthong would thus not be driven by RED = $\sigma_{\mu\mu}$ and would be blocked by *C-PL/X.

Alternatively, with the constraint RED = CVC (where CVC means any closed syllable), we can obtain the preferred form [**pûm**-pûɔ.nì] in three steps with the ranking in (12). The two constraints on coda content are ranked differently with respect to the size restricting RED = CVC: a nasal is copied into the reduplicant coda to satisfy higher-ranked RED = CVC at the expense of a violation of *C-PL/X, but for a stem like [-jú.bò] 'go out', *[**jûb**-jú.bò] is banned by the top-ranked $*C_{oral}]_\sigma$. Diphthong reduction (driven by NO-DIPH; Rosenthall 1997) and place assimilation take place in the next two steps, in either order.

(12) Step 1 of [**pûm**-pûɔ.nì] 'mix'

σ + σ σ pûɔ.nì	HD(σ)	$*C_{oral}]_\sigma$	RED=CVC	NO-DIPH	*C-PL/X
→ a. σ + σ σ pûɔn pûɔ.nì				1	1
b. σ + σ σ pû pûɔ.nì			1W	L	L
c. σ + σ σ pûɔ pûɔ.nì			1W	1	L
d. σ + σ σ pûɔ.nì	1W		1W	L	L

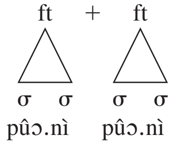
There are three problems with the constraint RED = CVC. First, CVC is not a prosodic category; imposing this requirement on the template goes against the basic premise of prosodic morphology in STS. Second, though there are other reduplication patterns that exhibit a CVC reduplicant (e.g., West Tarangan languages), the CVC shape has been analyzed as the result of constraint interaction, in particular, alignment constraints and faithfulness constraints in BR Correspondence Theory (Spaelti 1997). Because BR correspondence is not available in STS, a similar analysis cannot be applied to the Mbe data in STS. Third, introducing RED = CVC into STS would permit "simple-syllable reduplication" in (13), one of the reduplicative patterns that MKM claim to be unattested in arguments they present for STS over BR Correspondence Theory.

(13) *The simple-syllable reduplicative pattern* (MKM 2012:192)
a. CV- with CV or CV.V . . . stem
pa *pa*-pa
pu.a *pu*-pu.a
b. CVC- with CVC . . . stem
pa.ta *pat*-pa.ta
pat.ka *pat*-pat.ka

Given a syllable template with unspecified weight, STS is unable to produce the unattested pattern in (13), because without a maximal copy driver (such as MAX-BR in P-OT), a CV reduplicant is preferred no matter where NO-CODA is ranked. However, if RED = CVC were adopted and ranked above NO-CODA, it would admit patterns like those in (13) and an argument in favor of STS over P-OT would go away. Viewed from another perspective, because the reduplicant is realized as a variably weighted syllable based on a σ template, Mbe imperative reduplication would actually become a plausible instantiation of "simple-syllable reduplication," subject to a coda condition.

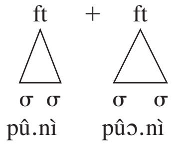
The third alternative adopts a *ft* template for the imperative affix. In this approach, the full content of a disyllabic verb stem would be copied in the first step. Certain material would then be deleted in subsequent steps. This "copying + deletion" strategy builds on an approach by MKM (2012:218) to obtain apparent discontinuous copy in Sanskrit reduplication. To allow syllable copying into the *ft* template, *COPY(σ) needs to be dominated by a constraint that triggers copying, such as FT-BIN(σ). Similarly to the analysis of Balangao in MKM, this strategy must employ a version of FT-BIN that enforces bisyllabicity (see section 1). A traditional version of FT-BIN, where binarity may be satisfied at the syllabic or moraic level (McCarthy and Prince 1986/1996, Prince and Smolensky 1993/2004), would fail to trigger copying of the second stem syllable, because copying the first syllable of [pûɔ.nì] into the *ft* template would obey FT-BIN on the moraic level. The copying + deletion path for the stem [-pûɔ.nì] is schematized in (14). Step 1 in (14) is a full copy of the base. In step 2, the second vowel in the diphthong is deleted, driven by the constraint NO-DIPH. In step 3, the vowel [i] in the second syllable of the reduplicative prefix is deleted, and in step 4 the nasal undergoes place assimilation.

(14) *Step 1: Syllable copying*



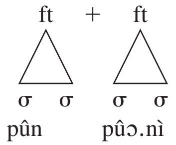
Hd(ft), Ft-Bin(σ) ≫ *Copy(σ)

Step 2: Diphthong reduction



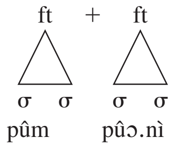
Max_{root} ≫ No-Diph ≫ Max

Step 3: Affix size reduction



Ft-Bin(σ) ≫ Aff≤σ ≫ Hd(σ), *C-Pl/X, Max

Step 4: Place assimilation



*C-Pl/X ≫ Ident(Place)

Step 5: Convergence

The deletion operation at step 3 could be triggered by a generalized templatic constraint, Affix≤σ, defined in (15) (adapted from McCarthy and Prince 1994).

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

We assume that concomitant (re)syllabification within this derivational step is consistent with gradualness, because it does not qualify as a distinct operation (McCarthy 2008). Since [**pûn**-pûɔ.nì] violates *C-Pl/X and Max and leaves a headless syllable node, violating Hd(σ), Affix≤σ must dominate these constraints. The question confronting us now is whether the prosodic structure shown for the output in step 3 in (14) satisfies Affix≤σ. The output has two syllable nodes, but only one is realized at the segmental level. Therefore, in order for the output to satisfy Affix≤σ, the constraint must be assessed on the basis of segmental material and affiliated prosodic structure but ignore prosodic constituents without segmental realization.

Affix≤σ must be dominated at step 1. Specifically, Affix≤σ must be ranked below Ft-Bin(σ); otherwise, copying of two syllables would not transpire at the first step. Yet this leads to a ranking paradox. If constraints involving prosodic constituency are evaluated on the basis of categories that are realized at the segmental level, as is necessary for AFFIX≤σ in this account, then it is expected that FT-BIN(σ) will be violated by the output in (14). However, since FT-BIN(σ) must dominate AFFIX≤σ to drive copying of two syllables, FT-BIN(σ) is expected to block the structure in (14) at step 3.

To restate the problem, with a *ft* template, the constraint that drives the two-syllable size of copying is FT-BIN(σ) and the size-restricting constraint that triggers deletion of the second nucleus is AFFIX≤σ; if both constraints are sensitive to segmentally realized content, a ranking paradox arises. To make this approach carry through, we could suppose that FT-BIN(σ) is evaluated on the basis of prosodic structure without reference to its segmental realization. In that case, the two size-related constraints would have to be assessed distinctly, with FT-BIN(σ) inspecting only the prosodic structure without reference to its segmental realization, while AFFIX≤σ is obeyed on the basis of segments and their affiliated prosodic structure. Interpreting the prefix's *ft* template as at once satisfying foot bisyllabicity and AFFIX≤σ is unsatisfactory; introduced purely for purposes of sidestepping a lookahead account, it is stipulative and inconsistent.[1]

4 Conclusion

We have argued that a pattern exists in Mbe reduplication that involves a kind of lookahead effect, underivable in STS, where the amount of material copied depends on a subsequent phonological change. The pattern centers on constraint(s) on coda content, leading to the CV/CVC alternation in reduplicative prefixes. STS faces a derivational paradox originating from the built-in pressure of gradualness, as copying and place assimilation cannot apply in the same step. On the other hand, BR Correspondence Theory deployed in P-OT predicts the possibility of lookahead effects like this one with parallel evaluation of MAX-BR and phonotactic constraints. On balance, this reduplication pattern poses a challenge for the viability of STS and the associated limitations that gradualness imposes, but it provides support for the P-OT theory of reduplication, contributing to ongoing assessment of these theories. We suggest that future research be directed to examining the typology of attested lookahead effects to inform future progress on theoretical approaches to reduplication.

[1] Another alternative in STS suggested to us by an anonymous reviewer first copies a placeless nasal, bypassing violation of $*C_{oral}]_{\sigma}$ and *C-PL/X. In step 2, the place feature of the following onset would spread to the nasal. Given the current assumptions of STS, it is not clear how the Copy operation could copy a segment without all of its features. Nevertheless, even if a placeless nasal could be copied, RED = CVC would still be required to deal with forms containing a nasal and a diphthong, and the problems already discussed would ensue.

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