Long-distance vowel-consonant agreement in Harari[1]

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Abstract

This article addresses the problem of coronal palatalization in Harari (Ethiopian Semitic) triggered by the 2nd person singular feminine non-perfective subject suffix /-i/. The palatalization process is unusual in two respects: (a) palatalization operates at a distance over other vowels and consonants and (b) palatalization may optionally affect more than one coronal consonant in the same stem, including prefixes. Although long-distance palatalization has been documented for other languages, it has been analyzed either as a floating affix or as consonant harmony. While Harari palatalization shares properties with both of these phenomena, it should be analyzed as neither. Harari palatalization targets a specific group of consonants and is modeled using a correspondence agreement constraint rather than aligning or spreading the palatalizing feature. This accounts for its ability to skip over intervening consonants and vowels, including front vowels and palato-alveolar consonants.

1. Introduction

Assimilation between vowels and consonants in languages is typically local, affecting segments that are strictly adjacent. In Canadian French, /t/ and /d/ are affricated to [tˢ] and [dᶻ] respectively preceding high front vocoids (1a), but not across other vowels and consonants (1b):

(1)   Canadian French

　　　a.　/ty/　　　　**tˢy**　　　　　'you (sg)'
　　　　　/dinamik/　　**dᶻinamɪk**　　'dynamic'

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b.	/təny/	**təny**	***tˢəny**	'held'
	/dəmi/	**dəmi**	***dᶻəmi**	'half'

Interaction between vowels and consonants may also occur over greater distances. Assimilation of a consonant to a vowel or vice versa may obtain over a string of segments, resulting in 'iterative' assimilation. For example, in Applecross Scottish Gaelic (Ternes 1973), stressed nasal vowels trigger nasalization of a string of following segments.

(2)   Applecross Scottish Gaelic
   a.   /māhar/   →   **mãh̃ãř**   'mother'
   b.   /tʰāhusk/   →   **tʰãh̃ũšk**   'senseless person, fool'

This type of assimilation over a string is uncontroversially analyzed as feature spreading in the nasal harmony literature (e.g., Hyman 1982, Piggott 1987, Walker 1998).

   Vowels and consonants may also interact at a distance across other segments which remain neutral or 'transparent'. Palatalization in Harari is of this type. Harari is a South Ethiopian Semitic language spoken in the walled city of Harar in eastern Ethiopia.[2] The 2nd person singular feminine subject suffix /-i/ attaches to imperative, jussive, and imperfective stems, and palatalizes coronals, with the exception of /r/. A coronal adjacent to the suffix is palatalized in (3a), a coronal two segments away is palatalized in (3b) and a coronal four segments and two syllables away is altered in (3c). The 2nd person singular masculine form is shown for comparison; it has no suffix. It is clear from the contrast between masculine and feminine forms that it is the suffix that triggers palatalization:

(3)   2sg.m   2sg.f
   a.   **libas**   **libaʃi**   'dress!'
   b.   **kitab**   **kitʃabi**   'write!'
   c.   **sibər**   **ʃibəri**   'break!

   The Harari data raise important issues with respect to the correct analysis of distance interaction. Local and iterative assimilations are typically analyzed as spreading of a feature or extension of a gesture from one segment to another. This kind of 'local spreading' has also been proposed to account for non-local interaction in which intervening segments are neutral in both consonant harmony (Flemming 1995, Gafos 1996, Ní Chiosaín and Padgett 1997) and vowel

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2. Harari is also known as Adarinya in Amharic and as Ge Sinan ('language of the city') by its speakers. Outside the walls of the city and in the surrounding areas, the Cushitic languages Oromo and Somali are spoken. Most Harari speakers are multilingual.

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harmony (Ní Chiosaín and Padgett 1997, 2001). The basic analysis advocated
by 'local spreading' is that the intervening segments acquire the spreading fea-
ture but show no overt audible evidence for it as the feature is non-contrastive
and has no discernible acoustic impact on the segments in question. The Harari
data and other examples like it prove problematic for such an analysis, or in-
deed for any spreading analysis. Consider the additional data in (4).

(4)   2sg.m   2sg.f
     a. **silab**   **ʃilabi**   or **ʃijabi**   'castrate!'
     b. **at-biʃak'i** **atʃ-biʃak'i**   'don't wet, soak!'
     c. **a-teħri**   **a-tʃeħri**   'postpone!'
     d. **dinabt'i**   dinabtʃ'i   *****diɲabtʃ'-i**   'be frightened!'
     e. **xidan**   **xidʒaɲi**   'cover!'

First, in (4a) potential targets, in this case /l/, may be optionally skipped, call-
ing into question the iterative spreading analysis. Second, under strictly local
spreading, vowels should be affected by fronting, but they are not. Under any
spreading analysis, blocking effects are expected, and yet in Harari interven-
ing front vowels and palato-alveolar consonants, which should bear the same
feature(s) as spreading, do not block palatalization (4b, c). Third, the notion
of a target has been downplayed considerably in Optimality Theory analy-
ses of spreading in favor of alignment of the spreading feature with a domain
edge (Kirchner 1993, Cole and Kisseberth 1994, 1995, Beckman 1995, Pulley-
blank 1996, McCarthy 1997, Walker 1998 among others). Yet, Harari displays
a preference for obstruent palatalization over sonorant palatalization (cf. (4d)
to (4e), and this fact argues in favor of singling out specific targets. Finally,
I will show that Harari palatalization bears important resemblances to conso-
nant agreement or consonant harmony, which have recently been analyzed not
via spreading of features but through featural agreement constraints (Walker
2000a, b, Rose and Walker 2001, Hansson 2001). Optional palatalization of
two or more coronal obstruents in the same stem also occurs in Harari for some
speakers, but still stems from the vocalic suffix. I will argue in this paper that
the best analysis for this type of long-distance vowel-consonant interaction is
through agreement constraints. This sets up an important dichotomy between
iterative interaction and long-distance interaction in general.

   This article is organized as follows. In Section 2, I present the range of data to
be accounted for and highlight optional and obligatory palatalization, as well
as some of the other factors influencing palatalization. In Section 3, I show
that featural alignment or spreading analyses cannot account for the range of
properties Harari displays. In Section 4 I present an analysis of the basic data
within Optimality Theory using featural agreement constraints. In Section 5, I
address the problem of multiple palatalization and argue that it is also vowel-
consonant agreement. In Section 6 I address how Harari fits within a small

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cross-linguistic typology of vowel-consonant long-distance interactions. The conclusion is in Section 7.

2.   Presentation of the data

Glossaries of Harari date back to the early 1800s, but the most extensive descriptions are found in Mondon-Vidailhet (1902), Cerulli (1936), Cohen (1931), Leslau (1958, 1963), Wagner (1983, 1997) and Garad and Wagner (1998). The data in this article were collected from eight native speakers of Harari, four residing in Harar and four in the United States.[3]

Since Harari is a Semitic language, the majority of its verb forms are built around the triconsonantal root. Most of my examples will be drawn from regular Type A triconsonantal roots[4] and will be given in the imperative, which usually has the shape CiCaC, where each C stands for a root consonant. However, the generalizations are valid for the imperfective form, other Types of verbs and longer roots with more than three consonants. These will be used where appropriate.

2.1.   Basic palatalization

If the final consonant of the stem is an alveolar consonant other than /r/, palatalization occurs in the 2.sg.f non-perfective form. Palatalization produces palato-alveolar or palatal consonants: /t t' s z d n l/ → [tʃ tʃ' ʃ ʒ dʒ ɲ j]. Examples with final palatalized consonants are given in (6).

(5)   Final palatalization

	2sg.m	2sg.f	
a.	**kifat**	**kifatʃi**	'open!'
b.	**zimad**	**zimadʒi**	'drag!'
c.	**rigat'**	**rigatʃ'i**	'kick!'
d.	**kifal**	**kifaj**	'pay!'
e.	**difan**	**difaɲi**	'block container!'

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3. The four speakers residing in the U.S. are Abdi Mohammed Idris, Farida Towfik, Muheydin Hajjibilla and Abdulfatar Succar. The four speakers residing in Harar are Firhewat Aweqe, Alfya Mohamed, Remziya Isaaq and Duniya Abrahim. The US speakers, except for Farida Towfik, are all men, whereas the Harar speakers are women. They range in age from late teens to late 40s, and all are multilingual. I am extremely grateful to them for their input.

4. Types A, B, C indicates the lexical classification of triconsonantal Ethiopian Semitic roots according to their conjugation patterns. The terminology dates back to Cohen (1936). In Harari, a Type D is recognized, with a rounded vowel in the first position ex. **bo:rada** 'arrive' (Leslau 1958).

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  f. **libas** **libaʃi**   'dress!'

The lateral /l/ is palatalized to the glide [j], but generally no final /-i/ appears
when a final /l/ is palatalized as in (5d) (due to an avoidance of **j-i** sequences
– see Section 4.2.3.). It is clear that the /l/ *is* in fact palatalized and not deleted
for two reasons. First, sequences of [li] are unproblematic in the language, and
second, medial [l] may be palatalized to [j]: /lik'alk'i /→ [lik'ajk'i] 'paint!' as
will be seen shortly.

 Velars, labials and gutturals are not palatalized. In Harari, only the 2sg.f
suffix /-i/ triggers palatalization. The epenthetic vowel [i][5] and lexical front
vowels do not. For example, in the 2sg.m simple imperfect form **tisabri** 'you
break', neither the [i] of the prefix /ti-/ nor the final epenthetic vowel [i] triggers
palatalization.[6] The same is true of the question marker /-i(n)/ and the 3sg.f
object marker /-e/: **ji-sadb-in-al** 'does he insult?' or **ji-sadb-e-ħal** 'he insults
her'.

 If the final consonant is not a coronal (other than [r]), palatalization may af-
fect coronals in the penultimate consonant position (6a–d) or initial consonant
position (6e–h):

(6) Non-final palatalization

    2sg.m 2sg.f
  a. **kitab** **kitʃabi** 'write!'
  b. **sidab** **sidʒabi** 'insult!'
  c. **nisaʔ** **niʃiʔ** 'take, take away'[7]
  d. **ħinak'** **ħiɲak'i** 'strangle!'
  e. **sixar** **ʃixari** 'be drunk!'
  f. **t'irag** **tʃ'iragi** 'sweep!'
  g. **dirak'** **dʒirak'i** 'be dry!'
  h. **sibar** **ʃibari** 'break!'

 In the cases in (6), the rightmost palatalizable coronal is an obstruent, or
in the case of (6d), the only coronal. However, if there are two palatalizable

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5. In Harari, as opposed to the other Ethio-Semitic languages, the epenthetic vowel is [i] and not
 [ɨ], although [ɨ] can occur as a variant of epenthetic [i] in closed syllables. In Tigrinya, the
 epenthetic vowel is [ɨ], except in word-final position, when it is [i].

6. The simple imperfect is used only in certain subordinate clauses; the compound imperfect
 with conjugated auxiliary **ħal** 'exist' is more generally used in Modern Harari. However, in
 the compound form, the 2sg.f form of the auxiliary eliminates the need for the epenthetic
 vowel: **ti-sabr-aːʃ** 'you (sg.f) break', so the simple imperfect is given here for illustrative
 purposes.

7. Verbs with final glottals often show the /-i/ suffix inside the stem: **simaʔ** (2sg.m) / **ʃimiʔ**
 (2sg.f.) 'listen!' or **sifaʔ** (2sg.m) vs. **ʃifiʔ** (2sg.f) 'sew!'. I will not analyze this alternation
 here. See Raz (1983) on similar effects in Tigre, and Rose (1997b) on the behavior of related
 a-final verbs in Amharic and Gurage with respect to the 2sg.f.

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coronals and the rightmost one is sonorant, /l/ or /n/, the situation is not so
straightforward. Palatalization *preferentially* affects obstruents, and will occur
on the rightmost obstruent, in addition to an /n/ or /l/ that follows it, as shown
in the forms in (7), in which the sonorant is in final position.[8] Some speak-
ers also acknowledge a form with just the final sonorant palatalized, i.e., (7a)
xidaɲi, but only one speaker reported preferring this form, so it is shown in
parentheses.

(7)   Obstruent-sonorant

	2sg.m	2sg.f			
a.	**xidan**	**xidʒaɲi**	or	**(xidaɲi)**	'cover!'
b.	**fit'an**	**fitʃ'aɲi**		**(fit'aɲi)**	'hurry!'
c.	**gidal**	**gidʒaj**		**(gidaj)**	'kill!'
d.	**nidal**	**nidʒaj**		**(nidaj)**	'make a hole!'

If the *initial* consonant is a coronal obstruent and the medial or final one a
coronal sonorant, there is more variability. For some speakers, only the sono-
rant may be palatalized (8a–d) and for others, the initial consonant may also
be palatalized.[9] I did not discern any difference in variability depending on
whether the sonorant was in final or medial position. Note that the final [-i]
in the 2sg.m. forms in (8c,e) is an epenthetic vowel inserted to prevent final
consonant clusters.

(8)   Initial obstruent-sonorant

	2sg.m	2sg.f			
a.	**dibal**	**dibaj**	or	**dʒibaj**	'add!'
b.	**dinak'**	**diɲak'i**		**dʒiɲak'i**	'be surprised!'
c.	**a-dagni**	**a-dagɲi**		**a-dʒagɲi**	'hit!'
d.	**sik'al**	**sik'aj**		**ʃik'aj**	'hang something!'
e.	**dogni**	**dogɲi**		**dʒogɲi**	'bend (tr.)!'

If the order of the palatalizable coronals is reverse, that is sonorant-obstruent,
only the obstruent will be palatalized for all speakers. The distinction can be
seen in comparing (7a) **xidʒaɲi** with double palatalization to (9d) **dinabtʃ'i**
with single palatalization.

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8. An exception to this pattern was previously given in (4a): a medial, but not final /l/ may be
   skipped in these obstruent-sonorant cases. See Section 4.2.3 for more details.
9. The forms with initial palatalization were preferred or accepted by the female consultants, but
   dispreferred or unaccepted by the male consultants. One consultant commented that multiple
   palatalization sounded 'like something a woman would say'. Since I have not conducted a
   sociolinguistic survey of this property, I can only speculate that the difference in palatalization
   preferences might depend at least in part on the gender of the speaker.

(9)   Sonorant-obstruent

	2sg.m	2sg.f		
a.	**a-mlit'**	**a-mlitʃ'i**	*a-mjitʃ'i	'escape!'
b.	**ʃeldi**	**ʃeldʒi**	*ʃejdʒ-i	'shave!'
c.	**k'onti**	**k'ontʃi**	*k'oɲtʃ-i	'pinch'
d.	**dinabt'i**	**dinabtʃ'i**	*diɲabtʃ'-i	'be frightened!'

Coronal sonorant consonants /n/ and /l/ in word-initial position are not palatalized regardless of whether there are following coronal consonants or not. With plain imperative verbs, this is also the root-initial position.

(10)   Initial sonorant consonant

	2sg.m	2sg.f	
a.	**nikaʔ**	**nikaʔi/nikiʔ**	'touch!'
b.	**nik'aħ**	**nik'aħi**	'be awake!'
c.	**lifaʔ**	**lifiʔ**	'work hard, toil!'
d.	**leħk'i**	**leħk'i**	'borrow!'
e.	**nit'ak'**	**nitʃ'ak'i**	'vomit!'
f.	**libas**	**libaʃi**	'dress!'

It is noteworthy that lexically, palatal sonorants do not occur in initial position, and in verb roots only rarely in weak roots that lack three surface consonants, e.g., **ʃeːɲ** 'accompany, see off'.[10]

To summarize, a sonorant will be palatalized under the following conditions: (i) if there is no coronal obstruent in the stem and it does not occur in initial position, or (ii) if it intervenes between the trigger suffix and the rightmost coronal obstruent, or (iii) if the coronal obstruent is not palatalized for an independent reason (i.e., avoidance of word-initial palatalization or preference for single palatalization).[11]

Finally, if no palatalizable consonants occur in the root, the difference between masculine and feminine is expressed by the /-i/ suffix alone. These verbs either have a lexically palatal/palato-alveolar consonant (11a, b) and/or contain no consonants which may be palatalized (11c, d).[12]

(11)   No palatalization

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10. Weak roots with final [a] such as this lose the [a] in the imperfective and imperative, so vowel hiatus does not arise: e.g., **baka** 'cry' has an 2sg.f imperfective **ti-bak-i** or **tʃi-baki** and 2sg.f imperative **bik-i**.
11. The verb /dilag/ 'work!' was given in the 2sg.f form as **dilagi**, with alternate forms as **dijagi** and **dʒijagi**. There is a resistance to palatalize [l] in non-final position, and in some cases it can be skipped over. This is the only case I found in which no palatalization occurred, despite the presence of two coronal consonants in the stem.
12. 'Non-palatalizable' may also include initial coronal consonants for some speakers.

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	2sg.m	2sg.f	
a.	**tʃ'imak'**	**tʃ'imak'i**	'squeeze, wring!'
b.	**biʃak'**	**biʃak'i**	'wet, soak!'
c.	**birar**	**birari**	'fly!'
d.	**k'ibar**	**k'ibari**	'bury!'
e.	**girabgi**	**girabgi**	'come back!'

If the masculine stem requires a final epenthetic vowel and in the feminine stem no palatalization is possible, this can lead to homophony between the 2sg.f and 2sg.m, as illustrated above in (11e) with a quadriliteral form.

2.2.   *Optional additional palatalization*

Let us now consider cases of optional double palatalization. Palatalization of two coronal obstruents may occur *optionally*. Note that due to root structure constraints on the combination of consonants with the same place of articulation (Greenberg 1950), I could find no verb roots with three different coronal obstruents. Combinations of coronal stops and fricatives are attested, but roots like (12b) with two stops are rare.

(12)   Obstruent-obstruent

	2sg.m	2sg.f		
a.	**bit'as**	**bit'aʃi** or	**bitʃ'aʃi**	'rip!'
b.	**t'imad**	**t'imadʒi**	**tʃ'imadʒi**	'tie, be strongly against!'
c.	**sidab**	**sidʒabi**	**ʃidʒabi**	'insult!'

Again, there is some variation on this point among speakers, with the female speakers preferring double palatalization. For all, though, skipping of intervening palatalizable obstruents is not allowed: ***ʃidabi** is ruled out.

There are also reduplicative forms in which a biconsonantal root expands to fill a triconsonantal template by doubling the final consonant to give a 122 pattern (see McCarthy 1979, 1981 on Arabic biliterals). Following arguments in Gafos (1996, 1998) and Rose (1997b, 2000), I assume that these are cases of reduplication and not long-distance spreading of a consonant to two templatic positions (see Section 5.3). In cases with two coronal obstruents, there is double, even triple palatalization (13a–d). With two identical sonorants, only the speakers interviewed in Harar gave alternate forms with double palatalization (13e–f). Nevertheless, we still find a propensity for obstruents to palatalize when possible and for sonorants to palatalize only when necessary.

(13)   Reduplication – 122

            2sg.m   2sg.f

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a.	**kisas**	**kiʃaʃi**	or	**kisaʃi**	'sue!'
b.	**sidad**	**sidʒadʒi ʃidʒadʒi**	**sidadʒi**		'chase away!'
c.	**k'idad**	**k'idʒadʒi**		**k'idadʒi**	'tear!'
d.	**mit'at'**	**mitʃ'atʃ'i**		**mit'atʃ'i**	'suck!
e.	**binan**	**binaɲi**		(**biɲaɲi**)	'sprinkle!'
f.	**zilal**	**zilaj**		(**zijaj** or **ʒijaj**)	'jump!'

Other reduplicative forms show similar patterns. In the verbs in (14), a bi-literal root is expanded by total reduplication to give a shape 1212 (14a–e) or a triliteral root has medial reduplication to give a pattern 1223 (14f–g). Internal reduplication of this type expresses the intensive or distributive of a verb form, and is often termed the frequentative (Leslau 1939). Double palatalization of sonorants may occur when a preceding obstruent is palatalized (14d); medial /l/ resists palatalization (14c), unless it is the only palatalizable consonant in the word (14e).

(14)   Reduplication – 1212

	2sg.m	2sg.f			
a.	**k'it'ak't'i**	**k'i'tak'tʃ'i**	or	**k'itʃ'ak'tʃ'i**	'hammer!'
b.	**diradri**	**diradʒri**		**dʒiradʒri**	'arrange!'
c.	**diladli**	**diladʒji**		**dʒiladʒji**	'level off!'
d.	**t'inat'ni**	**t'inat'ɲi**		**t'inatʃ'ɲi**	'spin'
				tʃ'iɲatʃ'ɲi	
e.	**lik'alk'i**	**lik'ajk'i**			'paint!'

Reduplication – 1223

f.	**kitatfi**	**kitʃatʃfi**		'hash again and again!'
g.	**mizazni**	**miʒaʒɲi**		'weigh many things/ consider carefully!'

2.3.   *Prefix palatalization*

The same kind of palatalization found in the imperatives is found in the imper-fective forms in (15), which have a prefix /ti-/ and a different stem shape. In the case of final consonant clusters, which are disallowed in Harari, the epenthetic vowel appears following the cluster, as in Tigrinya. Thus the final [i] in the masculine form of the verbs in (15) is an epenthetic vowel, due to the CaCC shape of the stem in the imperfective.[13] The epenthetic vowel in the 2sg.m.

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13. The forms given are the simple imperfective, which occurs in subordinate clauses. The main clause imperfective has an auxiliary, for the 2sg.f /-aʃ/. The palatalization facts are the same, except that the /-i/ does not appear when followed by /-aʃ/: e.g., **tiʃabr-a:ʃ** or **tʃiʃabr-a:ʃ** 'you (sg.f.) break'.

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forms does not trigger palatalization, whereas the 2sg.f. final high front vowel does. The prefix may also be optionally palatalized in these forms.

(15)   Imperfective

	2sg.m	2sg.f		
a.	**tikafti**	**tikaftʃi**	or **tʃikaftʃi**	'you open'
b.	**tisabri**	**tiʃabri**	**tʃiʃabri**	'you break'
c.	**tik'admi**	**tik'adʒmi**	**tʃik'adʒmi**	'you advance'
d.	**tisagdi**	**tisagdʒi**	**tʃisagdʒi**	'you prostrate'

Relevant palatalizable prefixes are the 2nd person prefix /t(i)-/ that occurs on imperfective verbs (as shown above in (15)) and negative imperatives (negative **a-** plus 2nd person prefix **t-** as in 16c–e), the passive/reflexive prefix /t(a)-/, which may occur obligatorily on some verbs (i.e., **ta-ge:bala** 'sit down'), the causative or adjutative prefix /at-/, and the relativizer /z-/. The prefixes are palatalized when there are no palatalizable root consonants (16a–b)[14], or if the only coronal in the root is a sonorant (16c–d). They may be palatalized optionally, like other cases of double palatalization for those speakers who allow double palatalization (16e–h). Finally, the examples in (16i–j) show that neither a lexical palato-alveolar consonant nor a front vowel blocks palatalization of the prefix to their left.

(16)   Palatalization of prefixes

	2sg.m	2sg.f	
a.	**ti-barri**	**tʃi-barri**	'you fly'
b.	**ti-k'abri**	**tʃi-k'abri**	'you bury'
c.	**a-t-ħinak'i**	**a-tʃ-ħiħak'i**	'don't strangle!'
d.	**a-t-ħilab**	**a-tʃ-ħilabi a-tʃ-ħijabi**	'don't milk!'
e.	**a-t-widak'**	**a-tʃ-widʒak'i**	'don't fall!'
f.	**ti-sabri**	**tʃi-ʃabri**	'you break'
g.	**ti-k'admi**	**tʃi-k'adʒmi**	'you advance'
h.	**t-a-sek'al**	**tʃ-a-ʃek'aj**	'go up!'
i.	**ti-ʃildi**	**tʃi-ʃildʒi**	'you shave'
j.	**a-teħri**	**a-tʃeħri**	'postpone!'

Palatalization of the prefix does not normally entail palatalization of a root-initial sonorant, as in (17).[15]

(17)   2sg.m   2sg.f

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14. Except for those speakers who do not have word-initial palatalization.

15. I found two counter-examples to this generalization, given as alternate forms: **a-tʃ-ɲikiʔ** 'don't touch' and **t-a-jeħk'i** or **tʃ-a-jeħk'i** 'you (sg.f) loan'.

a.	**a-t-nik'aʔ**	**a-tʃ-nik'iʔ**	'don't touch!'
b.	**a-t-lifaʔ**	**a-tʃ-lifiʔ**	'don't work hard!'

2.4.   *Summary of data*

There are restrictions on which consonants may host palatalization in Harari:
only the coronals, with the exception of /r/. In addition, optional palatalization
affects coronal obstruents. Intervening /n/, and less commonly /l/, are palatal-
ized if a preceding obstruent is palatalized, but otherwise are palatalized only
when there are no other coronals in the stem. I summarize the palatalization
data in terms of obligatory and optional palatalization in the following table.
Minimal palatalization is given for different speaker preferences. For exam-
ple, all speakers but one insisted on double palatalization with the obstruent-
sonorant verbs like /fit'an-i/ → **fitʃ'aɲi**, so the form with double palatalization
is listed under minimal palatalization.

(18)   Overview of palatalization data

Environment	Stem	Minimal palatalization	Optional palatalization
Final	**kifat**	**kifatʃi**	–
Medial	**kitab**	**kitʃabi**	–
Initial	**sibar**	**ʃibari**	–
Obstruent-sonorant	**fit'an**	**fit'aɲi** or **fitʃ'aɲi**	**fitʃ'aɲi**
Initial obstruent-sonorant	**dinak'**	**diɲak'i** or **dʒiɲak'i**	**dʒiɲak'i**
Obstruent-obstruent	**sidab**	**sidʒabi**	**ʃidʒabi**
Sonorant-obstruent	**dinabt'**	**dinabtʃ'i**	**dʒiɲabtʃ'i**
Initial sonorant-obstruent	**libas**	**libaʃi**	–
Reduplicated obstruent	**kisas**	**kisaʃi** or **kiʃaʃi**	**kiʃaʃi**
Reduplicated sonorant	**zilal**	**zilaj** or **ʒijaj, ʒilaj**	**ʒijaj, ʒilaj**

3.   Analytical problems posed by Harari palatalization

These Harari data pose several analytical challenges. First, I have described the
palatalization as triggered by the final suffix /-i/, but an alternate analysis might

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hold that palatalization is simply a morphological property of the 2sg.f stem. Second, should palatalization be analyzed as spreading of a feature across a span of segments like other cases of harmony? Third, how do we account for the preference for palatalization of coronal obstruents over coronal sonorants? Fourth, is the double palatalization an instance of harmony triggered by the rightmost palatalized segment, or is it the result of multiple effects triggered from the suffix?

In this section, I first address the issue of the morphological nature of the palatalization. Second, I explore possible analyses incorporating feature spreading or alignment of features. I will argue that the data call for an analysis involving long-distance agreement between the final suffix and particular target sets of consonants in the stem, following proposals for consonant agreement in Walker (2000a, b), Rose and Walker (2001) and Hansson (2001). This case of palatalization does not involve spreading or alignment of a feature. The question concerning consonant harmony will be addressed in Section 5.

3.1. Is palatalization grammatically conditioned?

As no other suffixes trigger palatalization, Kenstowicz and Kisseberth (1979) described the Harari palatalization as "grammatically conditioned". They state on p. 225 (see also Kenstowicz 1981) that palatalization "is exploited as a sign of the 2sg.f (to distinguish it from other forms of the paradigm such as the 2sg.m) and is being extended to mark the root as a whole in this particular grammatical category". This statement is based on the simple imperfective form (limited to subordinate contexts), in which the 2sg.f and 2sg.m *are* distinguished only by palatalization:

(19)   2sg.m   2sg.f
       a.   **tikafti**   **tikaftʃi**   'you open'
       b.   **tisabri**   **tiʃabri**   'you break'
       c.   **tik'admi**   **tik'adʒmi**   'you advance'
       d.   **tisagdi**   **tisagdʒi**   'you prostrate'

As stated for the data in (15), the final [i] is an epenthetic vowel in the masculine forms, inserted to prevent final consonant clusters. In the imperative form, however, the masculine has no /-i/ suffix in most verbs, whereas the feminine does. Hence, it is not only palatalization, but also suffixation of the 2sg.f /-i/ that distinguishes the feminine from the masculine. Furthermore, when the auxiliary is used, the form of the auxiliary serves to distinguish the two forms: **ti-sabr-aːl** (2sg.m) vs. **ti-sabr-aːʃ** (2sg.f).

There are two circumstances in which the 2sg.f /-i/ fails to appear. In casual speech, the final [i] of the imperatives may be dropped following a palatalized

consonant if the word occurs phrase-finally: **kifatʃ(i)** 'open!'. In this manner, the palatalization mirrors that found in the related language, Chaha, in that there is no overt realization of the vocalic /-i/ suffix, e.g., 2sg.m **kɨft** vs. 2sg.f **kɨftʃ** 'open!' (see Leslau 1950, Hetzron 1977, McCarthy 1983, Rose 1994, 1997a, b, Banksira 2000). Yet, it is important to recognize that this is an *optional*, variable realization in Harari. The 2sg.f suffix /-i/ must occur if there is no palatalization, and it is present if there is a following consonant-initial word, e.g., **kifatʃi ba:ja** 'he said "open!"' '

The second case in which the /-i/ is dropped is when a non-high vowel-initial suffix appears on the (simple) verb stem (e.g., object suffixes /-a/ 3sg.m /-e/ 3sg.f or 2sg.f imperfect auxiliary /-a:ʃ/).[16] The subject suffix /-i/ is deleted due to a ban on vowel hiatus, but palatalization still occurs. See Wagner (1997) for other examples of hiatus resolution. This produces an opaque situation in which the palatalization appears without an overt trigger:

(20) | | 2sg.m | 2sg.f | |
|---|---|---|---|
| a. | **kisas-a** | **kisaʃ-a** | 'sue him!' |
| b. | **sidab-a** | **sidʒab-a** | 'insult him!' |
| c. | **sibar-a** | **ʃibar-a** | 'break it! |

In other configurations, palatalization co-occurs with the suffix /-i/ and is not the sole indicator of the 2sg.f subject. While it is certainly true that palatalization is triggered by a particular front-vowel suffix, we cannot conclude that palatalization is grammatically conditioned as part of the 2sg.f stem with no relation to or need of the final suffix. Therefore, I analyze palatalization as stemming from the suffix. Although it is conceivable that the opacity or the dropping of phrase-final /-i/ may eventually lead to a situation in which only palatalization marks the 2sg.f (as occurs in Gurage dialects such as Chaha), Harari has not yet reached this stage.

3.2. *Palatalization as featural alignment or spreading?*

In this section, I will explore the possibility that Harari palatalization is a case of featural alignment or long-distance spreading of the palatalizing feature from the suffix to the coronal consonant(s). I will show that while such an analysis may be suitable for other kinds of distance interactions, it proves problematic for Harari palatalization. There are two main problems: transparency

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16. The high vowel suffix /-u/ '3p object' following /-i/ results in glide insertion:
/ti-sabr-i-u-huʃ/ → **tiʃabrijuhuʃ** 'you (sg.f.) break them' (Wagner 1997). Other methods of resolving hiatus include vowel fusion: /ji-sabr-u-a/ → **jisabro** 'they break it'.

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of intervening segments and the preference for coronal obstruents. I begin with
a discussion of transparency.

3.2.1. Transparency and opacity.   First, I will consider an analysis that spreads
the palatalizing feature from the suffix to the coronal obstruent.[17] I will assume
that the feature involved is [−back] for the sake of exposition; the same argu-
ments apply if different features such as [+high] or [−ant] are used, as will
be pointed out where relevant. I will address the issue of specific consonant
targets vs. spreading to a stem edge in Section 3.2.3, but the arguments raised
here are valid for either analysis.

Constraints on locality dictate that the obstruent closest to the suffix will be
palatalized. Yet, as discussed previously in (4), one set of data proves problem-
atic for this kind of spreading analysis. The data in (21a–c) show that interven-
ing "palatal" segments, either a palato-alveolar consonant or a front vowel, do
not block palatalization to their left.[18] The data in (21c) shows that intervening
/l/ may optionally be skipped.

(21)   2sg.m   2sg.f
    a.   **a-t-biʃak'i**   **a-tʃ-biʃak'i**   'don't wet, soak!'
    b.   **a-teħri**   **a-tʃeħri**   'postpone!'
    c.   **silab**   **ʃilabi** or **ʃijabi**   'castrate!'

A spreading analysis holds that blocking effects should arise when segments
bear the spreading feature, or if the spreading is strictly local, from segments
incompatible with the spreading feature. The former case is applicable here;
the latter case of blocking would fail to account for any distance effects, as
velars and labials are incompatible with the spreading feature in Harari.

Potential blockers bearing the spreading feature [−back] would include front
vowels and palato-alveolar or palatal consonants, as illustrated in (22). The
illustrations show the failure to spread through to affect the target /t/:

(22)   a. ****a - t - b i ʃ a k' - i**   b. ****a - t e ħ r - i**

                [−back]   [−back]   [−back]   [−back]

Yet the actual form in (22a) should be **atʃbiʃak'i**, whereby palatalization ap-
plies over palato-alveolar consonants and in (22b) **atʃeħri**, where it applies

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17. This could also be formulated as an alignment constraint aligning [−back] with a coronal
    obstruent
18. One speaker gave the form /at-nitʃ'-i/ → **at-ɲitʃ'i** 'don't reap!', but since I didn't elicit this
    verb from other speakers, I cannot be sure as to its generality. It demonstrates that a sonorant
    can be palatalized to the left of a lexical palato-alveolar.

over front vowels. To uphold the spreading analysis for (22a), this particular case of palatalization would have to be treated as consonant harmony triggered by the palato-alveolar consonant or the front vowel, but restricted only to the 2sg.f form. The connection between palatalization and the final suffix would be lost. Note that if one considered the spreading feature to be Coronal or [−ant] and adopted a unified features approach to vowel and consonant specification (Lahiri and Evers 1991, Hume 1992), both front vowels and palato-alveolars would also bear these features and should exhibit blocking. If [−ant] is specified solely on consonants, then the argument holds only for blocking by front vowels; if [+high] is the spreading feature, the argument holds for the palato-alveolar consonants.

One might contend that since Harari is a Semitic language, vowels would be on separate tiers from the consonants (McCarthy 1986), and should not interfere with palatalization. Arguments against tier separation and conflation are presented in Bat-El (1988), Gafos (1996, 1998) and Rose (2000). These arguments notwithstanding, palatalization applies to the entire stem including prefixes, suggesting that it applies after tiers would have been conflated into a linear sequence. Furthermore, a tier separation analysis could not explain the fact that lexical palato-alveolar consonants do not block palatalization to their left.

A reviewer mentions the possibility that the Harari palatalization is morphological harmony, as described in Cole (1987). Under Cole's analysis, transparency effects are due to the spreading feature residing on its own morphological plane from the stem. Features of the stem are projected onto a separate plane. While such an analysis could account for the Harari facts, it has several drawbacks. Although the utility of representational planes in accounting for transparency effects has been questioned in recent analyses (Gafos 1996, 1998, Ní Chiosáin and Padgett 2001, Padgett 2002), the main problem with the proposal is that each morpheme projects a separate autosegmental plane, and this proves to be too permissive. It predicts a distinction between harmony systems that show phonological blocking effects (harmony applies post plane-conflation) and those that do not (harmony applies pre plane-conflation). Yet, consonant harmony systems do not show blocking effects (Hansson 2001, Rose and Walker 2001) whereas vowel harmony systems may, but based on the phonological features of the vowels, not morphological structure. Furthermore, the morphological harmony cases that Cole analyzes involve floating features, whereas I argued above that the Harari data involve a full suffix.[19]

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19. Cole (1987) does argue that morpheme planes are involved in Warlpiri labial harmony, which does not have floating features. Vowel harmony exhibits transparency to labial consonants in the regressive direction but not in the progressive direction, and her analysis relates the transparency in the regressive direction to the harmony being morphologically restricted.

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The example in (21c) in which target /l/ is skipped is problematic for a strict locality analysis of long distance interaction. Under this view, skipping of segments in spreading is not possible as it produces an ill-formed gapped configuration (Ní Chiosáin and Padgett 1997, 2001), in which a feature is associated to two segments over an intervening segment. Instead, the strict locality proposal maintains that all segments in a string participate in spreading. To account for apparent neutral segments, it is assumed that the phonetic effects on these segments are not distinctive enough to warrant phonological attention, giving the illusion of transparency (Gafos 1996, Walker 1998). While this analysis is appealing in its restrictiveness, it fails to account for the Harari data in (21c). If [−back] spread to every segment to reach an initial coronal obstruent, we would expect to see effects on intervening segments, as /l/ is optionally palatalized. Furthermore, /a/ is frontable, but only in local coarticulation with preceding palato-alveolars:

(23)   2sg.m   2sg.f
    a.   **kitabi**   [kitʃɛbi]   'write!'
    b.   **sixari**   [ʃixari]   *[ʃixɛri]   'be drunk!'

In conclusion, spreading analyses fail to adequately account for the transparency effects seen in Harari palatalization.

3.2.2.   Obstruent preference.   The second set of data to contend with is the preference for palatalization of coronal obstruents. Recall that if the coronals are arranged in the linear order obstruent-sonorant, both consonants are preferentially palatalized (24a), but if they fall in the order sonorant-obstruent, only the obstruent is palatalized (24b):

(24)   2sg.m   2sg.f
    a.   **fit'an**   **fitʃ'aɲi**   (fit'aɲi)   'hurry!'
    b.   **dinabt'i**   **dinabtʃ'i**   *diɲabtʃ'-i   'be frightened!'

Furthermore, there is no correlation between double palatalization in (24a) and double palatalization of obstruents in forms such as /sidab-i/ → ʃidʒabi 'insult!'. Only certain speakers prefer the double palatalization of obstruents, but double palatalization is the norm for forms like (24a) (only one of the eight speakers consulted preferred single palatalization).

However, as McCarthy (2002) points out, the difference follows instead from the fact that progressive labial harmony undoes rounding (/u/ → [i]) whereas regressive labial harmony creates rounding (/i/ → [u]). This difference results in an alternate treatment of labial-round vowel sequences unrelated to morphological structure.

Consider first these data in a serial rule-based framework. In order to capture the preference for obstruents, we can assume a rule palatalizing coronal obstruents and a second rule palatalizing coronal sonorants, necessary for cases in which only a sonorant is palatalized, e.g., /kifal-i/ → **kifaj** 'pay!'. The asymmetry in the ordering of coronal sonorants and obstruents can be addressed if the rule of obstruent palatalization applies first. Subsequent application of sonorant palatalization is permitted only if the sonorant is to the right of the palatalized obstruent, where line crossing would not be violated. The palatalized obstruent resulting from obstruent palatalization would block palatalization of coronal sonorants on the left-hand side of the palatalized obstruent, e.g., **dinabtʃ'i** 'be frightened!'. This is due to the feature structure of the palato-alveolar consonant, which is also specified with the spreading feature and blocks spreading to its left. Derivations are shown in (25):

(25)		/dinabt'-i/	/fit'an-i/
	Rule 1 – Obstruent	**dinabtʃ'-i**	**fitʃ'an-i**
	Rule 2 – Sonorant	*blocked*	**fitʃ'aɲi**
	Surface form	**dinabtʃ'i**	**fitʃ'aɲi**

Unfortunately, the analysis outlined in (25) must assume blocking, and yet we saw with the data in (22) that palato-alveolar consonants do not block in Harari palatalization. Somehow the analysis has to distinguish lexical palato-alveolars from derived palato-alveolars.

3.2.3.   Alignment with edges and markedness.   A constraint-based analysis in Optimality Theory (OT) that does not specify specific targets fares no better. Featural alignment or spreading constraints have been applied to a number of harmony systems, such as vowel harmony (Kirchner 1993, Cole and Kisseberth 1994, Beckman 1995, Pulleyblank 1996, Ringen and Vago 1998 among others), emphasis harmony (McCarthy 1997, Shahin 2002) and nasal harmony (Homer 1998, Walker 1998)[20]. For example, in McCarthy (1997: 235), emphasis harmony is expressed using the following constraint:

(26)   RTR-RIGHT Align ([RTR], Right, Word, Right)
         Any instance of [RTR] is aligned finally in Word

No segments are singled out as explicit targets of emphasis. Instead, harmony is captured by a combination of alignment (assuming locality) and cooccurrence or markedness constraints, such as *RTR/HI 'no high RTR vowels', which determine which segments may bear the aligned feature. The segments that bear

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20. But see Beckman (1997) and Bakovic (2000) on approaches to vowel harmony in Optimality Theory that do not use alignment.

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the harmonizing feature are those that fail to violate the high-ranked markedness constraints.

     Let us assume that alignment of the feature [−back] with the right edge of the stem produces final palatalization.[21] Markedness constraints against palatal sonorants (or against palatalizing /l/ and /n/) are required, but cannot be ranked higher than alignment, as these segments do surface in 2sg.f forms. In addition, a constraint against palatalized coronal obstruents or a faithfulness constraint preventing alteration of underlying segments (IDENT-IO 'Corresponding segments in the input and output must be identical with respect to feature [F]') serves to disfavor double palatalization. This is shown in Tableau (27).

(27)

	fit'an -i	ALIGN[−back]	IDENT-IO	*ɲ
☺ a.	fit'aɲi		*	*
b.	fitʃ'ani	!*	*	
c.	fitʃ'aɲi		**!	*

The actual output, candidate (27c), is ruled out because of the double palatalization, which incurs more faithfulness violations. Yet no ranking of these constraints will favor the form with palatalization of *both* the sonorant and the obstruent. In sum, an alignment constraint aligning the [−back] feature (or the suffix /-i/ itself) with the stem, combined with general markedness constraints, cannot capture the preference for coronal obstruents to be palatalized over coronal sonorants.

     An examination of the problems encountered by both the rule-based spreading and the OT alignment analyses highlights the ingredients necessary for a successful analysis. First, the neutrality of intervening vowels and consonants to the palatalization must be explained, and this is problematic if feature spreading is assumed. Second, coronal obstruents have to be singled out as targets. While the rule-based analysis did this, its reliance on feature spreading made it incompatible with other data. The constraint-based analysis of alignment with edges could not capture the preference. I now turn to a formal analysis that incorporates the notion of "target", but does not use either spreading or alignment of features.

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21. This assumption is actually problematic. While stem-edge alignment is useful for featural morphology such as that found in Chaha (Akinlabi 1996, Zoll 1998, Rose 1997a, b), or nasal or emphasis harmony (Cole and Kisseberth 1994, 1995, Walker 1998, Shahin 2002), it is problematic for Harari, in which the final suffix /-i/ is still present. Right-edge alignment appears to favor no palatalization and left-edge alignment predicts too much palatalization, and fails to account for the hierarchical target preferences.

4.   Palatalization as agreement

While Harari palatalization is triggered by a final suffix /-i/, I claim that it should not be characterized as spreading of the palatalizing feature. In this sense, it resembles other long-distance processes that target consonants, namely consonant harmony or agreement. Consonant harmony has recently been reanalyzed without the use of feature spreading, because it, too, poses problems for long-distance spreading. In this section, I outline the resemblances between consonant agreement and vowel-consonant agreement and propose a similar analysis.

4.1.   Consonant agreement and vowel-consonant agreement

Consonant agreement or consonant harmony is a requirement that two or more consonants in a word separated by at least a vowel match for a certain phonological feature. While traditional analyses of consonant harmony have employed feature spreading (Poser 1982, Shaw 1991, Gafos 1996), this approach has been called into question by a series of works that investigate a wider typology of consonant agreement (Walker 2000a, b, Rose and Walker 2001 and Hansson 2001). Besides the well-known cases of coronal harmony, this literature documents cases of agreement for dorsal consonants, and for nasal, laryngeal and liquid features. There are two main properties that distinguish consonant agreement from other types of long-distance iterative interaction. First, participants consist of a small set of similar consonants, such as coronal stridents or oral stops. Second, intervening segments are entirely neutral; there are no blocking effects and the set of intervening segments is unrestricted. An example of long-distance nasal agreement is found in Yaka (Hyman 1995, Walker 2000b). Nasal agreement operates between a nasal stem segment and a suffix segment [d] while all intervening consonants and vowels are unaffected by the harmony and remain unnasalized (28a–c).

(28)   Yaka

a.	**yán-ini**	'to cry out'	d.	**yád-idi**	'to spread'
b.	**nók-ene**	'to rain'	e.	**dók-ede**	'to bewitch'
c.	**nútúk-ini**	'to slant'	f.	**búd-idi**	'to break'

The type of harmony seen in Yaka is markedly different from straightforward nasal harmony which operates locally and iteratively from one segment to the next and preferentially affects vowels. In Ijo (Kwa) (Williamson 1965, 1969, 1987, Walker 1998), nasality spreads leftward from a nasal consonant or nasal vowel (29a, b), but obstruents block the spreading (29c, d); the vowel to the left of the obstruent is not nasalized.
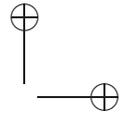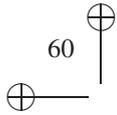
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(29)   Ijo

a.	**ãnda**	'wrestle'	c.	**izõŋgo**	'jug'
b.	**w̃ãĩ**	'prepare sugardane	**ʼaba)mu**	'loft'

Walker (2000b), Rose and Walker (2001) and Hansson (2001) propose to analyze the nasal agreement pattern seen in Yaka, as well as numerous other cases of "consonant harmony" through correspondence constraints requiring the interacting similar segments to agree for a given feature. There is no active spreading. This captures two properties about the agreement: (i) the fact that it occurs between similar segments (voiced oral and nasal stops) and (ii) the neutrality of intervening segments.

Harari long-distance palatalization shares these properties with consonant agreement. Vowels and consonants do belong to different natural classes, but front vowels and coronal consonants bear a strong degree of similarity in that they they are articulated in the front or palatal region. In fact, Lahiri and Evers (1991), Hume (1992) and Clements and Hume (1995) consider them to share the feature [coronal]. The second key property of the Harari case is the neutrality of the intervening segments, which closely parallels consonant agreement. Given these similarities, and the problems posed by feature spreading, agreement through correspondence appears the appropriate analysis for distance vowel-consonant agreement.

4.2.   *Basic palatalization*

Harari palatalization is typical of many cases of phonological processes that take place across a stem-affix boundary and are morphologically restricted, in the sense that only certain affixes trigger the alternation. Phonological interaction establishes a tighter bond between stem and affix. I propose to express this by means of an agreement identity constraint, articulated in a general format in (30), which requires identity through correspondence between stem and affix.

(30)   ∃STEM-AFFIX IDENTITY (SA-IDENT)
       Let x be an affix and y be a stem to which x attaches.
       If segment α in x is [+F], then there is some segment β in y such that
       $\alpha\Re\beta$ and β is [−F] in the input and [+F] in the output.

Following Struijke (2000), the constraint is existential in that it requires that a segment bears a relation with *some* other segment, rather than every segment in the stem. The correspondence relationship utilized here is surface correspondence between segments that belong to different morphological units. Correspondence constraints determine faithfulness between related structures,
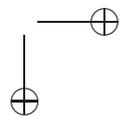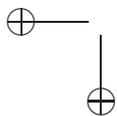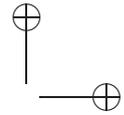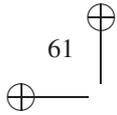
such as input-output or base-reduplicant. Surface correspondence between elements, either within the same domain or in different morphological domains, has been proposed by Bakovic (2000), Zuraw (2000), Krämer (2001) and Rose and Walker (2001). In Rose and Walker (2001), a correspondence relationship between surface consonants is established by a range of constraints ranked in a hierarchical order based on the consonants' similarity, and a single identity constraint mediates their agreement pattern. Here the correspondence relation is expressed directly in the constraint, as is done with other IDENTY constraints such as input-output or base-reduplicant. Correspondence constraints that reference morphological constituents such as roots and affixes have been proposed by, e.g., McCarthy and Prince (1995), Urbanczyk (1996), Benua (1997), and Pater (1999).

Applied to the 2sg.f /-i/, SA-IDENT refers to the feature [palatal] and requires the affixal vowel to correspond and match for the feature [palatal] [22] with a consonant in the stem. It also builds in an overt change in the stem, requiring that the input and output differ in the feature [palatal].

(31)   ∃STEM-AFFIX IDENTITY (∃SA-IDENT) – [PALATAL]
        Let x be an affix and y be a stem to which x attaches.
        If vowel α in x is [+PAL], then there is some consonant β in y such that $\alpha \mathfrak{R} \beta$ and β is [−PAL] in the input and [+PAL] in the output.

The ∃SA-IDENT constraint does not require that features be actively *spread* from the /-i/, only that a consonant and /-i/ *match* with respect to the palatalizing feature of the /-i/.[23] As we will see shortly, this accounts for the inertness of intervening elements, which proved problematic for the spreading analysis. The ∃SA-IDENT constraint also establishes that, unless prevented by higher-ranked constraints, palatalization will occur when the 2sg.f /-i/ is present. As mentioned previously, there are other affixes containing high front vowels, such as the question marker /-i(n)/, which do not trigger palatalization. There are two possible means of accounting for this. One would be to have the constraint in (31) refer specifically to the 2sg.f. The other would be to adopt an approach to

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22. I will not be concerned with the exact nature of the features which are responsible for palatalization here, a topic which has received abundant interest in recent years (Hume 1992, Lahiri and Evers 1991, Hall 1997, Rubach 2000). I simply note it as [palatal], but Coronal, [anterior], [−back], [+high, −back] or other features could be used with no change in the basic analysis.

23. Itô and Mester (1995) use a type of markedness constraint to model Japanese palatalization. CV-LINKAGE requires that every consonant-vowel sequence forms a linked domain such that a coronal consonant – front vowel sequence must be linked through the feature [+high]. Although their conception of the constraint requires feature sharing, it can also be interpreted so that the CV sequence 'agree' for a given feature, without structural linking. In this manner, it would be similar in spirit to the IDENT constraint proposed here.
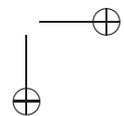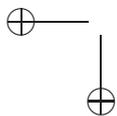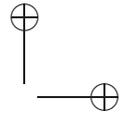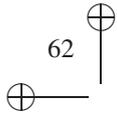
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Optimality Theory that incorporates lexical levels either by having constraints reference defined domains or classes of affixes (Buckley 1996, Benua 1997) or by adopting separate strata that may have different constraint rankings (Booij 1996, Orgun 1996b), termed Lexical Phonology and Morphology (LPM-OT) in Kiparsky (2000). The stem level includes the subject affixes, only one of which is the high front /-i/ capable of triggering palatalization. The word level incoroporates other affixes, such as object clitics, auxiliaries and question markers, and the epenthetic vowel is also added in the post-lexical level. In LPM-OT, the constraint in (31) would be ranked higher than faithfulness IDENT-IO in the stem level incorporating the subject affixes, and lower than IDENT-IO in subsequent level(s). Since adopting LPM-OT can also take care of the opacity effects found when a-initial affixes are added (discussed in Section 3.1), this appears to be a better solution than one specifying the exact affix specific to Harari in the constraint. Furthermore, OT models that reference only affix classes (Benua 1997) would have have to adopt an alternate analysis to account for the inability of the epenthetic vowel to trigger palatalization.

The constraint ∃SA-IDENT must be ranked above IDENT-IO, the faithfulness constraint that requires complete featural identity between corresponding input and output segments:

(32)   IDENT-IO
        Corresponding segments in the input and output must be identical with respect to feature [PAL].

I also assume markedness constraints against palatalized /r/ and the other non-coronal consonants, velars, gutturals and labials, which I label collectively as 'peripheral' (Avery and Rice 1989). These are required to rule out these segments in the language as a whole.

(33)   *R^{j} An /r/ may not bear the feature [PALATAL] in the output.
        *PER^{j} A peripheral consonant may not bear the feature [PALATAL] in the output.

An example of how the constraints interact is shown in (34). Candidate (34a) violates ∃SA-IDENT because there is no identity relationship between a stem consonant and the affix. In candidate (34b), ∃SA-IDENT is satisfied, but palatalization takes place on a peripheral consonant, ruled out by the high ranking markedness constraint. Candidate (34c) satisfies the two top ranked constraints, and violates only input-output faithfulness, which is ranked below ∃SA-IDENT.

(34)   *PER^{j}, ∃SA-IDENT ≫ IDENT-IO
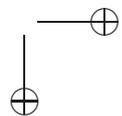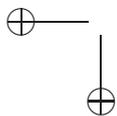
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	kifat-i	*PERʲ	∃SA-IDENT	IDENT-IO
a.	kifati		*!	
b.	kifʲati	*!		*
☞ c.	kifatʃi			*

The markedness constraint must actually be ranked above SA-IDENT, in order
to ensure no palatalization occurs in forms with non-palatalizable consonants.

(35)   *PERʲ ≫ ∃SA-IDENT ≫ IDENT-IO

	k'ibari	*PERʲ	∃SA-IDENT	IDENT-IO
a.	k'ibʲari	*!		*
☞ b.	k'ibari		*	

In future tableaux, I leave out candidates with non-coronal/non-r palatalization
and the constraints *rʲ and *PERʲ.

If there are two palatalizable obstruents in the word, it is the rightmost
one, the one closest to the suffix, that is palatalized, e.g., /sidab-i/ → **sidʒabi**
(*ʃidabi) 'curse, insult'. Since the present analysis does not utilize alignment,
some notion of adjacency or locality will be incorporated into the analysis
to account for this restriction (see Odden 1994, Archangeli and Pulleyblank
1987, 1994, McCarthy 1996, Steriade 1987, Suzuki 1998, Rose 2000, Rose
and Walker 2001 on adjacency or locality). Following Odden (1994), Adja-
cency or Proximity can be defined as the requirement that the trigger and target
be within a certain distance from each other for a process to apply. Locality,
on the other hand, can be defined as the requirement that targets or anchors
are not skipped in spreading.[24] In many cases, these requirements are coex-
tensive. However, adjacency is also involved in many dissimilatory processes
and cooccurrence restrictions, which do not involve feature spreading. Berkley
(1994), Frisch, Broe and Pierrehumbert (to appear) document how increased
distance can impact the severity of cooccurrence restrictions. I propose the fol-
lowing PROXIMITY constraint which constrains the distance of corresponding
elements:

(36)   PROXIMITY
        Correspondent segments can be separated by no more than one seg-
        ment of a different major class (C/V).
        Assess a violation for each non-corresponding segment intervening
        between correspondents.[25]

---

24. Strict Locality refers to the principle that all spreading of features is local, and proceeds from
    segment to segment (or is expressed as extension of a gesture) (Archangeli and Pulleyblank
    1994, Gafos 1996, Ní Chiosáin 1997, Walker 1998). Since I do not consider spreading to be
    involved in the Harari case, no violation of this principle is encountered here.

The restriction to "no more than one segment of a different major class" is specified for many cases of consonant agreement and consonant dissimilation which operate over a single intervening vowel (see Odden 1994, Suzuki 1998, Rose 2000, Rose and Walker 2001, Hansson 2001), or of vowel dissimilation which operates across a single consonant. In the case of vowel-consonant inter-action, the segments must be strictly adjacent or PROXIMITY is violated, since the interacting segments themselves belong to different major classes. PROX-IMITY is ranked below ∃SA-IDENT. This ensures that palatalization will take place, no matter how far away from the suffix the consonant occurs. PROXIM-ITY assesses only those segments that are not involved in the same correspon-dence relationship, rather than assessing two separate relationships for each palatalized segment, so there are three violations for candidate (37d) instead of two and four (**, ****).

(37)   ∃SA-IDENT ≫ PROXIMITY

	sidab-i	∃SA-IDENT	PROXIMITY	IDENTIO
a.	sidabi	*!		
b.	ʃidabi		****! (idab)	*
☞ c.	sidʒabi		** (ab)	*
d.	ʃidʒabi		***! (i ab)	**

If palatalization were restricted to the final coronal, the PROXIMITY constraint would be ranked above ∃SA-IDENT, allowing only root adjacent palataliza-tion. This occurs in the related Ethio-Semitic language, Amharic, in which 2sg.f palatalization is restricted to the final coronal consonant (excluding /r/), as shown in (38):

(38)   2sg.m   2sg.f
    a.   **sɨdab**   **sɨdabi**   'curse!'
    b.   **lɨbas**   **lɨbaʃ(i)**   'get dressed!'
    c.   **kɨfal**   **kɨfaj(i)**   'pay!'

Thus the cognate verb 'insult' is expressed as **sidʒabi** in Harari, but as **sɨdabi** in Amharic.[26] In Amharic, no palatalization of the medial coronal /d/ occurs as the consonant is not strictly adjacent to the suffix /-i/. This would be analyzed by ranking PROXIMITY above ∃SA-IDENT.

---

25. An alternative to assessing multiple violations is to have a fixed hierarchy of PROXIMITY constraints arranged to express increasing distances (Berkley 1994). Suzuki (1998) parame-terizes OCP-style constraints according to such a hierarchy. The difference is not crucial to the cases examined here.

26. Amharic palatalization is also morphologically-conditioned. Other affixes that trigger palatal-ization in the same manner include the active participle (agentive) /-i/, instrumental /-(i)ja/ and the 1sg. gerund /-e/. Other front-vowel suffixes, such as the possessive /-e/ do not trigger palatalization, e.g., **bet-e** 'my house'.

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4.3. Sonorant-obstruent asymmetries

Now let us turn to cases in which double palatalization occurs in obstruent-sonorant sequences, but not in sonorant-obstruent sequences. The crucial forms are repeated here:

(39)   Obstruent-sonorant

	2sg.m	2sg.f		
a.	**fit'an**	**fitʃ'aɨi**	**(fit'aɲi)**	'hurry!'
b.	**gidal**	**gidʒaj**	**(gidaj)**	'kill!'

Sonorant-obstruent

	2sg.m	2sg.f		
c.	**ʃeldi**	**ʃeldʒi**	*****ʃejdʒi**	'shave!'
d.	**dinabt'i**	**dinabtʃ'i**	*****diɲabtʃ'i**	'be frightened!'

We previously established that there is a preference for palatalization of obstruents, and that if they are targeted in non-final position, a following sonorant is also palatalized. As the analysis stands, there is nothing that accounts for this preference. Given our set of constraints, we expect only a single palatalization: **fit'aɲi**, but this is dispreferred by the majority of speakers. In order to account for the targeting of coronal obstruents over coronal sonorants, coronal obstruents are specifically targeted in the ∃SA-IDENT constraint. Thus, instead of identifying the target as a consonant, it is specified as a coronal obstruent.

(40)   ∃SA-IDENT-COROBS (∃SAICO)
        Let x be an affix and y be a stem to which x attaches.
        If vowel α in x is [+PAL], then there is some *coronal obstruent β*
        such that $\alpha\mathfrak{R}\beta$ and β is [−PAL] in the input and [+PAL] in the output.

One could, of course, have the ∃SA-IDENT constraint refer only to obstruents, since higher ranked markedness constraints would rule out palatalized labials and palatalized velars in the language as a whole. However, given that it is necessary to specify a particular target, and that coronals show a propensity for palatalization (Hume 1992, Hall 1997), the above constraint more directly expresses this fact.[27] Second, as Rubach (2000) and Banksira (2000) argue, different vowels may trigger different palatalization processes in the same language, so it is not sufficient to let markedness constraints weed out the undesired segments. Rubach (2000) builds specificity of the trigger into his

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27. Although not formalized, Rubach and Booij (2001) propose a Coronal Palatalization constraint which specifically requires coronals to be prepalatal before front vowels.

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constraints; I build in specificity of the target. Third, the analysis of consonant agreement presented in Rose and Walker (2001) and Hansson (2001) also refers to specific target and trigger in establishing agreement between consonants through correspondence. In the following tableau, which illustrates obstruent-sonorant double palatalization, palatalization of the sonorant /n/ occurs even though this entails an extra IDENT-IO violation. By so doing, PROXIMITY is better satisfied. ∃SAICO must outrank PROXIMITY to ensure that a candidate with a single final palatalized sonorant (41c) cannot be selected as the winner.

(41)   ∃SA-IDENT ≫ ∃SAICO ≫ PROXIMITY ≫ IDENT-IO

fit'an-i	∃SA-IDENT	∃SAICO	PROXIMITY	IDENT-IO
a. fit'ani	*!	*		
b. fitʃ'ani			**!	*
c. fit'aɲi		*!		*
☞ d. fitʃ'aɲi			*	**

When the order of coronals is sonorant-obstruent, the sonorant fails to palatalize. This is again due to PROXIMITY. By ranking target-specific constraint ∃SAICO with respect to general constraints on faithfulness and proximity, the asymmetry is accounted for.

(42)   ∃SA-IDENT ≫ ∃SAICO ≫ PROXIMITY ≫ IDENT-IO

dinabt'-i	∃SA-IDENT	∃SAICO	PROXIMITY	IDENT-IO
a. dinabt'i	*!	*		
b. diɲabt'i		*!	**	*
c. diɲabtʃ'i			**!	**
☞ d. dinabtʃ'i				*

For one speaker, however, only a final sonorant is palatalized, as in **fit'aɲi**. This form can be produced by raising PROXIMITY above ∃SAICO. This ranking will still obtain non-local palatalization in a form such as /sidab-i/ → **sidʒabi** 'insult!' due to the high-ranking ∃SA-IDENT, and it will not interfere with single palatalization in /dinabt'-i/ → **dinabtʃ'i** 'be frightened!' since the winning candidate violates neither PROXIMITY nor ∃SAICO.

The constraint ∃SA-IDENT is also necessary under the normal ranking, too, as it produces palatalization of /n/ in forms without coronal obstruents, as in **ħiɲak'i** 'strangle!', regardless of the position of PROXIMITY with respect to ∃SAICO.

(43)

ħinak'-i	∃SA-IDENT	∃SAICO	PROXIMITY	IDENT-IO
a. ħinak'i	*!	*		
☞ b. ħiɲak'i		*	**	*

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It is worth considering how these constraints account for palatalization across a lexically palatalized segment, as in the form /at-biʃak'i/ → **atʃ-biʃak'i** 'don't wet, soak!'. Recall that this type of verb was problematic for a spreading or alignment account, as the specification of the palatalized segment is predicted to block spreading to its left. The ∃SA-IDENT/∃SAICO constraints require correspondence between the stem and the suffix, achieved through palatalization of the prefix. A form with a lexically palatalized consonant does not satisfy the criterion that the consonant must be [−PALATAL] in the input, and palatalization of the prefix occurs:

(44)

a-t-biʃak'i	∃SA-IDENT	∃SAICO	PROXIMITY	IDENT-IO
a. a-t-biʃak'i	*!	*		
☞ b. a-tʃ-biʃak'i			*****	*

We have now accounted for all the cases of obligatory palatalization in Harari with the exception of the lack of initial palatalization for some speakers. I will address these forms in the next section.

4.4.   The initial consonant

There are various restrictions regarding the palatalization of the initial consonant, as shown in (8), (10) and (17). Some are absolute and others represent a tendency for certain speakers. In addition, there are differences between root-initial consonants and word-initial consonants. The following examples summarize the data:

(45)   Word-initial

	2sg.m	2sg.f		
a.	**somni**	**somɲi**	or **ʃomɲi**	'fast!'
b.	**nikaʔ**	**nikiʔ**	(*ɲikiʔ)	'touch!'
c.	**leħk'i**	**leħk'i**	(*jeħk'i)	'borrow!'

Root initial

	2sg.m	2sg.f	
d.	**ti-sumni**	**ti-ʃumɲi**	'you fast'
e.	**at-nikaʔ**	**atʃ-nikiʔ**	'don't touch!'
f.	**t-a-leħk'i**	**tʃ-a-leħk'i**	'you loan'

The generalizations are as follows:

(46)   Generalizations concerning initial segments
     a.   Word-initial sonorants are not palatalized.
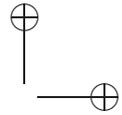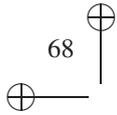
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b.   Word-initial obstruents are *optionally* palatalized.
c.   Root-initial sonorants are (usually) not palatalized.[28]

Unlike sonorants, root-initial obstruents display no special resistance to palatalization. I will now provide a formal analysis of the behavior of initial segments.

4.4.1.   Initial obstruents.   If the initial consonant is a coronal obstruent and the final or medial one a sonorant, then there is a tendency for only the sonorant to be palatalized for some speakers, i.e., /dilag-i/ → **dijagi** 'work' not **dʒijagi*. These cases differ from the forms just analyzed like /fit'an-i/ → **fit'aɲi** or **fitʃ'aɲi** 'hurry' in which the the obstruent is in non-initial position and the preference for most speakers is for both the sonorant and obstruent to be palatalized. A single speaker may thus prefer **fitʃ'aɲi** to **fit'aɲi** but prefer **dijagi** to **dʒijagi**. This dichotomy demonstrates that something else is at play with the initial consonant. In addition, speakers who resist word-initial palatalization *do* allow the initial root consonant to be palatalized if a prefix is attached and the root-initial segment is no longer word-initial.

Beckman (1997, 1998) argues that word initial syllables occupy a privileged position, and she introduces faithfulness constraints specific to segments occupying the first syllable. This accounts for patterns of vowel harmony, in which the initial syllable allows more contrasts and resists neutralization, and word-initial consonants which resist alternation. A constraint against changing the initial consonant of the word appears to be in force:

(47)   IDENT-IO-C1
        The word-initial consonant must have identical values for [PALATAL] in the input and output.

This constraint is ranked below ∃SA-IDENT in order to allow initial palatalization in a form like /sibari/ → **ʃibari** 'break!', which has only one palatalizable segment, but to disallow it in /dilagi/ → **dijagi** 'work', where another segment may be palatalized. In addition, IDENT-IO-C1 is ranked above ∃SAICO to permit only a coronal sonorant to be palatalized and not a coronal obstruent. The form **dijagi** with a palatalized coronal /l/ is illustrated in (48).

(48)   ∃SA-IDENT > IDENT-IO-C1 > ∃SAICO

28. The two counter-examples to this generalization (see Footnote 14) are rare in comparison to the majority of forms elicited. They suggest a variably-ranked constraint against root-initial palatal sonorants. In contrast, palatalization of both root-initial and word-initial obstruents was common, more so among the female speakers in Harar.
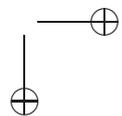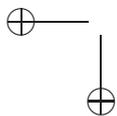
	dilag-i	∃SA-IDENT	IDENT-IO-C1	∃SAICO
a.	dilagi	*!		*
b.	dʒilagi		*!	
☞ c.	dijagi			*
d.	dʒijagi		*!	

When there are no other potential anchors for the palatalization, an initial coronal obstruent is palatalized in initial position in order to satisfy ∃SA-IDENT, motivating the ranking of ∃SA-IDENT > IDENT-IO-C1. Note that for certain speakers who do not palatalize initial consonants at all, the opposite ranking would entail.

(49)

	sibar-i	∃SA-IDENT	IDENT-IO-C1	∃SAICO
a.	sibari	*!		*
☞ b.	ʃibari		*	

4.4.2. Initial sonorants. In constrast to obstruents, when the coronal sonorants are initial, no palatalization may occur even if the sonorant is the only coronal, as forms such as [nikaʔi] show.[29] The explanation for this sonorant/ obstruent difference can be found in a more general constraint in Harari: a lexical word almost never begins with the palatal sonorant [ɲ] or [j].[30]

(50)   *[PAL/SON
      The first consonant of a stem cannot be palatal sonorant.

The constraint in (50) dominates the ∃SA-IDENT constraint to account for verb forms that show no palatalization:

(51)

	nikaʔ-i	*[PAL/SON	∃SA-IDENT	IDENT-IO-C1	∃SAICO
a.	ɲikaʔi	*!		*	*
☞ b.	nikaʔi		*		*

---

29. Leslau (1958) reports initial palatalization for 2sg.f **ɲixaʃi** 'bite!', but my consultants reject this.

30. A check of Leslau (1963) reveals that there are no forms listed with initial [ɲ] either strictly initial or when preceded by a vowel. As for [j], there are various prefixes and function words such as demonstratives beginning with [j], but only one or two lexical items, such as **jo:m** 'day', an Arabic borrowing, or **ja:ri** 'porcupine'. As for verb roots, the restriction is in fact true of verb roots in other Ethio-Semitic languages (see Berhane 1991 on Tigrinya, Chamora 1996 on Inor), except Tigre, which has a few **j**-initial roots. Amharic has two **j**-initial roots: **jazə** 'seize' and **jəkkəsə** 'ask a question' (based on Kane (1990) which has approx. 4 250 verb roots).

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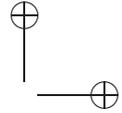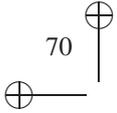
Furthermore, the constraint will also rule out palatalization of a root-initial sonorant preceded by prefixes, as in forms such as **tʃ-a-leħk'i** 'you loan!', since the inner stratum constitutes a stem domain. Note that there are no palatalizable sonorant prefixes occurring with the 2sg.f.

As discussed in Section 3.2.1, skipping of a potential target is problematic under a local spreading account, as a gapped configuration must be allowed. Under an agreement analysis, however, the non-participation of intervening segments is unproblematic. They may be skipped in two ways. Either they do not belong to the class of consonants specified in the ∃SA-IDENT constraint or a higher ranked (markedness) constraint prevents their participation. In this case, the high-ranking *[PAL/SON allows them to be skipped. In the next section, we explore more variability with /l/ that cannot be explained via constraints on root-initial segments.

4.4.3. Skipping of medial /l/.   In the preceding section, we saw how both /n/ and /l/ fail to palatalize when occurring in initial position of the root, even if they are the only coronal segments in the stem. The consonant /l/ also shows resistance to palatalization in non-final position, too. Some examples of medial /l/ being skipped are given in (52).

(52)

		2sg.m	2sg.f	
	a.	**at-ħilab**	**atʃ-ħilabi**	'don't milk!'
	b.	**zilal**	**ʒilaj**	'jump!'
	c.	**silab**	**ʃilabi**	'castrate!'
	d.	**zelmi**	**ʒelmi**	'do an injustice!'

The problem with medial /l/ appears to be that the output would create undesirable sequences of a front vowel and a palatal glide: [ij] or [ej]. These kinds of sequences are dispreferred due to the close articulation between front vowels and [j], an OCP effect on high/mid front vocoids. This conclusion is due in part to some interesting judgment differences between a few pairs – forms such as (53a) and one in which the [j] surfaces following [a]: **tiħajbi** or **tʃiħajbi** 'you (sg.f) milk'. Glides in final position also surface following the vowel [a]. Recall that final **aji#** sequences are reduced to [aj], e.g., **kifaj** 'pay!', emphasizing that the opposite order of glide and vowel [ji] is also disfavored. It is not possible to suppress vowels in the medial position, as the vowels are required for syllabification. Final **Cji#** sequences may also surface, i.e., /tinadli/ → **tinadʒji** or /tidabli/ → **tidabji**. This is due to syllabification constraints that prevent final consonant clusters, requiring the [i] to be present. Nevertheless, these cases occasionally result in skipping, too, found with a single elicited example: /tigadli/ → **tigadʒli**. In sum, a constraint against front vowel-palatal glide sequences (of
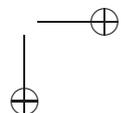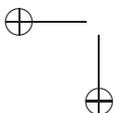
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either order) is necessary, which I abbreviate as *[ij].[31]

(53)

	silab-i	∃SA-IDENT	∃SAICO	*[ij]	PROXIMITY
a.	silabi	*!	*		
b.	sijabi		*!	*	**
c.	ʃijabi			*!	***
☞ d.	ʃilabi				****

If this constraint did not outrank PROXIMITY, candidate (53c) would emerge as
the winner. This is in fact an alternate possible form. Sonorants are palatalized
in non-final position under duress, when compelled to by high-ranking ∃SA-
IDENT. If there are coronal obstruents available that can satisfy ∃SA-IDENT,
then sonorants give the appearance of being skipped.

In conclusion, the 2sg.f palatalization in Harari is best expressed through
constraints requiring agreement between affix and stem segments. These con-
straints, in combination with constraints against initial palatalization and front
vowel-palatal glide sequences, account for the main cases of palatalization seen
in Harari. This analysis avoids the pitfalls of the general alignment analysis by
specifying the targets explicitly in the constraints. It also avoids problems en-
countered by the spreading analysis in that agreement predicts no blocking
effects of intervening consonants lexically specified with the agreeing feature.
In the following section, I turn to the cases of multiple palatalization of obstru-
ents.

5.   Optional multipe palatalization and consonant harmony

Multiple palatalization of obstruents is an optional phenomenon in the Harari
2sg.f forms, and appears to be favored by female speakers. Examples of double
palatalization are given in (54).

(54)   2sg.m   2sg.f
   a.   **bit'as**   **bit'aʃi**   or **bitʃ'aʃi**   'rip!'
   b.   **t'imad**   **timadʒi**   **tʃ'imadʒi**   'tie, strongly oppose!'
   c.   **sidab**   **sidʒabi**   **ʃidʒabi**   'curse'
   d.   **at-widak'i**   **at-widʒak'i** **atʃ-widʒak'i** 'don't fall!'

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31. A reviewer questions what would occur with [j] adjacent to a high round vowel [u]. Such
a case could potentially occur in a Type D verb with the right configuration of consonants.
One such verb is **t'o:laga** 'wither'. The imperfective would have the form **ti-t'u:lgi**. I did not
elicit this particular verb, so I cannot determine whether the 2sg.f form would be **ti-tʃ'u:lgi** or
ti-tʃ'u:jgi. I can only hypothesize that sequences of high vocoids of different backness might
also be avoided.
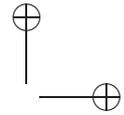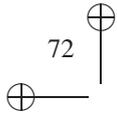
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    e.   **at-kitabi**   **at-kitʃabi**   **atʃ-kitʃabi**   'don't write!'

There are two possible analyses of the obstruent-obstruent palatalization: (i) it constitutes consonant harmony and represents a different system from the vowel-triggered palatalization or (ii) it reflects a requirement that additional coronal obstruents in a 2sg.f word be palatalized, an extension of the ∃SAICO constraint.

A form like /bit'asi/ has a single obligatory palatalization: **bit'aʃi**. It should be stressed that there is no correlation between the preference for a single obstruent palatalization and single palatalization with verbs like **fit'aɲi**. Some speakers have **bit'aʃi** but **fitʃ'aɲi**. This underscores the conclusion that the second case of double palatalization reflects the preference for obstruents to be palatalized over sonorants. Obstruents are targeted and the sonorant is palatalized to satisfy ∃SAICO and PROXIMITY. The double palatalization found with obstruents is a separate phenomenon. Since the ∃SAICO constraint only requires as a minimum a single palatalization, PROXIMITY or IDENT-IO would normally rule out double palatalization. Some other mechanism must be responsible for inducing extra palatalization. I first explore a consonant harmony analysis, and reject it on typological grounds.

5.1.   Consonant harmony

Consonant harmony can be defined as assimilation between consonants that are not string adjacent; other consonants and vowels may intervene. Coronal harmony is more common than any other kind of harmony involving place of articulation (Shaw 1991, Hansson 2001). Harmony at other places of articulation are rare. Dorsal harmony is found in only a handful of languages (Hansson 2001), and others involve secondary articulations, such as off-glide palatalization in Karaim (Vaux 1999, Kowalski 1929). Shaw (1991) lists Harari palatalization in her compilation of consonant harmonies based on Leslau (1958) and an unpublished presentation by Halefom (1988).[32] As far as I know, however, the intricacies of the system have not been presented in detail before, and the issue of whether the system is really harmony or not has not been addressed, except briefly in Rose (1997b). Various solutions to the puzzle of why coronal harmony is so widespread have been proposed. Shaw (1991) relates it to spreading of the features [anterior] and [distributed] that are dependents of the Coronal node, and not relevant for other places of articulation. Flemming (1995) and Gafos (1996) propose that coronal harmony derives from the non-interference of coronal consonants with vowel articulations. Vowels involve

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32. Halefom (p.c.) was unable to distribute the manuscript or handout from the talk.
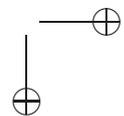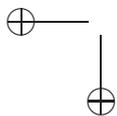
use of the tongue body or lips, but coronals involve the tongue tip-blade, not
utilized by vowels. They argue that aligning the tongue tip-blade articulation
of the consonant across other vowels and other consonants will have no not-
icable acoustic effect on intervening segments. Rose and Walker (2001) and
Hansson (2001) instead propose an agreement analysis, whereby specific con-
sonant groups interact with each other, along the lines of the analysis proposed
here. Whichever analysis is ultimately correct, if Harari is a case of consonant
harmony, we expect it to display characteristic properties of coronal consonant
harmony.

If Harari double palatalization were consonant harmony, there are four ba-
sic properties that would render it unusual. First, in a comprehensive survey of
consonant harmony, Hansson (2001) identifies three general classes of coronal
harmony. One class involves sibilants, in which the alveolar/palato-alveolar
s/ʃ alternation affects fricatives and affricates, but excludes stops (i.e., Chu-
mash, Tahltan, Chiricahua Apache, Navajo, Kinyarwanda, Berber, Omotic lan-
guages). For example, in Chumash (Beeler 1970, Poser 1982), the affricate [tˢ]
alternates with [tʃ] but [t] is unaffected. In Imdlawn Tashlhiyt Berber, there are
no affricates (Elmedlaoui 1992), so the harmony only operates between [s]/[ʃ]
and [z]/[ʒ]. In Kirundi, /t/ may be palatalized, but does not participate in coro-
nal harmony. In the second class, coronal harmony operates between stops in
several Nilotic languages such as Anywa (Reh 1996) and Mayak (Anderson
1999) as well as Australian languages, such as Gooniyandi (Hamilton 1993).
These languages have three or four-way contrasts among coronal stops and
have no or few fricatives. The third class, although less common, involves al-
ternation between stops and affricates, such as /t/ and /tʃ/. This occurs as a mor-
pheme structure condition on Aymara roots (MacEachern 1997) and in Pengo
(Burrow and Bhattacharya 1970, Hansson 2001). Crucially, though, none of
these cases involves both stops and fricatives interacting with each other, as
would be the case if Harari palatalization were harmony.

Second, in most languages that display consonant harmony, there is evi-
dence that monomorphemic words also respect the harmony pattern (e.g., Kin-
yarwanda, Kimenyi 1979: 44). This is not the case in Harari. It is rare for
two coronal fricatives to appear in the same word unless they are reduplica-
tive, due to morpheme structure constraints on Semitic roots (Greenberg 1950)
that prevent more than one consonant in a root at the same place of articu-
lation. However, a few nominal forms occur with no harmony: i.e., **ʃamsiya**
'umbrella'. Affricates and fricatives may co-occur with no harmony effects:
nadʒas-a 'be impure, polluted' or **satʃa** 'drink', and so may affricates and
stops: **taːtʃʼina** 'yesterday'. While there are a couple of words which show al-
ternation between [s] and [ʃ]: **ʃaraf aːʃa / saraf aːʃa** 'change money' or **ʃaɲiʔ
/ saɲiʔ** 'ironsmith, potter' (Leslau 1963), there does not appear to be a ban on

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alveolars and palato-alveolars occuring in the same word.[33]

Third, although consonant harmony can be triggered by a restricted set of affixes in some languages, in Harari, it is not the 2sg.f affix itself that would be responsible for the harmony, but only the consonant palatalized as a result of that affix. In other words, only a palato-alveolar consonant in a 2sg.f non-perfective word could trigger harmony. Other palatalized consonants in verbs do not trigger palatalization of preceding coronals.[34]

Fourth, intervening coronal sonorants [n] and [l] can participate in multiple palatalization and are transformed to [ɲ] and [j] respectively. For example, the verb /tidnabt'i/ 'you are frightened!' has a 2sg.f form **tidʒɲabtʃ'i** for those speakers that allow double palatalization. The coronal nasal is palatalized. The same is true of reduplicated roots. Although double palatalization of sonorants in reduplication is dispreferred (e.g., **binaɲi** 'sprinkle!'), it does occur if obstruents undergo double palatalization: **tit'nat'ni** 'you spin (m)' vs. **titʃ'ɲatʃ'ɲi** 'you spin (f.)'. Although sonorants can participate in some retroflex stop harmonies, they do not participate when fricatives or affricates are involved, as in the stop/affricate harmonies and the sibilant harmonies in which coronal stops, including sonorants, show no surface effects of the harmony process.[35]

In conclusion, while Harari palatalization bears some similarity to consonant harmony in that more than one coronal consonant is palatalized within a stem, it differs from other cases in enough ways to warrant an alternate analysis. Including it within the typology of consonant harmony would leave unexplained why Harari oral stops and fricatives actively participate in the palatalization harmony as a group but stops in other languages do not, even those that allow palatalization of stops, such as Kinyarwanda. Piggott (1997) draws a similar conclusion about standard nasal harmony versus the kind of nasalization triggered by the 1st person singular affix in Terena, which has different effects, including prenasalization and voicing of stops, which are not attested in other nasal harmony systems.

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33. The diachronic alternation between [s] and [ʃ] can be found irrespective of words that contain other coronals, and occurs in other Ethiopian Semitic languages, such as Tigrinya. Voigt (1988) and Banksira (2000) relate it to the presence of high back [u] that triggers palatalization.
34. Ntihirageza (1993) reports that Kirundi sibiliant harmony is dependent on palatalization triggered by a class of j-initial suffixes. These suffixes are treated as front-vowel initial in Broselow and Niyondagara (1990). If palatalization is a prerequisite for coronal harmony, then Harari would not differ substantially on this point. Yet, although coronal stops are palatalized in Kirundi (i.e., t → tˢ or ʃ), they do not participate in harmony.
35. Note that in the theory espoused by Flemming (1995) and Gafos (1996), coronal stops bear the feature (or gesture) extended between fricatives/affricates, but are argued to show no acoustic effects. As far as I know, this has not been tested experimentally.
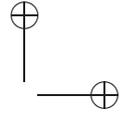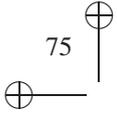
5.2.   *Extending coronal obstruent palatalization*

One option to achieve multiple palatalization is to extend the rule or constraint responsible for palatalization. In a rule-based framework, this would be equivalent to iterative spreading, or reapplication of a spreading rule (Myers 1991). However, I have already highlighted that a spreading analysis would have to contend with the problem of intervening consonants and vowels that also bear the palatalizing feature, particularly the palatalized consonant [ʃ] that is present in some stems.[36]

Coronal obstruent agreement is optionally extended or repeated for other coronal obstruents in the word, not just the rightmost one. This can be modeled using a non-existential version of the SAICO constraint requiring that *every* coronal obstruent in the stem agree with the suffix, rather than *some* coronal obstruent. Ussishkin (1999) refers to this as a 'strong' constraint.

(55)   SA-IDENT-COROBS (SAICO)
Let x be an affix and y be a stem to which x attaches.
If vowel α in x is [+PAL], then every *coronal obstruent* β such that $\alpha\mathfrak{R}\beta$ and β is [−PAL] in the input is [+PAL] in the output.

When ranked above PROXIMITY and IDENT-IO, every coronal in the stem will be palatalized as in (56); when ranked below, PROXIMITY (and ∃SA-IDENT) will favor (58d) with a single palatalization:

(56)

	bit'as-i	SAICO	PROXIMITY
a.	bit'asi	**!	
☞ b.	bitʃ'aʃi		*
c.	bitʃ'asi	*!	**
d.	bit'aʃi	*!	

The SAICO constraint expresses a relationship with the suffix /-i/ and not with the other palatalized coronals in the word. If double palatalization only made reference to other palatalized coronals, we would incorrectly predict double palatalization in other verb forms with palatalized consonants in the stem, such as 2sg.m **tiʃeldi** 'you shave'. The form *t**ʃiʃeldi** is impossible – that form is only possible as a feminine form. This reinforces the point that the palatalization in the 2sg.f is directly tied to the suffix, and not to the presence of other palato-alveolar consonants in a stem.

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36. Coronal consonant harmonies propagate through front vowels with no blocking effects, e.g., Aari /ʃen-sis/ → **ʃenʃiʃ** 'cause to buy/sell' (Hayward 1990) or Kirundi /ja-ses-je/ → **jaʃeʃe** 's/he spilled' (Ntihirageza 1993).
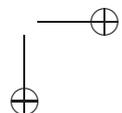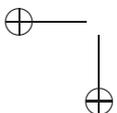
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5.3.   Reduplicated verbs

Reduplicated verbs show a greater propensity for double palatalization than
other verb forms. If there is more than one coronal obstruent, they are pref-
erentially both palatalized (57a–d), and in the case of internal reduplication,
the single palatalization option is not used. If there are two coronal sonorants,
however, only the final one is palatalized (57e–g), but there is optional double
palatalization with sonorants as a by-product of the optional initial palataliza-
tion in (57h–j). This particular configuration allows double palatalization as
by-product of the preference for obstruent palatalization combined with redu-
plication, but it does not constitute consonant harmony. As seen in Section 4.2,
medial /l/ often resists palatalization (57h).

(57)		2sg.m	2sg.f			
	a.	**kisas**	**kiʃaʃi** or	**kisaʃi**		'sue!'
	b.	**k'idad**	**k'idʒadʒi**	**k'idadʒi**		'tear!'
	c.	**k'itak'ti**	**k'itʃak'tʃi**	**k'itak'tʃ'i**		'hammer!'
	d.	**kitatfi**	**kitʃatʃfi**			'hash again and again!'
	e.	**binan**	**binaɲi**	**(biɲaɲi)**		'sprinkle!'
	f.	**zilal**	**zilaj (zijaj)**	**(ʒijaj)**		'jump!'
	g.	**lik'alk'i**	**lik'ajk'i**			'paint!'
	h.	**diladli**	**dʒiladʒji**	**diladʒji**		'level off!'
	i.	**t'inat'ni**	**tʃ'iɲatʃ'ɲi**	**t'inatʃ'ɲi**		'spin!'
	j.	**mizazni**	**miʒaʒɲi**			'weigh many things/ consider carefully'

I follow Gafos (1996, 1998) and Rose (1997b) in adopting the position that
biliteral roots of the shape $C_1C_2C_2$ such as **kisas** involve reduplication and
not consonant spreading. In Optimality Theory the relationship between a base
and a reduplicant is regulated by a correspondence relationship. In McCarthy
and Prince (1995, 1999), the input-output relationship does not refer to the
reduplicant. In other models, beginning with Orgun (1996a) and Spaelti (1997),
but most fully articulated in Struijke (2000), the input consonant corresponds
simultaneously to two output consonants. There is no separate input-base or
input-reduplicant relationship. The relationship between base and reduplicant
is another correspondence relationship. This model is represented as in (58):

(58)   Input

Output
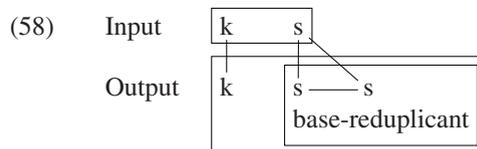
base-reduplicant

I adopt this conception of the input-reduplicant relationship, as it does not force one to decide arbitrarily which consonant is the base and which is the reduplicant. Two faithfulness constraints monitor the correspondence relationships, IDENT-IO, which we have already seen, and IDENT-BR, given in (59).

(59)   IDENT-BR
         Correspondent segments in the base and reduplicant are identical for
         the feature [+PAL].

There are two means of accounting for the double palatalization represented by (57a). One would be to rank SAICO above PROXIMITY as was done for the other double obstruent palatalization cases. The other would be to permute the rankings of IDENT-BR and IDENT-IO. The first option cannot account for the fact that speakers without optional obstruent palatalization still favor double palatalization in reduplicated forms. Yet the second option cannot accounts for roots with a reduplicated sonorant, which do not show double palatalization. Nevertheless, the fact that some speakers only have double palatalization with reduplicated stems argues in favor of the high ranking of IDENT-BR as the correct approach. The problem of the sonorants can be dealt with through markedness constraints against these types of segments.

Since the whole stem is the output, double palatalization would incur two violations of IDENT-IO, and worse violations of PROXIMITY just as with any sequence of two obstruents. If IDENT-BR is ranked above these constraints, the double palatalization is neatly captured (see Rose 1997b, Gafos 1998 for the same IDENT-BR > IDENT-IO ranking for Gurage dialects such as Chaha).

(60)

	kisas-i	∃SA-IDENT	IDENT-BR	PROXIMITY	IDENT-IO
☞ a.	kiʃaʃi			*	**
b.	kiʃasi		*!	**	*
c.	kisaʃi		*!		*

Applying the same ranking with no modification to reduplicated roots with repeated sonorants would incorrectly predict the same double palatalization. Yet, sonorants seem to resist palatalization. A parallel effect is found in the Chaha equivalent of the 2sg.f palatalization. In this language, the coronal sonorants /l r n/ have merged to a single phoneme in the verb system, predictably realized as [r] or [n] (Petros 1996, Banksira 2000). Final /r/ is palatalized to [j] in Chaha, realized as a vocalic element, i.e., 'break!' **siβir** (2sg.m) vs. **siβi** (2sg.f).[37] Reduplicated forms in Chaha display double palatalization (61a–b),

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37. It was suggested to me that the ability of /r/ to be palatalized in Chaha follows from its origin as /l/. While this may be so, all final [r] are palatalized synchronically in Chaha, no matter their origin as *l, *r or *n.

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except with /r/, as shown in (61c–d)

(61)   2sg.m   2sg.f
     a.   **kəsɨs**   **kəʃiʃ**   'accuse, sue'
     b.   **tata**   **tʃatʃə**   'twist into rope'
     c.   **bɨrər**   **bɨre**   ***bɨje**   'fly away!'
     d.   **fərfɨr**   **fərfi**   ***fəjfi/*fefi**   'rummage/be rotten!'

Rose (1997a, b) invokes a constraint against palatalization of /r/ that is ranked above IDENT-BR, but below IDENT-IO to account for the resistance of /r/ to palatalization, unless required to realize the morpheme. The same method can be invoked for Harari for palatalized /l/ and /n/.

(62)   *SONʲ
       A sonorant consonant must be [−PAL] in the output.

(63)

	binan-i	∃SA-IDENT	*SONʲ	IDENT-BR	IDENT-IO
a.	binan	*!			
b.	biɲaɲ		**!		**
☞ c.	binaɲ		*	*	*

It should be stressed that even though the constraint SONʲ plays a role in reduplicated forms, it does not exert influence in the general cases of palatalization, and target-specific constraints are still required.

5.4.   Opacity with suffixes

Before concluding, a word should be said about the opacity of palatalization discussed in Section 3.1. Recall that when a vowel-initial object clitic or auxiliary follows the 2sg.f stem, the /-i/ suffix is dropped, yet palatalization still occurs.

(64)   2sg.m   2sg.f
     a.   **kisas-a**   **kisaʃ-a**   'sue him!'
     b.   **sidab-a**   **sidʒab-a**   'insult him!'
     c.   **sibar-a**   **ʃibar-a**   'break it!

This is a typical instance of "non-surface apparent" (McCarthy 1999) or counterbleeding opacity, and has been addressed in various ways within the Optimality Theory literature such as through Trans-derivational Correspondence Theory (TCT) (Benua 1997), Sympathy theory (McCarthy 1999), or Lexical Phonology and Morphology in Optimality Theory (LPM-OT) Kiparsky 2000).

Within either TCT or LPM-OT, the form with only the subject affix, e.g.,
ʃibar-i (< /sibar-i/) serves as the base for the object affix. In TCT, words in
a paradigm are evaluated using a recursive constraint hierarchy. In the first
recursion, the stem with subject affix and the constraints as ranked so far pro-
duces palatalization. In the second recursion, ranked below the first, an output-
output constraint requiring identity for [PAL] between the base and the affixed
form ensures that a form with palatalization (69a) is chosen over one without
(65b), even though the trigger for palatalization is deleted. This constraint is
also present in the first recursion, but has no effect. No constraint re-ranking is
permitted in TCT between recursion levels.

(65)

	/ʃibari-a/	OO-IDENTITY[PAL]	*HIATUS	MAX-V
☞ a.	ʃibara			*
b.	sibara	*!		*
c.	ʃibaria		*!	
d.	sibaria	*!	*	

In LPM-OT, the analysis is actually very similar. Palatalization occurs at
the stem level, which includes subject affixes. However, at the word level, the
object clitic /-a/ is added to the stem (see Kiparsky 2000 on the same division in
Arabic), producing a violation of vowel hiatus, and so the suffix /-i/ is deleted.
Although LPM-OT allows constraint reranking between levels, no constraint
reranking is necessary for the constraints *HIATUS and MAX-V; the hiatus
situation does not arise at the stem level. Depalatalization is ruled out by the
IDENT-IO[PAL] constraint.

(66)

	ʃibari-a	*HIATUS	MAX-V	IDENTITY-IO[PAL]
☞ a.	ʃibara		*	
b.	sibara		*	*!
c.	ʃibaria	*!		
d.	sibaria	*!		*

Both analyses express the morphological distinction between the phonology
triggered by the subject affix and the phonology of the object clitic. The LPM-
OT analysis is slightly favored here, because as discussed in Section 4.1, it
also allows a more general expression of the ∃SA-IDENT constraint in (31).
In the next section, I address how the Harari pattern fits into the typology of
consonant-vowel interaction from a cross-linguistic perspective.

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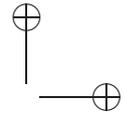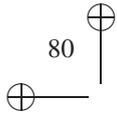
6.   Vowel-consonant distance effects

Harari palatalization is neither a case of consonant harmony, nor a case of alignment of features at a stem edge. Instead, it represents a morphologically-triggered palatalization process that extends beyond a simple local palatalization. It affects consonants elsewhere in the stem, and can result in multiple palatalization. In this section, I briefly compare the Harari case with other vowel-consonant distance interactions, and conclude that the lack of blocking effects is a general property of this type of interaction. Hansson (2001) reaches the same conclusion for consonant-consonant distance interactions.[38] In contrast, local spreading of features, as in emphasis harmony or nasal harmony displays blocking cross-linguistically. This occurs when the spreading feature is incompatible with the next segment in the spreading span (Archangeli and Pulleyblank 1994). In the case of [nasal], an obstruent blocks (Walker 1998) or with emphasis harmony, a high vowel or consonant (Davis 1995, Shahin 2002).

Other cases of vowels affecting consonants at a distance have been reported in the literature. Palatalization over a single consonant is found in Chimalpa Zoque (Odden 1980, 1994), Karok (Bright 1957) and Barrow Inupiaq (Kaplan 1981, Odden 1994). According to the cited authors, the intervening consonant is not also palatalized. Odden (1980) lists cases of deretroflexion in Luiseño and Choapun Zapotec that also operate across a single consonant.

An example of a distance effect on consonants that is not restricted to adjacent syllables is Sibe velar lowering (Li 1996, Vaux 1999), whereby velars are lowered to uvulars following non-high vowels. In (67a–e), the diminutive adjective suffix /-kɨn/ and the self-perceived immediate past tense suffix /-xɨ/ are shown, with vowel harmony (Li 1996: 201–202). The velar of these suffixes is lowered to a uvular in (67f–j). The trigger is the first vowel of the stem. Consonants and high vowels, both back and front, may intervene.

(67)   Sibe

a.	**ɨldɨ(n)-kɨn**	'bright'	f.	**ɢəlmi(n)-qɨn**	'long'
b.	**ulu-kun**	'soft'	g.	**dʐalu-qun**	'full'
c.	**muxuli(n)-kɨn**	'round'	h.	**adʐi(g)-qɨn**	'small'
d.	**tɨ-xɨ**	'to sit'	i.	**bɔdu-χu**	'to consider'
e.	**türü-xu**	'to rent'	j.	**lavdu-χu**	'to become more'

In Classical Mongolian (Odden 1980), the same velar to uvular shift occurs in the environment of [−back] vowels across a maximum of one consonant.

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38. Sanskrit retroflex harmony is the only exception, and Rose and Walker (2001) and Hansson (2001) treat this as a true spreading case, similar to emphasis harmony, whereas they analyze other consonant harmonies as agreement.
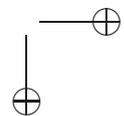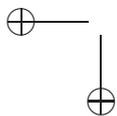
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Backing of /l/ to velarized [ɫ] before back vowels is also found in Votic (Odden 1980), again across a single consonant.

As for distance vowel-consonant interaction triggered by consonants, most cases involve vowel retraction or lowering triggered by back consonants. Intervening vowels can also be lowered, but consonants generally do not interfere. In Tigre, /ə/ is reported lowered to [a] preceding ejectives and pharyngeals across several syllables (Palmer 1956, Odden 1980, 1994). Rose (1996) found that other vowels were also slightly lowered and retracted in Tigre. Bessell (1998) determined that in Snchitsuʔumshtsn (Coeur d'Alene) Salish, vowels are retracted preceding 'faucal' consonants (uvulars, pharyngeals and r r'), as shown in the following examples. The trigger is the uvular in each suffix and the targets are the preceding stem or suffix vowels.

(68)   Snchitsuʔumshtsn

a.	**tˢíʃ-t**	'it is long'
b.	**dlím**	'he galloped hither'
c.	**sɛttˢ-ntˢ**	'he twisted it'
d.	**ʔɛ-niʔ-kús-ɛlstʃn**	'hair curls back from forehead'
e.	**tˢɛ́ʃ-alqʷ**	'he is tall'
f.	**tˢ-dlám-alqʷ**	'train'
g.	**nɛʔ-sáttˢ-ɛʔqs-n**	'crank (on a car)'
h.	**ʔat-kós-qn**	'his hair is curled'

Bessell adduced from phonetic evidence that intervening consonants remain unaffected by faucal harmony. Similar effects are found in other Salish languages such as Spokane and Kalispel, but only targeting specific vowels. In Cochamba Quechua, high vowels /i u/ are lowered to [e o] respectively preceding uvulars, either adjacent or across an intervening coronal sonorant [r] or [n] (Lastra 1968, Odden 1980). In Palestinian Arabic (Shahin 2002), vowels are retracted in the environment of pharyngeal consonants or vowels across other consonants.

While cases of vowels affecting consonants and consonants affecting vowels at a distance are not numerous, they share the following properties: (i) there are specific targets and triggers and (ii) no blocking effects are found with non-target consonants. In addition, in the cases of Sibe and Harari, intervening vowels do not block the non-local effects. Specifying the targets and invoking agreement constraints would allow one to bypass problems encountered with alignment or spreading rules which predict blocking effects for many of these cases (see Odden 1994). I leave the investigation of these additional types of vowel-consonant interaction for future research.
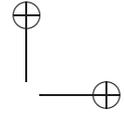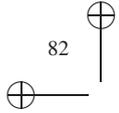
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7.   Conclusion

In this paper I have presented an analysis of Harari palatalization, which displays unusual long-distance effects, as well as double palatalization. I show that the non-local nature of the palatalization is best expressed by constraints requiring agreement between trigger and specific targets rather than through invoking spreading rules or general alignment constraints. This avoids problems of intervening elements, which do not block the long-distance palatalization, despite bearing the same features of palatalization. Double palatalization of a sonorant and an obstruent and a preference for palatalizing coronal obstruents over coronal sonorants follows from these constraints. Optional palatalization of more than one coronal obstruent within the verb stem is analyzed not as a case of consonant harmony, but instead represents additional satisfaction of a constraint requiring obstruents to be palatalized. This raises the possibility that not all cases of distance agreement may be spreading of features, but could also involve agreement through correspondence (Walker 2000a, b, Rose and Walker 2001, Hansson 2001).

affiliation???

References

Akinlabi, Akinbiyi (1996). Featural affixation. *Journal of Linguistics* 32 (2): 239–289.

Andersen, Torben (1999). Consonant alternation and verbal morphology in Mayak (Northern Burun). *Afrika und Übersee* 82: 65–97.

Archangeli, Diana and Douglas Pulleyblank (1987). Maximal and minimal rules: The effects of tier scansion. *Proceedings of NELS* 17: 16–35.

— (1994). *Grounded Phonology*. Cambridge, MA: MIT Press.

Avery, Peter and Keren Rice (1989). Segment structure and coronal underspecification. *Phonology* 6: 179–200.

Bakovic, Eric (2000). Harmony, dominance and control. Ph.D. dissertation. Rutgers University.

Banksira, Degif Petros (2000). *Sound Mutations: The Morphophonology of Chaha*. Amsterdam: John Benjamins.

Bat-El, Outi (1988). Remarks on tier conflation. *Linguistic Inquiry* 19: 477–485.

Beckman, Jill (1995). Shona height harmony: Markedness and positional identity. *University of Massachusetts Occasional Papers in Linguistics 18 - Papers in Optimality Theory*, J. Beckman, L. Walsh-Dickey, S. Urbanczyk (eds.), 53–75. Amherst, MA: GLSA.

— (1997). Positional faithfulness, positional neutralization and Shona vowel harmony. *Phonology* 14 (1): 1–46.

— (1998). Positional faithfulness: An optimality theoretic treatment of phonological asymmetries. Ph.D. dissertation, University of Massachusetts, Amherst. [Published 1999, New York: Garland].

Beeler, Madison (1970). Sibilant harmony in Chumash. *International Journal of American Linguistics* 36: 14–17

Benua, Laura (1997). Phonological relations between words. Ph.D dissertation, University of Massachusetts, Amherst. [Published 2000, New York: Garland].
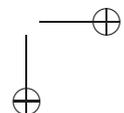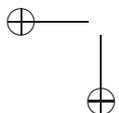
Long-distance vowel-consonant agreement in Harari   83

Berhane, Girmay (1991). Issues in the phonology and morphology of Tigrinya. Ph.D. dissertation, Université du Québec à Montréal.

Berkley, Deborah (1994). The OCP and gradient data. *Proceedings of FLSM V. Studies in the Linguistic Sciences* 24: 59–72.

Bessell, Nicola (1998). Local and non-local consonant-vowel interaction in Interior Salish. *Phonology* 15: 1–40.

Bhat, D. (1978). A general study of palatalization. In *Universals of Language* vol. 2, J. Greenberg, C. Ferguson and E. Moravcsik (eds.), 47–92, Palo Alto, CA: Stanford University Press.

Booij, Geert (1996). Lexical phonology and the derivational residue. In *Current Trends in Phonology: Models and Methods*. J. Durand and B. Laks (eds.), 69–96. European Studies Research Institute and University of Salford.

Bright, William (1957). *The Karok Language*. University of California Publications in Linguistics 13. Berkeley: University of California Press.

Broselow, Ellen and Alice Niyondagara (1990). Feature geometry of Kirundi palatalization. *Studies in the Linguistic Sciences* 20: 71–88.

Buckley, Eugene (1996). Constraint Domains in Kashaya. *Proceedings of WCCFL* 14: 47–61.

Burrow, Thomas and Sudhibhushan Bhattacharya (1970). *The Pengo language: Grammar, text and vocabulary*. Oxford: Clarendon Press.

Casali, Roderic (1997). Vowel elision in hiatus contexts: Which vowel goes? *Language* 73: 493–533.

Cerulli, Ernesto (1936). *Studi etiopici. I. La lingua e la storia di Harar*. Rome: Istituto per l'Oriente.

Chamora, Berhanu (1996). Consonant distribution in Inor. In *Essays in Gurage Language and Culture*, G. Hudson (ed.), 53–67, Wiesbaden: Otto Harrassowitz.

Clements, G. Nick and Elizabeth V. Hume (1995). The internal organization of speech sounds. In *The Handbook of Phonological Theory,* John Goldsmith (ed.), 245–306. Oxford: Blackwell.

Cohen, Marcel (1931). *Etudes d'éthiopien méridional*. Paris: Geuthner.

— (1936). *Traité de langue amharique*. Paris.

Cole, Jennifer (1987). Planar phonology and morphology. Ph.D. dissertation. MIT.

Cole, Jennifer and Charles Kisseberth (1994). An optimal domains theory of harmony. *Studies in the Linguistic Sciences* 24: 1–13.

— (1995). Nasal harmony in optimal domains theory. *Proceedings of WECOL* 7: 44–58.

Davis, Stuart (1995). Emphasis spread in Arabic and grounded phonology. *Linguistic Inquiry* 26: 465–98.

Elmedlaoui, Mohamed (1992). Aspects des représentations phonologiques dans certaines langues chamito-semitiques. Thèse de doctorat d'Etat. Université Mohamed V, Rabat.

Flemming, Edward. (1995). Vowels undergo consonant harmony. Paper presented at TREND, UC Berkeley.

Frisch, Stefan, Michael Broe and Janet Pierrehumbert (to appear). Similarity and phonotactics in Arabic. *Natural Language and Linguistic Theory*.

Gafos, Adamantios (Diamandis) (1996). The articulatory basis of locality in phonology. PhD dissertation. The Johns Hopkins University [published 1999, New York: Garland].

— (1998). Eliminating long-distance consonantal spreading. *Natural Language and Linguistic Theory* 16:223–278.

Gafos, Diamandis and Linda Lombardi (1999). Consonant transparency and vowel echo. *Proceedings of NELS* 29: 81–95.

Garad, Abdurahman and Ewald Wagner (1998). *Harari-Studien: Texte mit Übersetzung, grammatischen Skizzen und Glossar*. Wiesbaden: Harrassowitz.

Greenberg, Joseph (1950). The Patterning of Root Morphemes in Semitic. *Word* 6: 162–181.

Halefom, Girma (1988). Palatalization in Harari. Paper presented at the Canadian Linguistic Association, University of Windsor.

Hansson, Gunnar (2001). Theoretical and Typological Issues in Consonant Harmony. Ph.D. Dissertation, University of California, Berkeley.

84   *Sharon Rose*

Hall, T. Alan (1997). *The Phonology of Coronals*. Current Issues in Linguistic Theory 149. Amsterdam: John Benjamins.

Hamilton, Philip (1993). On the internal structure of the coronal node. *Proceedings of ESCOL:* 129–140.

Herbert, Robert (1977). Morphophonological palatalization in Southern Bantu: A reply to segmental fusion. *Studies in African Linguistics* 8: 143–171.

Hetzron, Robert (1977). *The Gunnän-Gurage Languages*. Naples: Istituto Orientale di Napoli.

Homer, Molly (1998). The role of contrast in nasal harmony. Ph.D. dissertation. University of Illinois, Urbana-Champaign.

Hume, Elisabeth (1992). Front vowels, coronal consonants and their interaction in non-linear phonology. Ph.D. dissertation, Cornell University. (published 1994, New York: Garland).

Hyman, Larry (1982). The representation of nasality in Gokana. *The Structure of Phonological Representations* (Part I), H. van der Hulst and N. Smith (eds.), 111–130. Dordrecht: Foris Publications.

— (1995). Nasal consonant harmony at a distance: The case of Yaka. *Studies in African Linguistics* 24: 5–30.

Itô, Junko and Armin Mester (1995). The core–periphery structure of the lexicon. In *University of Massachusetts Occasional Papers in Linguistics 18 – Papers in Optimality Theory*, J. Beckman, L. Walsh-Dickey, S. Urbanczyk (eds.), 181–209. Amherst, MA: GLSA.

Kane, Thomas (1990). *Amharic–English Dictionary*. Wiesbaden: Harrassowitz.

Kaplan, Lawrence (1981). Phonological issues in North Alaskan Inupiaq. Ph.D. dissertation. University of California, San Diego.

Kenstowicz, Michael (1981). Functional explanations in generative phonology. In *Phonology in the 1980s.* Dirk Goyvaerts (ed.), 431–444. Ghent: E.Story-Scientia.

Kenstowicz, Michael and Charles Kisseberth (1979). *Generative Phonology: Description and Theory.*. New York : Academic Press.

Kimenyi, Alexandre (1979). *Studies in Kinyarwanda and Bantu Phonology*. Edmonton: Linguistic Research Inc.

Kiparsky, Paul (2000). Opacity and cyclicity. *The Linguistic Review* 17: 351–367.

Kirchner, Robert (1993). Turkish vowel disharmony in Optimality Theory. Paper presented at the Rutgers Optimality Workshop 1, New Brunswick, NJ.

Kowalski, Tadeusz (1929). *Karaimische Texte im Dialekt von Troki*. Cracow Nakladem Polskiej Akademji Umiejetnosci.

Krämer, Martin (2001). Yucatec Maya vowel alternations – harmony as syntagmatic identity. *Zeitschrift für Sprachwissenschaft* 20 (2): 175–217.

Lahiri, Aditi and V. Evers (1991). Palatalization and coronality. In *The Special Status of Coronals: Internal and External Evidence*, Carole Paradis and Jean-François Prunet (eds.), 79–100, New York: Academic Press.

Lastra, Yolanda (1968). *Cochabamba Quechua Syntax*. The Hague: Mouton.

Leslau, Wolf (1939). Le theme verbal frequentative dand les langues éthiopiennes. *Revue des etudes sémitiques et bablyloniaca* 15–31.

— (1950). *Ethiopic Documents: Gurage*. Viking Fund Publications in Anthropology 14: 11–32.

— (1958). *The Verb in Harari (South Ethiopic)*. University of California Publications in Semitic Philolology Volume 21. Berkeley, CA: University of California Press.

— (1963). *Etymological Dictionary of Harari*. University of California Publications Near Eastern Studies Vol. 1. Berkeley: University of California Press.

Li, Bing (1996). *Tungusic Vowel Harmony: Description and Analysis*. The Hague: Holland Academic Graphics.

MacEachern, Margaret (1997). Laryngeal cooccurrence restrictions. PhD dissertation, UCLA. [Published by Garland, New York, 1999].

McCarthy, John (1979). Formal problems in Semitic phonology and morphology. PhD Dissertation, MIT.

Long-distance vowel-consonant agreement in Harari   85

— (1981). A prosodic theory of nonconcatenative morphology. *Linguistic Inquiry* 12: 373–418.

— (1983). Consonantal morphology in the Chaha verb. *Proceedings of WCCFL* 2: 176–188.

— (1986). OCP Effects: Gemination and Antigemination. *Linguistic Inquiry* 17: 207–263.

— (1996). Some remarks on phonological opacity. *Studies in AfroAsiatic Grammar*, Jacqueline Lecarme, Jean Lowenstamm and Urs Shlonsky (eds.), 215–243, The Hague: Holland Academic Graphics.

— (1997). Process-Specific Constraints in Optimality Theory. *Linguistic Inquiry* 28: 231–51.

— (1999). Sympathy and phonological opacity. *Phonology* 16: 331–399.

— (2002). Comparative markedness [long version]. In *Papers in Optimality Theory II* (University of Massachusetts Occasional Papers in Linguistics 26), Angela C. Carpenter, Andries W. Coetzee, and Paul de Lacy (eds.), 171–246. Amherst, MA: GLSA.

McCarthy, John and Alan Prince (1995). Faithfulness and reduplicative identity. In *University of Massachusetts Occasional Papers in Linguistics 18 - Papers in Optimality Theory*, J. Beckman, L. Walsh-Dickey, S. Urbanczyk (eds.), 225–247. Amherst, MA: GLSA.

— (1999). Faithfulness and identity in prosodic morphology. In *The Prosody Morphology Interface*, René Kager, Harry van der Hulst and Wim Zonneveld (eds.), 218–309, Cambridge: Cambridge University Press.

Mondon-Vidailhet, C. (1902). *La langue harari et les dialectes éthiopiens du Gouraghé*. Paris.

Myers, Scott (1991). Persistent rules. *Linguistic Inquiry* 22: 315–44.

Ní Chiosáin, Maire and Jaye Padgett (1997). Markedness, segment realization, and locality in spreading. Report no. LRC-97–01, Linguistics Research Center, UCSC. ROA-188.

— (2001). Markedness, segment realization, and locality in spreading. In *Segmental Phonology in Optimality Theory*, L. Lombardi (ed.), 118–156. Cambridge: Cambridge University Press.

Ntihirageza, Jeanine (1993). Kirundi palatalization process and sibilant harmony: Implications for feature geometry. M.A. Thesis, Southern Illinois University at Carbondale.

Odden, David. (1980). The irrelevancy of the relevancy condition: Evidence for the feature specification constraint. *Linguistic Analysis* 6: 261–394.

— (1994). Adjacency parameters in phonology. *Language* 70: 289–330.

Orgun, Orhan (1996a). Correspondence and identity constraints in two-level Optimality Theory. *Proceedings of WCCFL* 14: 399–414.

— (1996b). Sign-based phonology and morphology, with special attention to Optimality Theory. Ph.D. dissertation. University of California at Berkeley.

Padgett, Jaye (2002). Feature classes in phonology. *Language* 78: 81–110.

Palmer, F.R. (1956). 'Openness' in Tigre: A problem in prosodic statement. *Bulletin of the School of Oriental and African Studies* 18: 561–577.

Pater, Joe (1999). Austronesian nasal substitution and other NC effects. In *The Prosody Morphology Interface*, Harry van der Hulst, René Kager, and Wim Zonneveld (eds.), 310–343. Cambridge: Cambridge University Press.

Piggott, Glyne (1987). On the autonomy of the feature Nasal. *Papers from the Annual Meeting of the Chicago Linguistic Society 23, Papers from the Parasession on Autosegmental and Metrical Phonology*: 223–238.

— (1997). Licensing and alignment: A conspiracy in harmony. *Phonology* 14: 437–477.

Petros (Banksira), Degif (1996). Sonorant Alternations in Chaha. In *Essays in Gurage Language and Culture*, Grover Hudson (ed.), 153–173. Wiesbaden: Harrassowitz Verlag.

Poser, William (1982). Phonological representations and action-at-a-distance. In *The Structure of Phonological Representations*, Part II, Harry van der Hulst and Norval Smith (eds.), 121–58. Dordrecht: Foris Publications.

Pulleyblank, Doug (1996). Neutral vowels in Optimality Theory: A comparison of Yoruba and Wolof. *Canadian Journal of Linguistics* 41: 295–347.

Raz, Shlomo (1983). *Tigre Grammar and Texts*. Malibu: Undena Publications.

Reh, Mechthild (1996). *Anywa Language*. Cologne: Rüdiger Köppe Verlag.

86   *Sharon Rose*

Ringen, Catherine and Robert Vago (1998). Hungarian vowel harmony in Optimality Theory. *Phonology* 15: 393–416.

Rose, Sharon (1994). Palatalization, underspecification and plane conflation in Chaha. *Proceedings of WCCFL* 12: 101–116.

— (1996). Variable laryngeals and vowel lowering. *Phonology* 13 (1): 73–117.

— (1997a). Featural morphology and dialect variation: The contribution of historical change. In *Variation, Change and Phonological Theory*. Current Issues in Linguistic Theory 146, Frans Hinskens, Roeland van Hout and Leo Wetzels (eds.), 235–272. Amsterdam: John Benjamins,.

— (1997b). Theoretical issues in comparative Ethio-Semitic phonology and morphology. Ph.D. dissertation. McGill University.

— (2000). Rethinking geminates, long-distance geminates and the OCP. *Linguistic Inquiry* 31: 85–122.

Rose, Sharon and Rachel Walker (2001). A typology of consonant agreement at a distance. Ms. University of California, San Diego and University of Southern California. ROA-458.

Rubach, Jerzy (2000). Backness switch in Russian. *Phonology* 17: 39–64.

Rubach, Jerzy and Geert Booij (2001). Allomorphy in Optimality Theory: Polish iotation. *Language* 77: 26–60.

Shahin, Kimary (2002). *Post-Velar Harmony*. Amsterdam studies in the theory and history of linguistic science. Series IV, Current issues in linguistic theory 225. Amsterdam: John Benjamins.

Shaw, Patricia (1991). Consonant harmony systems: The special status of coronal harmony. In *The Special Status of Coronals: Internal and External Evidence*, Carole Paradis and Jean-François Prunet (eds.), 125–157, New York: Academic Press.

Spaelti, Phillip (1997). Dimensions of variation in multi-pattern reduplication. Ph.D. dissertation, University of California, Santa Cruz.

Steriade, Donca (1987). Locality conditions and feature geometry. *Proceedings of NELS* 17: 595–618.

Struijke, Caro (2000). Existential faithfulness. A study of reduplicative TETU, feature movement and dissimilation. Ph.D. Dissertation. University of Maryland [Published 2002, New York: Routledge].

Suzuki, Keiichiro (1998). A typological investigation of dissimilation. Ph.D. Dissertation, University of Arizona.

Ternes, Elmar (1973). *The Phonemic Analysis of Scottish Gaelic*. (Forum Phoneticum 1) Hamburg: Helmut Buske Verlag.

Urbancyzk, Suzanne (1996). Patterns of reduplication in Lushootseed. Ph.D dissertation. University of Massachusetts, Amherst. [Published 2001, New York: Garland].

Ussishkin, Adam (1999). The inadequacy of the consonantal root: Modern Hebrew denominal verbs and output-output correspondence. *Phonology* 16: 401–442.

Vaux, Bert (1999). Does consonant harmony exist? Paper presented at the Annual Meeting of the Linguistic Society of America, Chicago, IL.

Voigt, Rainer (1988). Labialization and the so-called sibilant anomaly in Tigrinya. *Bulletin of the School of Oriental and African Studies* 60 (3): 525–536.

Wagner, Ewald (1983). *Harari-Texte in arabischer Schrift: mit Übersetzung und Kommentar*. Wiesbaden: F. Steiner Verlag.

— (1997). Harari. In *The Semitic Languages*, Robert Hetzron (ed.), 486–508. London and New York: Routledge.

Walker, Rachel (1998). *Nasalization, Neutral Segments and Opacity Effects*. Ph.D. Dissertation, University of California, Santa Cruz (published 2000, New York: Garland).

— (2000a). Long-distance consonantal identity effects. *Proceedings of WCCFL* 19: 532–545.

— (2000b). Yaka nasal harmony: Spreading or segmental correspondence? *Proceedings of BLS* 26: 321–332.

Williamson, Kay. (1965). *A Grammar of the Kolokuma Dialect of Ijo*. Cambridge: Cambridge University Press.
— (1969). Ijo. In *Twelve Nigerian Languages*. Elizabeth Dunstan (ed.), 85–96. New York: Africana Publishing Corp.
— (1987). Nasality in Ijo. In *Current Approaches to African Linguistics*, Vol. 4, David Odden (ed.), 397–415. Dordrecht: Foris.
Zoll, Cheryl (1996). Parsing below the segment in a constraint-based framework. Ph.D dissertation. University of California, Berkeley. [published 1998 by CSLI, Stanford].
Zuraw, Kie Ross (2000). Exceptions and regularities in phonology. Ph.D. Dissertation, UCLA.