PROCEEDINGS OF THE TWENTY-SEVENTH ANNUAL MEETING OF THE
BERKELEY LINGUISTICS SOCIETY
March 22-25, 2001

SPECIAL SESSION
ON
AFROASIATIC LANGUAGES

Edited by
Andrew Simpson

Berkeley Linguistics Society
Berkeley, California, USA
Segmental effects on (de)gemination in Western Gurage

TODD O'BRYAN and SHARON ROSE
University of California, San Diego

0. Introduction
There is a curious interplay between the nature of the final root consonant and a voicing alternation of the preceding consonant in some Western Gurage¹ (South Ethiopian Semitic) dialects. In some verbs, the penultimate root consonant is voiceless in the perfective, but voiced in the imperative (1a). Yet in other verbs, there is no alternation (1b). Examples are from Chaha, and are given in the 3rd person masculine singular form.

(1) Perfective Imperfective
a. sataṭ-a-m ji-sadīb 'curse'
b. gaḍaf-a-m ji-gadif 'break the fast'

Banksira (2000) established that the devoicing of the penultimate root consonant in the perfective of verbs such as (1a) is dependent on the final root consonant. He proposed that final consonants unspecified for laryngeal features condition loss of voicing in the penultimate consonant. In this paper, we argue that this account is untenable for other Western Gurage dialects, Inor, Gyeto and Endegeñ. Instead, we provide a historical account that relies on the phonetic duration of the final consonant. Specifically, the penultimate consonant in question was historically a geminate which degeminated, but degemination was blocked if the final root consonant had short phonetic duration, as in (1a). Remaining geminates were devoiced and then simplified, giving rise to the voicing alternation. This is a surprising and important result, as degemination has the hallmarks of a phonological effect, but yet it is constrained by phonetic detail.

1. Chaha Data
We begin in (2) by illustrating the pattern in Chaha, the best-described dialect (Banksira 2000). Penultimate obstruents alternate between voiced and voiceless.

¹ The Western Gurage dialects are spoken approximately 180 kilometers southwest of Addis Ababa. Western Gurage includes the dialects Chaha, Inor, Ezha, Gyeto and Endegeñ; Masqan and Muher are also sometimes classified within the Western Gurage group (Leslau 1969).
In Type A’ triliteral verbs, the perfective penult is voiceless whereas the imperfective and jussive penult are voiced obstructions (2a-d). In quadrilaterals, the perfective and imperfective penult is voiceless, whereas the jussive penult is voiced (2e-f).

Unlike the verbs in (2), some verbs have a consistent voiced obstruent throughout the paradigm (3a-b). In addition, voiceless obstructions and sonorants do not alternate (3c-d).

The non-alternating verbs are not a set of lexical exceptions, as previously assumed (Leslau 1979, McCarthy 1986). The pattern first noticed by Banksira (2000) is that if the final root segment is a sonorant or [t], the penult in the perfective (and the imperfective if the verb is quadrilateral) is devoiced if obstruent. If the final root segment is a fricative, ejective or voiced stop, there is no alternation. Penultimate voiceless obstructions are unaffected and penultimate sonorants remain voiced. The main pattern is summarized below. The jussive penult provides the clue as to whether the root has a voiced obstruent or not.

Before trying to make sense of the peculiar segment classes shown in (4) for the final root segment, we discuss the historical motivation for the alternations: templatic gemination of the positions where devoicing occurs.

2. The Historical Motivation

It is uncontroversial that penultimate devoicing in Chaha affects consonants that were historically geminate (Lelaslau 1948). Western Gurage dialects divide into three groups with respect to gemination: Ezha, Masqan and Muher show gemination. Endegenen also has gemination, but its geminate obstructions are devoiced, and Chaha, Gyeto and Inor have no gemination, but like Endegenen have a devoiced obstruent in the penultimate position. The cognate root ‘curse’ is illustrated below across four of the dialects. The Endegenen data are taken from Lelaslau (1976, 1978, 1979) and the Inor data from Chamora (1997). Ezha and Chaha data are from our own field notes or Leslau (1967) and Banksira (2000).

As discussed in Ohala & Riordan (1979), maintaining vocal fold vibration during a prolonged constriction is articulatorily difficult, so geminate obstructions have a tendency to devoice. Based on this tendency, we surmise that Ezha represents the historical form, and that in Endegenen, Chaha, Gyeto and Inor, devoicing of the penult geminate occurred. In the latter three dialects this geminate was ultimately simplified. This is outlined in (6), and forms the first part of our analysis. The three stages correspond to attested modern dialects.

3. Part 1 of analysis:

Historical form *sdaddβ (= current Ezha)
Geminant devoicing sottaβ (= current Endegenen)
Degemination sotaβ (= current Chaha, Gyeto, Inor)

Such a scenario is uncontroversially assumed by most researchers working on Gurage. They differ in whether geminants are assumed synchronically in the underlying representation and then simplified on the surface (e.g. Lowenstamm

---

2 [β] is actually a sonorant in Chaha, a fact convincingly argued by Banksira (2000), but alternates with obstruent [p].
3 Type A is a lexical conjugation class and the least phonologically opaque of the verb types in Chaha. See Banksira (2000) for details.
4 There is only one verb mesaxam 'chew, ruminate' that seems to condition devoicing. It has no alternations in the paradigm, but related dialects show a voiced penult [z]: ex. Ezha mazzaxam.
5 The classification of Masqan and Muher as Western Gurage is controversial. See Leslau (1969) and Hetzron (1972, 1977). For this reason, we will concentrate on Ezha as the 'geminating' dialect for the remainder of the paper.
3. **Segmental effects of final root consonant—synchronous licensing of [voice]**

We now return to the question of why the peculiar sets of final consonants in (4) should affect devoicing of the penult. Banksira (2000) proposes that the final consonant has a *direct* connection to devoicing. In his account, the laryngeal specification of the final segment affects the licensing of the feature [voice] on the penult geminate. Let us consider again the set of final consonants and their division into classes which trigger or do not trigger penultimate devoicing.

(7) **Chaha final consonant classes**

<table>
<thead>
<tr>
<th>Non-Trigger Class</th>
<th>Trigger Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>[t’ k’ f s z d g]</td>
<td>[r \beta m \text{j a t}] ((a) &lt; ^*? h h ?))6</td>
</tr>
</tbody>
</table>

Banksira (2000) adopts privative phonological features with underspecification. Given his model, segments in the Non-Trigger Class have laryngeal specification. Ejectives are [constricted glottis], voiceless fricatives are specified with [spread glottis] (a view supported by Vaux (1998) for other languages), and voiced obstruents are specified [voice]. In contrast, the segments in the Trigger Class are laryngeally unspecified segments. Sonorants lack a [voice] specification. Banksira argues that \([k]\) is underlyingly /x/ and draws no firm conclusions about its status in the group. This leaves /t/ as the only other obstruent lacking a voicing specification.

The relationship between the laryngeal specification of the final root segment and the penultimate geminate is expressed with a constraint: 'No Doubly Linked Final [voice]' (Banksira 2000:77), where 'final' corresponds to the rightmost specification in the stem. If the consonant to the right of the geminate has Laryngeal specification, no devoicing occurs, as shown in (8) for two verbs.

(8) **Non-Trigger Class**

<table>
<thead>
<tr>
<th>(n a z z \ a k’)</th>
<th>(\rightarrow) <strong>nazzak’</strong></th>
</tr>
</thead>
</table>

\(V\) |

Lar  Lar |

\([\text{voice}] [\text{sg}]\)

Banksira assumes that there are underlying geminates in modern-day Chaha, but that they are simplified on the surface, as shown in the sample derivation in (9).

---

*The segment \([a]\) occurs in verbs whose final root consonant was a guttural, one of the set /h h ?/.

In Inor, Endegne, and Gyeto, the /?/ is still found.
the verb 'jump' is a member of the Trigger Class and triggers devoeing in Endegēn, Inor and Chaha. The final [d] in the verb 'touch' causes devoeing in Endegēn and Inor (where it is a Trigger), but not in Chaha (where it is a Non-Trigger).

A further point to note is that in Endegēn, the devoiced penult is geminate, whereas the voiced penult is singleton. In fact, there is a strong predictive relationship between gemination and the two Classes identified in (10), irrespective of devoicing. If the final consonant is a member of the Non-Trigger class, the penult is singleton, but if the final consonant is a member of the Trigger class, the penult is geminate. This is shown in (12) with penults that do not devoe. The final consonants [k’ t] are members of the Non-Trigger Class and co-occur with singleton penults (12a), whereas the final consonants [r’ t] are members of the Trigger Class and co-occur with geminates (12b):

(12) a. Non-Trigger Class - singleton penult
   nat’ak’o  'snatch away'
   k’ənaf’o  'hit with a stick'

   b. Trigger Class - geminate penult
   gaffar’o  'release'
   sennaf’o  'steal'

Problematic for the laryngeal licensing analysis is the fact that two [constricted glottis] segments, [k’] and [t] occur in different classes. More importantly, given that laryngeal licensing pertains only to devoicing, the relationship between the final consonants and the presence of penultimate gemination would have to be treated separately. We contend, however, that they are crucially connected.

While there is no set of phonological features that cleanly distinguish the Trigger and Non-Trigger classes, the two groups do form natural phonetic classes in terms of their duration. As laboratory measurements bear out, the segments in the Non-Trigger Class are all longer than those in the Trigger Class. We propose that, rather than affecting devoicing directly as argued by Banksira (2000), the final consonant influenced the preservation or loss of penultimate gemination. Indeed, Leslau (1976) observes that gemination in Endegēn as shown in (12) is 'phonetically conditioned' and remarks on the short duration of [r] in this respect. The penult degeminated in verbs with relatively longer final segments, but if the final segment was short, gemination (basically increased duration of a segment) was maintained to avoid compromising some minimal duration constraint on the stem. Voiced obstruct geminates were subsequently devoiced, and eventually simplified in Inor, Gyetu and Chaha.

Evidence from Ezha supports the contention that duration of the final consonant can condition gemination of the penult. In a form that is unique in Semitic, Ezha jussives typically have a geminated penult if the final consonant is [r] (Leslau 1967), as shown in (13) with Chaha jussive forms for reference.

(13) Ezha                              Chaha
    a. ja-flikk’ær                  ja-fk’ær  'be fat'
    b. ja-miggar                   ja-mggar  'suppurate'
    cf. c. ja-nfás                  ja-nfás  'blow (wind)'

We note that [r] is the shortest consonant in the language, and that the presence of final [r] seems to evoke gemination of the penultimate consonant, an alternation without historical precedent. This shows that the final consonant can condition the presence of gemination, even without regard to whether the resulting geminate is ever devoiced. This is precisely what we are arguing for in the other dialects.

Let us now consider the exact duration of Trigger and Non-Trigger segments obtained through phonetic measurement. We recorded a 30-year-old male speaker of Chaha using a Sony professional tape recorder. A wordlist of third-person masculine singular perfective verb forms was constructed. This form has the shape CaCa- with final suffixes -am, (e.g., [kaʃoʃam]). The target final consonant was in intervocalic position as the onset of an unstressed syllable, and we obtained three tokens of each consonant. Sonorants and fricatives were measured from the loss of vowel forms until their return after the segments. Two measurements were taken for stops corresponding to the closure period and the burst. These were added together to obtain the overall measurement. This is crucial, since it distinguishes ejectives from regular voiceless stops. Although the latter have some degree of aspiration, the ejective burst is significantly longer.

The average duration results are presented in table (14).8

---

8 There are two ways of interpreting degemination. One possibility is that a constraint against two long segments (a geminate and a long consonant) triggered degemination. Constraints on two geminates in a word have been reported for Latin and Japanese (Hō & Mester 1998, Suzuki 1998).
Western Gurage dialects have a tendency for laryngeal agreement; a requirement that (primarily adjacent) coronal and velar stops in a root match for laryngeal features (Leslau 1979; Banksira 2000, Rose & Walker 2000). As shown in (16), cognate words in the related language Amharic with a mix of ejectives and voiced stops agree in laryngeal specification in Chaha. This pattern of laryngeal agreement was leftward—the laryngeal specification ([constricted glottis] or [voice]) of the rightmost consonant caused the consonant to the left to match.

(16) Amharic | Chaha
---|---
k'ida | gida 'draw liquid!'
mìt'ad | midad 'griddle'
dik'ak' | t'ik'ak' 'be crushed, be ground!'

There is no evidence among cognate examples that voiceless segments trigger agreement. In fact, penults which are in fact devoiced do not in turn trigger devoicing of a voiced consonant to their left, e.g., the root /gdr/ is jipdir in the imperfective and gataram in the perfective. This result is consistent with the view in Lombardi (1995) and others that laryngeal features are privative, so that voiceless consonants cannot trigger agreement in the consonant to their left (since they have no laryngeal features to agree with), but they may receive a [voice] specification through assimilation or distance agreement.

Our proposal is that verbs with final [d ɹ] maintained gemination in Chaha, just as in all the other dialects. However, because of laryngeal agreement, the geminates could not be devoiced in Chaha. The requirement for the penult to agree in laryngeal features with the final consonant outweighed the pressure for the geminate to devoice in Chaha, whereas in the other dialects, the laryngeal agreement was ignored in favor of devoicing. In an Optimality Theoretic grammar, this could be modeled as alternate ranking between two constraints. When all the geminates were simplified to singletons, only penults before [d ɹ] maintained voicing in Chaha in spite of previous gemination. This gives the appearance that they are members of the class that allowed previous degemination in Chaha. This historical derivation is illustrated in (17).

(17) Part 3 of analysis

<table>
<thead>
<tr>
<th>Historical form</th>
<th>Endegeh</th>
<th>Inor, Gyeto</th>
<th>Chaha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degemination 1</td>
<td>*naggad</td>
<td>*naggad</td>
<td>*naggadom</td>
</tr>
<tr>
<td>Geminate Devoicing</td>
<td>nakkad</td>
<td>nakkad</td>
<td>blocked by laryngeal agreement</td>
</tr>
<tr>
<td>Degemination 2</td>
<td>—</td>
<td>nakkad</td>
<td>naggadom</td>
</tr>
</tbody>
</table>

5. What about [d ɹ] in Chaha?

Even though they are relatively short, the segments [d ɹ] appear to belong to the Non-Trigger Class in Chaha. In the other dialects, they are clearly in the Trigger Class (compare the cognates for 'touch' from (11) nakkad-a in Endegeh, nakad-a in Inor, but nagad-a-m in Chaha.) We hypothesize that the difference between the dialects is no: a difference of the class into which [d ɹ] fall, but rather whether or not the geminates which remained before [d ɹ] could be devoiced.
6. Additional considerations

6.1 Why two rounds of degemination?

Perhaps the first criticism that could be leveled at our analysis is that it relies on two distinct rounds of degemination, one of which is sensitive to the duration of the final root consonant, and another which applies across the board. However, the first context-sensitive round of degemination is clearly required for the dialect Endegeñ, so that verbs with short final consonants maintain surface gemination and verbs with long final consonants do not. Given that Endegeñ requires an episode of degemination which is sensitive to the duration of final consonants, and that this duration-sensitive degemination explains the voicing alternations in the other dialects, the principle of economy argues for the inclusion of this episode of degemination in all dialects, and a second round of across-the-board degemination in those dialects which lack surface geminates, as a means of paradigm leveling.

6.2 Why assume that the Trigger Class verbs ever had a geminate?

A second possible criticism involves our conclusion that all penults were historically geminate, even those which show no surface alternation which would suggest historical gemination (the forms which under our analysis underwent the first round of degemination). This conclusion is based on two arguments. The first, which we have already mentioned, is that all penults are geminate in related dialects which maintain surface gemination without alternations. Admittedly, this argument relies on data from related dialects and nothing internal to the dialects we are treating. The second argument is more compelling. There is a systematic alternation between the continuants [b x r] and the stops [b x n] with the stops appearing in the penult of the perfective, and the continuants elsewhere. This alternation is illustrated in (18) for Chaha.

<table>
<thead>
<tr>
<th>Root</th>
<th>Perfective</th>
<th>Imperfective</th>
<th>Jussive</th>
</tr>
</thead>
<tbody>
<tr>
<td>/t'bps/</td>
<td>t'abs-o-m</td>
<td>ji-t'_bp</td>
<td>jo-t'bp</td>
</tr>
<tr>
<td>/mk:/</td>
<td>mako-o-m</td>
<td>ji-moxir</td>
<td>jo-mxir</td>
</tr>
<tr>
<td>/k'nl/</td>
<td>k'onofo-o-m</td>
<td>ji-k'orf</td>
<td>jo-k'irf</td>
</tr>
</tbody>
</table>

We view this alternation as another example of the well-established resistance by geminates to lenition, as discussed in Kirchner (2000). Given that these forms were historically geminate, the stops can be explained as the historical residue of geminate-blocked lenition. Without historical gemination, there is no explanation for the stops in this location. Note that this stop alternation affects verbs even if they do not (as in 18a) also undergo devoicing.

7. Conclusion

In conclusion, we have shown that the loss or retention of templatic gemination of the penultimate root consonant in some Western Gurage dialects (Chaha, Gyeto, Inor, Endegeñ) was originally conditioned by the final root segment. Short segments (sonorants and stops) disfavored degemination, while longer segments (fricatives and ejectives) allowed it. Subsequently, geminates were devoiced and geminates were later simplified to singletons in Chaha, Gyeto, and Inor. In contrast to the other dialects, Chaha did not devoice geminates in verbs with final root voiced stops due to the overriding effect of laryngeal agreement, an independently motivated construct.

On both theoretical and empirical grounds, our diachronic account should be preferred to the laryngeal licensing account which Banksira (2000) proposes for the synchronic grammar of Chaha. First, all aspects of our account are independently motivated, in contrast to Banksira’s constraint ‘No Doubly Linked Final [voice]’, which is tailor-made for the alternation in question. Second, unlike Banksira’s our diachronic approach can account for all four dialects.

Finally, there are a number of questions which we have not attempted to resolve and which remain for future inquiry. First, as we have been careful to couch our account in diachronic terms, there is a very real question about what the synchronic grammar of these languages must look like, and how much of the history should be included in the synchronic grammar. Perhaps as importantly, there remains a fundamental theoretical question about the relationship of this phonetic duration effect to the morphophonology. It calls into question the intrinsic connection between moras and phonetic duration that has been advocated for other languages (e.g. Hubbard 1994, Broselow et al 1997). Finally, we have yet to explore whether the duration interplay we have identified is related to the templatic nature of the languages involved.

References


---

7 Like many generalizations in these languages, this is an oversimplification. The stops appear in other places as well, as a result of a number of interacting constraints. See Banksira (2000) for a complete account.
The Vocalism of Strong Verbs in Afar

PIERRE RUCART
Université Denis Diderot – Paris VII

1. Introduction
Afar is a Cushitic language spoken in the Horn of Africa. In this study, I aim to show that Afar strong verbs have specific structural characteristics that account for their particular conjugation. The examination of their vocalism reveals a correlation between the structure of strong verbs and their lexical vowel. The behaviour of long vowels in closed syllables leads me to propose a specific status for such vowels. This hypothesis allows us to account for their behaviour and unify the strong verbal class into a unique template. All the surface patterns and their vocalism can be derived from this template according to the nature of the root. The relationship between structure and vocalism is a crucial point in my analysis.

This work follows the theory of Generative Phonology with the CV/CV option (cf. Kaye et al. 1990, Lowenstamm 1996) that reduces the syllabic constituency to a strict succession of onsets and nuclei, respectively linked to consonantal segments and vocal segments. I use the Theory of Elements (cf. Kaye et al. 1985) to represent vowels: a vowel corresponds to an expression in Elements that are the final constituents distributed on autosegmental lines.

2. Characterization of Strong Verbs
Two different types of conjugation exist in Afar (following Hayward 1978, Bliese 1981, Parker and Hayward 1985). On the one hand, the predominant verbal class consists of weak verbs. It exclusively uses suffixes as shown in the following examples (throughout the text, examples are spelled as in Parker and Hayward 1985, that is the A.P.I., except: y<>palatal glide, x<>voiced post-alveolar retroflex occlusive, c<>voiceless pharyngeal fricative and g<>voiced pharyngeal fricative):

(1) Perfect 1s: fak-e ‘I opened’
   Perfect 2s: fak-t-e ‘you opened’
   Imperfect 1s: fak-a ‘I open’
   Imperfect 2s: fak-t-a ‘you open’