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Palatalization and labialization in the Chadic languages of Chad

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Abstract

This paper[1] examines verb data from five Chadic languages of Chad, in order to show the extent to which the prosodies of labialization (LAB) and palatalization (PAL) are relevant to the synchronic analysis of their phonologies. Previous studies have established the synchronic functioning of prosodies in Chadic languages of the Central branch, but not for other branches of the family. Of the languages considered in this paper, one (Heɗe) is from the Masa branch, the other four from the Eastern branch: Somrai, Gabri, and Kabalay from the Chari-Logone subbranch, and Mawa from the Guéra subbranch. In Heɗe and Somrai, the vowel system can be reduced to a single underlying /a/, similar to the analysis claimed for many Central Chadic languages. Epenthetic [ɨ] is added to separate between consonants, and the distinctive prosodic features of LAB and PAL blanket whole words, creating a full set of surface vowels. A consequence of such a system is that high vowels like [ɨ] are marginal, while only the nonhigh vowel /a/ is fully phonemic. Gabri displays these characteristics, but to quite a lesser degree; in this language, PAL also seems to play a limited morphological role. The vowel system of Kabalay again shows a dichotomy in behavior between high and nonhigh vowels, but there is only a hint that prosodies are relevant. Mawa clearly shows that the vowel /a/ can be affected by LAB and PAL, but these prosodies do not interact with the seven other phonemic vowels. The article concludes by suggesting that the LAB and PAL prosodies must have functioned in Proto-Chadic, although they have been lost to differing degrees in individual languages in the Chadic languages of Chad.

Keywords: East Chadic, Chad, prosodies, labialization, palatalization

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1 This article is a revised version of the paper presented at the 4th Biennial International Colloquium on the Chadic Languages, Bayreuth, October 2007, entitled "Palatalization and Labialization in Eastern Chadic verbs."

1 Introduction

Chadic languages have a number of original features of interest to phonologists on both a descriptive and theoretical level. Perhaps the most intriguing phonological phenomenon concerns the suprasegmental features of palatalization and labialization. These two prosodies are especially prominent in the Central branch of Chadic, and their functioning has been described in a number of papers, e.g. Barreteau 1987, Roberts 2001, Wolff 2003, 2023. This phonological phenomenon is included in Schuh's (2017) massive Chadic compendium; in addition, he surveys the use of these prosodies with a morphological function. Schuh himself had described the morphological function of palatalization in West Chadic languages (Schuh 2002). But to my knowledge there are no clear references to these prosodies functioning in languages of the Eastern or Masa branches of the Chadic family. The burden of this paper is to demonstrate that prosodies are indeed relevant to the phonologies and morphologies of a number of Chadic languages in Chad. Admittedly, the prosodies are not of universal relevance in the Eastern or Masa branches, as they are in the Central branch. Nonetheless, I will look briefly at five languages and the synchronic evidence they contain for the functioning of palatalization (PAL) and labialization (LAB) as suprasegmental prosodies within their phonological systems. These prosodies are distinctive elements of the phonology, suprasegmental features which characterize whole words. Their effect is always seen in the vowels, but they may affect certain consonants as well. I conclude by considering the implications for our understanding of Proto-Chadic and the nature of its phonological system.

The data used in this paper will be limited to the verbs of these languages. But why verbs? In my experience, the morphology and phonology of verbs in Eastern Chadic languages is very tightly constrained and usually almost completely regular. Verbs borrowed from another language will be made to fit the phonological constraints imposed by the language. The same is not true of nouns, whose structures are much more disparate and open to diverse influences. As a result, any important patterns in the language are likely to be more clearly seen in the verbal system than anywhere else. Chadic verbs are all constructed from a certain number of consonants (up to as

many as six) and no more than one vowel (see Frajzyngier 1983: 125). It should be noted that monoconsonantal verbs do display some peculiarities: this was the theme of an earlier Chadic colloquium (Jungraithmayr & Tourneux 1990). Apart from exceptional cases such as these, all verbs of these languages adhere to a single set of principles, which are specific to the given language.[2]

For the purposes of this paper, I have chosen five languages of Chad that show evidence of PAL and LAB operating to varying degrees. One language is taken from the Masa branch, and the others are Eastern Chadic: of these, three are from the Chari-Logone subgroup, and the last one is from the Guéra subgroup.

The first language is Heɗe (ISO [hed]), a language of the Masa branch. The verb data on this language comes from Vaïbra (2003), who focuses on the phonology and morphology of the verbal system; he uses a corpus of 445 verbs. The next three languages are from the Chari-Logone subgroup of Eastern Chadic (Group A in Newman's (1977) classification of East Chadic): Somrai, Gabri, and Kabalay. For Somrai (ISO [sor]), SIL linguist Thomas Deusch collected and verified 260 verbs for use in a sketch of the phonological system of the language (Deusch 2007); a full analysis of prosodies in the Somrai verbal system is detailed in Roberts 2012. The Kabalay (ISO [kvf]) data come from a corpus of 320 verbs collected and treated more fully in a mémoire describing the verbal system of that language (Selgué 2005). For Gabri (ISO [gab]), I rely on the data collected by two native speakers collected over a period of several years, and produced in manuscript form as Kaïndi, Roberts & Samane 2000. This lexicon includes 802 basic verbs, not including derived verbs. It should be noted that this is the Darbé variety of (southern) Gabri, which is somewhat different from northern Gabri (ISO [tng]), properly called Tobanga and treated in Caprile 1978. Finally, Mawa (ISO [mcw]) represents the Guéra subgroup of Eastern Chadic. The corpus of 361 verbs was collected and checked by myself in the village of Mahoua with native speakers Youssouf Hissène and his father Hissène Abdoullaye; the essence of the Mawa analysis is presented in Roberts 2009. The sources of data for each language is summarized in Table 1.

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2   I have not found synchronic evidence of verb classes defined by the final vowel and tone in Eastern Chadic, as claimed by Newman (1975) at least for the Western branch.

Table 1. Languages and sources of data

Language	Source	Corpus
Heɗe	Vaïbra 2003	445 verbs
Somrai	Deusch 2007, Roberts 2005	260 verbs
Gabri	Kaïndi, Roberts & Samane 2000	802 verbs
Kabalay	Selgue 2005	320 verbs
Mawa	Roberts 2009	361 verbs

2 Heɗe

I start with Heɗe (ISO [hed]), one of the languages of the Zime cluster, belonging to the Masa branch and spoken in the area around the town of Pala.[3] As far as prosodies are concerned, this language behaves very much like the Central Chadic languages spoken across the border in Cameroon, so my presentation of this language will serve to illustrate how a language with fully functioning prosodies operates. I will not present arguments for the prosodic approach here; the aforementioned sources (Barreteau 1987, Roberts 2001, and Wolff 2003, 2023) develop this analysis in detail, and show why it is the most appropriate treatment of the phonology of Central Chadic languages. I will simply show here how the approach is applied to Heɗe.

Heɗe has six surface vowels which divide into two groups: the high vowels [i, ɨ, u] and the nonhigh vowels [e, a, o]. The vowel [ɨ] has a very limited distribution, especially in the verbal system. It is never the only vowel in a word; furthermore, it only occurs in a light syllable followed by a syllable containing [a]. It is best treated as an epenthetic vowel that is inserted when certain conditions are met. Consider now the following verbs, taken from Vaïbra 2003, shown in their base form (which is used both as verbal noun and as a finite incompletive form),[4] presented in Table 2:

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3 The vùn dzìpàw variety described by Sachnine (1982) is considered to be a dialect of this language.

4 Transcriptions in this article follow IPA conventions, with an exception common to Africanists: [y] represents the palatal glide, and [j] the palatal plosive/affricate.

Table 2. Heɗe verbs sorted according to root vowel and root structure

V	CV	CVC	CVCV	CVCVC
a	pà 'love'	ɬàt 'shake'	sīdā 'grow'	kìràk 'trim'
e	vè 'take'	kēɓ 'look for'	dīdē 'get wet'	dīɲèr 'balance'
i	tī 'eat'	sīn 'send'	wīlī 'shine'	tīwīr 'turn'
o	ŋgō 'control'	kòl 'wait for'	pūnō 'eat'	hūrōk 'scratch'
u	ɓū 'trick'	cùm 'stretch'	hūtū 'grind'	tūpūr 'round off'

In this system, the vowel /a/ can be considered the only underlying vowel, if we admit of the two distinctive word-level prosodies of palatalization and labialization. The surface vowel [e] is seen as the prosody of palatalization realized on the vowel /a/, and [o] is treated as that same underlying /a/ when subjected to labialization. The situation is parallel among the high vowels: the surface vowel [i] is the realization of palatalization on the (otherwise epenthetic) "zero vowel" [ɨ], and [u] is the realization of labialization on that same vowel.[5] Along these lines, the underlying structure of the Heɗe verbs of Table 2 (apart from tone) can be represented as shown in Table 3. In this table, and in the rest of this article, I will use autosegmental representations to highlight the suprasegmental nature of PAL and LAB by according to these features a tier of their own, because they behave independently of the consonants and vowels. This practice is a logical extension of the insights of John Goldsmith and others (see Leben 2018), an approach which has even been exploited in treatments of Afroasiatic morphology (McCarthy 1981). For reasons of economy, I place all segments (consonants and vowels) on the same tier. The ∅ represents the absence of an underlying vowel; it will be filled by the insertion of the default vowel [ɨ]. When prosodies are also present, they attach to these two vowels to produce all of the surface vowels found in the data.

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5 Note again the phonological weakness of the vowel [ɨ]: it must always appear in conjunction with another phonological element – either with one of the prosodies of palatalization or labialization, or else with the vowel /a/ in a separate syllable.

Table 3. Underlying structure of Heɗe verbs

CV	CVC	CVCV	CVCVC
pà pa 'love'	*ɬàt* ɬat 'shake'	*sīdā* sØɗa 'grow'	*kìràk* kØrak 'trim'
PAL | *vè* va 'take'	PAL | *kēɓ* kaɓ 'look for'	PAL ∧ *dīdē* dØɗa 'get wet'	PAL ∧ *dìnèr* dØɲar 'balance'
PAL | *tī* tØ 'eat'	PAL | *sīn* sØn 'send'	PAL ∧ *wīlī* wØlØ 'shine'	PAL ∧ *tīwīr* tØwØr 'turn'
LAB | *ŋgō* ŋga 'control'	LAB | *kòl* kal 'wait for'	LAB ∧ *pūnō* pØna 'eat'	LAB ∧ *hūrōk* hØrak 'scratch'
LAB | *ɓū* ɓØ 'trick'	LAB | *cùm* cØm 'stretch'	LAB ∧ *hūtū* hØtØ 'grind'	LAB ∧ *tūpūr* tØpØr 'round off'

In dissyllabic verbs (structure CVCV and CVCVC), it will be noted that the vowel of the first syllable is always high, and agrees in backness and roundness with the vowel of the second syllable: [i] with the front vowel [e], [ɨ] with the central [a], and [u] with the round [o].

The effect of these prosodies is not just limited to an individual vowel or syllable, but rather is applied to the word as a whole. This fact explains the vowel agreement phenomena alluded to earlier, and is confirmed when we consider the result of suffixing the object pronouns -*an* (1SG) and -*m* (3SG.M). Table 4 displays the results of adding these suffixes to verb roots of shape CVC.

Table 4. Suffixation of *-an* (1SG) and *-m* (3SG.M) onto CVC verbs

Root V	CVC	Gloss	CVC + *-an*	CVC + *-m*
a	ɬàt	'shake'	ɬɨ̀tàn	ɬɨ̀tɨ̀m
e	kēɓ	'look for'	kīɓēn	kīɓīm
i	sīn	'send'	sīnēn	sīnīm
o	kòl	'wait for'	kùlòn	kùlùm
u	cùm	'stretch'	cùmòn	cùmùm

In the suffixed forms, the vowel of the root is deleted as a consequence of the morphological process of suffixation. Then the epenthetic zero vowel [ɨ] is inserted to separate the two consonants that have come into contact.[6] The shape of the suffix is not changed during affixation, although an additional [ɨ] will be inserted to separate the [m] of the 3SG.M suffix from the final consonant of the root. Note that if the verb root has a prosody, the prosody remains, and extends to affect the suffix as well as any epenthetic vowels, so that the whole word is covered by that prosody. The autosegmental representations of Figure 1 illustrate the process for the forms of *kēɓ* 'look for' and *cùm* 'stretch' (taken from Table 4).
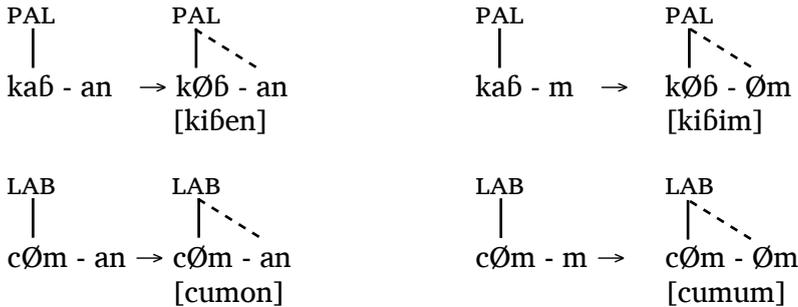
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PAL          PAL               PAL          PAL
 |            |⌐·.               |            |⌐·.
kaɓ - an  → kØɓ - an          kaɓ - m   → kØɓ - Øm
             [kiɓen]                        [kiɓim]

LAB          LAB               LAB          LAB
 |            |⌐·.               |            |⌐·.
cØm - an → cØm - an            cØm - m  →  cØm - Øm
             [cumon]                        [cumum]
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Figure 1. Effect of prosodies in inflected verbal forms of Heɗe

The consequence is that a prosody always applies to the word in its entirety, and not just the root.[7]

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  6 This description evokes the principles of Lexical Phonology, following Mohanan 1986. The deletion rule is a lexical rule triggered by morphological affixation; and the insertion of [ɨ] is undoubtedly a postlexical rule.

  7 It should also be noted that in the inflected forms, there is neutralization of the vowel patterns for verbs with either [e] or [i] as root vowel, and also for verbs with either [o] or [u] as root vowel.

3 Somrai

The second language is Somrai, a member of the Chari-Logone group
of Eastern Chadic. Somrai demonstrates the operation of the palatali-
zation and labialization prosodies to the greatest degree of any of the
Eastern branch languages that I have examined. The verbal system
of this language was described by Barreteau & Jungraithmayr (1979),
who bring out much of the data relevant to the prosodies. However,
they do not recognize the prosodies as such, and our interpretation of
the data differs in a number of points from theirs. The verb data that
I will be using, taken from Deusch (2007) and synthesized in Roberts
(2005, 2012), is shown in Table 5.

Table 5. Inflected forms of Somrai verbs, sorted according to root vowel

Root vowel	Verbal noun	Perfective	Subjunctive	Gloss
a	*dàm-à*	*dàm*	*dàm-nà*	'stay'
	ɓābīr-ā	*ɓābīr*	*ɓābīr-nà*	'hang'
e	*dẹàs-à*	*dèʃ(ì)*	*dẹàsì-nà*	'close'
	dẹāŋs-ā	*dēŋsī*	*dẹāŋsī-nà*	'tamp'
o	*cu̯ār-á*	*cōŕ*	*cu̯āŕ-nà*	'return'
	ju̯āŋg-á	*jōŋgí*	*ju̯āŋgí-nà*	'stoop'
ɨ	*pɨ́d-ə̄*	*pɨ́d(ɨ)*	*pɨ́dɨ́-nə̀*	'pass'
	dɨrs-ə̀	*dɨrsì*	*dɨrsì-nə̀*	'flatten'
i	*wīd-ə̄*	*wīd(ɨ̄)*	*wīdī-nə̀*	'get drunk'
	ʃīʃm-ə̄	*ʃīsīm*	*ʃīsīm-nə̀*	'suck'
u	*cūb-ə̄*	*cūb(ɨ̄)*	*cūbī-nə̀*	'take off'
	ɓūms-ə̄	*ɓūmsī*	*ɓūmsī-nə̀*	'germinate'

The verbs in this table are representative of the whole system. For
each of the six surface vowels which occur in verb roots (seen most
transparently in the perfective form), two verbs are displayed, one
having two consonants and another with three consonants. The lex-
ical vowel always occurs in the first syllable. After that, an epenthetic
[ɨ] may be inserted predictably, in either of two contexts: (a) in word-
final position of the perfective form, to support a final obstruent con-
sonant; or (b) word-internally, to separate two adjacent consonants
according to the principles of sonority sequencing, which I will not
detail here. There is a major dichotomy between the behavior of the

high vowels [i], [u], and [ɨ] on the one hand, and of the nonhigh vowels [e], [o], and [a] on the other, shown by the heavy line across the middle of the table. A verb with a nonhigh lexical vowel takes suffixes with the low vowel [a], while a verb with a high vowel has[ə] in its suffixes instead. What is more, the nonhigh vowels [e] and [o] show variability in their realization. In the morphologically bare perfective form, these vowels are monophthongs, yet in the subjunctive and nominal forms they show up as the corresponding diphthongs [e̯a] and [u̯a].

This whole array of data can be interpreted as the outworking of a simple underlying system which admits of only one underlying vowel, namely /a/, in conjunction with the two prosodies of palatalization and labialization, just as presented above for the Heɗe system. The verbs in the first six rows of Table 5 have the underlying vowel /a/, whereas the verbs in the last six rows have no underlying vowel at all; the surface vowels that appear there are the reflexes of the epenthetic vowel [ɨ] which is inserted to break up the consonants. The prosody of palatalization is present in those verbs with the surface vowels [e] and [i]. It fuses completely with the underlying /a/ to produce [e] in the perfective form, but fuses only partially with /a/ in the nominal and subjunctive forms to create the diphthong [e̯a]. The surface vowel [i] is the manifestation of palatalization as it affects the epenthetic vowel [ɨ], and is uniform in its realization. Similarly, the prosody of labialization is present in verbs with surface vowels [o] and [u]. The vowel [o] seen in the perfective forms is the surface result of labialization as it fully affects the underlying vowel /a/, and the diphthong [u̯a] seen in the nominal and subjunctive forms is the result of the partial fusion of labialization with this same underlying /a/. When there is no underlying vowel, there is no variability in the realization of the prosody of labialization: it appears as surface [u] in all forms of verbs that contain it. Finally, we note that verbs with surface vowels [a] and [ɨ] involve no prosody at all.

Table 6 presents my interpretation of the underlying phonological structure of each of the verb roots found in Table 5. A verb may have the vowel /a/, or else no underlying vowel at all (indicated here by Ø), in the first syllable. In addition, a verb may have no prosody at all, or else PAL, or else LAB. The surface forms of these roots (equivalent to the bare perfective forms) are shown to the side.

Table 6. Underlying and surface structure of Somrai verbs

Root V	Underlying	Surface	Gloss
a	d a m	*dam*	'stay'
	ɓ a b r	*ɓab(i)r*	'hang'
e	ᴾᴬᴸ d a s	*deʃ*	'close'
	ᴾᴬᴸ ɗ a ŋ s	*deŋs(i)*	'tamp'
o	ᴸᴬᴮ c a r	*cor*	'return'
	ᴸᴬᴮ j a ŋ g	*joŋg(i)*	'stoop'
ɨ	p Ø d	*pid(i)*	'pass'
	d Ø r s	*dir(i)s*	'flatten'
i	ᴾᴬᴸ w Ø d	*wid(i)*	'get drunk'
	ᴾᴬᴸ s Ø s m	*ʃis(i)m*	'suck'
u	ᴸᴬᴮ c Ø b	*cub(i)*	'take off'
	ᴸᴬᴮ ɓ Ø m s	*ɓums(i)*	'germinate'

The prosodies in Somrai work differently from Heɗe in that the prosody does not affect the vowels of every syllable of the word, but only and always the initial syllable. Nonetheless the prosodies are word-level features in that they may not affect vowels or syllables individually. A prosody is either present or absent for each verb root as a whole, as was the case in Heɗe.

There is an interesting sidelight concerning one of the consonants that confirms that the phenomenon involved here is suprasegmental, and not just a local segmental issue for vowels. When the consonant /s/ occurs in the first syllable of a verb with palatalization, it will be realized not as phonetic [s], but rather as the palatalized [ʃ], just as would happen in a Central Chadic language. The verb [ɗeʃ], for example, is underlyingly /ᴾᴬᴸɗas/, and [ʃisɨm] is underlyingly /ᴾᴬᴸs(ɨ)s(ɨ)m/. When the /s/ falls outside the influence of the prosody (i.e. in a noninitial syllable), it is realized as alveolar and not palatal: compare the occurrence of [ʃ] in the verbal noun form [ʃiʃ.mə] from Table 5 with the occurrence of [s] in the second syllable of the perfective form [ʃi.sɨm].

4 Gabri

Gabri is another language of the Chari-Logone subgroup, spoken to the southwest of the Somrai-speaking area. It is possible to see the effect of prosodies in Gabri, although to a lesser degree than in Somrai. In fact, a traditional phonology of Gabri would not even be tempted to propose palatalization or labialization as relevant to its description. Nonetheless, one curiosity of Gabri phonology is that the high vowels [i] and [u] are only marginally phonemic, if they must be recognized at all: [i] only occurs in word-final position, where one might argue that it is merely a vocalized realization of the consonant [y]. Similarly, [u] occurs in only two positions: word-finally, where it could be treated as the vocalized realization of the consonant [w], and also in a syllable preceding another round vowel, where it could be reckoned as an [ɨ] which has undergone assimilation of rounding. The vowel [ɨ] is ubiquitous, but its function seems merely to provide transition between consonants that are not separated by any other vowel, or (at the end of words) to provide support to obstruents which occur word-finally. So this vowel also may be seen as epenthetic, and not an underlying vowel phoneme.

In the verbal system, we find that only very few vowels occur. The only vowels found in verb roots are the nonhigh vowels [a] and [ɔ/o], as well as the epenthetic zero vowel [ɨ]. There is also a handful of verbs with [u] (0.4% of my corpus, or 29 verbs), but in these verbs the [u] is either in absolute initial position, or else it follows the velar consonants, [k] or [g].[8] Table 7 displays the possibilities, with four inflectional forms given for each verb; suffixes are separated from the stem by a hyphen:

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8   The evidence of contrast between [u] and the other vowels relies uniquely on these 29 verbs; for this reason the phonemic status of /u/ is extremely marginal within the language as a whole. Regarding its co-occurrence with [k] and [g], there is a well-known affinity between vowel-rounding, or labialization, with the velar consonants in Central Chadic languages (Barreteau 1987: 172, Roberts 2001: 95–96).

Table 7. Inflected forms of Gabri verbs, sorted by root vowel

Root vowel	Verbal noun	Perfective	Imperative[9]	Ventive[10]	gloss
a	*làs-è*	*làs(ì)*	*làs-à*	*lès-è*	'encourage'
	ɓágím-ē	*ɓágīm*	*ɓágím-ā*	*ɓégím-ē*	'pick up'
	hìràg-è	*hìràg(ì)*	*hìràg-à*	*hìrèg-è*	'bemoan'
o/ɔ	*bɔ̀s-ɛ̀*	*bòs*	*bìs-à*	*bìs-è*	'force'
	sɔ́bír-ɛ́	*sóbír*	*síbír-á*	*síbír-é*	'control'
	bùdɔ̀l-ɛ́	*bùdŏl*	*bìdìl-á*	*bìdìl-é*	'vomit'
ɨ	*dìb-é*	*dìb(ì)*	*dìb(ì)*	*dìb-è*	'put'
	mìgír-ē	*mìgír̄*	*mìgír̄*	*mìgír-ē*	'crunch'
u	*gùd-ē*	*gùd(ì)*	*gùd(ì)*	*gùd-ē*	'knead'

This table, like the preceding Table 6 for Somrai, distinguishes by a heavy line between the nonhigh lexical vowels [a] and [o/ɔ] above the line, and the high vowels [ɨ] and [u] below. It will be noted that regardless of the number of consonants contained in the verb, the lexical vowel ([a] or [o/ɔ]) only occurs once in the word.[11] For the verbs of Table 7 which have three consonants, it will be noted that the position of that vowel is variable, occurring either in the first or in the second syllable. Another curiosity is the variation between [o] and [ɔ], wherein the open variety [ɔ] always occurs in the verbal noun form, and the closer variety [o] always occurs in the morphologically bare perfective form. Speakers systematically make the difference between these two vowels, although no minimal pairs can be produced to show a contrast. The same situation obtains for the pair of front vowels [e] and [ɛ].

These data do not make an irrefutable argument for an analysis with prosodies, but there are a number of elements that are remi-

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9 The imperative might more properly be called the irrealis form, for it is used in a variety of contexts in Gabri, including the conditional, negative, etc.

10 The ventive form, although created productively, is not used very frequently in the language. Its principal usage is in the imperative (and other irrealis contexts), and it actually looks like it is based on the imperative form by a change of vowel(s). However, even verbs with root vowel [ɨ] or [u], which have no suffix in the imperative, still add a suffix *-e* in the ventive.

11 In common with all Eastern Chadic languages. Gabri allows only one lexical vowel per verb. Frajzyngier (1983: 125) concurs with this claim.

niscent of prosodic systems found elsewhere. I suggest that the unusual distributional facts can be explained if an earlier stage of the language had a more fully functioning prosody system which has been largely eroded away today. The near non-existence of distinctive high vowels is of course one hallmark of the prosodic systems of Central Chadic, as well as of Heɗe and Somrai. A parallel to that situation is the similarity in behavior between the nonhigh vowels. In Gabri, while verbs whose vowel is [ɨ] or [u] take no suffix in the imperative form, verbs with either of the nonhigh lexical vowels [a] or [o/ɔ] take the suffix -a. Curiously, though, the o-verbs have no [o/ɔ] in the imperative form. If the o-verbs are simply considered to be a-verbs affected by the labialization prosody, it might be claimed that the prosody, along with the underlying /a/ vowel that it affects, drops out in the imperative.

If o-verbs do involve the prosody of labialization, the behavior of the prosody is a bit peculiar. The LAB prosody first docks onto the underlying vowel /a/ in the root, and then spreads backward from that point to the beginning of the word, transforming the epenthetic [ɨ] into [u]. Figure 2 shows an autosegmental representation of the o-verbs *budol* and *sobɨr*. In the latter verb, note that the vowel [ɨ] in the syllable following o is unaffected, because lab spreads only to the left.[12]
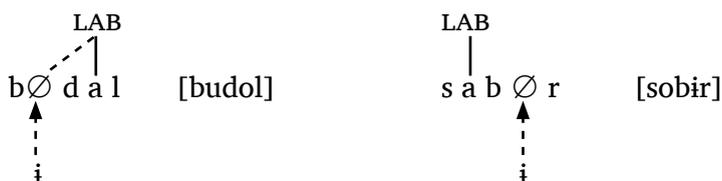

Figure 2. Effect of the LAB prosody in the o-verbs of Gabri

It is interesting to note that, although the lexical vowel of Gabri verbs may be [a] or [o], there are no verbs with a front vowel (especially the nonhigh [ɛ] or [e], nor even with the high vowel [i]). There may be a morphological reason for this. The ventive form, shown in Table 7, takes the verb root stripped of any prosody, and adds the

12 Barreteau (1987: 177) shows a similar peculiarity in the behavior of the LAB prosody in the Central Chadic language Mafa. In that language, LAB parses the word to be affected from the right edge, docking onto the first velar consonant it encounters, then affects all vowels and velar consonants further to the left from that point. If the word contains no velar consonant, LAB associates only to the leftmost vowel. Roberts (2001: 104) shows this in an autosegmental representation.

suffix *-e*. At the same time, any instances of [a] within the root are fronted to [e]. This situation is reminiscent of similar phenomena in Podoko (Central Chadic; see Swackhamer n.d., Roberts 1994) or in Miya (West Chadic; see Schuh 2002), where applying the prosody of palatalization to a verb invests it with an inflectional value.

In Gabri, I propose that the ventive form is characterized by the PAL prosody. In addition to PAL, which blankets the whole word, there is a suffix which is underlyingly /-a/, but shows up as [e] because of the prosody. Figure 3 shows the formation of the ventive for the verbs [ɓagɨme] and [hɨrage].
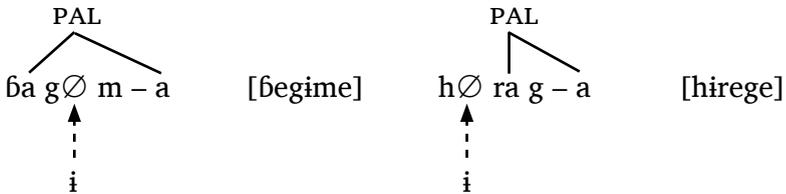

Figure 3. Formation of the ventive forms of Gabri

It will be noticed that PAL in these ventive forms does not affect the epenthetic [ɨ] by fronting it to [i], although in parallel fashion LAB does transform [ɨ] into [u] by leftward spreading, as seen in Figure 2. This fact simply demonstrates that the two prosodies operate independently and may have differing effects, just as is the case in their operation in Central Chadic languages (see Roberts 2001).[13] It also offers further confirmation that the evidence for LAB in Gabri is stronger than the evidence for PAL, and emphasizes the very marginal character of [i] in this language.

5 Kabalay

The next language to be considered is Kabalay, also taken from the Chari-Logone group, and the western neighbor of Gabri. The verb data here is very similar to that of Gabri. But if the case for prosodies in Gabri was weak, the case is even weaker in Kabalay. Nonetheless, there are features of this language which suggest that prosodies may

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13 Alternatively, one might claim that there is no [i] in ventive forms because the epenthetic [ɨ] is added at a very late stage, after PAL has effected its changes. Even so, that analysis would have to recognize that PAL behaves differently from LAB.

have been more active in the past, compared to what we see today. The Kabalay data under consideration are displayed in Table 8, taken from Selgue 2005:

Table 8. Verbal forms of Kabalay, sorted by root vowel

Root V	Verbal noun	Perfective	Imperative	Gloss
a	*bàr-ɔ́*	*bàr*	*bàr*	'insult'
	ɲīlāɲ-ɔ́	*ɲīlāɲ*	*ɲīlāɲ*	'slip'
o	*bōl-ɔ́*	*bōl*	*bāl*	'get pale'
	cōgīm-ɔ́	*cōgīm*	*cāgīm*	'grab'
ə	*sɔ̄m-ɔ́*	*sɔ̄m*	*sīm-ā*	'whip'
	cɔ̄gīn-ɔ́	*cɔ̄gīn*	*cīgīn-á*	'sew'
ɨ	*sɨ̄l-ɔ́*	*sɨ̄l*	*sɨ̄l*	'cut down'
	lɨ̄gɨ̄r-ɔ́	*lɨ̄gɨ̄r*	*lɨ̄gɨ̄r*	'encircle'
u	*gūn-ɔ́*	*gūn*	*gūn*	'poison'
	lūgīr-ɔ́	*lūgīr*	*lūgīr*	'sort'
i[14]	*nín-ɔ́*	*nín*	*nín*	'wander'

The three forms given for each verb in Table 8 correspond to the first three forms shown in Table 7 for the verbs of Gabri. One peculiarity of Kabalay is that the vowel [e] is virtually nonexistent; instead, we find the phonetic vowel [ə] in its place. I do not know why a former *[e] should have centralized globally in Kabalay, if that is the source of the vowel [ə] that we see today. At any rate, [ə] functions fully as a nonhigh vowel like [a] and [o].

Consider now the shape of the imperative forms. When the root vowel is high [i, u, ɨ], there is nothing surprising: the verbal noun takes the suffix *-ə*, and there is no suffix in either the perfective or imperative. The remarkable case is in the imperative form of verbs whose root has a nonhigh vowel [a, o, ə]. In those verbs, the imperative always has the vowel [a], regardless of which was the original lexical vowel. If the root vowel was [o], the [a] replaces it *in situ* in the imperative form. But if the root vowel was [ə], the vowel disappears altogether from the stem; the vowel [a] appears as a suffix. As elsewhere, the epenthetic [ɨ] separates contiguous consonants.

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14 Verbs with a robust lexical vowel [i] are very rare. Selgue (2005) does not show any with three consonants, so there are none to show in Table 8, as for verbs with the five other lexical vowels.

Here again we have only a vague vestige of the operation of prosodies. However, Kabalay still manifests a dichotomy in behavior between the high and nonhigh vowels, indicated again in Table 8 by the solid line that separates the two sets. Although the high vowel [u] is relatively well established as phonemic, [i] is very marginal, almost always occurring in the company of a palatal consonant. The nonhigh vowels, on the other hand, are all very robust as surface phonemes. With respect to the nonhigh vowels, the prosodic hypothesis would interpret [o] as an underlying /a/ affected by the LAB prosody, and [ə] would be an underlying /a/ affected by the PAL prosody (although a fronted realization is masked by a further process of centralization). Accordingly, one might claim that the imperative is formed by stripping off any prosody that might be present. And that provides at least a weak explanation for why all verbs with a lexical nonhigh vowel show the vowel [a] in the imperative, because they all have /a/ as an abstract underlying vowel.

6 Mawa

The final language to be considered is Mawa, the only one taken from the Guera group (Group B of Newman 1977) of East Chadic. Together with Ubi, Sokoro, Saba, and Barein, Mawa belongs to the southern subgroup. The verb data to be considered is based on my own field notes; these data are presented more fully in Roberts 2009, where I argue that distinctive prosodies of palatalization and labialization are the best means of accounting for certain phenomena in the language. I should also say that Mawa is the only language of the Guera group that I have found to show clear evidence for prosodies. Most of the other languages in this group have classic five-vowel inventories, and a prosodic analysis is not helpful to describe them.

Mawa is thus a very interesting case. The verb data to be considered are presented in Table 9; all verbs are shown in their infinitival, or verbal noun, form:

Table 9. Verbal noun forms of Mawa verbs

Root vowel	Short vowel	Long vowel
a	*dàgāŋ* 'lose'	*dà̀àsāŋ* 'jump'
o	*tòrōŋ* 'bite'	*jòòpōŋ* 'cover'
e	*tèpēŋ* 'think'	*dèèmēŋ* 'break'
ə	*làwāŋ* 'insult'	*kà̀àlāŋ* 'meet'
u	*dùlūŋ* 'bow'	*sùùgūŋ* 'move away'
i	*wìcīŋ* 'swell'	*tì̀sīŋ* 'fill a hole'
u̯a	*du̯ànāŋ* 'lean on'	*lu̯à̀àkāŋ* 'go around'
e̯a	*me̯àtāŋ* 'groan'	*de̯à̀àsāŋ* 'repair'

The suffix of the verbal noun form is *-ŋ*, which appears on all forms
in this table. As is true for the other languages surveyed above, each
verb has exactly one lexical vowel; in Mawa the lexical vowel fills all
the vowel slots of the word. Unlike the preceding languages, how-
ever, the lexical vowel in a Mawa verb is maintained without change
in all its inflectional forms, and for that reason the inflected forms
have not been included in this table. Vowel length is distinctive in
Mawa, but a long vowel may only occur in the first syllable. Each of
the eight vowels of the above table is distinctive, occurring in a wide
range of contexts.

The justification for prosodies in Mawa is restricted to the diph-
thongs [e̯a] and [u̯a] seen in the last two lines of Table 9. These
diphthongs are phonetically identical to the ones that occur in Somrai.
But in Mawa these diphthongs contrast with the simple vowels: in
particular, [e̯a] contrasts with [e], and [u̯a] with [o]. Examples of
these contrasts are given in (1):

(1) a. *e̯amaŋ* 'push'
        emeŋ 'crunch'

      b. *u̯aalaŋ* 'cool off'
        ooloŋ 'hurt'

Even if Mawa once had a minimal vowel inventory like Heɗe or Somrai,
a full set of vowels has now become phonologized. Nonetheless, I
argue (Roberts 2009) that its phonological analysis must still
recognize the distinctive prosodies of PAL and LAB synchronically,
even though they only affect words with the vowel /a/. The prin-
cipal arguments in favor of word-level prosodies in Mawa rest on the

suprasegmental behavior associated with the diphthongs. The prosodic approach provides an explanation for otherwise peculiar distributional facts. For one thing, there may only be one diphthong per word, and it will always occur on the initial syllable. Secondly, there is variability in the realization of the prosodies. The diphthong [ea̯] may alternatively be realized as the monophthong [ɛ], and [ua̯] may be realized as [ɔ]. In other words, a prosody which normally affects the vowel /a/ by breaking it into a diphthong, may optionally fuse with it to form a monophthong. Not only that, but other syllables beyond the first may sometimes be affected phonetically, as seen in the variability in words of (2). The autosegmental diagram of Figure 5 attempts to capture these facts. The solid association line shows where the prosody must be realized, and the dotted lines connect to the other segments that are optionally affected by it.

(2) a. [se̯atak] ~ [sɛtɛk] ~ [ʃetɛk]   'hot pepper'
     b. [ju̯akalam] ~ [jɔkɔlam] ~ [jɔkɔlɔm]   'elbow'

<pre>
     PAL   LAB
      ⌐|⌐   ⌐⌐⌐
     ╱ | ╲   ╱ ⟍⟍
    s a t a k   j a k a l a m
</pre>

Figure 5. Variability in the effect of PAL and LAB in Mawa

Further arguments for LAB and PAL in Mawa are presented in Roberts (2009), showing that the prosodic approach is superior to any alternative analysis. If prosodies are still functioning in Mawa today, it suggests that they are a vestige of system that once depended more heavily on such suprasegmental features. In this regard Mawa may be very conservative as compared to neighboring Chadic languages of the Guera, which have lost almost all evidence of a prosodic system such as that which is still very much active in the languages of Central Chadic.

7 Synthesis

What conclusions can be drawn from the data of these five languages? First, the facts from Heɗe and Somrai establish that full-fledged synchronic prosodic systems with LAB and PAL exist in the Masa and East branches of the Chadic family, and are not limited to Central branch. In both of these languages, the vowel system can be reduced to a single underlying vowel /a/. An epenthetic [ɨ] is added

to supply a default vowel when required, and word-level prosodies of palatalization and labialization are superimposed to produce the full range of surface vowels.

In Somrai and in Mawa, the prosodies produce diphthongs [ea] and [ua] whose broken nature allows us to hear the prosodies affecting the underlying vowel /a/ without fully fusing with it. In both languages also, there is some degree of alternation between each diphthong and a corresponding monophthong, whether in a morphophonemic or in an optional phonetic context. Mawa is quite different from Somrai, nonetheless, in that it has developed a full set of phonemic vowels. The high vowels function fully in the language, just as much as the nonhigh vowels. This characteristic would seem to detract from considering Mawa as having a prosodic system. Yet the vowel /a/, whether alone or affected by LAB or PAL, is by far the most common vowel overall in Mawa, found in 47% of all verbs. In other languages with a prosodic system, such as Heɗe or Somrai, about half of the words are analyzed as having an underlying /a/.

Prosodies play a much reduced role in Gabri, as compared to Somrai. Nonetheless, some of the same characteristics hold. For one thing, the status of high vowels in Gabri is very marginal; the non-high vowels [a] and [o], and potentially also [e], display a similarity of behavior in the imperative forms. In this language it is also possible that palatalization functions morphologically, and not simply phonologically. In Kabalay, it was established that all three nonhigh vowels are reduced to the basic vowel /a/ in the imperative form, as though any prosody which might have been lexically present in a verb is stripped off by a morphological process. The high vowels [ɨ, u, i] are marginal in this language too, just as in other languages with a functioning prosodic system. Apart from those phenomena, though, a prosodic analysis does not seem very helpful in describing Kabalay.

Note that the five languages chosen for this study are not all spoken in the same geographical region. Gabri, Kabalay, and Somrai are all neighboring languages, it is true, but Heɗe is a bit further afield, and there is quite a geographical and cultural separation between these four languages and Mawa. Nonetheless, synchronic analyses of all these languages show some relevance of palatalization and labialization to their phonological (and maybe also morphological) systems, to a greater or lesser degree. The simplest explanation for the existence of prosodic systems in scattered languages throughout

the Eastern zone is to suppose that prosodies were characteristic of the Proto-language. And since prosodies still play such a fundamental role in languages of the Central branch, it might be supposed that prosodies were part of Proto-Chadic itself.

If Proto-Chadic did indeed make full use of prosodies, then such a system has seriously eroded in the Eastern branch. The synchronic and comparative studies attempted in this paper show that the prosodies of LAB and PAL have ceased their function to differing degrees in individual languages, from the relatively complete retention of prosodies in Somrai, to the remote vestiges of them in Kabalay. Further synchronic studies of individual Chadic languages may suggest possible paths for understanding how the prosodies have been lost, and the mechanisms by which each individual language has evolved.

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