

Second radical reduplication in Amharic: Optimality Theory^{*}

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Tak, Jin-young. 2016. Second radical reduplication in Amharic: Optimality Theory. *Studies in Phonetics, Phonology and Morphology* 22.1. 121-145. The present study attempts to provide an insightful analysis of the second radical reduplication in Amharic, one of the Semitic languages spoken in the central and southern highlands of Ethiopia. Following Unseth (2002), it is suggested that even though underlying ghost consonants (laryngeals [h, ʔ, h, ʕ] or glides [w, y]) do not typically appear in regular verbal conjugations, they may emerge in verbal reduplication. To account for this, the present study proposes a root-and-pattern analysis incorporated with sympathetic candidates (McCarthy 1999, 2003) contrary to Bat-El (1994, 2003), Ussishkin (2003, 2006) and Schluter's (2008) word-based analyses. Given this, a candidate that satisfies the faithfulness constraint MAX-TEMPLATE_✱ is selected as a sympathetic candidate. Moreover, the faithfulness relations between the sympathetic candidates and the other candidates are evaluated through the sympathetic constraints ✱MAX-ROOT and ✱IDENTITY-[PLACE]_{ROOT}, resulting in obligatory realizations of ghost segments in reduplication. If this notion is adopted, the data on Amharic verbal reduplication can be properly analyzed as a single phenomenon, i.e., reduplication of the underlying penultimate radical. (Sejong University)

Keywords: radical, template, word-based analysis, root-and-pattern analysis, infix, reduplication, Sympathy, selector

1. Introduction

This paper attempts to provide an account for nonconcatenative verbal reduplication in Amharic within the framework of Sympathy Theory (McCarthy 1999, 2003).

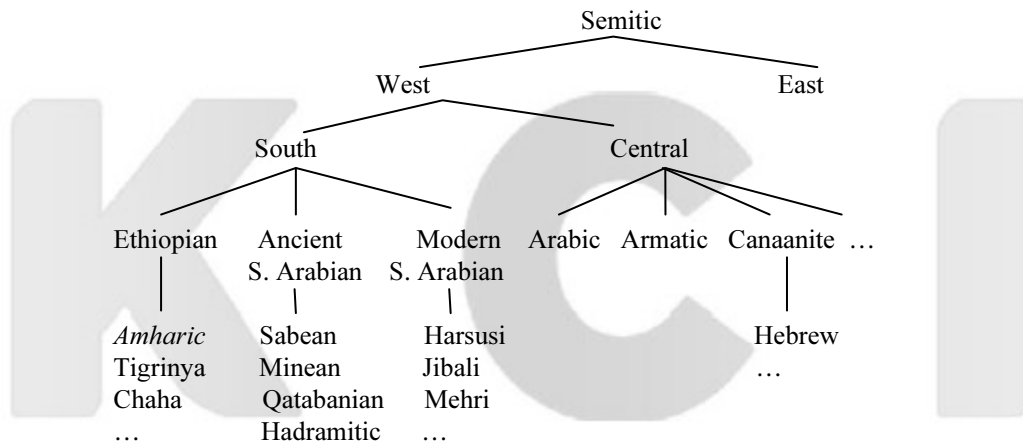
^{*} I would like to express my sincere thanks to two Amharic informants Yodit Alemu and Frezer Legesse who provided valuable information and comments while I stayed at Indiana University in 2014. All errors and misrepresentations are the author's responsibility.

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Amharic, spoken in North Central Ethiopia, belongs to the Ethiopian branch of the Southern Semitic languages. It is reported that Amharic is the second most spoken Semitic language after Arabic. Despite the large number of speakers, Amharic is less known and even less investigated than other languages in Semitic languages such as Arabic, Hebrew, and Chaha (Teferra and Hudson 2007).

A Semitic family tree to show the relationships between Amharic and the other Semitic languages is depicted in (1).

(1) Family tree of Semitic (Teferra and Hudson 2007: 18)



Because Amharic displays very complex reduplicative patterns incorporated with diverse conjugations, it is worthy of exploring Amharic reduplication in order to offer more comprehensive analysis. It is proposed in this paper that even though Amharic reduplication of the second consonant as in $C_1VC_2VC_3$ displays diverse patterns, it can be analyzable as a single phenomenon if Sympathy Theory (McCarthy 1999, 2003) is facilitated.

This paper is organized as follows: Section 2 introduces Amharic verbal reduplication data preceded by rudimentary Amharic phonology. In Section 3, previous research is presented by comparing word-based approaches with root-and-pattern approaches. Based on this discussion, Section 4 provides an analysis by means of sympathetic candidates of Optimality Theory. Section 5 offers conclusions to this research.

2. Nonconcatenative morphology in Amharic

2.1 Assumption

Before presenting Amharic reduplication data, I will make several preliminary remarks on Amharic phonology relevant for the discussion of the present study. First, Amharic has 27 consonants and 7 vowels as shown in (2)-(3) (Titiov 1976, Leslau 1995, 2000, Amberber 2002, Teferra and Hudson 2007, Sande 2014).

(2) Amharic consonants (Leslau 1995, 2000, Amberber 2002; Sande 2014: 184)

	Labial	Dental	Palatal	Velar	Laryngeal
stop	p	t	č	k	ʔ
	b	d	ǰ	g	
	p̣	ṭ	č̣	ḳ	
fricative	f	s	š		h
		z	ž		
		ʃ			
nasal	m	n	ɲ		
liquid		l, r			
Glide	w		y		

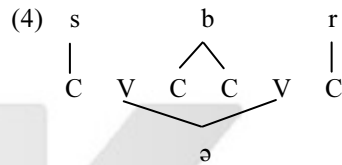
Most of the Amharic consonants are pronounced the same or nearly the same as the English sounds except for glottalized or ejective consonants [p̣, ṭ, č̣, ḳ, and ʃ̣]. These consonants are produced when the stream of air coming from lung is blocked by the closure of the glottis, while the air above is pushed out through a stricture formed in the vocal tract.

(3) Amharic vowels (Amberber 2002: 3, Teferra and Hudson 2007: 34)

	front	center	back
high	i	ɨ	u
mid	e	ə	o
low			a

All vowels are short in Amharic. The vowels always occur with consonants, but are never written in isolation.

Second, verbs in Amharic are analyzed as consisting of the two following elements under so-called root-and-pattern morphology (Bender and Fulass 1978, Leslau 1995, 2000, Rose 2003a, b, Amsalu and Gibbon 2005): (1) a consonantal root, which carries the basic lexical meaning, and (2) a pattern of CV-skeletons and vowels, which conveys the grammatical meaning. For example, in the case of the verb *səbbər*, \sqrt{sbr} is the consonantal root with the meaning of ‘break’; a pattern of *CVCCVC* and *a* reveals perfect tense. Within McCarthy’s (1979, 1981) theory, the underlying representation of *səbbər* is illustrated as follows:



This root-and-pattern approach has been widely adopted for many analyses by Semitic linguists.

Third, the verbs in Amharic are further classified into Type A, Type B, and Type C based on their conjugational characteristics. This is shown in (5), relying on Amberber (2002) and Leslau (1995, 2000).

(5) type	root	gloss	stem		
			perfect	jussive	imperfect
a. A	\sqrt{sbr}	break	səbbər-	-sbir-	-sibər-
b. B	\sqrt{flg}	search	fəlləg-	-fəllig-	-fəllig-
c. C	\sqrt{mrk}	cause to surrender	marrək-	-marrik-	-mark-

The perfect tense, normally expressing the past, is realized with only suffixes indicating person, gender, and number (i.e., *səbbər-ə* ‘he broke’ and *səbbər-ku* ‘I broke’). On the other hand, the imperfect tense expresses the present and future in the main negative clause (Leslau 2000: 62)¹. It is formed with prefixes and suffixes (i.e.,

¹ The imperfect tense is also used in the relative clauses to express either affirmative or negative meanings, and its realizations in the relative clauses are quite complicated. Such a discussion is outside of the scope of this paper, and this is not further discussed here.

ay-sabr-əmm ‘he does not (will not) break’ from *yi-sbər* where the prefix *a-* and *-əmm* are negative; *al-sabr-əmm* ‘I do not (will not) break’ from *ə-sabr*). The jussive expresses a command or an order for the first or third person; their affixation is the same as that of the imperfect except for the first person singular, which is realized with the prefix *lə-* instead of *yi-*, as in *lə-sbər* ‘let me break’ (Leslau 2000: 75).

In addition, these three types differ both in the quality of the vowel after the first radical and in (non-)gemination of the second radical. That is, verbs in Type A have conjugation patterns where a penultimate consonant geminates in perfect only; in Type B verbs, a penultimate consonant geminates throughout. In contrast, Type C is characterized by the vowel [a] after the first radical and [ə] after the second radical. Then, the second radical geminates in perfect and jussive.

As seen in (2)-(5), Amharic demonstrates its linguistic peculiarities and complexities different from other languages.

2.2 Data

All of the second radical reduplicative forms represented in (6) acquire the meaning of ‘intensive,’ ‘iterative’ or ‘reciprocal.’ The relevant perfect tense data in (6) are drawn from Leslau (1995, 2000) and Unseth (2002).

(6) stem	gloss	reduplicative stem
a. <i>ləmmət-</i>	grease	<i>ləmammət-</i>
b. <i>məlləs-</i>	return	<i>məlalləs-</i>
c. <i>məkkər-</i>	advise	<i>məkakkər-</i>
d. <i>məzzən-</i>	weigh	<i>məzazzən-</i>
e. <i>rəggət-</i>	kick	<i>rəgaggət-</i>
f. <i>nəggər</i>	say, tell	<i>nəgaggər-</i>

(7) stem	gloss	reduplicative form
a. <i>səmma-</i>	hear	<i>səmma-</i>
b. <i>rəgga-</i>	coagulate	<i>rəgagga-</i>
c. <i>nəssa-</i>	deprive of	<i>nəsassa-</i>
d. <i>sədda-</i>	be clean	<i>sədadda-</i>

(8)	stem	gloss	reduplicative form
	a. mäsəkkər	testify	mäsəkakkər
	b. dəbəllərq	mix, confuse	dəbəlləllərq

(9)	stem	gloss	reduplicative form
	a. sam-	kiss	sasam-
	b. sat-	be mistaken	sasat-
	c. tal-	throw	tatal-
	d. saf-	try hard	sasaf-
	e. lak-	send	lalak-
	f. alləf-	pass	alalləf-
	g. assər-	trust	asassər-

(10)	stem	gloss	reduplicative form
	a. ša	want	šəša

(11)	stem	gloss	reduplicative form
	a. ɣom-	stop, stand	k ^w ak ^w am-
	b. zor-	go around	zwawwər-
	c. ɬes-	smoke	čəčas-

If the data only in (6) and (7) are considered, it can be easily proposed that the second radical is infixed with the designated vowel [a] before the geminated second radical. In contrast, in the data in (8), the third radical is reduplicated. Also, different from the data in (6), (7), and (8), in the examples in (9) and (10), the reduplicated radical is the first one, and not the second nor the third one. The data in (6) and (8) differ from each other in terms of the number of underlying radicals, consisting of three and four radicals, respectively. Interestingly, in (11), [w] which does not exist in the stem emerges in the reduplicative form. Based on the descriptions focusing on the surface forms, it seems that the reduplicative patterns in Amharic are very complicated and therefore unlikely to be explained in a uniform way.

However, this paper posits that the representations in (6)-(11) which look ostensibly different from one another can be comprehensively explained by assuming that Amharic verbal reduplication is defined as infixing the penultimate radical, rather than the second radical, with a fixed vowel [a].

3. Previous research

Second radical reduplication in Amharic has been analyzed mostly relying on a root-and-pattern approach (McCarthy and Prince 1995, Leslau 2007). Under this approach, an Amharic reduplicative verb is simply described as the infixing of the second radical with the vowel [a]. Similar analyses in another Semitic language are proposed by Banksira (1993, 1997, 2000) for Chaha and Buckley (2002) for Tigrinya. However, problems of the infixing analysis are raised by many scholars (Bat-El 1994, Ussishkin 2003, 2006, Schluter 2008). First, if we further investigate data on the jussive, it turns out that the infixing approach is not adequate. Consider the following data (Rose 2003a, b):

(12)	jussive	actual reduplication	predicted reduplication
a. Type A	yi-sbir	yi-səbabir	*yi-sbabər
b. Type B	yi-fəllig	yi-fəlalig	?yi-fəlallig
c. Type C	yi-bark	yi-bərarik	?yi-barark

As illustrated in (12), if reduplicative patterns are defined as a process of inserting the penultimate radical followed by the vowel [a], the unintended forms are derived. In examples (12a) and (12c), [ə] is inserted between the first and second radical in reduplication; the geminated second radical in (12b) surfaces as a singleton in reduplication. However, as noticed by Rose (2003b), some Amharic speakers prefer *yi-fəlallig* over *yi-fəlalig* in (12b). Therefore, she argues that the actual forms in (11) cannot be considered counterexamples to root-and-pattern analyses, but rather they should be viewed as variants of intended forms.

Further evidence against the infixing approach is drawn from the reduplication of bi-consonantal radicals. Consider the data in (13), which are extracted from (6-11) (Rose 1997, 2000).

(13) stem	gloss	reduplicative stem	gloss
a. lak-	send	lalak-	send to one another
b. səmma-	hear	səmma-	correspond, agree
c. zor-	go around	zwawwər-	wander

As illustrated in (13a), the reduplicated radical is first, not second, whereas in

(13b), even though the second radical is reduplicated, it is geminated. More interestingly, in (13c), [w], which is not present in the stem, emerges in reduplication. These phenomena cannot be explained by the infixing of the second radical and the following [a] before the second radical.

Different from the infixing analysis, Rose (2003a, b) proposes separate reduplicative templates to which the root is mapped. This analysis can provide an answer for why the reduplicative template is identical through all verbs only belonging to the same type.

However, this approach still cannot account for bi-radical reduplication in (13) since the actual reduplicative forms do not fit reduplicative templates.

By acknowledging these problems, Heath (1987), Darden (1992), and Bat-El (1994), McOmber (1995), Ussishkin (1999) argue that Semitic languages do not need to rely on abstract entities like roots; instead, full words or stems serve as bases. Their argument is based on the observation that certain derivations depend on independent words, not templates, roots, or vowel melodies. They investigate various Semitic languages, such as Arabic (McOmber 1995), Cairene Arabic (Darden 1992), Moroccan Arabic (Heath 1987), and Tigre (Hammond 1988), Hebrew (Bat-El 1994, Ussishkin 1999). For example, broken plurals are closely related to their singular counterparts in Tigre (Hammond 1997, Ratcliffe 1998) where *māsa:kut* ‘windows’ is derived from *māskot* ‘window.’ Therefore, the root-and-pattern approach in which templates for singulars and plurals are independent cannot account for the relationships between singulars and their corresponding broken plurals.

By totally abandoning root-and-pattern approaches, Schluter (2008) proposes that the reduplicative morpheme in Amharic is $/[+consonant]a/$, and the underspecified $[+consonantal]$ receives the feature through phonology within the framework of Optimality Theory (Prince and Smolensky 1993, Rose 2003a). The constraints proposed by Schluter (2008) are illustrated in (14).

(14) Constraints

- a. ALIGN-FOOT: ALIGN (foot, right; base, right)

The right edge of every prosodic foot must align with the right edge of the base.

- b. FOOTBINARY

A foot consists of exactly two syllables.

- c. ALIGN-REDa-FOOT: ALIGN(REDa, left; foot, left)

The left edge of the reduplicative morpheme must align with the left edge of

the prosodic foot.

d. Align-REDA-VERBAL STEM: Align (REDA, left; base, left)

The left edge of the reduplicative morpheme must align with the left edge of the verbal stem.

Additionally, Schluter (2008) suggests that constraints ALIGN-FT, FTBIN, and Align-REDA-FT dominate Align-REDA-VS. Given this, the evaluations of ALIGN-FT, FTBIN, ALIGN-REDA-FT >> Align-REDA-VS are shown in (15).

(15) Evaluation of *fəlləg*- from *fəlləg*-

/fəlləg+REDA/	ALIGN-FT	FTBIN	ALIGN-REDA-FT	ALIGN-REDA-VS
a. <i>la</i> .(fəlləg)			!a	
☞ b. fə(<i>la</i> .ləg)				fə
c. (fə. <i>la</i> .ləg)		*!	fə	fə
d. (fə. <i>la</i>)ləg	!ləg		fə	fə
e. fəl(<i>la</i> .ləg)				fəl!
f. fəl(ləg. <i>la</i>)	!a		ləg	fəlləg

As seen in the tableau in (15), (15d) and (15f) violate the higher ranking constraint ALIGN-FT and are thus judged as the least preferred outputs. Then, candidate (15c) which incurs a violation of FTBIN cannot be the winner, either, because the foot is composed of three syllables. The selection among (15a), (15b), and (15e), depends on whether or not they obey two key alignment constraints, ALIGN-REDA-FT and ALIGN-REDA-VS. Since ALIGN-REDA-FT outranks, the candidate in (15a) cannot be the optimal output since the reduplicative form *la* does not align with the left edge of the foot. As for (15b) and (15e), in spite of the violations of ALIGN-REDA-VS, candidate (15b) wins because it incurs a fewer violations of ALIGN-REDA-VS.

Additionally, Schluter (2008) shows how the constraints in (14) predict the quality of the reduplicative morphemes. As for the input /fəlləg+REDA/ in (15), constraints ALIGN-REDA-FT and Align-FT compel *fə*(RED*al.ləg*) to be realized as the optimal output; he further argues that the reduplicative segment is identical to the following consonant segment.

Without a reference to roots and templates, Schluter (2008) posits that all reduplication patterns are explained. However, he does not analyze conjugations of bi-radical verbs where semi-vowels are realized in reduplication, even though

Schluter (2008) admits that for some speakers *kom-* in the perfect tense may be pronounced as *k^wam-*. Consider the following data (Leslau 2000)².

(16) Conjugations of <i>kom-</i> ‘stand’		Conjugations of <i>tes-</i> ‘smoke’
a. perfect	<i>kom-</i>	<i>tes-</i>
b. imperfect	<i>-kom-</i>	<i>tes-</i>
c. jussive	<i>-kum</i>	<i>-tis</i>
d. participle	<i>k^wam-</i>	<i>tiyas-</i>

Unless the existence of the penultimate semi-vowels in the underlying representation is accepted, it is implausible to account for the source of the semi-vowels [w] and [y] in *k^wam-* and *tiyas-*, respectively. Based on this observation, the present paper accepts Leslau’s (2000) proposal that the perfect forms *kom-* and *tes-* are derived from \sqrt{kwm} and \sqrt{tys} . Therefore, it is argued that the word-based approach rejecting underlying consonant roots cannot provide any logical evidence to support these variations.

Rose (2003a) proposes a mixed approach to Amharic infixing reduplication. By noticing the similarities between the quadri-lateral and reduplicative templates, she argues that reduplicative outputs must conform to quadri-lateral templates. This is illustrated in (17).

(17)	quadri-consonantal \sqrt{mskr}	reduplication of \sqrt{sbr}
a. perfect	<i>məsəkkər</i>	<i>səbabbər</i>
b. imperfect	<i>yi-məsəkkir</i>	<i>yi-səbabbir</i>
c. jussive	<i>yi-məskir</i>	<i>yi-səbabir</i>

As illustrated in the data in (17), the significant difference between the quadri-lateral and reduplicative templates is in the appearance of [a] after the second radical in reduplication. In the jussive, in order for [a] to emerge in reduplication, a vowel slot to which [a] is mapped in the template should be inserted. Instead of proposing a reduplicative template (i.e., CəCaCCəC-), she suggests that reduplication is in fact

² The data in (16), drawn from Leslau (2000), were carefully examined by the Amharic informants Yodit Alemu and Frezer Legesse at Indiana University. Contrary to Schluter (2008), the two Amharic informants in this paper informed us that *k^wam-* is not allowed in the perfect tense. Therefore, this paper follows the linguistic intuition of the two informants.

formed by means of the infixing of a reduplicative syllable to the regular verb stems with a special reference to templatic shapes and roots. However, she does not adequately provide an answer for verbal reduplication patterns including laryngeals and glides.

In this section, most well-known studies on Amharic reduplication are reviewed, the majority of which still need to provide an answer for the unsolved data, i.e., verbs realized with laryngeals and glides. In consideration of this, the present paper provides a uniform analysis toward Amharic penultimate reduplication by facilitating Sympathy Theory (McCarthy 1999, 2003) and Output-Output Correspondence (McCarthy and Prince 1995).

4. An optimality-theoretic analysis

At a first glance, Amharic reduplication seems to be analyzable simply as the infixing of the second consonant followed by a fixed vowel [a]. However, if reduplication of bi-radical verbs and other conjugation patterns in jussive, gerund, and infinitive are thoroughly scrutinized, it turns out that the simple infixing account cannot explain various Amharic reduplication patterns.

First, note the data in (18) where the reduplicative forms in the participle and perfect tense are identical. Interestingly, their corresponding bases are different (Leslau 2000).

(18) a. Conjugations of \sqrt{kwm} 'stand'		reduplicative form
perfect	$\text{\textit{\textbf{k}om-}}$	$\text{\textit{\textbf{k}^w a \textbf{k}^w am-}}$
participle	$\text{\textit{\textbf{k}^w am-}}$	$\text{\textit{\textbf{k}^w a \textbf{k}^w am-}}$
b. Conjugations of \sqrt{tys} 'smoke'		
perfect	$\text{\textit{\textbf{t}es-}}$	$\text{\textit{\textbf{\text{c}a \textbf{\text{c}as-}}}}$
participle	$\text{\textit{\textbf{t}iyas-}}$	$\text{\textit{\textbf{\text{c}a \textbf{\text{c}as-}}}}$

Schluter (2008: 298) argues that the data in (18) are bi-radical, yet still a word-based approach can account for the data in (18). If so, an explanation is necessary as to why the reduplicative form for $\text{\textit{\textbf{k}om-}}$ in the perfect tense surfaces $\text{\textit{\textbf{k}^w a \textbf{k}^w am-}}$ rather than $\text{\textit{\textbf{k}o \textbf{k}om-}}$. In fact, Schluter (2008) proposes that $\text{\textit{\textbf{k}om-}}$ in the perfect tense is also pronounced as $\text{\textit{\textbf{k}^w am-}}$; both $\text{\textit{\textbf{k}o \textbf{k}om-}}$ and $\text{\textit{\textbf{k}^w a \textbf{k}^w am-}}$ are permissible reduplicative forms in Amharic. However, according to Leslau (2000) and Schluter (2008), $\text{\textit{\textbf{k}o \textbf{k}om-}}$ is not

a possible output in Amharic³. Additionally, Leslau (2000) presents more data similar to (18a) like *tə-k^wak^wam* ‘resisit, withstand’ and *a-k^wak^wam* ‘establish,’ where *tə* and *a* are attached, respectively. The *tə*-stem is used mostly to denote the passive of transitive verbs and to change transitive verbs into intransitive verbs; the *a*-stem serves for the most part to express causative. If the underlying glides are not posited in (18), it is impossible to explain how they emerge in some output forms.

If the above problematic data are evaluated by means of the constraints proposed by Schlueter (2008) in (14), it turns out that tableau (19) fails to pick up the right optimal form *k^wak^wam-* from *kom-*. This is seen in (19).

(19) Evaluation of *k^wak^wam-* from *kom-*

/kom- REDa/	ALIGN-FT	FTBIN	ALIGN-REDa -FT	ALIGN-RED-VS
☞ a. (ka ^w kom)				
b. (ko ^w ka ^w am)			k!o	ko
☞ c. (ko ^w kom)				
☞ d. (k ^w ak ^w am)				
e. k ^w a(k ^w am)		*!	k ^w a	

Candidates (19b) and (19e) are ruled out since (19e) disobeys the higher ranking constraint FOOT-BINARY, and (19b) violates ALIGN-REDa -FT because the reduplicant does not align with the left edge of the foot. Among candidates (18a), (18c), and (18d), none of these violate any constraints; all of them seem to be realized as winners. In fact, the candidate in (19d) turns out to be the optimal form.

In order to offer an intuitive analysis for seemingly bi-radical roots in (18), this paper argues that many Amharic verb roots may contain a ghost segment, which is used to refer to any segment that alternates with zero regardless of whether it overtly surfaces or not. The ghost segment is ascribed to historical laryngeal consonants [h, ʔ, ɸ, ʕ] or glides [w, y], mostly lost in contemporary Amharic. Even though they alternate with zero in verbs, they appear in nouns, leading to the conclusion that they do exist in the underlying representation. The relevant data to show the laryngeal [h] and zero alternations are extracted from Leslau (1997: 402).

³ Like Leslau and Rose, the two informants in the present research offered the same comment on reduplicative form of *kom-* ‘stand.’ Both of them ensured that *ko^wkom-* would not be acceptable in Amharic.

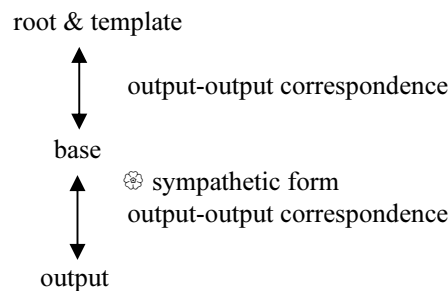
(20)	verbs	nouns
a. azzəna	to be sad	hazən sadness
b. alləmə	to dream	həlm dream
c. amməmə	to be sick	həməm disease
d. annətə	to build	hənsə building

As seen in the data in (20), [h] is realized in the nouns, while it disappears in the verbs. Moreover, the existence of such ghost segments is drawn from other cognate languages. For example, *bərətta* ‘be strong’ in Amharic is cognate with *bərte* in Tigrinya, where laryngeals are still distinctive.

On behalf of the ghost consonants, symbols ʔ , W , Y are used to represent [h, ɸ, ʔ, ʕ], [w], and [y], respectively. For example, *səmma-* ‘hear’ is defined as a verb stem with underlying radicals $\sqrt{sm\text{ʔ}}$; *sam-* ‘kiss’ with $\sqrt{s\text{ʔ}m}$. On the other hand, *kom-* ‘stop, stand’ has an underlying representation as \sqrt{kWm} , while *tes-* ‘smoke’ does so as \sqrt{tYs} .

Furthermore, the present paper facilitates Sympathy Theory (McCarthy 1999, 2003) and Output-Output Correspondence (McCarthy and Prince 1995). Sympathy is a theory of holding faithfulness relations between one candidate and another candidate through the evaluations of a sympathetic constraint. Through a sympathetic relation between a sympathetic candidate and the output, the diverse Amharic reduplication can be uniformly explained within the framework of Output-Output Correspondence (McCarthy and Prince 1995), requiring every element of the base to be realized in reduplication. This is depicted in (21).

(21) Correspondence Relations in Amharic reduplication (McCarthy and Prince 1995, McCarthy 1999, 2003)



The main idea is that a designated failed candidate (i.e., sympathetic candidate), which in derivational phonology is an intermediate representation, influences the optimal output through a sympathetic relation between a sympathetic candidate and the output (McCarthy 1999). In this framework, a sympathetic candidate cannot be chosen arbitrarily; it is the one which obeys a critical faithfulness constraint (i.e., a selector notated by \diamond). Given this, the present study suggests that $\text{MAX-TEMPLATE}_{\diamond}$, a faithfulness constraint which ensures the realization of every templatic slot in the underlying representation, serves as a selector. This is motivated by Template Satisfaction Condition (McCarthy 2005). According to McCarthy (2005: 177), satisfaction of template is mandatory and governed by both universal and language-particular requirements. $\text{MAX-TEMPLATE}_{\diamond}$ is introduced in (22a), along with Template Satisfaction Condition in (22a).

(22) a. Template Satisfaction Condition (McCarthy 2005)

Satisfaction of template is obligatory and determined by universal and language-particular requirements on the units they refer to.

b. $\text{MAX-TEMPLATE}_{\diamond}$

Every templatic slot of the input has a correspondent in the output.

Additionally, notice that in Amharic a labiovelar followed by [ə] may become a plain velar followed by [o] as in $k^wəttər$ - ‘to count’ may be realized as $kottər$ - and $k^wənnən$ - as $konnən$ - ‘to condemn’ (Leslau 2000). In the same light, when the glide [y] or [h]/[ʔ] is followed by [ə], this sequence merges into [e] or [a], respectively, in output (Ussishkin 1999). This is seen in (23).

(23) Contraction of labiovelars, palatals, laryngeals followed by [ə] (Leslau 1995: 37-38)

$*C^yə$	e
$C^wə$	o
$ʔə/hə$	a

As for the data in (18) and (23), two faithfulness constraints (i.e., one restricting one-to-many relations between input and output segments and the other banning the deletion of roots) and two language-specific markedness constraints are introduced in (24).

(24) a. UNIFORMITY (no coalescence)

No element of the output has multiple correspondents.

b. MAX-ROOT (no deletion)

Every root of the input stands in correspondent with some segment in the output.

c. *GHOST

Ghost consonants are not allowed in the surface representation.

d. HAVEONEPLACE+[ə]

No consonants with secondary articulation or no laryngeals before [ə].

e. IDENTITY-[PLACE]_{ROOT}

The place specification for a root (i.e., consonant or radical) must be preserved in its correspondence.

Constraint (24a) restricts one-to-many relations between input and output segments, while constraint (24b) bans the deletion of input segments. Additionally, markedness constraint (24c) does prohibit latent consonants from surfacing, whereas (24d) ensures the realizations of glides as an isolating segment and no realizations of laryngeals. The constraint in (24e) requires an identity relation with respect to a place feature to hold between input and output consonants. .

Tableaux (25) and (27) demonstrate how the constraints in (22b) and (24) derive $k^w a k^w am$ from $\sqrt{k} W m$ by means of Sympathy (McCarthy 1999, 2003).

(25) Evaluation of $k om$ from $\sqrt{k} W m$

$\sqrt{k} W m$ - $C_1 \emptyset C_2 C_2 \emptyset C_3$	*GHOST	HOP+[ə]	MAX- ROOT	ID- [PLACE] _R	UNIF	MAX- TEMP _◇
a. $k \emptyset w w \emptyset m$	*!					
☞ b. $k om$			w		*	*
c. $k^w \emptyset m$		*!		k^w		*
d. $k \emptyset w \emptyset m$	*!					*

As shown in (25), a verb root $\sqrt{k} W m$ and a template $C_1 \emptyset C_2 C_2 \emptyset C_3$ are given as an input; due to the undominated constraint *GHOST, any candidate whose ghost radical is realized as an independent segment is ruled out. Therefore, candidates (25a) and (25d) become losers. Furthermore, candidate (25c) is also excluded because of the violation of HOP+[ə], which ensures a consonant with only one place feature before

[ə]. Furthermore, it violates IDENTITY-[PLACE]_{ROOT} since [k] is labialized, acquiring a secondary place feature. In spite of the disobedience to MAX-ROOT, UNIFORMITY, and MAX-TEMPLATE_◇, (25b) is selected as a winner. Importantly, (25b) violates Max-ROOT since the underlying root [W] does not appear as an independent segment.

Before considering tableau (27), which evaluates the derivations of $k^w ak^w am$ from kom , the present study proposes the sympathetic constraint \otimes MAX-ROOT. This ensures maximizing all input roots (i.e., consonants or radicals) of the sympathetic candidate in output. The sympathetic constraint is described as follows:

(26) Sympathetic faithfulness constraint I

\otimes MAX-ROOT

Every root (i.e., consonant or radical) of the sympathetic candidate has a correspondent in the output.

The constraint in (26) should be ranked below *GHOST and HOP+[ə], with the result that ghost segments emerge in output. With \otimes MAX-ROOT, the tableau (27) shows how $k^w ak^w am$ is chosen as a correct winning output. As seen in (27), the reduplicative template is fixed as $C_1əC_2aC_2C_2əC_3$.

(27) Reduplication: evaluation of $k^w ak^w am$ from kom

$kom-$ $C_1əC_2aC_2C_2əC_3$	*GHOST	HOP+[ə]	\otimes MAX- ROOT	ID- [PLACE] _R	MAX- ROOT	MAX- TEMP _◇
a. $kə(wawwəm)$	*! **					
b. $(kəkōm)$			w!w			*
c. $(kōkōm)$			w!w			*
d. $kō(wām)$	*!		ww			*
e. $(k^w ak^w am)$			w	k^w		*
f. $(k^w ak^w əm)$		*!	w	k^w		*

In tableau (27), constraints *GHOST , HOP+[ə], and \otimes MAX-ROOT make the crucial decisions on outputs. Since *GHOST is undominated in Amharic, (27a) and (27b), where w surfaces as an independent segment, become losers. Additionally, (27f) becomes a loser because of the violation of HOP+[ə]. Then, candidates (27b), (27c), (27e) disobey \otimes MAX-ROOT. However, (27e) is selected as a winner due to the fact that (27e) incurs a fewer violations than (27b) and (27c). In details, (27b) and (27c)

incur two violations of \otimes MAX-ROOT since two of three glides in the sympathetic candidate are not realized, while in (27e) only one glide does not appear, resulting in the selection of (27e) as a winner. Notice that constraint ID-[PLACE]_{ROOT} is violated in (27e) and (27f) since the root [k] in input surfaces as [k^w], failing to preserve the place feature.

Now, consider another case where laryngeal consonants should be presented underlyingly. This paper suggests that in Amharic [h] and [ʔ] are placeless and are readily deleted, resulting in the alternations with zero. This is based on Leslau's (1997) observation: *hagər-agər* 'country,' *hassab-assab* 'through,' *hamus-amus* 'Thursday' and *ʔantə-antə* 'you,' *səʔat-səat* 'hour,' *bəʔər-bəər* 'pen' (Leslau 1997). Given this, tableau (28) to illustrate how to choose a base *səma-* from $\sqrt{smʔ}$ 'hear' is investigated.

(28) Evaluation of *səma-* from $\sqrt{smʔ}$ 'hear'

$\sqrt{smʔ}$ - C ₁ əC ₂ C ₂ əC ₃	*GHOST	HOP+[ə]	ID- [PLACE] _R	Max-ROOT	MAX-TEMP _✱
a. səmməʔ	*!				
b. səmmət			t!		
c. səmma				ʔ	*

In tableau (28), (28a) disobeys *GHOST because of the realization of [ʔ]. Additionally, the candidate in (28b) incurs a violation of ID-[PLACE]_{ROOT} since the placeless [ʔ] surfaces the [t] specified for [coronal]. Therefore, candidate (28c), which satisfies highly ranking constraints, wins.

Then, consider the evaluations of *səmma*. To account for this reduplicative pattern, another sympathetic constraint is adopted, as in (29).

(29) Sympathetic faithfulness constraint II

\otimes IDENTITY-[PLACE]_{ROOT}

The place specification for a root (i.e., consonant or radical) of the sympathetic candidate must be preserved in its correspondence.

This paper proposes that \otimes IDENTITY-[PLACE]_{ROOT} is ranked above \otimes MAX-ROOT in order to get rid of candidates where laryngeals in the sympathetic constraint are realized as any segments other than laryngeals. This is seen in (30).

(30) Reduplication: evaluation of *səmma-* from *səmma-*⁴

<i>səmma-</i> C ₁ əC ₂ aC ₂ əC ₃	*GHOST	ALIGN- FT	ALIGN- RED-FT	ID- [PLACE] _R	MAX- ROOT	ID- [PLACE] _R	MAX- TEMP _✧
a. sə(<u>mammə</u> ?)	*!						
b. sə(<u>mammət</u>)				t!			
c. (sə <u>səm</u>)ma		m!a			?		*
d. s <u>a</u> (<u>səmma</u>)			s!ə		?		*
e. sə(<u>mamma</u>)					?		*

In this tableau, the candidate *sə(mammə?)* in (30a) is selected as a sympathetic candidate since it is faithful to MAX-TEMP_✧. Candidates (30a), (30c), and (30d) cannot be winners because they violate the higher ranking constraints *GHOST, ALIGN-FT, and ALIGN-RED-FT. Then, candidate (30b) cannot be a winner; it violates ID-[PLACE]_{ROOT} since the placeless [?] of the sympathetic candidate is realized as [t], specified for [coronal].

Now, consider an example that seems to be exceptional since the first radical, not the penultimate radical, is reduplicated: *sasam-* from $\sqrt{səm}$ ‘kiss.’ Tableau (31) illustrates the derivations of *sam* from $\sqrt{səm}$ ‘kiss.’

(31) Evaluation of *sam* from $\sqrt{səm}$ ‘kiss’

$\sqrt{səm}$ - C ₁ əC ₂ C ₂ əC ₃	*GHOST	HOP+[ə]	ID- [PLACE] _R	MAX-ROOT	MAX-TEMP _✧
a. sə? <u>?</u> ə <u>m</u>	*!	*			
b. sə <u>t</u> tə <u>m</u>			t!t		
c. s <u>a</u> m				?	*

Tableau (31) excludes (31a) as a correct winner because of the violation of the undominated constraint *GHOST. The candidate in (31b) is also ruled out; it disobeys ID-[PLACE]_{ROOT} because /t/ surfaces as [t]. Therefore, in spite of the violation of MAX-ROOT and MAX-TEMP_✧, (31c) is realized as an optimal output and chosen as a base for Tableau (32).

⁴ In this paper, ALIGN-REDA-FT and ALIGN-RED-VS by Schluter (2008) are somewhat modified into ALIGN-RED-FT and ALIGN-RED-BS.

(32) Reduplication: evaluation of *sasam-* from *sam-*

sam- C ₁ əC ₂ aC ₂ C ₂ əC ₃	*GHOST	ALIGN- RED-FT	HOP+ [ə]	ID- [PLACE] _R	MAX- ROOT	ID- [PLACE] _R	MAX- TEMP _◇
a. sə(ʔaʔʔəm)	*!		*				
b. sə(tattəm)				t!tt			
c. (səmam)		s!ə			??		*
d. (sasam)					??		*

In tableau (32), *sasam* is chosen as an optimal form since any highly ranking constraints are not violated. (32a), a sympathetic candidate, is discarded because of the violations of *GHOST. The candidate in (32b) is a loser because of three violations of ID-[PLACE]_{ROOT}. Between (32c) and (32d), candidate (32d) becomes a winner. The candidate in (32c) disobeys ALIGN-RED-FT since the left edge of the reduplicative morpheme does not align with the left edge of the foot.

In sum, this paper proposes the following constraint hierarchy:

(33) Constraint hierarchy in Amharic verbal reduplication I⁵

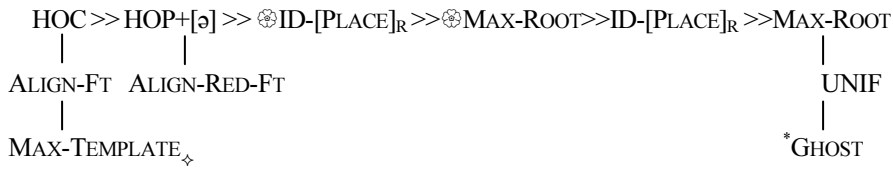
In Section 3, it was mentioned that when *kom-* in the perfect tense is conjugated with *tə-* and *a-*stem, the underlying ghost glide appears as in *təḵ^wak^wam* ‘resisit, withstand’ and *ak^wak^wam* ‘establish.’ As for the *at-*stem whose actual form is realized with the appearance of Type C (i.e., C₁əC₂C₂əC₃-), the second ghost radical appears in the surface representation as in the perfect *akḵəwwəmə*⁶. To account for this conjugation, the present paper proposes that *GHOST demotes and at the same time MAX-TEMPLATE_◇ promotes, resulting in the appearance of [w]. If the existence of the glide [w] as a second radical is not assumed, it is impossible to explain the

⁵ Here, the symbol | indicates that the constraints connected with this symbol are not in the domination relationship.

⁶ The prefix *at-* conveys the meaning of ‘causative, reciprocal.’

appearance of [w] in the *at*-stem conjugations. This is seen in (34), where the undominated constraint *HETEROORGANICCLUSTER is introduced to account for place assimilation⁷. The constraint hierarchy for *at*-stem is illustrated in (34).

(34) Constraint hierarchy in Amharic verbal reduplication for *at*-stem II



Given the constraint hierarchy for *at*-stem in (34), *akḵəwwəm* is chosen as an output. This is illustrated in (35).

(35) Reduplication: evaluation of *akḵawwəm*- from $\sqrt{k}Wm$

$\sqrt{k}Wm$ - <i>at</i> C ₁ əC ₂ C ₂ əC ₃	MAX- TEMP _◇	*HOC	HOP+[ə]	MAX- ROOT	UNIF	*GHOST
a. atḵəwwəm		*!				*
☞ b. akḵəwwəm						*
c. akḵ ^w əm	*!		*		*	
d. akḵom	*!			w		
e. akḵawəm	*!					*

In tableau (35), *akḵəwwəm* is selected as a winner since it obeys MAX-TEMPLATE_◇ and *HOC. It means that any candidates that do not satisfy Template Satisfaction Condition cannot be chosen as winners.

Now examine how to derive a reduplicative pattern from *akḵəwwəm*. This is demonstrated in (36).

⁷ *HETEROORGANICCLUSTER cannot explain the interesting assimilation patterns that are attested in many languages (Mohanen 1993, Jun 1995). However, providing an explanation for place assimilation in Amharic verbal reduplication is not the main purpose of this paper, this constraint is adapted for convenience of explanation.

(36) Reduplication: evaluation of *aḵḵəwawwəm* from *aḵḵawwəm*

$aḵḵəwawm-$ $atC_1əC_2aC_2C_2əC_3$	MAX- TEMP _✧	HOP+[ə]	⊗MAX- ROOT	MAX- ROOT	UNIF	*GHOST
⊗ a. $aḵḵə(wawwəm)$						*
b. $aḵ(kəḵom)$	*!		ww	ww	*	
c. $aḵ(koḵom)$	*!		ww	ww	*	
d. $aḵko(wam)$	*!		ww	w	*	*
e. $aḵ(k^wəḵ^wam)$	*!		w		*	
f. $aḵ(k^wəḵ^wəm)$	*!	*	w		*	

As illustrated in (35) and (36), when the *at-stem* is attached to $\sqrt{k}Wm$, the second radical is realized in output, and it is even reduplicated as in *aḵḵəwawwəm*-. Since MAX-TEMPLATE_✧ is highly ranked and dominates other constraints, any candidates that do not harmonic to the base and the designated template cannot be winners. Therefore, candidates (36b), (36c), (36d), (36e), and (36f) should be ruled out in favor of (36a) since they fatally violate MAX-TEMPLATE_✧. Interestingly, the sympathetic constraint ⊗Max-ROOT does not play any critical role since the candidate which satisfies MAX-TEMPLATE_✧ is realized as a winner

This paper shows that Amharic phonology cannot be explained without acknowledging the existence of roots and templates, because the word-based approach fails to provide an insightful explanation for conjugation variants of seemingly bi-radical roots that underlyingly possess ghost segments.

5. Conclusions

This paper investigates Amharic second radical reduplication and proposes that it should in fact be called penultimate reduplication as many phonologists argue. To do so, latent or ghost laryngeals or glides, such as laryngeals [h, ʔ, ɦ, ʕ] or glides [w, y], which disappear in normal conjugation are assumed to exist in the underlying representation. Then, it can be explained why they may emerge in verbal reduplication. Otherwise, it is not plausible to account for the appearance of the latent sounds in reduplication.

Additionally, this paper shows that a root-and-pattern approach is more adequate to account for the data of verbal reduplication than a word-based approach. While some phonological phenomena in Semitic languages may be analyzed in terms of a

word-based approach, it is impossible to provide an analysis of verbal reduplication in Amharic without a reference to roots and templates.

Furthermore, this paper proposes that MAX-TEMPLATE_✧, ⊗MAX-ROOT, and ⊗ID-[PLACE]_{ROOT} take a very crucial role to derive actual outputs. Candidates that satisfy MAX-TEMPLATE_✧ are chosen as a sympathetic candidate and through the faithfulness relations between the sympathetic candidate and other candidates the actual output is selected. In this analysis, constraints ⊗MAX-ROOT and ⊗ID-[PLACE]_{ROOT} provide evidence for the realization of these latent segments in verbal reduplication in Amharic.

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