"Templatic Backcopying" in Guarijio Abbreviated Reduplication*

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Although a wide array of phonological properties seem to backcopy in reduplication, it is an open question whether reduplicative templates can backcopy as well. It has been argued that natural languages do not have reduplicative constructions where the base truncates to match the truncated reduplicant (McCarthy & Prince 1994, 1999; Spaelti 1997; inter alia). In Guarijío Abbreviated Reduplication (Miller 1996), however, both copies of the reduplicative construction truncate, instantiating the pattern that has been claimed not to exist. This paper argues that the Guarijío case fills this typological gap. Although the data can be given a templatic backcopying analysis, this paper defends a Morphological Doubling Theory analysis using cophonologies (Inkelas & Zoll 2005). In Morphological Doubling Theory, Guarijio Abbreviated Reduplication results from the parallel imposition of a truncating cophonology in each copy of the reduplicative construction. Guarijío Abbreviated Reduplication is predicted to exist by Morphological Doubling Theory together with other documented cases of parallel phonological modification in reduplication.

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1. Introduction

Building on work by Wilbur 1973, developing theories of reduplication have attributed much importance to phonological opacity effects, seeking to account for the attested patterns of phonological processes that can opaquely apply or fail to apply in reduplication. In her 'Identity Constraint', Wilbur (1973:58) attributed these effects to a tendency to preserve the identity of base and reduplicant in reduplication: a phonological process conditioned in either the base or the reduplicant may unexpectedly fail to apply in its triggering environment or it may exceptionally apply in an environment where it is not expected, in order to achieve better identity between base and reduplicant. Wilbur termed the former phenomenon "underapplication" and the latter "overapplication".

One kind of overapplication is *backcopying*, where the phonology of the reduplicant appears to be enforced in the base to match the reduplicant. A widely cited example of backcopying is nasal substitution in Tagalog (McCarthy & Prince 1995:85). In this language, an N+voiceless stop configuration yields nasal substitution (1a). This configuration is present in the reduplicant and duplicated in the base, as shown in (1b):

(1) Tagalog backcopying of nasal substitution

a. Nasal substitution occurs in the environment N+voiceless stop

/paN+pu:tul/ pa-**m**u:tul

b. Nasal susbstitution overapplies to base (backcopying)

/paN+RED+pu:tul/ pa-**m**u-**m**u:tul (*pa-**m**u-**p**u:tul)

The key aspect of the interaction between nasal substitution and reduplication in this language is that an oral, voiceless stop in the base becomes nasal in a context where there is no preceding nasal segment, yielding the opaque *pa-**m**u-**m**u:tul* and not the transparent form **pa-**m**u-**p**u:tul*.

While patterns like Tagalog nasal substitution are not uncommon in reduplicative morphology, it has been an open question whether templates can also backcopy in reduplication. Philip Hamilton and Rene Kager observed that the reduplicative template itself never seems to backcopy, a problem known in the literature as the 'Kager-Hamilton problem' (Spaelti 1997:37; McCarthy & Prince 1999:259; Downing 2000:32; Inkelas & Zoll 2005:89). In Base-Reduplicant Correspondence Theory (BRCT; McCarthy & Prince 1993, 1995), where reduplication is a matter of phonological identity between base and reduplicant, ranking permutations would predict that a language might backcopy, for example, a minimal word (MinWd) template. To illustrate this, McCarthy & Prince (1999:259) constructed a hypothetical language, called Diyari´. In contrast to Real Diyari (2a), Diyari´ could have reduplicative structures like *kulku–kulku* from *kulkuna* or *tilpa-tilpa* from *tilparku*. The ranking that yields Diyari´ is given in (2b).

(2) Ranking Properties of the Kager-Hamilton problem

a. "Normal Application" of Templatic Constraint (Real Diyari):

RED-*kulkuna* → *kulku-kulkuna*

RED=MINWD, MAX-IO>> MAX-BR

b. "Backcopying Overapplication" of Templatic Constraint (Diyari´):
RED-*kulkuna* → *kulku-kulku*
RED=MINWD, MAX-BR >> MAX-IO

(McCarthy & Prince 1999:260)

Diyari´ represents the logical possibility of a language where the need to achieve close Base/Reduplicant-Identity (compelled by a high ranked constraint MAX-BR) yields the indirect imposition of a reduplicant-specific prosodic constraint (such as RED=MINWD) onto the base. Languages like Diyari´ have been assumed to be unattested: "languages like Diyari´ do not exist" (McCarthy & Prince 1999:260).[1]

This apparent typological gap has influenced theories of reduplication and has prompted different reactions as to what its source might be. One prominent response was to attribute its existence to templatic constraints. This position is summarized in (3).

(3) "[T]his prediction [the existence of Diyari´] depends on the assumption that all the constraints in (2) are indeed part of UG; if they are not, then permutations of their ranking are irrelevant…the flaw in (2b) lies in the assumption that UG contains templatic constraints like RED=MINWD. There are no such constraints, and without them the Kager-Hamilton problem evaporates".

(McCarthy & Prince 1999:260-261)

This modification of BRCT –the elimination of templatic constraints- gave rise to Generalized Template Theory (GTT; McCarthy & Prince 1994, Urbanczyk 1996). In GTT, the shape of the reduplicant follows directly from the morphological category – stem or affix – of the reduplicant. Stems and affixes are matched in UG with characteristic phonological properties: stems are generally foot-sized or larger, and affixes are generally syllable-sized or smaller. From this, reduplicant shape follows without further stipulation.

In a GTT analysis of the actual language Diyari, the reduplicant is lexically categorized as a stem (McCarthy & Prince 1999:262). Stems are canonically realized as prosodic words (Prince & Smolensky 1993). The most harmonic prosodic words consist of two syllables parsed into binary feet, which emerge in reduplication via undercopying, a phenomenon termed The Emergence of the Unmarked (TETU; Prince & Smolensky 1993). Both reduplicant and base are stems subject to the same markedness constraints. A high ranked constraint that requires input segments to have output correspondents (MAX-IO) protects the base, but not the reduplicant. This constraint also predicts that there are roots in Diyari larger than minimal words (i.e., reduplicants, but not every stem in the language, are truncated to a minimal prosodic word). The lack of a constraint specific to the reduplicant prevents backcopying to the base. Ranking MAX-IO over the constraint that requires that every element in the base have a correspondent in the reduplicant

[1] Others who assume this typological gap include Spaelti (1997:37) and Idsardi & Raimy (to appear:17).

(MAX-BR) eliminates *kulku-kulku*, the Diyari´ pattern.[2] GTT thus ensures that the candidates that display backcopying of a template will never emerge as winning candidates: in the ranking for backcopying, a markedness constraint is highly ranked and obeyed in the whole language. A language like Diyari´ is ruled out because no phonological property is able to emerge *and* be back-copied in the same language (McCarthy & Prince 1999:266).

Like other a-templatic approaches to reduplication (Gafos 1998; Spaelti 1997; Urbanczyk 1996, 1999, 2006; Downing 2006), GTT has the broader goal of deriving size requirements of prosodic morphemes from independent principles of the grammar. However, the efficacy of this theory's solution to the apparent non-existence of templatic backcopying is debated (see Spaelti 1997; Downing 2000; Gouskova 2004; Inkelas & Zoll 2005; Idsardi & Raimy *to appear*). Spaelti 1997, for instance, argues that templatic backcopying does not occur in natural languages because the ranking MAX-IO >> size restrictors >> MAX-BR is universally fixed (1997:38); the size restrictions on reduplication arise exclusively from *emergence of the unmarked,* excluding the possibility of truncating the base to match the reduplicant. Idsardi & Raimy's "dynamic theory of the base", on the other hand, offers a different solution. In this theory, the base for reduplication is defined through base-specific constraints, which are always ranked below FAITH-IO; a high ranked reduplicative template and MAX-BR can no longer induce truncation of the base if a constraint ranked below MAX-IO leads to the "modification of the base region in the output with no impact on the actual FAITH-IO mapping" (to appear: 20). There are thus several responses to the Kager-Hamilton problem. But independently of the stand taken in the debate, examples of apparent templatic backcopying have been largely missing.

This paper introduces a case of reduplication not yet discussed in the theoretical literature: Guarijío Abbreviated Reduplication (Miller 1996). This construction involves truncation from both copies of the reduplicative construction, in a pattern that very closely resembles that of the hypothetical Diyari´. This novel pattern of reduplication, which adds to other apparent examples of templatic backcopying put forth in the literature,[3] makes the Kager-Hamilton problem disappear, meaning that it can no longer be used as strong evidence against prosodic templates. The responses to the so-called Kager-Hamilton problem, thus, are not empirically justified: since this problem is illusory, all its proposed solutions incorrectly rule out Guarijio Abbreviated

[2] In partial reduplication, on the other hand, in which the reduplicant is smaller than a foot, the reduplicant is analyzed as an affix, rather than a stem (McCarthy & Prince 1994:10). General constraints on affix shape and syllabic structure outrank MAX-BR, modeling partial reduplication without appealing to a template (McCarthy & Prince 1994:13, Urbanczyk 1999:505). MAX-IO must be undominated in this case as well in order to prevent base truncation.

[3] I am aware of two other cases: Hausa reduplicated ideophones (Downing 2000:33-34), where bases truncate to a disyllable to match the reduplicant, and double truncated nicknames like *Jojo* or *Coco* (from *Josephine* or *Collette*) (Inkelas & Zoll 2005:89). The main point that Downing and Inkelas & Zoll make about these cases is the challenge they present to the Kager-Hamilton problem and to the a-templatic solution GTT proposed by McCarthy & Prince 1999 to solve this problem.

Reduplication. And although this pattern can be modeled as templatic backcopying, this paper argues that a straightforward account of Guarijio Abbreviated Reduplication can be provided in Inkelas & Zoll's (2005) Morphological Doubling Theory (MDT). In this analysis, both base and reduplicant are associated with the same cophonology, or construction-specific phonological mapping, truncating each half of the reduplicative construction. The truncation of both copies in reduplication is predicted to occur together with other cases of parallel imposition of phonological modifications that are characteristic of reduplication (Inkelas & Zoll 2005:86-89). Although BRCT with templatic constraints is able to account for Guarijío Abbreviated Reduplication, it is unable to model other cases of parallel modification in reduplication, such as final vowel shortening in Hausa denominal adjectival reduplication (Inkelas & Zoll 2005:86).

The remainder of this paper is organized as follows. First, general phonological characteristics of Guarijío and the details of the Abbreviated Reduplication pattern are presented in §2. This section illustrates that truncation is not used as a separate process in this language and appears exclusively in this reduplicative construction. §3 models the Guarijío evidence in BRCT with templatic constraints. The reduplicant equals a core syllable, which is copied back onto the base through the debated ranking that generates the hypothetical Diyari´ of the Kager-Hamilton problem. §4 shows how Guarijio Abbreviated Reduplication cannot be modeled as backcopying in GTT, but presents two possibilities of analysis of this pattern that are compatible with this a-templatic theory: (i) truncation plus subsequent reduplication, and (ii) truncation enforced by an output size maximality constraint that forces the output of reduplication to be disyllabic. Problems and issues for further research with respect to these alternatives are discussed in this section. Finally, §5 delves into the specifics of an MDT analysis of Guarijio Abbreviated Reduplication. This paper makes an empirical contribution by introducing the Guarijío Abbreviated Reduplication case in the theoretical literature and raises the more general issue that any descriptively adequate theory of reduplication should be able to model this data and predict its existence.

2. Guarijío

Guarijío[4] is a Uto-Aztecan language of the Taracahitan branch spoken in northern Mexico by about 5,000 speakers (Gordon 2005 (1994 SIL)). This understudied language has two main dialects: Highland Guarijío, spoken in the state of Chihuahua; and Lowland Guarijío,[5] spoken in the state of Sonora. The data analyzed in this paper is from the Highland dialect, described by Miller (1996).[6] Guarijío is an agglutinating language that is predominantly suffixing.

[4] Alternative spellings are Warihío, Varohío, or Huarijío.

[5] Miller (1996) calls the highland dialect "Sierra" Guarijío, and the lowland dialect "River" Guarijío.

[6] According to Miller (1996), Guarijío's consonant inventory is: p, t, k, b, r, g, č, s, m, n, w, y, l, ', h. There are no geminate consonants. The monophthongal vowel inventory is: i, e, u, o, a. There is no distinctive vowel length.

Guarijío syllables are basically CV in shape, with derived codas after post-tonic vowel reduction (Miller 1996:34). In addition, some roots bear a glottal prosody (discussed in more detail in Haugen 2004) restricted to surfacing in association with the vowel of the first syllable of the word, between the first and the second syllable (e.g., *so'péči* 'bat', *ta'íča* 'to talk'). Glottal stop occurs nowhere else in the word.

There are a few monosyllabic roots, but most Guarijío roots are disyllabic and trisyllabic (Miller 1996:124). Trisyllabic roots have fixed second- or third-syllable stress. The few tetrasyllabic roots that exist in the language mostly have stress on the third syllable (Miller 1996:47-48). Some disyllabic roots have variable, morphologically conditioned stress.[7]

Guarijío has productive CV prefixing reduplication that indicates plural number, and iterative or durative aspect (Miller 1996:62), for example *ya-yawí*, 'to dance repeatedly' from *yawí*, 'to dance', or *sa-saé*, 'to smell repeatedly', from *saé*, 'to smell'. I will refer to this reduplicative pattern as "pluractional". Guarijío also has a less productive nominal CV prefixing reduplication to mark plural with human nouns, including kinship terms (Miller 1996:67).

The pluractional and nominal reduplication patterns resemble common reduplication patterns in other languages. However, Guarijío has another, typologically unusual verbal reduplication construction in which the first syllable of the base is reduplicated, while the base is truncated to its first syllable. This reduplication-plus-truncation pattern is labeled "abbreviated reduplication" by Miller (1996:65), and indicates inceptive aspect: it is precisely the kind of pattern that has been claimed in the literature not to exist. There is no independent process of truncation in the language, and the base is only shortened in this reduplicative construction.

(4)					
	a.	toní	'to boil'	to-tó	'to start boiling'
	b.	sibá	'to scratch'	si-sí	'to start scratching'
	c.	čonó	'to fry (intr)'	čo-čó	'to start frying'
	d.	nogá	'to move'	no-nó	'to start moving'
	e.	kusú	'to sing (animals)'	ku-kú	'to start singing'
	f.	suhku	'to scratch body'	su-sú	'to start scratching the body'
	g.	muhíba	'to throw'	mu-mú	'to start throwing'

(Miller 1996:65-66)

In Guarijío, some disyllabic verb roots have fixed stress on the second syllable, the root's final syllable, and some roots alternate between second (root-final) syllable stress when inflected for certain categories, like progressive and perfective, and third syllable stress (the suffix) when inflected for other categories, like future and potential (Miller 1996:124). Most verbs that undergo Abbreviated Reduplication share the

[7] Miller cites disyllabic verbs in their future form in order to inform the reader of the verb's stress properties. Verbs are cited in their root forms in this paper, since these bare roots are full prosodic words.

characteristic of being disyllabic and having stress on the suffix immediately following the verbal root when inflected for, e.g. future singular (e.g., *toni-má* 'to boil, future singular', or *siba-má* 'to scratch, future singular'). Not every verb with this stress pattern, however, undergoes Abbreviated Reduplication (Miller 1996:65).[8]

This construction does seem to be restricted to verbs of a particular semantic class. The Abbreviated Reduplication pattern is only available to a subset of verbs (Miller lists 23 verbs (1996:65-66)), compared to the pluractional reduplication. As Miller notes, "[v]erbs that allow the Abbreviated Reduplication do not conform to a syntactic class…but there is a constant meaning in the majority of these verbs. The actions [denoted by these verbs] might be analyzed as a succession of events, repeated or individual; for example: "biting", a succession of bites." (Miller 1996:169; my translation). Abbreviated Reduplication thus appears to target verbs denoting events which are iterative, construed as instantaneous, in terms of Vendler 1967. It is possible to relate the semantics of the target verbs to the semantics of the reduplication construction in the following way: without reduplication, these verbs denote an event which is punctual; with Abbreviated Reduplication, these verbs denote a punctual event that is about to take place. This suggests that the inceptive aspect is more complex and has an iterative component to it, which precludes it from applying to durative predicates.

There is one aspect of Abbreviated Reduplication that deviates from the straightforward phonological description given above. As mentioned above, there are words that contain a word-medial glottal stop. Following Zoll 1998, this glottal prosody can be analyzed as a floating feature of [+constricted glottis] ([+c.g.]) that is underlying in some roots and docks in the first syllable of the prosodic word. When such roots reduplicate, there is a glottal between the first and second syllable of the reduplicated form, as shown in (5).

(5) a.	/[+c.g.], pena/	pe'ná	'to gather'	pe'-pé	'to start gathering'
b.	/[+c.g.], čii/	či'í	'to suck'	či'-čí	'to start sucking'
c.	/[+c.g.], tona/	to'ná	'to knock'	to'-tó	'to start knocking'
d.	/[+c.g.], koa/	ko'á	'to eat'	ko'-kó	'to start eating'
e.	/[+c.g.], yoa/	yo'á	'to throw up'	yo'-yó	'to start throwing up'
f.	/[+c.g.], čona/	čo'ná	'to grind'	čo'-čó	'to start grinding'
g.	/[+c.g.], kiču/	ki'čú	'to bite'	ki'-kí	'to start biting'
h.	/[+c.g.], wona/	wo'ná	'to bark'	wo'-wó	'to start barking'

(Miller 1996:65-66)

The segmental materialization of the glottal prosody also emerges in the leftmost syllable in the pluractional and nominal reduplicative forms of roots with glottal prosody

[8] The forms after abbreviated reduplication often have stress in the second syllable (Miller 1996:168), but stress placement is largely unpredictable in this reduplicative construction. This is consistent with the stress behavior in the rest of the constructions in the language: Guarijío stress is lexical and morphology-dependent and words have either first, second or third syllable stress (Miller 1996:35).

(Miller 1996:63), consistent with the general phonotactic constraints of the language. The lexical entries of these roots are exemplified in the first column in (5), and sample derivations of a root with underlying glottal prosody are given in (6).

(6) /[+c.g.], pena /	→	[pe'na]	'to gather'
/[+c.g.], pena, RED/	→	[pe'pe]	'to start gathering'

There are no glottalized consonants in Guarijío, and this leaves the leftmost vowel as the optimal place for the feature [+c.g.] to emerge (excluding forms like **p'e-pe*).

In sum, Guarijío Abbreviated Reduplication involves simultaneous reduplication and truncation to mark inceptive aspect. Truncation does not occur as a separate process in the language, but is exclusive to this construction. Although many of the verb roots that allow Abbreviated Reduplication belong to the same prosodic category (third-syllable stress when inflected for some morphological categories), these verbs more clearly form a semantic class - verbs that are punctual and iterative. This semantic factor is responsible for the restricted number of forms that undergo the process.

In the next section, the Guarijío data is modeled in a BRCT analysis with templatic constraints, where the reduplicant equals a core syllable. While it is not crucial for the analysis, I will treat this reduplication pattern as prefixing, following Miller 1996.

3. Guarijío Abbreviated Reduplication in templatic BRCT

Parallel evaluation of output forms in BRCT can lead to the disruption of regular phonological processes in reduplication for the sake of reduplicative identity, including copying a reduplicative prosodic template back onto the base. BRCT's main claims are summarized in (7):

(7) BRCT with templatic constraints
- a) Identity in reduplication is phonological
- b) Base-Reduplicant (BR)-Identity[9] provides content to the reduplicant
- c) Red=X >> BR-Identity provides for reduplicative truncation
  (where X = a prosodic template)
- d) The ranking "Phono-Constraint" (Phono-C) >> BR-Identity accounts for The Emergence of the Unmarked (TETU)
  (reduplicants relatively unmarked)
- e) High ranking BR-Identity accounts for over- and under-application
  (including *backcopying*)

[9] McCarthy & Prince's 1993 "Basic Model" of reduplication involves correspondence relations between input and output (IO-Faithfulness), and between base and reduplicant (BR-Identity).

In this version of BRCT, the Guarijío Abbreviated Reduplication pattern can easily be generated through an analysis that employs a templatic constraint, RED=σ. The constraints that give the reduplicant's size are defined in (8).

(8) Constraints that determine reduplicant size in BRCT

RED=σ	Align both edges of the reduplicant with the edges of a syllable
MAX-BR	Every element in the base has a correspondent in the reduplicant 'No partial reduplication'
MAX-IO	Input segments must have output correspondents 'No deletion'

RED=σ is violated when the reduplicative suffix is not equal to a syllable. The ranking MAX-BR, RED=σ >> MAX-IO yields partial reduplication and triggers truncation in the base, as shown in Tableau 1 (roots are underlined).[10] Only the most relevant candidates are evaluated.

Tableau 1 – RED = σ in Guarijío

	/ RED+<u>toni</u> /	MAX-BR	RED=σ	MAX-IO
a)	toni-<u>toni</u>		*!	
b)	to-<u>toni</u>	*!*		
c)	toni-<u>to</u>		*!	**
☞d)	to-<u>to</u>			**

The highly ranked MAX-BR and RED=σ favor the candidate that truncates both the reduplicant and the base (candidate (d)), at the expense of MAX-IO. This result holds independently of whether the reduplicant is represented as a prefix or a suffix. Specifically, in either a prefixing or a suffixing analysis ANCHOR-L(RED, Base) is needed, since the reduplicant copies from the left edge of the base (and this is why we do not get *ni-ni* from toni-RED). The difference is one of alignment: ALIGN-R(RED, Base) is highly ranked in a suffixing analysis, while ALIGN-L(RED, Base) is highly ranked in a prefixing one.

[10] The pluractional and nominal reduplication patterns differ in how they interact with the phonology of the language, since they do not trigger backcopy; specifically, these reduplicative morphemes would fare differently with respect to MAX-BR. A language with several reduplicative affixes can have different, separately rankable constraints (McCarthy & Prince 1999:226). The specifics of the analysis of the pluractional reduplicative morpheme and the nominal reduplicative morpheme will not be dealt with in this paper.

(9) Anchoring and alignment (McCarthy & Prince 1993, 1995)

ANCHOR-L(RED, Base)	The leftmost element of the reduplicant corresponds to the leftmost element of the base.
ALIGN-L(RED, Base)	The reduplicant is at the left edge of the base (RED is a prefix)
ALIGN-R(RED, Base)	The reduplicant is at the right edge of the base (RED is a suffix)

These constraints do not interact in a crucial way with MAX-IO, MAX-BR and RED=σ, the constraints which determine reduplicant size. Tableau 2 below shows that regardless of whether the reduplicant is considered to be a suffix (candidates (a-f)) or a prefix (candidates (g-l)), the winning candidate is *to-to* (candidates (d) and (j)).

Tableau 2 – Prefixing vs. suffixing candidates in Guarijío Abbreviated Reduplication

	toni,Red_{affix}	ANCHOR-L (RED,Base)	**ALIGN-R (RED,Base)**	**ALIGN-L (RED,Base)**	MAX-BR	RED=σ	MAX-IO
a)	toni-toni			*		*!	
b)	toni-to			*	*!*		
c)	to-toni			*		*!	**
(☞)d)	to-to			*			**
e)	toni-ni	*!		*	**		
f)	ni-ni	*!		*			**
g)	toni-toni		*			*!	
h)	to-toni		*		*!*		
i)	toni-to		*			*!	**
(☞)j)	to-to		*				**
k)	ni-toni	*!	*		**		
l)	ni-ni	*!	*				**

Similarly, the reduplicated forms of roots with underlying glottal prosody do not affect the constraints that determine reduplicant size. Recall from Section 2 that glottal stop in Guarijío is a segmental materialization of a glottal prosody that exclusively surfaces between the first and second syllable of the word. Forms like *pe'-pé*, 'to start gathering', do not constitute a violation to BR-Identity because the glottal stop is not part of either the base or the reduplicant.

In sum, alignment of the reduplicant and realization of the glottal underlying prosody in reduplication are independent of the constraints that yield reduplicant size. The relevant ranking for Guarijío Abbreviated Reduplication is shown in (10).

(10) MAX-BR, RED=σ >> MAX-IO

This is, of course, the problematic ranking (shown in (2b)) that gives "Backcopying Overapplication" of Templatic Constraint in the Kager-Hamilton problem. It thus seems that the apparent overgeneration conundrum assumed in McCarthy & Prince 1994, Spaelti 1997, Idsardi & Raimy to appear, among others, does not exist.[11]

The existence of the Guarijío Abbreviated Reduplication pattern, however, does not necessarily entail that it must be modeled as templatic backcopying. The next section discusses possible alternatives of analysis of Guarijio Abbreviated Reduplication compatible with GTT, where size restrictions are derived through general markedness constraints on the phonological properties of morphemes.

4. Guarijío Abbreviated Reduplication in a-templatic GTT

4.1 Templatic backcopying

Given its CV shape and the fact that stems in Guarijío are overwhelmingly disyllabic or trisyllabic, the reduplicant in Guarijío must be treated as an affix in GTT:

(11) RED(INC) = AFFIX The reduplicant (Inceptive) in Guarijío is affixed

Monosyllabicity of the reduplicant must be derived through a size-restrictor constraint which is ranked higher than MAX-BR. Early versions of GTT have used the size-restrictor constraint AFFIX≤σ: "so long as MAX(-BR) is low ranking, this entails monosyllabicity of the reduplicant, through AFFIX≤σ" (M&P 1994:A13).[12] More recent work within GTT use a structural constraint, *STRUC-σ, ranked above MAX-BR to derive the monosyllabicity of reduplicative affixes (Urbanczyk 2006). *STRUC-σ (Zoll 1998:131) is part of the *STRUC family of constraints which penalize structure (Prince & Smolensky 1993). Every syllable gets a violation.

(12) *STRUC-σ 'No syllables'

*STRUC-σ must be highly ranked, given that the reduplicant truncates. The monosyllabicity of the reduplicant is derived through *STRUC-σ >> MAX- BR. Since the

[11] Arguments in favor of template-based analyses over a-templatic ones can be found in Inkelas' 1999 analysis of exceptional stress in Turkish and Downing's 2000 analysis of Kinande verbal reduplication.

[12] This size-restrictor constraint leads to a loophole in the GTT, initially brought up in the literature by Spaelti 1997: there is nothing that can rule out templatic backcopying in a language with the ranking AFFIX≤σ, MAX-BR >> MAX-IO. In such a language all affixes would be monosyllabic or smaller. This means that the GTT is restricted to rule out backcopying in languages that have stems longer than prosodic words and affixes longer than syllables.

base also truncates, however, it must be the case that MAX-BR outranks MAX-IO. This ranking eliminates candidates with faithful reduplicants in favor of the candidate with the fewest number of syllables, yielding partial reduplication. Consider Tableau 3:

Tableau 3 – RED = affix in Guarijío

	Red_{affix}+toni	*STRUC-σ	MAX-BR	MAX-IO
a.	toni-toni	***!*		
b.	to-toni	***!	**	
c.	toni-to	***!		**
☞d.	to-to	**		**

If *STRUC-σ were ranked lowest, the reduplicant would not truncate (*toni-toni*). Ranking MAX-IO as lowest yields the back-copied form (*to-to*), but also predicts that there are no polysyllabic roots in this language.[13] Since Guarijío does have polysyllabic roots and affixes, it must be the case that MAX-IO outranks *STRUC-σ.[14] This ranking, however, has the effect of eliminating the form with backcopying, giving the unattested *to-toni,* as shown in Tableau 4.

Tableau 4 – RED = affix in Guarijío

	Red_{affix}+toni	MAX-IO	*STRUC-σ	MAX-BR
a.	toni-toni		***!*	
(☞) b.	to-toni		***	**
c.	toni-to	*!*	***	
💣 d.	to-to	*!*	**	

GTT thus leads us to a ranking paradox: for backcopying to be possible, the constraint that defines the shape of the reduplicant (in this case *STRUC-σ) must outrank MAX-IO (as in Table 3); and for the unmarked size of the reduplicant to emerge in reduplication, MAX-IO must outrank MAX-BR (as in Table 4). In other words, it is impossible to backcopy an emergent phonological property, since backcopying and The Emergence of the Unmarked (TETU) require mutually incompatible constraint rankings (McCarthy & Prince 1999:266).

But while GTT is not able to generate the Guarijío pattern as backcopying, there could be other possible analyses compatible with this theory. Specifically, Abbreviated Reduplication might be thought of as involving i) separate processes of truncation and reduplication in a feeding relationship, or ii) a high ranked output maximality constraint that leads to truncation of the base.

[13] This prediction, of course, would not hold in a cophonology analysis, where this particular ranking would be exclusive to the reduplicative construction.

[14] For a parallel treatment of partial reduplication in GTT, see Urbanczyk 2006.

4.2 Alternatives to backcopying within GTT

Any apparent case of templatic backcopying could be analyzed as the coincidental co-occurrence of two independent morphological processes in the same word: truncation to one syllable and (subsequent) normal reduplication. A hypothetical example is provided in (13):

(13) Hypothetical independent application of truncation and reduplication in Guarijío

		Truncation	*Reduplication*	
a.	kusú	kú	ku-kú	'to start singing'
b.	muhíba	mú	mu-mú	'to start throwing'

If Guarijío had an independently motivated truncation process the Abbreviated Reduplication pattern could conceivably be analyzed as the reduplication of a truncated word, but no such process exists in Guarijío. Also, there are other language-internal reasons to believe that Guarijío Abbreviated Reduplication does not involve separate processes of truncation and reduplication. As discussed in Section 2, most roots undergoing Abbreviated Reduplication are disyllabic with stress falling on a following suffix, the third syllable. These verbs truncate one syllable in Abbreviated Reduplication. This could lead us to hypothesize that Guarijio Abbreviated Reduplication might arise from truncation and minimality-induced reduplication, as one anonymous reviewer suggests. But Guarijio verb roots are not minimally disyllabic - Miller does document a few monosyllabic verbs (1996:124). If reduplication was being used as a repair strategy for sub-minimal stems, we would expect that the present or the recent past forms of these roots –categories realized through the bare root in Guarijío (Miller 1996:27-29)- would be reduplicated, but Miller does not document such forms. Furthermore, there is a documented trisylabic root with second syllable stress (*muhíba* 'to throw') that truncates *two* syllables, supporting the thesis that truncation arises from Base-Reduplicant correspondence, rather than from a different phonological process. This single documented trisyllabic verb root is significant, if we keep in mind that there is a limited number of verbs that allow this reduplicative pattern (due to the semantic restrictions mentioned in Section 2).[15]

Another possible solution for generating the Guarijío pattern is an analysis where truncation in the base arises through a high-ranked constraint that limits the shape of the output to be of a certain size. As an anonymous reviewer suggests, Guarijío Abbreviated Reduplication may reflect the consequence of a maximality output-size restriction. This result could be obtained through a high ranked output maximality constraint $\textsc{Lex}=(\sigma\ \sigma)_{\text{Ft}}$, which enforces lexemes to be maximally a disyllabic foot. This hypothesis is consistent with the central tenets of the GTT: the reduplicant's size would be derived through

[15] Another possible clue of the status of this trisyllabic root for the Abbreviated Reduplication construction could be the relative frequency of disyllabic verbs in the language with respect to trisyllabic roots. Miller does not provide this information, and so this issue remains for future research.

general constraints on syllable shape that emerge in reduplication via the ranking MAX-IO >> *STRUC-σ >> MAX-BR, but an undominated LEX=$(\sigma\ \sigma)_{Ft}$ would enforce truncation from the base to fit the maximal disyllabic size of the output. The reduplicative morpheme would need to have a phonological exponent in the output due to the constraint REALIZE-MORPHEME (Walker 2000). This restriction would preclude forms in which the reduplicant is not realized phonologically. [16]

This approach does not seem viable, however. If this output size constraint were in fact responsible for truncation of the base in Guarijío, this would entail that the constraint LEX=$(\sigma\ \sigma)_{Ft}$ would be ranked above MAX-IO. However, this ranking would also predict that all output words in the language would have to be a foot long, but this is not the case. As mentioned in Section 2, Guarijío trisyllabic and tetrasyllabic roots are not uncommon.

As Downing (2000:33) points out, constraints on word maximality do not tend to apply generally in all morphological constructions of a language, but are rather specific to just certain morphological contexts, such as truncation and hypocoristic formation. Size restrictor constraints thus cannot outrank MAX-IO, because it is not the case that all morphological categories across a language systematically violate input faithfulness to satisfy size restrictions (Downing 2000:33). The two GTT-compatible analyses of Guarijio Abbreviated Reduplication considered here fall into this trap: it is not possible to predict phonological effects that occur in reduplication patterns through highly ranked markedness constraints that outrank IO-Faithfulness without also predicting that these effects should be found *outside* of reduplication.

In an alternative view, reduplicative patterns may exhibit phonological effects different from those found in other constructions of the same language as an instance of morphologically conditioned phonology (Inkelas & Zoll 2005:67). The next section presents a Morphological Doubling Theory (MDT; Inkelas & Zoll 2005) analysis of Guarijío Abbreviated Reduplication. Making crucial use of cophonologies, or

[16] The option of deriving Guarijio Abbreviated Reduplication through a highly ranked output maximality constraint like LEX=$(\sigma\ \sigma)_{Ft}$ might be related to a larger issue, brought up by an anonymous reviewer. The appearance of templatic backcopying could be conceived as related to the handling of underapplicational phenomena in GTT, defined in broad terms as the situation in which an unmarked or default element appears in a context where the phonology of the language requires a marked element (McCarthy & Prince 1999:284). This reviewer suggests that truncation of the base in reduplication could be analyzed as emergent unmarked prosodic structure appearing in a context where marked prosodic structure is expected, i.e., the base. Templatic form would be just one kind of unmarked property that GTT predicts not to backcopy in reduplication. McCarthy & Prince (1999:284), however, allow the appearance of underapplication to be achieved if the phonology of the language contains a higher ranked constraint that independently of reduplication provides a context in which an unmarked element is required (such as the maximality constraint mentioned above). More research about prosodic word structure of Guarijío might uncover a path to an analysis of the Guarijío pattern in the spirit of the underapplication analysis in GTT, but this task and a thorough discussion of the implications of the GTT for underapplication phenomena are left as open questions for future research.

construction-specific phonological mappings, in this theory the restrictions on prosodic size of base and reduplicant are not expected to hold outside the reduplicative construction.

5. Guarijío Abbreviated Reduplication in Morphological Doubling Theory

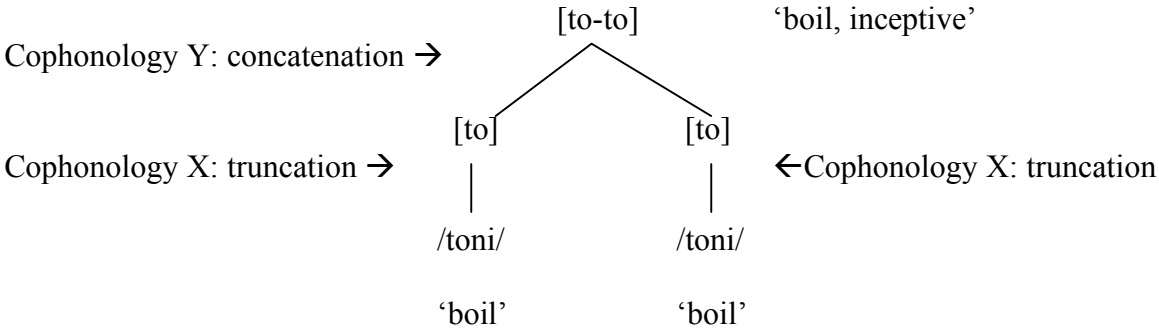
In Morphological Doubling Theory (MDT; Inkelas & Zoll 2005), reduplication is a matter of *morpho-semantic* identity between two copies of the reduplicative construction, where phonological modifications are possible on either or both copies. The constructional approach adopted in MDT makes crucial use of cophonologies (Orgun 1996; Anttila 1997, 2002; Inkelas 1998; Inkelas & Zoll 2003), or construction-specific phonological grammars. Cophonologies handle morphologically conditioned phonology through fully general constraints and multiple rankings for different morphological constructions. In this theory, reduplicative constructions involve three cophonologies: one for each copy of the reduplicated construction (daughters), which in turn serve as inputs to the reduplicative construction, the third (mother) cophonology (Inkelas & Zoll 2005:87). Each daughter may undergo phonological changes due to phonological constraints imposed by a stem forming construction, and the mother cophonology may impose phonological constraints that apply to the construction as a whole (Inkelas & Zoll 2005:25).

This model makes strong predictions about the range of phonological modifications possible in reduplication. First, it predicts that the copies of the reduplicative construction might be associated with different cophonologies, undergoing divergent phonological modifications (Inkelas & Zoll 2005:82). This prediction is borne out in cases like Hausa tonal modification in augmentative adjective reduplication (Newman 2000:74), where the first copy has high tone and the second low tone (for discussion of this and other cases see Inkelas & Zoll 2005:83-86).

Second, this model also predicts that both copies of the reduplicative construction can be associated with the same cophonology, undergoing "parallel modification", or parallel imposition of phonological effects such as truncation or contrast reduction within the reduplicant (Inkelas & Zoll 2005:87). In this respect, MDT also differs drastically from BRCT and GTT, which specifically rule out this kind of phenomenon.

In MDT, Guarijío Abbreviated Reduplication does not involve backcopying, but is rather a straightforward case of parallel modification, where both daughters of the reduplicative construction are associated with a cophonology that truncates the verb to its first syllable. The outputs of truncation are then associated into a constituent, the inceptive aspect construction. The truncated stems are the input to the cophonology of the mother node of the reduplication construction (Inkelas & Zoll 2005:88). This is shown schematically in (14).

(14) Guarijío Abbreviated (inceptive) Reduplication construction



More than one phonological model can be chosen for the formalization of the cophonologies. For instance, we can assume that truncation of the input occurs in Cophonology X (the daughters' cophonology) due to a constraint that requires the output to be a light syllable (OUTPUT=CV), ranked above Input-Output Faithfulness (IO-Faith) (Inkelas & Zoll 2005: 84-85), as exemplified in (15).

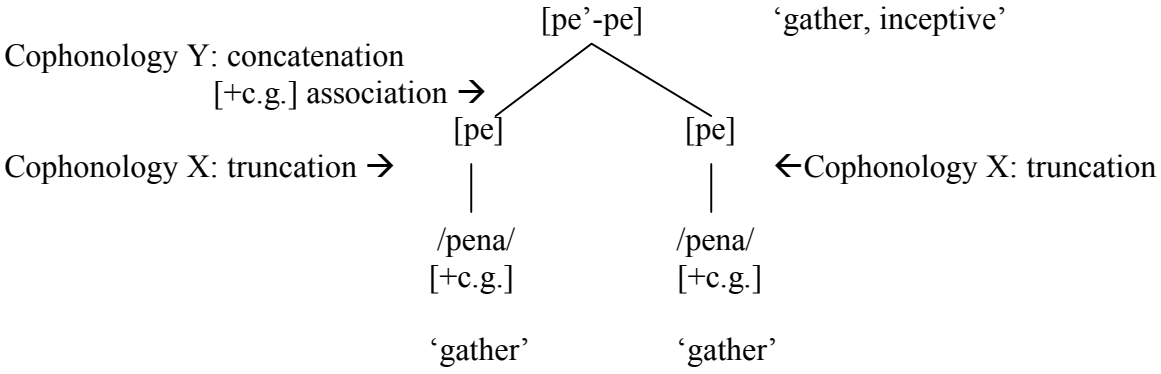
(15)

Cophonology X	/toni/	Output=CV	IO-Faith
a.	toni	*!	
☞ b.	To		**
c.	ton	*!	*

Rules or constraints might be used, and constraints might be templatic or a-templatic. The issue at stake is rather that reduplicative phonology is considered a product of the same principles that govern morphologically conditioned phonology in general (Inkelas & Zoll 2005:68). Thus, although possible, it is not necessary for the constraints or rules that condition truncation in reduplication to do so in the rest of the language. That is, reduplicative constructions may exhibit phonology not found in other constructions of the same language. This contrasts with the GTT-compatible approach of separate truncation and reduplication processes (as described in (13)), where truncation must be assumed to be an independently motivated process in the language.

Finally, as predicted by MDT, the Abbreviated Reduplication construction is associated with its own distinctive phonology as a whole: the [+c.g.] feature underlying to some roots is assigned to the leftmost vowel of the prosodic word in the cophonology of the mother node of the reduplicative construction. This is shown in (16).

(16) Guarijío Abbreviated Reduplication of roots with glottal prosody



MDT is, thus, at least equally successful as BRCT with templatic constraints in deriving the Guarijio Abbreviated Reduplication pattern. There are, however, reasons outside the Guarijio data to prefer MDT's parallel modification analysis over BRCT's templatic backcopying analysis. As pointed out by Inkelas & Zoll (2005:88), while the later approach is able to model truncation of the base and reduplicant – as in Guarijio-, it is not able to model other cases of parallel modification in reduplication. One such case is Hausa denominal adjectival reduplication, where nouns undergo total reduplication. In this reduplicative construction the final vowel of both copies shortens (Newman 2000:27; Inkelas & Zoll 2005:87):

(17)	gishiri**:**	'salt'	gishir**i**-gishir**i**	'salty'
	bùh**u:**	'sack'	bùh**u**-bùh**u**	'sacklike'
	gà:r**i:**	'flour'	gà:r**i**-gà:r**i**	'powdery'

In order to model word-final vowel shortening in BRCT, a constraint militating against final long vowels has to be higher ranked than the constraint preserving vowel length from the input representation. This ranking, however, incorrectly predicts that all final vowels shorten in this language (Inkelas & Zoll 2005:88-89).

Both Hausa denominal adjectival reduplication and Guarijío Abbreviated Reduplication are predicted to exist by MDT with cophonologies. This theory is also necessary to model cases of "divergent modification", where each copy of the reduplication construction is able to display divergent phonological modifications. Although MDT using cophonologies and BRCT with templatic constraints might seem equally successful in modeling the Guarijío data, the former theory should be preferred over the later due to its broader empirical coverage.[17]

[17] Though not a critical factor, recall that BRCT poses an analytic ambiguity concerning the alignment of the reduplicant, since there are no factors that can help us decide between a prefixing or a suffixing analysis of Abbreviated Reduplication. An MDT approach, on the other hand, does not pose this analytic ambiguity.

Finally, this analysis has consequences for the Tagalog nasal substitution pattern given as an example of backcopying in (1), since backcopying of any kind (templatic or segmental) is not an analytic possibility in MDT. Evidence found after a detailed examination of Tagalog morphology led Inkelas & Zoll (2005:183) to argue that reduplication is infixing and that it applies to the output of reduplication (for more details that justify this analysis, see Inkelas & Zoll 2005:183-185). Schematically:

(18) Prefixation as input to reduplication: [pa**m**utul] (/paN+pu:tul/)

Output of infixing reduplication [pa-**m**u-**m**u:tul]

"Because reduplication operates on prefixed stems, the output of nasal fusion is thus present in the input to reduplication" (Inkelas & Zoll 2005: 183). There is no backcopying, but just transparent application of phonology rendered opaque by reduplication.

6. Summary

The Guarijío case adds to a small but growing collection of possible counterexamples to the claim that a grammar with templatic constraints overgenerates (cf. Downing 2000 and Inkelas & Zoll 2005). The evidence presented here suggests that Guarijío Abbreviated Reduplication instantiates the pattern that McCarthy & Prince 1999 (and others) thought of as templatic backcopying, reinstating the need for templatic constraints in BRCT. This paper, however, also argues that templatic backcopying might not be the best analysis for Guarijio Abbreviated Reduplication. In MDT using cophonologies, the Guarijio case resembles other documented cases of parallel imposition of phonological modifications in both copies of reduplication. Though similar in spirit to MDT in rejecting templatic backcopying, the alternatives within GTT run into the problem of predicting that the size restrictions that affect the reduplicant occur as independently motivated processes in the language. This apparent case of templatic backcopying can be recast as an instance of "parallel modification" in a theory where phonological opacity effects in reduplication arise through the intrinsic layering of the cophonologies in the reduplicative construction, and not due to phonological identity effects between base and reduplicant.

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