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A case for parallelism: reduplication-repair interaction in Maragoli

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Abstract

This paper carries out a detailed investigation into new data from Maragoli displaying an interaction between reduplication and hiatus repair. The data give rise to paradoxical, opportunistic orderings of phonological processes: in one set of inputs, copying before repairing avoids a complex onset, while in another set, repairing before copying avoids an onsetless syllable and maximizes word-internal self-similarity. Based on attested words and nonce probe data elicited from a native speaker, I argue that a successful analysis of the interaction requires direct comparison between forms derived by opposite orders of phonological changes. The orderings receive a full analysis in Parallel Optimality Theory (Prince & Smolensky 1993/2004) but translate into constraint ranking paradoxes in Harmonic Serialism with Serial Template Satisfaction (McCarthy et al. 2012). The data thus constitute evidence for *irreducible parallelism* in the sense of McCarthy (2013).

1. Introduction

One characteristic of Optimality Theory (OT; Prince & Smolensky 1993/2004) that distinguishes it from constraint-based serial frameworks is its commitment to parallelism: optimal satisfaction of the constraint hierarchy is computed over the whole hierarchy and the entire set of candidates. Parallelism was said to carry with it a number of striking advantages, including the widespread treatment of a variety of reduplication-phonology interactions which challenge conventional serialism but which are readily captured if reduplicative identity and phonological constraints are assessed in parallel (McCarthy & Prince 1986/1996). Yet with the more recent revival of constraint-based serialism, and in particular with the advent of the framework Harmonic Serialism with Serial Template Satisfaction (McCarthy et al. 2012), cases of reduplication and its interaction with other phonological processes have been successfully captured in a way that applies changes one at a time. This paper examines a reduplication-repair interaction found in Maragoli, a Bantu language spoken primarily in Kenya. It argues based on attested words and nonce probe data elicited from a native speaker that a successful analysis of it requires direct comparison between candidates displaying multiple changes to the input — in particular, candidates that would be derived by opposite orders of changes. The data give rise to paradoxical, opportunistic orderings of phonological processes, with changes applying in whichever order yields a simplex surface onset: in one set of inputs, copying before repairing avoids a complex onset, while in another set, repairing before copying avoids an onsetless syllable and maximizes word-internal self-similarity. The orderings are fully analyzable in Parallel Optimality Theory, which can directly compare the well-formedness of candidates displaying opposite orders of changes, but translate into constraint-ranking paradoxes in Harmonic Serialism with Serial Template Satisfaction. The interaction thus constitutes evidence for *irreducible parallelism*, in the sense of McCarthy (2013): though capturable if multiple changes take place in the same step of the derivation, the interaction cannot be expressed in Harmonic Serialism, which requires phonological changes to take place one at a time under a fixed constraint ranking.

The paper is structured as follows. Section 2.1 gives an empirical background for the reduplication-repair interaction, and Section 2.2 provides the results of a nonce probe study suggesting that Maragoli speakers internalize the interaction. Section 3.1 shows how the interaction can be captured in Parallel OT, while Section 3.2 illustrates the ranking paradoxes that arise in the Harmonic Serialism account. Section 3.3 discusses and ultimately rejects alternative serial analyses. Section 4 concludes.

2. Empirical background and preliminary observations

Maragoli (also referred to as Lulogooli, Luragoli, Llogoori) is a Bantu language of the Luyia family spoken primarily in western Kenya by roughly 600,000 people (Mould 1973, Bastin 2003). Prior coverage of Maragoli phonology includes dictionaries (Friends 1940, Ndanyi & Ndanyi 2005), a sketch grammar (Leung 1991), and theoretical treatments of individual aspects of the grammar (Leung 1991, Goldsmith 1992, Eshun 2007, Glewwe & Aly 2015). The data presented in this paper were elicited from a native speaker of Maragoli in a Field Methods class at UCLA in January of 2015. My consultant was born in the United States, but grew up in Nairobi. He speaks Maragoli natively and is proficient in both English and Swahili.

In Maragoli, vowels are distinguished by height, tenseness, backness/roundness, and length (e.g., [ɾi-kudu] = NCL7-turtle versus [ɾi-kuːɾu] = NCL7-owl), its phoneme inventory containing 14 vowel phonemes: /i iː e eː ɛ ɛː a aː ɔ ɔː o oː u uː/. In addition, the inventory contains 21 consonants: /p b t d tʃ dʒ k g f v s z h l ɾ m n̪ n ɲ w j/.

Like many Bantu languages, Maragoli has noun classes identifiable by characteristic prefixes (labeled NCL in the glosses below), and in addition exhibits noun class agreement, which too presents as a set of prefixes (labeled AGR).

(1a)	m̩-tʃɛːɾɛ	go-ɾa	(1b)	e-suːze	e-ndaːhe[1]
	NCL3-rice	AGR3-this		NCL9-fish	AGR9-pretty
	‘this rice’			‘pretty fish’	

Noun classes, associated prefixes, and representative examples are shown in the table below. The noun class numbers are adopted from Leung (1991).

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[1] Note that the language forbids codas, and so the nasal in [e-ndaːhe] is syllabified in the onset of the second syllable of the word (*cf.* [n-deː] = 1sg-eat-PAST = ‘I ate’).

Class	Noun class prefix	Examples showing noun class prefix UR	Agmt. prefix	Examples showing agmt. prefix UR
1	/mu/-	mu-saːza, 'man'	/o/-	o-ɾa, 'this'
2	/va/-	va-saːza, 'men'	/va/-	va-ɾa, 'this'
3	/m̩/-	m̩-tʃɛːɾɛ, 'rice'	/go/-	go-ɾa, 'this'
4	/mi/-	mi-tʃɛːɾɛ, 'rice' (pl.)	/dʒi/-	dʒi-ɾa, 'this'
5	/ɾi/-	ɾi-duːma, 'corn'	/ɾi/-	ɾi-lahe, 'pretty'
6	/ma/-	ma-duːma, 'corn' (pl.)	/ga/-	ga-ɾa, 'this'
7	/ke/-	ke-saːɾa, 'branch'	/ke/-	ke-ɾa, 'this'
8	/vi/-	vi-saːɾa, 'branches'	/vi/-	vi-ɾa, 'this'
9	/e/-	e-suːze, 'fish'	/e/-	e-ɾa, 'this'
10	/zi/-	zi-suːze, 'fish' (pl.)	/zi/-	zi-ɾa, 'this'
11	/ɾo/-	ɾo-baho, 'wood'	/ɾo/-	ɾo-ɾa, 'this'
10	/zi/-	zi-baho, 'woods'	/zi/-	zi-ɾa, 'this'
12	/ka/-	ka-saːɾa, 'twig'	/ka/-	ka-ɾa, 'this'
13	/to/-	to-saːɾa, 'twigs'	/to/-	to-ɾa, 'this'
14	/vo/-	vo-meɾika, 'America'	/vo/-	vo-ɾa, 'this'
15	/ko/-	ko-sjɛːva, 'dance'	/ko/-	ko-ɾa, 'this'
16	/ha/-	ha-voːndu, 'place'	/ha/-	ha-ɾa, 'this'
18	/mu/-	mu-sukuɾu, 'in school'	/mu/-	mu-ɾa, 'this'
20	/go/-	go-kudu, 'big turtle'	/go/-	go-ɾa 'this'
4	/mi/-	mi-kudu, 'big turtles'	/dʒi/-	dʒi-ɾa 'this'

Table 1: *noun classes, noun class and agreement prefixes, and representative examples*

Like many Bantu languages, Maragoli forbids vowel hiatus, employing a variety of repairs to avoid it (McLaren 1955, Bergman 1968, Brown 1970, Awobuluyi 1972, Aoki 1974, Elimelech 1978, Casali 1998), enumerated below. I provide a brief introduction to the repairs, but give them a more thorough treatment in the OT analysis in Section 3.1.

In Maragoli glide formation, tense vowels surface as glides when they precede another vowel. This can be observed below in forms involving noun class agreement prefixes:

Glide formation

(2a) vi-ɾa vj-aːŋgɛ (/vi+angɛ/) vj-a (/vi+a/)
AGR8-this AGR8-my AGR8-of
'this' 'my' 'of'

(2b)	e-ɾa	j-aːŋgɛ (/e+angɛ/)	j-a (/e+a/)
	AGR9-this	AGR9-my	AGR9-of
	‘this’	‘my’	‘of’
(2c)	go-ɾa	gw-aːŋgɛ (/go+angɛ/)	gw-a (/go+a/)
	AGR3-this	AGR3-my	AGR3-of
	‘this’	‘my’	‘of’
(2d)	mu-ɾa	mw-aːŋgɛ (/mu+angɛ/)	mw-a (/mu+a/)
	AGR1-this	AGR1-my	AGR1-of
	‘this’	‘my’	‘of’

The underlying forms of the agreement prefixes above must be identical to their vocalic allomorphs, as the glided allomorphs reflect a neutralization of height. Glide formation applies to the above prefixes before vowel-initial stems: in particular, /i e/ and /o u/ surface as [j] and [w], respectively. The following vowel undergoes compensatory lengthening in the wake of glide formation, unless it is word-final, in which case lengthening is blocked, as in the ‘of’ forms. Maragoli also productively deletes vowels in particular environments to resolve hiatus. /a/ elides before other vowels, as the following data illustrate:

Low vowel elision

(3a)	ma-duːma	m-uːva (/ma+uva/)
	NCL6-corn	NCL6-sun
	‘corn’	‘suns’
(3b)	ga-ɾa	g-eːtu (/ga+etu/)
	AGR6-this	AGR6-1pl.POSS
	‘this’	‘our’

Moreover, /i/ elides following front vowels, as we see with the /-iz/ suffix:

Front vowel elision

(4)	mw-ig-iz-i	ko-sjɛː-z-a (/ko+sjɛ+iz+a/)
	2sg-learn-CAUS-PAST	1pl-grind-CAUS-PROG
	‘you teach’	‘we cause to grind’

Compensatory lengthening applies to the surviving vowel both after low vowel elision, as in (3a), and front vowel elision, as in (4). Finally, when a velar stop precedes a hiatus with an initial tense front vowel, the velar palatalizes, and the following vowel surfaces as a glide:

Velar palatalization

(5a)	ke-ɾa AGR7-this ‘this’	tʃj-aːŋgɛ (/ke+angɛ/) AGR7-my ‘my’
(5b)	a-ge-ɾɛmɛɾ-a 3sg-NCL9-make.float-PROG ‘(s)he makes it float’	a-dʒj-ɛːn̪-a (/a+ge+ɛn̪+a/) 3sg-NCL9-want-PROG ‘(s)he wants it’

/k{i e}V/ and /g{i e}V/ sequences surface as [tʃjV] and [dʒjV] respectively. Note that our consultant displayed variation in the extent of reduction, occasionally producing [kjV], and at other times [tʃV] (*cf.* Glewwe and Aly 2015).[2]

2.1 Reduplicative possessives in Maragoli

This paper concerns primarily the interaction between hiatus repair and prefixal reduplication, the latter of which is observed exclusively in the human possessive paradigm. We thus begin with an account of the morphology of human possessives. Consider the possessive forms below, which are associated with the class 8 agreement prefix /vi/-, as in (2a).

	1p	2p	3p
Sing.	vj-aːŋgɛ ‘my’ (class 8)	**viː-vj-ɔ** ‘your (sg.)’ (class 8)	**viː-vj-ɛ** ‘his/her’ (class 8)
Pl.	vj-eːtu ‘our’ (class 8)	vj-eːɲu ‘your (pl.)’ (class 8)	vj-aːvɔ ‘their (pl.)’ (class 8)

Table 2: *Noun class 8 possessive paradigm*

The first-person singular possessive and the plural possessives in Table 2 display glide formation of the prefix vowel and compensatory lengthening of the subsequent stem vowel. The stem URs for these forms are therefore taken to be identical, minus length, to their surface forms, as shown below in Table 3a-b. The second- and third-person singular possessives — hereafter referred to as *reduplicative possessives* — display reduplication of the agreement prefix as well as glide formation.[3] Reduplicative possessives are part of a growing number of patterns characterized by a one-to-many mapping between meaning and form, with possessive status spelled out as both reduplicated material and the fixed stem-internal material (see, for example, Stonham 1994, Downing & Inkelas 2015 for the same pattern in Nitinaht, and Dayley 1989, Haugen 2008 for the

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[2] Though the language features them, tones are withheld from transcriptions, as tonal process have not been found to be relevant to the reduplication-repair interaction covered below (*cf.* Leung 1991). For reference, in all reduplicative possessives, the first syllable receives low tone while the second receives high tone. For example, we observe [gùː-gw-ɔ́] and [gw-ìː-gw-ɛ́].

[3] Unfortunately, we cannot observe reduplication in reduplicative possessives in isolation from hiatus repair, since all reduplicative possessives interact with some repair in the language. The rationale for presenting first the forms in Table 2 and in (6-8) is that they maximally elucidate the underlying forms adopted throughout the analysis.

same pattern in Tümpisa Shoshone; see Inkelas & Zoll 2005 for other cases). In the following OT analysis, I follow Marantz (1982) and later work in assuming that the reduplicated content is part of a prefixal template, and refer to copied material as the *reduplicant*, labeled below as RED.

Immediately below I present only a few reduplicative possessives — enough to motivate the general structure of underlying forms. The full data set will be presented thereafter, followed by discussion of the properties of copied material (e.g., vowel length and height). Consider the forms below:

(6a)	vi-saːɾa	**viː-vj-ɔ** (from /vi/-)	(6b)	vi-saːɾa	**viː-vj-ɛ**
	NCL8-branches	RED-AGR8-2sg.POSS		NCL8-branches	RED-AGR8-3sg.POSS
	‘your branches’			‘their branches’	
(7a)	e-suːze	**jɔː-j-ɔ** (from /e/-)	(7b)	e-suːze	**jɛː-j-ɛ**
	NCL9-fish	RED-AGR9-2sg.POSS		NCL9-fish	RED-AGR9-3sg.POSS
	‘your fish’			‘their fish’	
(8a)	m̩-tʃɛːɾe	**guː-gw-ɔ** (from /go/-)	(8b)	m̩-tʃɛːɾe	**gw-iː-gw-ɛ**
	NCL3-rice	RED-AGR3-2sg.POSS		NCL3-rice	RED-3sg.POSS-AGR3-3sg.POSS
	‘your rice’			‘their rice’	

The possessives above contain the class agreement prefixes /vi/-, /e/-, and /go/- (*cf.* (2a-c)). We focus first on the second-person forms. [viː-vj-ɔ], as in (6a), can be broken up into three elements: two contiguous instances of the class 8 agreement prefix one of which is copied material, and a final stem vowel. [jɔː-j-ɔ] is similarly composed of three elements, but the first element contains an instance of both the following class 9 prefix and the final stem vowel. I take the reduplicant to be located word-initially, filling out the first syllable; if it were otherwise, we would have to say that the copy is infixal in (6a) ([viː-**vj**-ɔ]), but suffixal in (7a) ([j-ɔː-**jɔ**]). As for third-person possessives, we find a vowel, [i], preceding the agreement prefix in (8b) but absent in (8a) (in particular, we do not get [guː-gw-ɔ]/*[guː-gw-ɛ] for second- and third-person possessives in this case). The additional vowel present in third-person but missing in second is noticed in Leung (1991), and I follow her in positing it as part of the underlying form for third-person singular possessives.[4] (In (6b) and (7b), I take it that this vowel underwent front vowel elision, as in (4).) Thus the underlying forms for the class 8 and class 3 human possessive paradigm are as follows:

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[4] In fact, Leung (1991) also posits an underspecified high vowel preceding the agreement prefix in the underlying form of second-person singular possessives, to capture reduplicant vowel height in [guː-gw-ɔ], from /go/-. My analysis does not rely on an underspecified high vowel in the second person possessives, but instead captures the height discrepancy through constraints — see Section 3.1. Furthermore, in principle one could posit templates with distinct internal structure across second- and third-person, for example with /i/ being a fixed segment only in the third-person template. I do not see how this would strengthen the parallel analysis in Section 3.1 or the serial analysis in 3.2. I assume throughout the analysis that all templates in the paradigm have the same internal structure, and that /i/ is located outside of the template in third-person cases.

	1p	2p	3p
Sing.	/vi+angɛ/ vj-aːŋgɛ AGR8-1sg.POSS	**/RED+vi+ɔ/** **viː-vj-ɔ** **RED-AGR8-2sg.POSS**	**/RED+i+vi+ɛ/** **viː-vj-ɛ** **RED-3sg.POSS-AGR8-3sg.POSS**
Pl.	/vi+etu/ vj-eːtu AGR8-1pl.POSS	/vi+eɲu/ vj-eːɲu AGR8-2pl.POSS	/vi+avɔ/ vj-aːvɔ AGR8-3pl.POSS

Table 3a: *Noun class 8 possessive paradigm with URs*

	1p	2p	3p
Sing.	/go+angɛ/ gw-aːŋgɛ AGR3-1sg.POSS	**/RED+go+ɔ/** **guː-gw-ɔ** **RED-AGR3-2sg.POSS**	**/RED+i+go+ɛ/** **gw-iː-gw-ɛ** **RED-3sg.POSS-AGR3-3sg.POSS**
Pl.	/go+etu/ gw-eːtu AGR3-1pl.POSS	/go+eɲu/ gw-eːɲu AGR3-2pl.POSS	/go+avɔ/ gw-aːvɔ AGR3-3pl.POSS

Table 3b: *Noun class 3 possessive paradigm with URs*

In general, the second-person singular possessives are formed as in (9a), with RED and the final vowel together serving as the exponent for second-person singular possessive status, and AGR serving as the exponent for noun class agreement.

(9a) Second-person singular possessives: /RED+AGR+ɔ/

In third-person cases, RED, and the stem-initial and stem-final vowels together serve as the exponent for third-person singular possessive status, following Leung (1991) for Maragoli, and Inkelas & Zoll (2005) (among others) for other cases of one-to-many mappings between morphological and phonological elements:

(9b) Third-person singular possessives: /RED+i+AGR+ɛ/

Note that I signify AGR only in (9a-b) to indicate the locus of the agreement prefix, but assume in the URs throughout this paper that AGR is realized as a particular prefix before copying and other phonological processes apply (e.g., /vi/-, AGR8, as in Table 3a).

Reduplication and hiatus repair interact in an intricate way, as the full paradigm of second- and third-person singular possessives, given in the table below, displays.

Noun class	Agmt. prefix	Examples showing agmt. prefix UR	2sg poss.	3sg poss.
1	/o/-	o-ɾa, ‘this’	wɔː-v-ɔ	wɛː-v-ɛ
2	/va/-	va-ɾa, ‘this’	vɔː-v-ɔ	vɛː-v-ɛ
3	/go/-	go-ɾa, ‘this’	guː-gw-ɔ	gw-iː-gw-ɛ
4	/dʒi/-	dʒi-ɾa, ‘this’	dʒiː-dʒj-ɔ	dʒiː-dʒj-ɛ
5	/ɾi/-	ɾi-lahe, ‘pretty’	ɾiː-ɾj-ɔ	ɾiː-ɾj-ɛ
6	/ga/-	ga-ɾa, ‘this’	gɔː-g-ɔ	gɛː-g-ɛ
7	/ke/-	ke-ɾa, ‘this’	tʃiː-tʃj-ɔ	tʃiː-tʃj-ɛ
8	/vi/-	vi-ɾa, ‘this’	viː-vj-ɔ	viː-vj-ɛ
9	/e/-	e-ɾa, ‘this’	jɔː-j-ɔ	jɛː-j-ɛ
10	/zi/-	zi-ɾa, ‘this’	ziː-zj-ɔ	ziː-zj-ɛ
11	/ɾo/-	ɾo-ɾa, ‘this’	ɾuː-ɾw-ɔ	ɾw-iː-ɾw-ɛ
12	/ka/-	ka-ɾa, ‘this’	kɔː-k-ɔ	kɛː-k-ɛ
13	/to/-	to-ɾa, ‘this’	tuː-tw-ɔ	tw-iː-tw-ɛ
14	/vo/-	vo-ɾa, ‘this’	vuː-vw-ɔ	vw-iː-vw-ɛ
15	/ko/-	ko-ɾa, ‘this’	kuː-kw-ɔ	kw-iː-kw-ɛ
16	/ha/-	ha-ɾa, ‘this’	hɔː-h-ɔ	hɛː-h-ɛ
18	/mu/-	mu-ɾa, ‘this’	muː-mw-ɔ	mw-iː-mw-ɛ

Table 4: *second- and third-person singular possessives by noun class*

Leung (1991) provides a sketch grammar of Maragoli, but does not include the full human possessive paradigm. For the relatively few reduplicative possessives included in the sketch (6 in total), the match with the data above is perfect.

I classify the data into four categories by the hiatus repair they display and by their surface base shape, and give representative examples below. Note that “C” below stands for any non-vowel segment.

(10a) **Glided CCV base** (total number of examples of this type: 9 second-person + 9 third-person = 18 forms):

2sg possessive	3sg possessive	Agmt. pref.
/RED+vi+ɔ/ → [viː-vj-ɔ]	/RED+i+vi+ɛ/ → [viː-vj-ɛ]	/vi/-, AGR8
/RED+go+ɔ/ → [guː-gw-ɔ]	/RED+i+go+ɛ/ → [gw-iː-gw-ɛ]	/go/-, AGR3

(10b) **Glided CV base** (total number of examples of this type: 2+2 = 4):

2sg possessive	3sg possessive	Agmt. pref.
/RED+e+ɔ/ → [jɔː-j-ɔ]	/RED+i+e+ɛ/ → [jɛː-j-ɛ]	/e/-, AGR9
/RED+o+ɔ/ → [wɔː-v-ɔ]	/RED+i+o+ɛ/ → [wɛː-v-ɛ]	/o/-, AGR1

(10c) **Elided base** (total number of examples of this type: 4+4 = 8):

2sg possessive	3sg possessive	Agmt. pref.
/RED+ga+ɔ/ → [gɔː-g-ɔ]	/RED+i+ga+ɛ/ → [gɛː-g-ɛ]	/ga/-, AGR6

(10d) **Palatalized base** (total number of examples of this type: 2+2 = 4):

2sg possessive	3sg possessive	Agmt. pref.
/RED+ke+ɔ/ → [tʃiː-tʃj-ɔ]	/RED+i+ke+ɛ/ → [tʃiː-tʃj-ɛ]	/ke/-, AGR7

Overall, the reduplicants above all present as heavy syllables, sharing in common the presence of an onset as well as a long vowel. This can be accounted for either with a constraint that forces reduplicant heaviness or by specifying that the reduplicant is underlyingly heavy (see Hayes & Abad (1989) and McCarthy et al. (2012) on heavy reduplication in Ilokano, and Blevins (1996) on heavy reduplication in Mokilese—these investigators take one or the other approach).[5] We opt to specify the reduplicant as underlyingly bimoraic—RED = $\sigma_{\mu\mu}$. In the second-person possessives in (10a), the base prefix is repaired by glide formation, and the reduplicant remains mostly identical to the underlying agreement prefix, except that the vowel surfaces as high and long. In the third-person possessives in (10a), the base prefix is repaired by glide formation, and in [gw-iː-gw-ɛ] the vowel /i/ idiosyncratic of third person is syllabified into the reduplicant, with the glided agreement prefix copying into the onset. In [viː-vj-ɛ], third-person vowel /i/ is deleted.

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[5] A merely apparent alternative approach is to say that length is a remnant of compensatory lengthening following hiatus repair in the base. For example, we could envision the following schematic derivation for [jɔː-j-ɔ]: RED-e-ɔ → RED-j-ɔː (glide formation with compensatory lengthening) → jɔː-j-ɔː (copying) → jɔː-j-ɔ (final vowel shortening). But [viː-vj-ɔ] and like forms deriving from Ci- prefixes suggest this cannot be the right approach: the copy vowel is long, and yet does not derive from a base vowel that was lengthened at any point in the derivation.

In the reduplicative possessives in (10b), the agreement prefix is repaired by glide formation, and the glide, together with the subsequent stem vowel, are copied into the reduplicant. The vowel /i/ idiosyncratic of third-person is deleted in this case. Furthermore, in [wɔː-v-ɔ] and [wɛː-v-ɛ], the agreement prefix is hardened, surfacing as [v] rather than as [w]. Glide hardening is, as far as I am aware, the result of a phonotactic ban: though the language bears stems with [awa] sequences (e.g., [e-laːwa] = NCL9-flower), it appears to lack entirely forms in which [w] is surrounded by non-low vowels. In the reduplicative possessives in (10c), the agreement prefix vowel is deleted, and the prefix consonant together with the final stem vowel are copied into the reduplicant. Like in the forms in (10b), the vowel /i/ associated with third-person is deleted in (10c). In the reduplicative possessives in (10d), the prefix palatalizes before the stem vowel. The reduplicant is occupied by a palatal affricate as well as a high vowel otherwise identical to the underlying prefix vowel. The reduplicant vowel is a copy of the prefix vowel, and the vowel /i/ idiosyncratic of third-person is deleted.

2.2 Nonce probe study: nonce reduplicative possessives

As a test of the relevance of reduplicative possessives to phonological theory, I conducted a nonce probe study (Berko 1958) to assess whether my consultant internalized the reduplication-repair interaction, rather than simply memorizing all of the surface forms. My consultant was provided with an illustration of a bird, and was given probes composed of a nonce prefix and a fixed nonce stem [taka] = 'bird'. Single tokens of first-, second-, and third-person singular possessive constructions featuring the nonce prefix were then elicited. For example, I provided my consultant with the nonce probe [bu-taka] = PREF-bird, and then asked how he would say 'my bird', 'your (sg.) bird', and 'his/her bird', given the novel prefix. Nonce prefixes were modeled after agreement prefixes associated with glided CCV bases, glided CV bases, elided bases, and palatalized bases, as in the categories in (8a-d). [bu]-, for instance, was modeled after prefixes that compose forms with glided CCV bases (e.g., /go/-, [guː-gw-ɔ]), [u]-after prefixes that compose forms with glided CV bases (e.g., /o/-, [wɔː-v-ɔ]), and so on. The nonce prefixes thus took one of the following forms:

	Affixes testing reduplication with…	Description
(11a)	*Glide formation*	CV-, where C belongs to [p b t d s z l] and V belongs to [i e o u]
(11b)	*Glide formation*	V-, where V belongs to [i e o u]
(11c)	*Low vowel elision*	Ca-, where C belongs to [p b t d k g s z l]
(11d)	*Velar palatalization*	KI-, where K belongs to [k g] and I belongs to [i e]

This came initially to 7·4+4+9+2·2 = 45 probes. Combinations that resulted in prefixes extant in the lexicon were excluded. Note that the mid lax vowels /ɛ ɔ/ were excluded from nonce probes, since no agreement prefix in the language contained them.

The probes, along with my consultant's responses to them, are provided below.

Probe noun /PREF+taka/	*2sg poss.* /RED+PREF+ɔ/	*3sg poss.* /RED+i+PREF+ɛ/
Glided CCV base		
pi-taka	piː-pj-ɔ	piː-pj-ɛ
pu-taka	puː-pw-ɔ	pw-iː-pw-ɛ
bi-taka	biː-bj-ɔ	biː-bj-ɛ
bu-taka	buː-bw-ɔ	bw-iː-bw-ɛ
ti-taka	tiː-tj-ɔ	tiː-tj-ɛ
tu-taka	tuː-tw-ɔ	tw-iː-tw-ɛ
di-taka	diː-dj-ɔ	diː-dj-ɛ
du-taka	duː-dw-ɔ	dw-iː-dw-ɛ
li-taka	liː-lj-ɔ	liː-lj-ɛ
lu-taka	luː-lw-ɔ	lw-iː-lw-ɛ
si-taka	siː-sj-ɔ	siː-sj-ɛ
su-taka	suː-s^{u}w-ɔ	s^{u}w-iː-s^{u}w-ɛ
zu-taka	zuː-zw-ɔ	zw-iː-zw-ɛ
Ce-taka	Ciː-Cj-ɔ	Ciː-Cj-ɛ
Co-taka	Cuː-Cw-ɔ	Cw-iː-Cw-ɛ

Probe noun /PREF+taka/	*2sg poss.* /RED+PREF+ɔ/	*3sg poss.* /RED+i+PREF+ɛ/
Glided CV base		
i-taka	jɔː-j-ɔ	jɛː-j-ɛ
u-taka	wɔː-v-ɔ	wɛː-v-ɛ
Elided base		
ba-taka	bɔː-b-ɔ	bɛː-b-ɛ
pa-taka	pɔː-p-ɔ	pɛː-p-ɛ
ta-taka	tɔː-t-ɔ	tɛː-t-ɛ
da-taka	dɔː-d-ɔ	dɛː-d-ɛ
la-taka	lɔː-l-ɔ	lɛː-l-ɛ
sa-taka	sɔː-s-ɔ	sɛː-s-ɛ
za-taka	zɔː-z-ɔ	zɛː-z-ɛ
Palatalized base		
gi-taka	dʒiː-dʒj-ɔ giː-gj-ɔ	dʒiː-dʒj-ɛ giː-gj- ɛ
ki-taka	tʃiː-tʃj-ɔ kiː-kj-ɔ	tʃiː-tʃj-ɛ kiː-kj- ɛ

Table 5: *nonce probe results*

C{i e o u}- nonce probes (where C is a non-velar obstruent) were treated like [viː-vj-ɔ]/[viː-vj-ɛ] and other reduplicative possessives with glided CCV bases, as in (10a). In the second-person possessives, the base prefix is repaired by glide formation, and the reduplicant remains mostly identical to the underlying agreement prefix, except that the vowel surfaces as high and long. In the third-person possessives, the base prefix is repaired by glide formation; in cases with C{o u}- probes, the vowel /i/ idiosyncratic of third person is syllabified into the reduplicant and the glided agreement prefix is copied into the onset, as in the class 3 form [gw-iː-gw-ɛ]; in cases with C{i e}- probes, the agreement prefix is copied into the reduplicant and the vowel /i/ is deleted. My consultant also produced high reduplicant vowels in these forms. i- and u- nonce probes were treated like [wɔː-v-ɔ]/[wɛː-v-ɛ] and other reduplicative possessives with glided CV bases, as in (10b). The agreement prefix is repaired by glide formation, and the glide and subsequent stem vowel are copied into the reduplicant. The third-person vowel /i/ is deleted in these cases. My consultant also reduplicated glide hardening between non-low vowels, as in [wɔː-v-ɔ]/[wɛː-v-ɛ] in (10b). Ca- nonce probes were treated like [gɔː-g-ɔ]/[gɛː-g-ɛ] and other reduplicative possessives with elided copies as in (10c). The agreement prefix vowel is deleted, and the prefix consonant together with the final stem vowel are copied into the reduplicant. The third-person vowel /i/, as in the glided CV forms, are deleted in these forms too. As for the palatalizing forms, my consultant varied with respect to nonce probes with /ki/- and /gi/-: in both cases, he at first produced [kiː-kj-ɔ]/[kiː-kj-ɛ] and [giː-gj-ɔ]/[giː-gj-ɛ], but hesitated, and then mentioned that [tʃiː-tʃj-ɔ]/[tʃiː-tʃj-ɛ] and [dʒiː-dʒj-ɔ]/[dʒiː-dʒj-ɛ], respectively, were alternate possibilities. His production of reduplicative possessives associated with [su] was exceptional in its admission of excrescent vowels. But overall, my consultant largely replicated the interactional patterns associated with the different copy categories in (10a-d), providing mostly expected responses to the different nonce prefixes. This suggests that reduplicative possessives in Maragoli do reflect grammatical knowledge on the part of speakers.

3. Analysis

3.1 Parallel analysis: a compromise between syllable structure preferences and base-reduplicant identity

This section gives a full Parallel OT (Prince & Smolensky 1993/2004) analysis of Maragoli reduplication and its interaction with hiatus repair. I begin with a brief treatment of the various repairs covered in Section 2.1 that are displayed in reduplicative possessives: glide formation, low vowel deletion, and velar palatalization.

Some of the data on glide formation given previously are reproduced below. To repeat, tense vowels surface as glides when they precede a second vowel, and the latter undergoes compensatory lengthening in turn.

(12a)	vi-ɾa	vj-aːŋgɛ (/vi+angɛ/)
	AGR8-this	AGR8-boat
	‘this’	‘my’
(12b)	go-ɾa	gw-aːŋgɛ (/go+angɛ/)
	AGR3-this	AGR3-my
	‘this’	‘my’

It is assumed that vowels differ from glides both featurally and structurally in Maragoli, the two segment classes contrasting with respect to the feature [syllabic] and occupying peak versus marginal syllable positions respectively (see Section 3.2.1 for a defense of this assumption). The OT account given below employs the constraints NoHiatus (de Haas 1988; Orie and Pulleyblank 1998; Borroff 2003, 2007; *cf.* Orie and Pulleyblank 1998 argues for a hiatus-based constraint over Onset to capture hiatus resolution in Bantu) and Ident-IO(syll) to regulate glide formation:

(13) a. NoHiatus: assess one penalty for every pair of adjacent syllable nuclei.

b. Ident-IO(syll): assess one penalty for each [α syllabic] output correspondent of a [-α syllabic] input segment.

Compensatory lengthening can be achieved by assuming that vowels are specified as underlyingly moraic (Hyman 1985, McCarthy & Prince 1986, Hayes 1989, Kawahara 2002) — syllables, however, need only be represented in surface forms. A tableau is given below which illustrates glide formation in [gw-aːŋgɛ] = AGR3-my.

/go$_{\mu}$+a$_{\mu}$ngɛ$_{\mu}$/	NoHiatus	Max-μ	Ident-IO(syll)
go$_{\mu}$-a$_{\mu}$ŋgɛ$_{\mu}$	*!		
gw-a$_{\mu}$ŋgɛ$_{\mu}$		*!	*
→ gw-a$_{\mu\mu}$ŋgɛ$_{\mu}$			*

Table 6a: *illustration of glide formation in Maragoli*

Glide formation applies to the input, satisfying NoHiatus but violating Ident-IO(syll) in the process, and the stranded mora docks onto the subsequent vowel to satisfy Max-μ. There is a fair bit of controversy over how compensatory lengthening can be adequately modeled in OT considering its seemingly serial nature, occurring in response to the loss or transformation of a moraic segment (Lee 1996; Sumner 1999; Goldrick 2001; Topintzi 2006, 2010; Samko 2011; Torres-Tamarit 2012; *cf.* Samko 2011 for a discussion of issues that arise even in a Harmonic Serialism account). These issues are distant from the central concerns of this analysis: reduplicative possessives display hiatus repair, but only before word-final vowels, where compensatory lengthening is blocked (as in [vj-a] from /vi+a/ = AGR8-of and [guː-gw-ɔ] from /RED+go+ɔ/ = AGR3-your). I therefore put aside the question of how to best account for language's lengthening process, and I suppress the moraic-segment notation observed Table 6a from tableaux below, but still maintain specification for whether vowels are long in outputs.

The data on low vowel elision, in which /a/ deletes preceding other vowels, are reproduced below.

(14a)	ma-duːma NCL6-corn 'corn'	m-uːva (/ma+uva/) NCL6-sun 'suns'
(14b)	ga-ɾa AGR6-this 'this'	g-eːtu (/ga+etu/) AGR6-1pl.POSS 'our'

The account of low vowel elision is similar to that of glide formation, but uses instead a low-ranking Max-IO constraint.[6]

(15) Max-IO-V: assess one penalty for every input vowel lacking an output correspondent

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[6] So as to prevent glide formation here, we can posit a constraint banning [a̯], or glided [a]. Also, to prevent deletion of /u/ over /a/, we can posit a MAX constraint specifically preserving root vowels — this approach is taken in Glewwe (2016) for hiatus cases in Maragoli.

/ma+uva/	NoHiatus	Max-IO-V
ma-uva	*!	
→ m-uːva		*

Table 6b: *illustration of low vowel elision in Maragoli*

Low vowel elision applies to satisfy NoHiatus, violating Max-IO-V.

Finally, I provide data on velar palatalization, in which /k{i e}V/ and /g{i e}V/ surface as [tʃjV] and [dʒjV] respectively:

(16a)	ke-ɾa	tʃj-aːŋgɛ (/ke+angɛ/)
	AGR7-this	AGR7-my
	‘this’	‘my’
(16b)	a-ge-ɾɛmɛɾ-a	a-dʒj-ɛːn̺-a (/a+ge+ɛn̺+a/)
	3sg-NCL9-make.float-PROG	3sg-NCL9-want-PROG
	‘(s)he makes it float’	‘(s)he wants it’

I posit a constraint against [{k g}j] sequences, as well as Ident-IO(delayed release) (abbreviated “d.r.” below):

(17)	a. *Kj:	assess one penalty for every velar stop-[j] sequence.
	b. Ident-IO(d.r.):	assess one penalty for each [α d.r.] output correspondent of a [-α d.r.] input segment.

/ke+angɛ/	NoHiatus	*Kj	Ident-IO(d.r.)	Ident-IO(syll)
ke-aŋgɛ	*!			
kj-aːŋgɛ		*!		*
→ tʃj-aːŋgɛ			*	*

Table 6c: *illustration of velar palatalization in Maragoli*

Velar palatalization applies to satisfy NoHiatus and *Kj, violating Ident-IO(d.r.) and Ident-IO(syll).

One goal of this paper is to give a comprehensive Parallel OT treatment of Maragoli reduplication and its interaction with hiatus resolution and other repairs in the language. Some of the central aspects that the grammar I propose below accounts for are as follows: what the reduplicant’s shape is, what hiatus repair applies to which reduplicative possessives, whether and where a repair is copied in the reduplicant, and how reduplication and repair are constrained by the language phonotactics. There could in principle be numerous approaches leading to a successful analysis (McCarthy & Prince 1994a-b; McCarthy & Prince 1995, 1997; Urbanczyk

1996; Inkelas & Zoll 2005; Kirchner 2010), but we need only take one approach to demonstrate the framework's capacity to treat reduplicative possessives in the way I describe above. I assume the basic premises of Prosodic Morphology (McCarthy & Prince 1986/1996), positing as the underlying form of the reduplicant a prosodic unit devoid of segmental content. All of the surface copies are single syllables consisting of onset material as well as a long vowel, and so I specify the reduplicant template to be a single, heavy syllable, represented as $\sigma_{\mu\mu}$ (*cf.* Hayes & Abad 1989, McCarthy, Kimper & Mullin 2012 for a similar reduplicant shape in Ilokano).[7] Reduplication in Maragoli will be mediated through base-reduplicant correspondence (BR-correspondence; McCarthy & Prince 1995, 1997): base segments (defined as all content not in the reduplicant) are driven to correspond with reduplicant segments, and corresponding pairs of segments are driven to be identical. Correspondence and identity between base and reduplicant segments are enforced by means of rankable constraints. MAX-BR drives correspondence between segments in the base and the reduplicant, and IDENT-BR(F) requires corresponding segments to bear identical values with respect to some feature [F]. The constraints are defined below.

(17)	c. MAX-BR:	assess one penalty for every base segment lacking a reduplicant correspondent.
	d. IDENT-BR(F):	assess one penalty for each [α F] reduplicant correspondent of a [-α F] base segment.

We first turn to an account of the second-person reduplicative possessives. I give below the following representative examples of glided base forms:

(18a)	*Glided CCV base*:	/RED+vi+ɔ/ → [viː-vj-ɔ] AGR8-your	/RED+go+ɔ/ → [guː-gw-ɔ] AGR3-your
(18b)	*Glided CV base*:	/RED+e+ɔ/ → [jɔː-j-ɔ] AGR9-your	/RED+o+ɔ/ → [wɔː-v-ɔ] AGR1-your

The forms above exhibit glide formation of the base (except [wɔː-v-ɔ], which exhibits hardening) and copying of part of or all of the base. We focus on (18a), whose analysis is illustrated below in Table 7a-b — the forms in (18a-b) would receive essentially the same analysis. The segments in the surface base are taken to correspond with reduplicant segments as follows: [v$_1$i$_2$ː-v$_1$j$_2$-ɔ$_3$] and [j$_1$ɔ$_2$ː-j$_1$-ɔ$_2$]. In (/RED+e+ɔ/, [j$_1$ɔ$_2$ː-j$_1$-ɔ$_2$]), the entire base is copied rather than just the prefix, as in *[e$_1$ː-j$_1$-ɔ$_2$], because partial copying results in a base segment that lacks a reduplicant correspondent, violating MAX-BR. (Note that ONSET could have also been used eliminate *[e$_1$ː-j$_1$-ɔ$_2$], as it contains an onsetless syllable, but I leave it out merely for the purpose of brevity.) In (/RED+vi+ɔ/, [v$_1$i$_2$ː-v$_1$j$_2$-ɔ$_3$]), on the other hand, only the agreement prefix is copied rather than the entire base, as in *[v$_1$j$_2$ɔ$_3$ː-v$_1$j$_2$-ɔ$_3$]. This can be accounted for with *COMPLEX,

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[7] Particularly in (18a-b), reduplicant vowel length seemingly cannot be explained as resulting from a lengthening process that is independent of reduplicant heaviness.

which penalizes complex onsets: [viː-vj-ɔ] wins over *[vjɔː-vj-ɔ] since the latter candidate contains an extra complex onset.

(19) *COMPLEX: assess one penalty for each complex onset.

Note that independent evidence exists for the working of *COMPLEX in Maragoli; in particular, while CG clusters and homorganic NC clusters are seemingly permitted in onsets, no other kind of cluster is attested, as is the case in a variety of other Bantu languages (Odden 2015). But *COMPLEX must be ranked below NOHIATUS, as complex onsets are formed to avoid hiatuses more broadly in the language. The tableaux below illustrate how glide formation and reduplication interact in the selection of (/RED+vi+ɔ/, [viː-vj-ɔ]) and (/RED+e+ɔ/, [jɔː-j-ɔ]):[8]

/RED+vi+ɔ/	NO HIATUS	*COMPLEX	MAX-BR	IDENT-IO(syll)
RED-vi-ɔ	*		***	
viː-vi-ɔ	*!		*	
→ viː-vj-ɔ		*	*	*
vjɔː-vj-ɔ		**!		*

Table 7a: *parallel analysis of second-person possessives with glided CCV bases*

/RED+e+ɔ/	NO HIATUS	MAX-BR	IDENT-IO(syll)
RED-e-ɔ	*	**	
eː-e-ɔ	*!*	*	
eː-j-ɔ		*!	*
→ jɔː-j-ɔ			*

Table 7b: *parallel analysis of second-person possessives with glided CV bases*

The language generally prefers for all base segments to be represented in the reduplicant, but if full representation were to result in a complex reduplicant onset, as is borne out in the losing candidate *[vjɔː-vj-ɔ], then only the prefix is copied. The result is instead a simplex reduplicant onset, as in [viː-vj-ɔ]. The second-person possessives thus add to the breadth of cases of the emergence of the unmarked (McCarthy & Prince 1994a) in the sense that CG onsets are avoided in reduplicants but allowed in stems. In these cases the grammar enforces full representation of base segments in the reduplicant, unless doing so would result in a suboptimal onset (*cf.* Barker 1964, Steriade 1988, Hayes & Abad 1989, Fleischhacker 2005).

The analysis of (/RED+go+ɔ/, [guː-gw-ɔ]) and (/RED+o+ɔ/, [wɔː-v-ɔ]) is similar, with only a few additional constraints needing to be mentioned. I take the correspondences in these forms

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[8] Note that (/RED+vi+ɔ/, [v$_1$ɔ$_3$ː-v$_1$j$_2$-ɔ$_3$]) can be eliminated by a high-ranking CONTIGUITY constraint.

to be (/RED+go+ɔ/, [g$_1$u$_2$ː-g$_1$w$_2$-ɔ$_3$]) and (/RED+o+ɔ/, [w$_1$ɔ$_2$ː-v$_1$-ɔ$_2$]) (see Footnote 14 which argues against an alternative analysis positing [g$_1$u$_3$ː-g$_1$w$_2$-ɔ$_3$]). In (/RED+go+ɔ/, [g$_1$u$_2$ː-g$_1$w$_2$-ɔ$_3$]), the reduplicant vowel matches its corresponding surface glide for height, instead of the underlying prefix vowel — this can be captured with IDENT-BR(high).(/RED+o+ɔ/, [wɔː-v-ɔ]) also displays glide hardening (compare with *[wɔː-w-ɔ]), avoiding the illegal sequence [ɔwɔ] (see Section 2.1 for discussion). Hardening of the agreement prefix /o/ can be enforced with a constraint that bans [w] between non-low vowels:

(20) $*V_{[-l]}wV_{[-l]}$: assess one penalty for every instance of [w] occurring between two non-low vowels.

The tableaux for (/RED+go+ɔ/, [guː-gw-ɔ]) and (/RED+o+ɔ/, [wɔː-v-ɔ]) are given below.[9]

/RED+go+ɔ/	NO HIATUS	IDENT-IO(high)	*COMPLEX	MAX-BR	IDENT-IO(syll)
RED-go-ɔ	*			***	
goː-go-ɔ	*!			*	
goː-gw-ɔ		*!	*	*	*
→ guː-gw-ɔ			*	*	*
gwɔː-gw-ɔ			**!		*

Table 7c: *parallel analysis of second-person possessives with glided CCV bases*

/RED+o+ɔ/	NO HIATUS	$*V_{[-l]}wV_{[-l]}$	MAX-BR	IDENT-IO(syll)
RED-o-ɔ	*		**	
oː-o-ɔ	*!*		*	
oː-w-ɔ			*!	*
wɔː-w-ɔ		*!		*
→ wɔː-v-ɔ				*

Table 7d: *parallel analysis of second-person possessives with glided CV bases*

We now turn to extending the analysis to account for the rest of the second-person possessives, and the third-person possessives. In the second-person forms (/RED+ga+ɔ/,

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[9] Hardening and reduplication appear here to interact opaquely: [wɔː-v-ɔ] is preferred to *[vɔː-v-ɔ], a BR-identical form in which the hardened glide is represented in the reduplicant. One could capitalize on the fact that there exists a homophonous second-person possessive (/RED+va+ɔ/, [vɔː-v-ɔ]), making use of a CONTRAST constraint that prevents homophones from occurring in the same paradigm (Ichimura 2006). Alternatively, one can capture this by positing input-reduplicant faithfulness constraints (McCarthy & Prince 1995, Struijke 1998, Zuraw 2005, Sloos 2009) requiring the reduplicant segment [w] to be as featurally similar as possible to its input correspondent.

[gɔː-g-ɔ]) and (/RED+ke+ɔ/, [tʃiː-tʃj-ɔ]), segments in the surface base and reduplicant are taken to correspond as follows: [g$_1$ɔ$_2$ː-g$_1$-ɔ$_2$] and [tʃ$_1$i$_2$ː-tʃ$_1$j$_2$-ɔ$_3$]. [tʃiː-tʃj-ɔ] exhibits overapplication (Wilbur 1973), the initial consonant surfacing as palatal even though the environment for palatalization is not met in the reduplicant. This can be accounted for with IDENT-BR(d.r.), which drives consonant identity between the base and the reduplicant.[10] The tableaux below illustrate how reduplication interacts with low vowel elision and palatalization:

/RED+ga+ɔ/	NOHIATUS	MAX-BR	MAX-IO-V
RED-ga-ɔ	*	***	
gaː-g-ɔ		*!	*
→ gɔː-g-ɔ			*

Table 8a: *parallel analysis of second-person possessives with elided bases*

/RED+ke+ɔ/	NO HIATUS	*Kj	IDENT-BR(d.r.)	IDENT-BR(high)	*COMPLEX	MAX-BR	IDENT-IO(syll)
RED-ke-ɔ	*					***	
keː-kj-ɔ		*!		*	*	*	*
keː-tʃj-ɔ			*!	*	*	*	*
tʃeː-tʃj-ɔ				*!	*	*	*
→ tʃiː-tʃj-ɔ					*	*	*
tʃjɔː-tʃj-ɔ					**!		*

Table 8b: *parallel analysis of second-person possessives with palatalized bases*

The candidate [gaː-g-ɔ] given above is intended to be indexed as [g$_1$a$_3$ː-g$_1$-ɔ$_2$]. The reduplicant vowel shares its quality with the underlying prefix vowel, but its would-be base correspondent was deleted to resolve hiatus, as indicated by the MAX-IO violation. [gɔː-g-ɔ] beats out [gaː-g-ɔ] for the same reason that [jɔː-j-ɔ] beats out *[eː-j-ɔ] in Table 7b: the winning candidate is most faithful to MAX-BR, exhibiting full representation of base segments in the reduplicant. [tʃiː-tʃj-ɔ], on the other hand, wins over its competitors because it satisfies high-ranking constraints enforcing palatalization, and is the most BR-identical form with an optimal reduplicant onset.

Though in large part the third-person possessives fall out from the analysis of the second-person cases, a few considerations need to be taken into account. Recall that the general UR for the third-person singular possessive is /RED+**i**+AGR+ɛ/, wherein a vowel separates the reduplicant from the agreement prefix, motivated for example by the difference between the second- and third-person possessives [guː-gw-ɔ] and [gw-iː-gw-ɛ]. I take the correspondences in [gw-iː-gw-ɛ] to be [g$_1$w$_2$-i$_3$ː-g$_1$w$_2$-ɛ$_4$], in which the vowel /i/ is skipped for purposes of reduplication (*cf.* Odden and Odden 1985; Cassimjee 1994; Downing 1998, 2004, 2009). This necessitates a constraint regulating nonlocal reduplication. Candidates that contain a reduplicant

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[10] My consultant would oftentimes produce the more reduced form [tʃiː-tʃ-ɔ], in which the base glide fused with the preceding palatal. The opacity created as a result could be handled, for instance, using output-variant correspondence constraints (Kawahara 2002) requiring reduplicants between the two variants to be identical.

segment corresponding to the prefixal vowel (for instance, [j$_1$-i$_1$ː-gw-ɛ]) can be eliminated by adopting MAX-BR-C$_{\text{stem}}$, which requires non-vowels to be copied (Riggle 2004). For purposes of brevity, I will withhold MAX-BR-C$_{\text{stem}}$, [j$_1$-i$_1$ː-gw-ɛ], and like candidates from the tableaux below.

Furthermore, consider the third-person counterparts to the second-person forms [guː-gw-ɔ] and [wɔː-v-ɔ], namely [gw-iː-gw-ɛ] and [wɛː-v-ɛ]:

(21a) /RED+**i**+go+ɛ/ → [g$_1$w$_2$-i$_3$ː-g$_1$w$_2$-ɛ$_4$], *[g$_1$w$_2$-ɛ$_3$ː-g$_1$w$_2$-ɛ$_3$],
AGR3-his/her

(21b) /RED+**i**+o+ɛ/ → [w$_1$ɛ$_2$ː-v$_1$-ɛ$_2$], *[w$_1$-i$_2$ː-v$_1$-ɛ$_3$]
AGR1-his/her

In [gw-iː-gw-ɛ], the underlying vowel idiosyncratic of third-person, /i/, is preserved, and is syllabified into the reduplicant nucleus, rather than deleting for purposes of BR-identity, as in *[gwɛː-gw-ɛ]. (Though [i] surfaces in the reduplicant in [gw-iː-gw-ɛ], the first dash is depicted anyway, to show it is located outside of RED underlyingly.) In [wɛː-v-ɛ], however, BR-identity is preferred over preservation of /i/, as in *[w-**i**ː-v-ɛ]. That we get /i/-preservation in [gw-iː-gw-ɛ] but /i/-deletion in [wɛː-v-ɛ] points to a broader pattern: the base and the reduplicant are identical, with /i/-deletion applying, in all the forms with simple, CV surface bases (in Table 9a) and in none of the other forms with more complex bases (in Table 9b), as the following data illustrate:

Noun class agmt. prefix	**2sg poss.**	**3sg poss.**
/o/-	wɔː-v-ɔ	wɛː-v-ɛ
/va/-	vɔː-v-ɔ	vɛː-v-ɛ
/ga/-	gɔː-g-ɔ	gɛː-g-ɛ
/e/-	jɔː-j-ɔ	jɛː-j-ɛ
/ka/-	kɔː-k-ɔ	kɛː-k-ɛ
/ha/-	hɔː-h-ɔ	hɛː-h-ɛ

Table 9a

Noun class agmt. prefix	**2sg poss.**	**3sg poss.**
/go/-	guː-gw-ɔ	gw-iː-gw-ɛ
/ɾi/-	ɾiː-ɾj-ɔ	ɾiː-ɾj-ɛ
/ke/-	tʃiː-tʃj-ɔ	tʃiː-tʃj-ɛ
/vi/-	viː-vj-ɔ	viː-vj-ɛ
/ɾo/-	ɾuː-ɾw-ɔ	ɾw-iː-ɾw-ɛ
/vo/-	vuː-vw-ɔ	vw-iː-vw-ɛ

Table 9b

Table 9a-b: *relatively strong reduplicative identity in forms with* CV *bases*

Reduplicative identity is stronger in cases with a surface base of minimal size (i.e., [CV] as opposed to [CCV]) (*cf.* Zuraw 2002; “Aggressive Reduplication”). Particular examples of size-based correspondence across languages includes Tagalog (Zuraw 2002), wherein the preference for cluster simplification over BR-identity depends on the size of the reduplicant, and of Cilungu (Bickmore 2013), wherein perfect copying of base tones into the reduplicant seems to depend on the size of the base. To capture this difference, we can posit BR-correspondence specific to base size:

(22) a. Max-B$_{CV}$R: assess one penalty for every segment in a CV surface base lacking a reduplicant correspondent.

To prevent /i/-deletion from applying in [gw-iː-gw-ɛ], we also posit Max-IO-$V_{[\text{-low}]}$:

(22) b. Max-IO-$V_{[\text{-low}]}$: assess one penalty for every [-low] input segment lacking an output correspondent.[11]

Ranking Max-B$_{CV}$R ≫ Max-IO([-low]) ≫ Max-BR captures /i/ preservation in [gw-iː-gw-ɛ] as well as strong reduplicative identity in [wɛː-v-ɛ]. This is illustrated in the tableaux below:

/red+i+go+ɛ/	NoHiatus	Max-IO ([-low])	*Complex	Max-BR	Ident-IO(syll)
red-i-go-ɛ	*			****	
goː-i-go-ɛ	*!*			**	
gwɛː-i-gw-ɛ	*!		**	*	*
gwɛː-gw-ɛ		*!	**		*
→ gw-iː-gw-ɛ			**	*	*
guː-gw-ɛ		*!	*	*	*

Table 10a: *parallel analysis of third-person possessives with glided CCV bases*

/red+i+o+ɛ/	NoHiatus	$*V_{[-l]}wV_{[-l]}$	Max-B$_{CV}$R	Max-IO ([-low])	Max-BR	Ident-IO(syll)
red-i-o-ɛ	**				***	
oː-i-o-ɛ	*!**				**	
w-iː-w-ɛ		*	*		*	*
w-iː-v-ɛ			*!		**	*
→ wɛː-v-ɛ				*		*

Table 10b: *parallel analysis of third-person possessives with glided CV bases*

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[11] Casali (1998) notes that high vowels are more prone to being targets of hiatus resolution than low vowels. Though I posit MAX-IO([-low]), this should not suggest that MAX-IO([-low]) is intended to rank higher than MAX-IO([+low]) — in fact, Maragoli preserves [a] when it is the second member of a hiatus, deleting the first member instead (Glewwe 2016).

[gw-iː-gw-ɛ] and *[gwɛː-gw-ɛ] have CCV surface bases, and so the latter candidate is eliminated by medially ranked MAX-IO([-low]). Note that *[guː-gw-ɛ] is also included above to show that /i/-preservation is preferred to complex onset avoidance — in other words, MAX-IO([-low]) is ranked above *COMPLEX. Moreover, [w$_1$ε$_2$ː-v$_1$-ε$_2$] and *[w$_1$-i$_2$ː-v$_1$-ε$_3$] have CV surface bases, and so *[w$_1$-i$_2$ː-v$_1$-ε$_3$] is eliminated by MAX-B$_{CV}$R, which enforces size-based correspondence. The third-person cases (/RED+i+vi+ɛ/, [v$_1$i$_2$ː-v$_1$j$_2$-ε$_3$]) and (/RED+i+e+ɛ/, [j$_1$ε$_2$ː-j$_1$-ε$_2$]) are similarly captured, but in the former possessive /i/ idiosyncratic of third-person is deleted to resolve hiatus.

We need not extend the analysis much further to capture the elided and palatalized third-person forms (/RED+i+ga+ɛ/, [gɛː-g-ɛ]) and (/RED+i+ke+ɛ/, [tʃiː-tʃj-ɛ]). I take the correspondence relations in the two surface forms to be [g$_1$ε$_2$ː-g$_1$-ε$_2$] and [tʃ$_1$i$_2$ː-tʃ$_1$j$_2$-ε]. [tʃiː-tʃj-ɛ], in which /i/ was deleted, wins over *[tʃj-iː-tʃj-ɛ], in which it was preserved. This can be accounted for with a markedness constraint banning [Cji] sequences:

(23) *Cji: assess one violation for every instance of [Cji].

The language permits surface [ji] provided [j] does not share its onset with another consonant (see Section 3.2.1), but [Cji] is, as far as I am aware, unattested in the language (*cf.* Kawasaki 1982, Padgett 2001, Flemming 2002, Suh 2009). The tableaux below shows how elided and palatalized third-person possessives can be captured:

/RED+i+ga+ɛ/	NO HIATUS	MAX-B$_{CV}$R	MAX-IO-V$_{[\text{-low}]}$
RED-i-ga-ɛ	*		
gaː-i-ga-ɛ	*!*		
gɛː-i-g-ɛ	*!		
→ gɛː-g-ɛ			*
g-iː-g-ɛ		*!	

Table 11a: *parallel analysis of elided copies in third-person possessives*

/RED+i+ke+ɛ/	NO HIATUS	*Kj	*Cji	IDENT-BR(d.r.)	MAX-IO-V$_{[\text{-low}]}$	IDENT-BR(high)	*COMPLEX
RED-i-ke-ɛ	*						
keː-i-ke-ɛ	*!*						
keː-kj-ɛ		*!			*	*	*
keː-tʃj-ɛ				*!	*	*	*
tʃeː-tʃj-ɛ					*	*!	*
→ tʃiː-tʃj-ɛ					*		*
tʃjɛː-tʃj-ɛ					*		**!
tʃj-iː-tʃj-ɛ			*!				**

Table 11b: *parallel analysis of palatalized copies in third-person possessives*

Reduplication-repair interactions in these forms mirror their second-person counterparts, except that the above cases involve deletion of /i/. In [gɛː-g-ɛ], /i/-deletion is triggered by high-ranking MAX-B$_{CV}$R preferring strong reduplicative identity in CV-base forms, while in [tʃiː-tʃj-ɛ], it is triggered by *Cji, which penalizes the [tʃji] sequence.

The Hasse diagram below depicts necessary rankings for the OT analysis above:

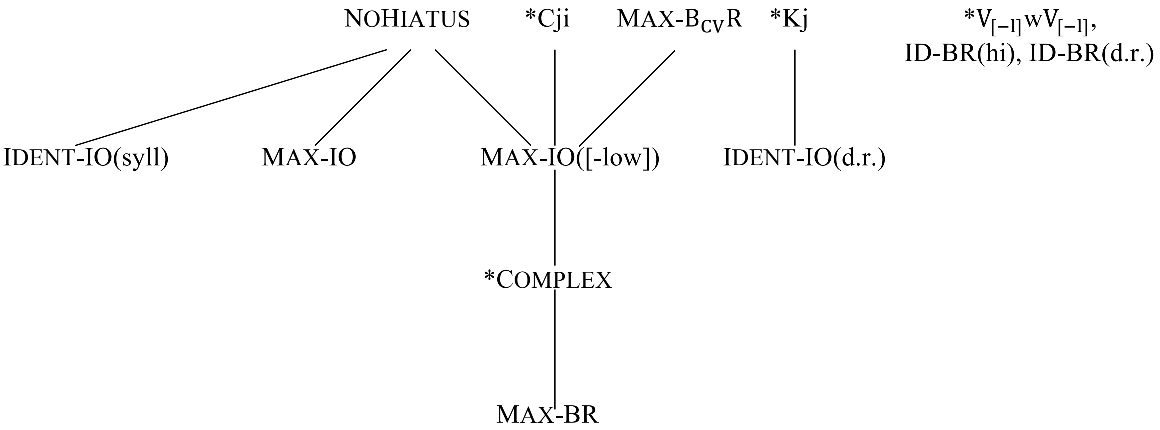

Figure 1: *Hasse diagram for the Parallel OT analysis*

A fuller tableau containing a richer set of constraints and candidates (14 unranked constraints, and 12+18+10+31+16+20+14+31 = 152 candidates for the 8 underlying forms) was inputted into OTSoft 2.3.3 (Hayes, Tesar, & Zuraw 2013), which utilizes the Fusional Reduction Algorithm (Brasoveanu & Prince 2011) to assess whether the desired winners would be chosen amongst a broader set of candidates and to determine necessary rankings between inputted constraints. The program obtained the desired winners under a set of rankings compatible with those presented throughout this section.

3.2 Ordering paradoxes in the Harmonic Serialism analysis of reduplicative possessives

This section considers how Harmonic Serialism (HS; Prince & Smolensky 2004, McCarthy 2010a), a serial version of OT, fares in accounting for the data. We begin with an introduction to the framework.

In HS, optimization is gradual, allowing for GEN-EVAL cycles. GEN can only generate candidates that differ in at most one respect from the input so that at most one change, or *phonological operation*, can apply in one cycle.[12] The optimal candidate is determined by constraint competition and fed back into GEN as the input. Rankings remain fixed throughout each cycle, and higher-ranking markedness constraints are satisfied before lower-ranked ones are. The cycles repeat until convergence, when the input and output are identical, at which point the output is taken to be the surface form. McCarthy, Kimper & Mullin (2012) propose a sub-framework within HS, Serial Template Satisfaction, which captures patterns of reduplication.

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[12] I assume (re)syllabification not to be a phonological operation itself, but to apply concurrently and persistently with other phonological operations (McCarthy 2010b). See Section 3.2.1 below for discussion.

Following McCarthy & Prince (1986/1996), reduplicants are analyzed as prosodic templates. Serial Template Satisfaction denies a role for BR-correspondence, instead employing HEADEDNESS (hereafter HD) (Selkirk 1995) and *COPY constraints, which respectively drive and limit copying segmental content into the template.

(24) a. HD(*σ*): Assign a penalty for every syllable that does not contain a segment as its head.

b. *COPY(seg): Assign a penalty for copying a nonempty string of segments.

Note that *COPY(seg) does not assess penalties on a segment-by-segment basis, but rather assesses a single penalty for copying a whole string of segments.

To give a brief example of a phonological analysis using HS with Serial Template Satisfaction, we turn to Chumash plural reduplication and its interaction with coalescence (Applegate 1976, Mester 1986, McCarthy & Prince 1995, McCarthy, Kimper & Mullin 2012). The pertinent data are given below. The URs are adopted from McCarthy, Kimper & Mullin (2012): *k*- is the first-person possessive prefix and RED- is the plural prefix.

(25) /k+σ+ʔaniš/ → [k^{ʔ}an-k^{ʔ}aniš] /k+σ+hawaʔ/ → [k^{h}aw-k^{h}awaʔ]
‘my paternal uncles’ ‘my maternal aunts’

The data in (25) form a prototypical case of overapplication. In /k+σ+ʔaniš/, *k*- coalesces with the stem, and the resulting segment together with the following two segments are copied into the reduplicant. In HS, this is represented as step-by-step application of the operations coalescence and copying:

Stage	/k+σ+ʔaniš/	*Cʔ	HD(*σ*)	DON'TCOALESCE	*COPY(seg)
1	k+σ+ʔaniš	*!	*		
1	→ σ+k^{ʔ}aniš		*	*	
1	k+ʔan+ʔaniš	*!			*
2	σ+k^{ʔ}aniš		*!		
2	→ k^{ʔ}an+k^{ʔ}aniš				*

Table 12: *HS analysis of coalescence and reduplication in Chumash*

Coalescence takes place in Stage 1, in the first cycle: the intermediate form \RED+k^{ʔ}aniš\ wins over its competitors, satisfying high-ranking *Cʔ. The Stage 1 winner is then taken to be the Stage 2 input (not shown explicitly above). In Stage 2, copying takes place: \k^{ʔ}an+k^{ʔ}aniš\ wins over the faithful candidate, satisfying high-ranking HD(*σ*). In Stage 3, suppressed from above, convergence takes place: the Stage 3 winner is the same as the input. The output is taken to be the surface form, namely [k^{ʔ}an-k^{ʔ}aniš]. McCarthy, Kimper & Mullin (2012) show that a variety of reduplication-phonology interactions can be successfully analyzed in this way.

But as I argue below, the framework fails to account for the reduplication-repair interaction observed in Maragoli, due to the fact that it applies phonological operations gradually, one at a time, under a fixed ranking. Even after affording HS the constraints used in the OT analysis (or, in some cases, HS analogues of the OT constraints), the HS analysis of reduplicative possessives suffers from contradictory rankings. Some forms require the constraint that drives copying to rank above that which drives hiatus repair — in other words, these forms require copying to apply before repair. Other forms require the opposite ranking — that is, for repair to apply before copying. The reduplication-repair interaction displayed in Maragoli therefore constitutes evidence for *irreducible parallelism*, in the sense of McCarthy (2013). The interaction can be expressed in OT, in which multiple changes take place in the same stage of the derivation, but it cannot be expressed in HS, which requires phonological changes to take place one at a time in a series, under a fixed ranking.

I begin with the following glided second-person possessives:

(26a) /RED+vi+ɔ/ → [viː-vj-ɔ] (26b) /RED+e+ɔ/ → [jɔː-j-ɔ]
AGR8-your AGR9-your

We first illustrate the issue with a serial approach in (27a-b) using informal, schematic derivations of of the two forms. In (27a), on the one hand, glide formation takes place before copying to derive [jɔː-j-ɔ] from /RED-e-ɔ/:

(27a)	UR	/RED-e-ɔ/	UR	/RED-e-ɔ/
	Glide Formation	RED-j-ɔ	**Copying**	eː-e-ɔ
	Copying	jɔː-j-ɔ	**Glide Formation**	eː-j-ɔ
	SR	[jɔː-j-ɔ]	SR	*[eː-j-ɔ]

In (27b), on the other hand, copying must take place before glide formation, to derive [viː-vj-ɔ] from consonant-initial /RED-vi-ɔ/. This ensures a simplex onset in the reduplicant, avoiding the extra complex onset in *[vjɔː-vj-ɔ].

(27b)	UR	/RED-vi-ɔ/	UR	/RED-vi-ɔ/
	Glide Formation	RED-vj-ɔ	**Copying**	viː-vi-ɔ
	Copying	vjɔː-vj-ɔ	**Glide Formation**	viː-vj-ɔ
	SR	*[vjɔː-vj-ɔ]	SR	[viː-vj-ɔ]

As we will see, HS is challenged by these data because both orders are needed, depending on the form, to ensure a surface simplex onset.

In the Parallel OT analysis, NOHIATUS and IDENT-IO(syll) are used to regulate glide formation, MAX-BR is used to regulate copying, and *COMPLEX is used to capture the fact that we get a partial base copy, rather than a full base copy, in [viː-vj-ɔ] to avoid a complex reduplicant onset. Each of these constraints can be imported into the HS analysis except MAX-BR; instead, Serial Template Satisfaction employs HD(σ) and *COPY(seg). As the following tableaux reveal, the forms in (26a, b) necessitate paradoxical rankings between HD(σ) and NOHIATUS. The operations driven by HD(σ) and NOHIATUS — namely, copying and hiatus repair — cannot be applied in a fixed series, since both orders are required for the full paradigm. To derive [viː-vj-ɔ] from /RED+vi+ɔ/, HD(σ) must be ranked above NOHIATUS so that copying applies before glide formation. But then [jɔː-j-ɔ] cannot be derived from /RED+e+ɔ/, as copying would apply too early.

Stage	/$\sigma_{\mu\mu}$+vi+ɔ/	HD(σ)	NoHiatus	*Complex	Ident-IO(syll)	*Copy(seg)
1	$\sigma_{\mu\mu}$-vi-ɔ	*!	*			
1	$\sigma_{\mu\mu}$-vj-ɔ	*!		*	*	
1	→ viː-vi-ɔ		*			*
2	viː-vi-ɔ		*!			
2	→ **viː-vj-ɔ**			*	*	

Stage	/$\sigma_{\mu\mu}$+e+ɔ/	HD(σ)	NoHiatus	*Complex	Ident-IO(syll)	*Copy(seg)
1	$\sigma_{\mu\mu}$-e-ɔ	*!	*			
1	☹ $\sigma_{\mu\mu}$-j-ɔ	*!			*	
1	→ eː-e-ɔ		**			*
2	eː-e-ɔ		*!			
2	🛇 **eː-j-ɔ**				*	

Table 13a: *ranking paradox in the HS account, with reduplication applying first*

To derive [jɔː-j-ɔ] from /RED+e+ɔ/, NoHiatus must be ranked above HD(σ) so that glide formation applies before copying. But then [viː-vj-ɔ] cannot be derived from /RED+vi+ɔ/, as repair would apply too early.[13]

Stage	/$\sigma_{\mu\mu}$+vi+ɔ/	NoHiatus	HD(σ)	*Complex	Ident-IO(syll)	*Copy(seg)
1	$\sigma_{\mu\mu}$-vi-ɔ	*!	*			
1	→ $\sigma_{\mu\mu}$-vj-ɔ		*	*	*	
1	☹ viː-vi-ɔ	*!				*
2	$\sigma_{\mu\mu}$-vj-ɔ		*!	**		
2	🛇 **vjɔː-vj-ɔ**			*		*

Stage	/$\sigma_{\mu\mu}$+e+ɔ/	NoHiatus	HD(σ)	*Complex	Ident-IO(syll)	*Copy(seg)
1	$\sigma_{\mu\mu}$-e-ɔ	*!	*			
1	→ $\sigma_{\mu\mu}$-j-ɔ		*		*	
1	eː-e-ɔ	*!*				*
2	$\sigma_{\mu\mu}$-j-ɔ		*!			
2	→ **jɔː-j-ɔ**					*

Table 13b: *ranking paradox in the HS account, with hiatus repair applying first*

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[13] Note that we cannot employ an ONSET constraint ranking higher than HD(σ) to eliminate Stage 1 candidate /eː-e-ɔ/, since then it would eliminate /viː-vi-ɔ/, a desired Stage 1 winner. Positing ONSET/PWd (Flack 2009) and ranking ONSET/PWd ≫ HD(σ) ≫ ONSET may dispel this paradox, but fails to dispel either of the paradoxes that arise in the account of (27a-b) and (28a-b) below.

Note that *COMPLEX must be ranked below NOHIATUS, as complex onsets are formed to avoid hiatuses in the language. It thus plays no role in ensuring that [viː-vj-ɔ], with a simplex reduplicant onset, wins; it cannot "look ahead" to see whether a complex onset is formed later in the derivation. In Table 13b I show it ranked below HD(*σ*), such that *[vjɔː-vj-ɔ] surfaces; if it were ranked above HD(*σ*), the derivation would converge on [RED-vj-ɔ] (or some other undesirable form). The Maragoli data are reminiscent of misalignment phenomena observed in Bantu in which vowel-initial stems are treated differently for purposes of reduplication (*cf.* Odden and Odden 1985; Cassimjee 1994; Downing 1998, 2004, 2009), but here the ordering between reduplication and repair is what facilitates formation of optimal surface onsets (*cf.* Barker 1964, Steriade 1988, Hayes & Abad 1989, Fleischhacker 2005). The Maragoli reduplication-repair interaction constitutes an example of a *conspiracy of procedures*, in the sense of Adler & Zymet (2017): the grammar applies one procedure, hiatus repair followed by copying, unless the result is an extra complex onset; in such case, the grammar instead applies a different procedure, namely copying followed by hiatus repair. Such a conspiracy presents no issue in Parallel OT, since the candidates [viː-vj-ɔ] and [jɔː-j-ɔ] are available to be compared against *[vjɔː-vj-ɔ] and *[eː-j-ɔ] respectively. Parallel OT can express the generalization that reduplication and glide formation apply in a way that yields optimal surface onsets; HS, on the other hand, is seemingly unable to do so.

The glided second-person singular possessives (/$\sigma_{\mu\mu}$+go+ɔ/, [guː-gw-ɔ]) and (/$\sigma_{\mu\mu}$+o+ɔ/, [wɔː-v-ɔ]) run into the same issues. [guː-gw-ɔ] requires a derivational path in which HD(*σ*) ranks above NOHIATUS (/$\sigma_{\mu\mu}$+go+ɔ/ → \goː+go+ɔ\ → \goː+gw+ɔ\ → …), while [wɔː-v-ɔ] requires a derivational path in which NOHIATUS ranks above HD(*σ*) (/$\sigma_{\mu\mu}$+o+ɔ/ → \$\sigma_{\mu\mu}$+w+ɔ\ → \wɔː+w+ɔ\ → …). One side detail that I do not address in HS would also have to be fleshed out: the reduplicant vowel in [guː-gw-ɔ] surfaces as high, even though it is the copy of a non-high vowel. In Parallel OT, this can be captured simply by employing the IDENT-BR(high) constraint, but in HS, which lacks BR-correspondence, a different approach would have to be taken (e.g., specifying the reduplicant with an underlying [+high] feature).

Ranking paradoxes arise in the analysis other pairs of second-person possessives as well, assuming the various hiatus repairs in Maragoli are triggered by the same constraint. Constraint-based accounts of diverse repairs in Bantu and beyond typically utilize a single NOHIATUS (or ONSET) constraint as well as a set of ranked faithfulness constraints to determine the repair for a particular hiatus (Rosenthall 1994; Casali 1995, 1997, 1998; Orie & Pulleyblank 1998; Senturia 1998; Baković 2007). But in HS, ranking paradoxes between HD(σ) and NOHIATUS emerges if one attempts to account for different hiatus repairs using NOHIATUS as the only triggering constraint. Consider, for example, the following second-person possessives, which display glide formation of the base in (28a) but low vowel elision of the base in (28b):

(28a) /$\sigma_{\mu\mu}$+vi+ɔ/ → [viː-vj-ɔ]
AGR8-your

(28b) /$\sigma_{\mu\mu}$+ga+ɔ/ → [gɔː-g-ɔ]
AGR6-your

From the parallel analysis we import MAX-IO-V, violated by [gɔː-g-ɔ]. Provided that both glide formation and vowel elision in Maragoli are triggered by the same constraint, the paradox observed in Table 13 arises once again in the account of (27a-b) below. To derive [viː-vj-ɔ] from

/RED+vi+ɔ/, HD(*σ*) must be ranked above NoHiatus so that copying applies before low vowel elision. But then [gɔː-g-ɔ] cannot be derived from /RED+ga+ɔ/, as copying would apply too early.

Stage	/$\sigma_{\mu\mu}$+vi+ɔ/	HD(*σ*)	NoHiatus	Ident-IO(syll)	*Copy(seg)
1	$\sigma_{\mu\mu}$-vi-ɔ	*!	*		
1	$\sigma_{\mu\mu}$-vj-ɔ	*!		*	
1	→ viː-vi-ɔ		*		*
2	viː-vi-ɔ		*!		
2	→ **viː-vj-ɔ**			*	

Stage	/$\sigma_{\mu\mu}$+ga+ɔ/	HD(*σ*)	NoHiatus	Max-IO(syll)	*Copy(seg)
1	$\sigma_{\mu\mu}$-ga-ɔ	*!	*		
1	☹ $\sigma_{\mu\mu}$-g-ɔ	*!		*	
1	→ gaː-ga-ɔ		*		*
2	gaː-ga-ɔ		*!		
2	🛇 **gaː-g-ɔ**			*	

Table 14a: *ranking paradox in the HS account, with reduplication applying first*

To derive [gɔː-g-ɔ] from /$\sigma_{\mu\mu}$+ga+ɔ/, NoHiatus must be ranked above HD(*σ*) so that low vowel elision applies before copying. But then [viː-vj-ɔ] cannot be derived from /RED+vi+ɔ/, as glide formation would apply too early.

Stage	/$\sigma_{\mu\mu}$+vi+ɔ/	NoHiatus	HD(*σ*)	*Complex	Ident-IO(syll)	*Copy(seg)
1	$\sigma_{\mu\mu}$-vi-ɔ	*!	*			
1	→$\sigma_{\mu\mu}$-vj-ɔ		*	*	*	
1	☹ viː-vi-ɔ	*!				*
2	$\sigma_{\mu\mu}$-vj-ɔ		*!	**		
2	🛇 **vjɔː-vj-ɔ**			*		*

Stage	/$\sigma_{\mu\mu}$+ga+ɔ/	NoHiatus	HD(*σ*)	*Complex	Max-IO(syll)	*Copy(seg)
1	$\sigma_{\mu\mu}$-ga-ɔ	*!	*			
1	→ $\sigma_{\mu\mu}$-g-ɔ		*		*	
1	gaː-ga-ɔ	*!*				*
2	$\sigma_{\mu\mu}$-g-ɔ		*!			
2	→ **gɔː-g-ɔ**					*

Table 14b: *ranking paradox in the HS account, with hiatus repair applying first*

To dispel the paradox, one might be compelled to use quality-specific constraints such as $*\begin{bmatrix}+\text{low}\\+\text{syllabic}\end{bmatrix}\text{V}$ and $*\begin{bmatrix}-\text{low}\\+\text{syllabic}\end{bmatrix}\text{V}$, ranking the former constraint above HD(σ) to ensure early vowel elision, and the latter constraint below HD(σ) to ensure late glide formation. But then we fail to derive cases like [jɔː-j-ɔ], as in Table 13b, which seem to necessitate early glide formation.[14]

The HS analysis of the third-person possessives encounters even more issues. Glided third-person forms are given below:

(28c) /RED+i+go+ɛ/ → [gw-iː-gw-ɛ]
AGR3-his/her

(28d) /RED+i+o+ɛ/ → [wɛː-v-ɛ]
AGR1-his/her

The constraints used in the OT analysis of these forms that have not so far been imported into the HS analysis are MAX-IO([-low]) and MAX-B$_{CV}$R; these constraints are discussed beneath the following tableaux. To derive [gw-iː-gw-ɛ], HD(σ) can be ranked above NOHIATUS so that reduplication applies first in the derivation. But then [wɛː-v-ɛ] cannot be derived from /RED+i+o+ɛ/, as reduplication would apply too early for stem-final /ɛ/ to be copied into the reduplicant.[15]

Stage	/$\sigma_{\mu\mu}$+i+go+ɛ/	HD(*σ*)	NOHIATUS	IDENT-IO(syll)	*COPY(seg)
1	$\sigma_{\mu\mu}$-i-go-ɛ	*!	*		
1	$\sigma_{\mu\mu}$-i-gw-ɛ	*!		*	
1	→ goː-i-go-ɛ		**		*
2	goː-i-go-ɛ		*!*		
2	→ gw-iː-gw-ɛ			*	

---

[14] Furthermore, it would seem that neither ranking between HD(*σ*) and NOHIATUS captures (/$\sigma_{\mu\mu}$+ke+ɔ/, [tʃiː-tʃj-ɔ]). I suppress tableaux demonstrating the matter for purposes of brevity, but the schematic derivations below elucidate the problem:

Copy first: /$\sigma_{\mu\mu}$+ke+ɔ/ → \keː+ke+ɔ\ → \keː+tʃj+ɔ\ ?→ [tʃiː-tʃj-ɔ]
Repair first: /$\sigma_{\mu\mu}$+ke+ɔ/ → \ $\sigma_{\mu\mu}$-tʃj-ɔ\ → \tʃjɔː+tʃj+ɔ\ = *[tʃjɔː-tʃj-ɔ]

[tʃiː-tʃj-ɔ] is like [viː-vj-ɔ] and other possessives with glided CCV bases in the sense that the agreement prefix is copied, but not the stem vowel. The repair-first approach leads to full copying, yielding the undesirable form *[tʃjɔː-tʃj-ɔ], which contains a complex reduplicant onset. Hence we rely on the copy-first approach, and thus run into same issue we observe in Tables 14a-b: while other hiatus repairs apply early in the derivation, palatalization applies late, which necessitates contradictory rankings for HD(*σ*) and NOHIATUS. And even if copying were to apply first, it is unclear how overapplication of palatalization in the reduplicant could be captured in [tʃiː-tʃj-ɔ], considering that it is the result of hiatus repair. One might posit that second-person singular possessives have an underspecified high vowel in the underlying form (*cf.* Leung 1991), before which the /ke/- copy somehow palatalizes. Third-person counterpart [tʃiː-tʃj-ɛ] presumably would receive a similar account. I leave these matters to be fleshed out in future investigations.

[15] Note that in [gw-iː-gw-ɛ] glide formation and compensatory lengthening, as well as multiple instances of glide formation, are collapsed into one stage for purposes of brevity. See Samko (2011) for a more extensive account of how glide formation and compensatory lengthening proceed in Harmonic Serialism.

Stage	/$\sigma_{\mu\mu}$+i+o+ε/	HD(σ)	NoHiatus	Ident-IO(syll)	*Copy(seg)
1	$\sigma_{\mu\mu}$-i-o-ε	*!	**		
1	☹ $\sigma_{\mu\mu}$-i-w-ε	*!		*	
1	→ o:-i-o-ε		***		*
2	o:-i-o-ε		*!**		
2	🛇 w-i:-w-ε			*	

Table 15a: *ranking paradox in the HS account, with reduplication applying first*

Reversing the ranking so that NoHiatus ranks highest fails to derive both [gw-iː-gw-ε] and [wεː-v-ε]: glide formation applies first as desired, but then copying cannot apply thereafter, as it would result in another hiatus.

Stage	/$\sigma_{\mu\mu}$+i+go+ε/	NoHiatus	HD(σ)	Ident-IO(syll)	*Copy(seg)
1	$\sigma_{\mu\mu}$-i-go-ε	*!	*		
1	→$\sigma_{\mu\mu}$ i-gw-ε		*	*	
1	☹ go:-i-go-ε	*!*			*
2	🛇 $\sigma_{\mu\mu}$-i-gw-ε		*		
2	gwε:-i-gw-ε	*!			*

Stage	/$\sigma_{\mu\mu}$+i+o+ε/	NoHiatus	HD(σ)	Ident-IO(syll)	*Copy(seg)
1	$\sigma_{\mu\mu}$-i-o-ε	*!*	*		
1	→ $\sigma_{\mu\mu}$ i-w-ε		*	*	
1	o:-i-o-ε	*!**			*
2	🛇 $\sigma_{\mu\mu}$-i-w-ε		*		
2	☹ wε:-i-w-ε	*!			*

Table 15b: *ranking paradox in the HS account, with repair applying first*

Note that the same problem arises in elided-base forms like (/$\sigma_{\mu\mu}$+i+ga+ε/, [gεː-g-ε]): early copying sending /$\sigma_{\mu\mu}$+i+ga+ε/ to \gaː+i+ga+ε\ would be followed by low vowel elision, resulting in *[g-iː-g-ε]; early repair sends /$\sigma_{\mu\mu}$+i+ga+ε/ to \$\sigma_{\mu\mu}$+i+g+ε\, but subsequent copying as in \gεː+i+g+ε\ cannot take place, since it would result in another hiatus. To capture cases like [wεː-v-ε] and [gεː-g-ε] it seems one must resort to hiatus bans that are sensitive to quality. In [wεː-v-ε], for example, a constraint triggers glide formation applying to the first vowel in /o+ε/ early in the derivation (enforced by $*\begin{bmatrix}\text{-low}\\ \text{+syllabic}\end{bmatrix}\text{V}$ being ranked above HD(σ)), but \ε:+i\ is tolerated later on when the copy is created (due to HD(σ) being ranked above *ε:i). \ε:+i\ would then be resolved via front vowel elision, where $\text{Max-IO-V}_{[\text{-low}]}$ can come into play. Problematically, [gw-iː-gw-ε] still cannot be derived — early glide formation followed by copying would result in \gwεː+i+gw+ε\ as in Table 15b, and then front vowel elision would result in *[gwɛː-gw-ɛ]. And, to repeat, late glide formation seems necessary for second-person possessives like [viː-vj-ɔ] and [guː-gw-ɔ]. Hence quality-specific hiatus bans seem to be needed for HS, but not in OT, which is a point in favor of the latter; moreover, the addition of these constraints does not improve the HS analysis for the glided cases.

The OT analysis capitalizes on size-sensitive reduplicative strength (*cf.* Zuraw 2002) to capture the difference between (/RED+i+go+ɛ/, [gw-iː-gw-ɛ], *[gwɛː-gw-ɛ]) and (/RED+i+o+ɛ/, [wɛː-v-ɛ], *[w-iː-v-ɛ]) and like forms, where copying is stronger because the latter surface base is [CV]. Serial Template Satisfaction denies a role for correspondence (*cf.* McCarthy et al. 2012), and so the framework in its current formulation could not entertain constraints like MAX-BR and MAX-B$_{CV}$R. But for purposes of being comprehensive in our argument, suppose we reinstated the notion of base-reduplicant correspondence in Serial Template Satisfaction, and employed the two constraints, redefined below.

(29) a. MAX-BR: assess one penalty for every base segment lacking a reduplicant correspondent.

b. MAX-B$_{CV}$R: assess one penalty for every segment in a CV surface base lacking a reduplicant correspondent.

Could HS then accommodate the glided reduplicative possessives? Consider the possessives (/$\sigma_{\mu\mu}$+i+go+ɛ/, [gw-iː-gw-ɛ]) and (/$\sigma_{\mu\mu}$+i+o+ɛ/, [wɛː-v-ɛ]), and suppose they have the same correspondence relations posited in the parallel analysis: [g$_1$w$_2$-i$_3$ː-g$_1$w$_2$-ɛ$_4$] and [w$_1$ɛ$_2$ː-v$_1$-ɛ$_2$], with /i/ resyllabified into the reduplicant in the former, and with /i/ deleted in the latter. Perhaps we could derive them in HS using the constraints in (29), considering that [wɛː-v-ɛ] has a CV base and features full representation of the base in the reduplicant, but [gw-iː-gw-ɛ] has neither a CV base nor full base-reduplicant representation. My argument is that we cannot: we get the same results for the glided reduplicative possessives as we did in Tables 15a-b. We need copying to apply early to derive [gw-iː-gw-ɛ]; hence, MAX-BR must rank above NOHIATUS. The result is that (/$\sigma_{\mu\mu}$+i+o+ɛ/, [wɛː-v-ɛ]) cannot be derived — copying applies too early, resulting in /oː+i+o+ɛ/. MAX-B$_{CV}$R thus plays no role in determining the outcome: HS unable to "look ahead" in the derivation, enforcing early glide formation so that MAX-B$_{CV}$R is later satisfied in a path such as /$\sigma_{\mu\mu}$+i+o+ɛ/ → \\$\sigma_{\mu\mu}$+i+w+ɛ\\ → \\$\sigma_{\mu\mu}$+i+w+ɛ\\ → \\wɛː+i+w+ɛ\\ → **\\wɛː+w+ɛ** → **\\wɛː+v+ɛ\\ = [wɛː-v-ɛ]**. HS similarly could not ensure early copying in second-person cases like [viː-vj-ɔ] but early glide formation in [jɔː-j-ɔ] so that we get full representation in the reduplicant in only the latter. The explanation for why MAX-B$_{CV}$R fails to improve the HS analysis is the same as that given for *COMPLEX in the discussion under Table 13b: HS cannot "look ahead" in the derivation, deciding the order of operations based on which one best satisfies the constraint.

Taking stock, this section argues that reduplication and hiatus repair cannot be applied in a series under a fixed ranking and still derive the full set of surface forms. Constraints are satisfied by directly comparing candidates that would be derived by opposite orders of reduplication and glide formation. Though reduplicative possessives are readily analyzable in Parallel OT, they present a challenge for serial frameworks such as Harmonic Serialism with

Serial Template Satisfaction. The following section considers a variety of alternative approaches to the HS analysis, but concludes that each of them is either undesirable or untenable.

3.2.1 Alternative serial analyses considered and rejected

A prior reviewer raises an alternative analysis of the second-person possessives, in which all forms undergo hiatus repair first. In cases of glided CCV bases as in (/RED+vi+ɔ/, [viː-vj-ɔ]), the winning intermediate candidate is one with a representation in which the syllable nucleus is occupied solely by a glide. One can imagine a Duke of York-style derivation (*cf.* Pullum 1976, McCarthy 1999) for (/RED+vi+ɔ/, [viː-vj-ɔ]), in which /i/ first undergoes glide formation, and then only the segments \vj\ are copied into the reduplicant, with \j\ copying into the nucleus and revocalizing at a later stage. A schematic derivation is given below for the glided-base forms [viː-vj-ɔ] and [jɔː-j-ɔ] (in which syllabic \j\ is represented as \J\):

(30)	UR	/RED+vi+ɔ/	UR	/RED+e+ɔ/
	Glide Formation	RED+vj+ɔ	Glide Formation	RED+j+ɔ
	Copying	vJː.+vj+ɔ	Copying	jɔː+j+ɔ
	Revocalization	viː+vj+ɔ	Revocalization	— — —
	SR	[viː-vj-ɔ]	SR	[jɔː-j-ɔ]

Though the analysis seems to succeed in treating these forms, it does so at a serious cost, relying on a representation \J\ which is surface-unattested and elsewhere unmotivated in languages, as far as I am aware. There exist plenty of languages in which syllable nuclei are occupied by syllabic nasals, liquids, or even obstruents. In addition, there exist a number of languages featuring syllable nuclei argued to be occupied by onglide-vowel or vowel-offglide sequences (Barlow 1996, Harris & Kaisse 1999, Hualde 2005). But there do not seem to exist languages in which the glide alone surfaces as a syllable nucleus (*cf.* Pater 2012; Padgett 2008). In serial frameworks such as Harmonic Serialism, the learner's set of representations would not only have to be extended to entertain winning intermediate candidates with abstract, surface-untrue structures that are attested in other languages or at least independently motivated (*cf.* Kenstowicz & Kisseberth 1979, Pruitt 2012, though see Kiparsky 1968, Albright 2002, Bowers 2012 on learnability issues; *cf.* Trigo 1988 *et seq* on placeless nasals, though see Noriko 2013 for counterevidence), but also structures that are crosslinguistically surface-unattested and not independently motivated (see Samko 2011, Topintzi 2012 for discussion). This reanalysis is thus undesirable not simply because there is little to no evidence that Maragoli learners entertain nucleic glide representations, but also because there is little to no evidence that any language learner does.

Another option would be to posit reduplicants composed of two segment slots (McCarthy 1981, Marantz 1982, Levin 1985), capitalizing on the fact that reduplication in Maragoli always involves copying of two segments. In (/RED+i+go+ɛ/, [gw-iː-gw-ɛ]) and (/RED+i+o+ɛ/, [wɛː-v-ɛ]), two segments from each of the underlying stems, /go/ and /oɛ/, could be copied into the template slots, with further repair following in the derivation. But considering the body of evidence for prosodic reduplicative templates (McCarthy & Prince 1986/1996 *et seq*), this is an option I do not explore, leaving it for further research.

Alternatively, the problematic glided second-person cases such as (/$\sigma_{\mu\mu}$+vi+ɔ/, [viː-vj-ɔ]) and (/$\sigma_{\mu\mu}$+j+ɔ/, [jɔː-j-ɔ]) which produce the paradox Tables 13a-b seemingly can be accounted for by adopting weighted constraints rather than ranked constraints (Serial Harmonic Grammar; Pater 2012). This approach, however, seems untenable, since the elided base forms such as (/$\sigma_{\mu\mu}$+ga+ɔ/, [gɔː-g-ɔ]) as well as the third-person possessives still elude analysis. If HD(σ) and NoHiatus are weighted so that 2w(NoHiatus) > w(HD(σ)) > w(NoHiatus), the paradoxical second-person forms [viː-vj-ɔ] and [jɔː-j-ɔ] can be analyzed as resulting from cumulative constraint violation: /$\sigma_{\mu\mu}$+vi+ɔ/ maps to \viː-vi-ɔ\ in Stage 1 satisfying syllable headedness; two violations of hiatus, however, are worse than one violation of syllable headlessness, and so /$\sigma_{\mu\mu}$+e+ɔ/ maps to \$\sigma_{\mu\mu}$+j+ɔ\ in Stage 1 rather than to \eː+e+ɔ\, preceding the eventual selection of [jɔː-j-ɔ]. But since HD(σ) is weighted higher than NoHiatus, elided base forms could not be derived: in (/$\sigma_{\mu\mu}$+ga+ɔ/, [gɔː-g-ɔ]), for instance, /$\sigma_{\mu\mu}$+ga+ɔ/ should undergo low vowel deletion prior to copying (/$\sigma_{\mu\mu}$+ga+ɔ/ → \$\sigma_{\mu\mu}$+g+ɔ\ → [gɔː-g-ɔ]), but with the current ranking it would undergo copying first, leading to *[gaː-g-ɔ]. Perhaps the only recourse in this case would be to use quality-specific hiatus bans (see discussion under Table 14a-b). Moreover, the third-person possessives such as (/$\sigma_{\mu\mu}$+**i**+go+ε/, [gw-iː-gw-ε]) and (/$\sigma_{\mu\mu}$+**i**+o+ε/, [wεː-v-ε]) seemingly could not be analyzed as resulting from a cumulative effect unlike their second-person counterparts, as there exists no set of factors that together yield the outcome of /i/-deletion or preservation in one form but not the other.

The last alternative I explore is an HS analysis in which glide formation is taken not to constitute an actual phonological operation, but rather a *faithful change* to the input (McCarthy 2010b). Such approach would say it violates no faithfulness constraints and thus can apply freely at any stage in the derivation concurrent with other operations, much like syllabification. If we find that glide formation should be considered a faithful change, then HS should be free to apply it in concert with reduplication, since it only limits GEN to producing candidates that display at most one unfaithful change (here, copying). For glide formation to violate no faithfulness constraints, the transformation from vowel to glide must involve no featural change — in other words, vowels and glides must be taken to be featurally identical. Suppose [syllabic] is excluded from the feature set so that glides are featurally identical to vowels, differing from them only in their position within the syllable. The paradox displayed in the second-person possessives in Tables 13a-b can be dispelled assuming glide formation is a fully faithful change to the input, as illustrated in the tableaux below. Since Serial Template Satisfaction lacks BR-correspondence, I use Onset instead to eliminate *[eː-j-ɔ], which contains an onsetless syllable.

(31) Onset: assess one penalty for every syllable without an onset.

/$\sigma_{\mu\mu}$+vi+ɔ/	NoHiatus	HD(*σ*)	*Complex	*Copy(seg)
$\sigma_{\mu\mu}$-vi-ɔ	*!	*		
$\sigma_{\mu\mu}$-vj-ɔ		*!	*	
viː-vi-ɔ	*!			*
→ viː-vj-ɔ			*	*
vjɔː-vj-ɔ			**!	*

Table 16a: *HS analysis of glided CCV base reduplicative possessives with free glide formation*

/$\sigma_{\mu\mu}$+vi+ɔ/	NoHiatus	HD(*σ*)	Onset	*Copy(seg)
$\sigma_{\mu\mu}$-e-ɔ	*	*	**	
$\sigma_{\mu\mu}$-j-ɔ		*!		
eː-j-ɔ			*!	*
→ jɔː-j-ɔ				*

Table 16b: *HS analysis of glided CV base reduplicative possessives with free glide formation*

/$\sigma_{\mu\mu}$+vi+ɔ/ can undergo copying into the syllable template, syllabification of the stem, and glide formation at once, mapping to \viː-vj-ɔ\ in one fell swoop. Likewise, /$\sigma_{\mu\mu}$+e+ɔ/ can undergo copying, syllabification, and glide formation, mapping to \jɔː-j-ɔ\ at once.

I argue that considering glide formation a faithful change is untenable for two reasons: first, much research suggests glides and vowels should be taken to be featurally distinct; and second, featural identity between vowels and glides fails to account for the distribution of [j] in Maragoli.

Phonologists have previously argued for the elimination of [syllabic] (Selkirk 1982, Clements and Keyser 1983, Kaye and Lowenstamm 1984, Hyman 1985, Levin 1985), the feature that distinguishes glides from vowels, on the basis of theoretical economy: if the theory distinguishes between nuclear and non-nuclear roles, then it need not accommodate a featural distinction as well. Vowels and glides were taken to be featurally identical, differing only in terms of position. A more recent spate of research, however, has argued for the restoration of a featural distinction despite the apparent redundancy. In some languages, the distribution of glides is not predicted by a theory that forbids vowels and glides to co-occur in a single phoneme inventory (Rosenthall 1994, Hualde 2005, Levi 2008). Moreover, a theory that lacks their featural distinction fails to predict the transparent behavior of glides in cases of vowel harmony (Nevins and Chitoran 2008), or their opaque behavior in cases of nasalization (Cohn 1993), or the existence of processes that distinguish vowels from glides in terms of constriction degree (Padgett 2008).

Eliminating [syllabic] from the feature inventory and taking glide formation to be a fully faithful change succeeds in accounting for the Maragoli data above, but fails to account for the distribution of [j] in the language. Indeed, vowels and glides do distribute complementarily, as hiatuses never surface in the language. However, other evidence suggests that [j] is phonemic.

Compensatory lengthening consistently follows glide formation in non-final syllables (Leung 1991), as can be observed in pairs such as [nz-izuɾiz-a] = 1sg-fill-PROG = ‘I am filling’ and [kw-iːzuɾiz-a] = 1p-fill-PROG = ‘we are filling’. If glides were strictly allophonic in the language, then we would not expect them to precede non-final short vowels. Glides preceding non-final short vowels would constitute evidence that they are present in underlying forms. Consider the third-person subject agreement prefix, [a]-/[j]-. The latter form surfaces before vowels:

(32a) j-i-siːŋg-a (/j+i+siːŋg+a/)
3sg-REFL-wash-PROG
‘(s)he washes himself/herself’

(32b) j-igoɾ-a (/j+igoɾ+a/)
3sg-open-PROG
‘(s)he is opening’

(32c) j-a-jaːnz-a (/j+a+jaːnz+a/)
3sg-HABIT-like-PROG
‘(s)he likes (in general)’

As there are no processes attested elsewhere in the language that derive one of [a] or [j] from the other, I treat third-person subject agreement as a case of phonologically conditioned allomorphy. Both /a/ and /j/ are adopted as underlying forms, and which of the two surfaces is determined by properties of the stem (Tranel 1996). If the glide allomorph were the result of glide formation from a featurally identical vowel (e.g., /i/), then we would expect the following vowel to lengthen in turn. On the contrary, the forms above show that short vowels can follow [j], a fact that remains unexplained if the phoneme inventory were assumed to lack /j/. It would be problematic to say that the absence of compensatory length is due to glide formation preceding mora assignment in this case specifically, since then one would have to explain why subject prefixes other than the third-person singular [j]- do trigger compensatory lengthening (e.g., [kw-iːzuɾiz-a] = 1p-fill-PROG). Excluding [syllabic] from the feature set fails to predict simultaneous phonemehood of vowels and glides, and so rendering glide formation to be a faithful change does not appear to be a valid option. The analyst who chooses to do so would have to reckon with these facts, in addition to those presented in the aforementioned literature.

A prior reviewer suggests that Maragoli could potentially contain two types of glides: a phonemic glide that contrasts with vowels and whose distribution is unpredictable, and a non-phonemic glide derived only in the process of hiatus resolution (*cf.* Levi 2008). Vowels and derived glides would be featurally identical, but phonemic glides would be specified for some extra feature. If such were the case, one might expect phonemic glides and derived glides to be somehow phonetically distinguished. In fact, my Field Methods colleagues and I have not found any context-dependent differences between glide tokens. But even if they are phonetically indistinguishable, Levi (2008) argues that languages can have pairs of glides that bear a phonological distinction but not a phonetic one. In Karuk, for example, a variety of phonological rules treat seemingly phonemic glides differently from phonetically identical derived glides. In Maragoli, however, I have encountered no phonological evidence of this kind or any other that would distinguish two classes of glides.

In sum, I am aware of no HS reanalysis that succeeds in treating the data (at least using representations motivated elsewhere). It is, of course, a daunting task to show that no Harmonic Serialism analysis exists for these data, given the rich variety of constraints and representations that have been proposed in the literature. I therefore leave it to future investigators to assess whether promising approaches not covered above lead to a complete analysis.

4 Conclusion

Based on attested words in the language and as well as nonce probe data, this paper has argued that a successful analysis of Maragoli reduplication-repair interaction requires direct comparison between candidates derived by opposite orders of phonological changes. The data give rise to paradoxical, opportunistic ordering of phonological processes, with changes applying in whichever order yields optimal surface onsets: in one set of inputs, copying before repairing avoids a complex onset, while in another set, repairing before copying avoids an onsetless syllable and maximizes word-internal self-similarity. Maragoli reduplication-repair interaction thus adds to a growing number of cases of conspiracy of procedures, in the sense of Adler & Zymet (2017): the grammar applies one procedure, repair followed by copying, unless the result is a suboptimal onset; in such case, the grammar instead applies a different procedure, namely copying followed by hiatus repair. The data, though fully analyzable in Parallel Optimality Theory, produce constraint-ranking paradoxes in Harmonic Serialism with Serial Template Satisfaction, and therefore constitute evidence for irreducible parallelism (McCarthy 2013).

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