About the Harmony Disposition of Lelemi Affixes

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One of the African languages studied by Hildegard Höftmann was the Ghanaian Kwa language Lelemi. Being a member of a team of the Institute of African Studies of the Humboldt University of Berlin which conducted research work on the then so-called „remnant languages“ (later’s Central Togo languages and today’s Ghana-Togo Mountain languages), she did several months of field research in this language in the 60’s, publishing her experiences, methods and results in Höftmann & Berger 1965, Höftmann 1966, 1970 and 1971. The interesting features of the language laid out by Höftmann as well as the discussion when consulting her with regard to a selection among the Ghana-Togo Mountain languages led Ines Fiedler and me to follow her path. About 40 years later, we had another look on Lelemi within the frame of the research project on „Focus in Gur and Kwa Languages“ which is part of the SFB 632 on Information Structure and directed by Hildegard Höftmann’s former student Brigitte Reineke.

The aim of this paper is to give further insight into the vowel harmonizing properties of Lelemi affixes as it has been well-known for 40 years that „very many of the Kwa languages (...) have vowel harmony of (...) the cross-height type“ (Stewart 1971:198) which is based on the feature of tongue root advancing, while details for individual languages are often missing. The account given here just represents a minor revision of former analyses that however helps to understand some peculiarities in the language and that affects the representation of nominal and verbal prefixes which might be needed for language-external comparison.

The paper is organized as follows: Section 1 gives brief information about the geography of the language, its speakers as well as its classification and documentation. In section 2 some general linguistic features of Lelemi beyond vowel harmony are shortly introduced. Section 3 concerns the vowel harmonizing system and its impact in verbal and nominal morphology. A short summary in section 4 concludes the paper.

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1 I would like to take this opportunity to thank Marcus Kwame Pewudie, who served as major language assistant on Lelemi, and all other language informants for their concentration and patience during our work as well as my colleague Ines Fiedler for her constant encouragement since we first went to the language area in 2004. Last but not least I also want to express my gratitude to the DFG which made the research within the SFB 632 on Information Structure financially possible.
1. Speakers, Documentation and Classification

The term Lelemi (iblemi), or the more dialect comprehensive name Lelemi-Lefana, refers to a language that is spoken in the Buem district of the Volta Region (southeastern Ghana) beside the border to Togo. The language area comprises about 17 communities and the number of speakers, the Balem (ibalem), is reported for 2003 to have reached approximately 49,000 speakers (Gordon 2005).

The language received comparatively early recognition and attention, yielding first studies of quite heterogeneous quality. Hence, Seidel’s early work in 1898 is reported as ‘wildly inaccurate’ (Allan 1973:27). In 1910, Westermann added an article about the language, and Miegeod included Lelemi data in his collective work published in 1911. Apart from general discussions of the genetic affiliation of the languages situated in the Ghana-Togo mountain area, comparative recognition of the language was also rendered by Bertho in 1952 as well as by Kropp in 1967 and by Heine in 1969. Höftmann allocated the above mentioned publications, especially focusing on the nominal morphology (1966), her method of language analysis and description (1970), and also outlining the general structure of the language (1971). Finally, an important linguistic contribution was made by Allan whose PhD Thesis 1973 constitutes the first more extensive grammar of Lelemi. After Allan added a revised version of Höftmann’s Structure of Lelemi in 1975 and allocated a ‘Buem’ contribution into the West African Language Data Sheets in 1977 linguistic publications have, as far as I am aware, come to a stop. Hence, although the language is integrated into the projects of the Ghana Institute of Linguistics, Literacy and Bible Translation (GILLBT), running literacy courses and Bible translation, academic work expanding the existing linguistic knowledge on Lelemi is still highly desirable.

Genetically, the language is regarded as belonging to the Na-Togo branch being located besides the Kwa branch within the Kwa languages (cf. Heine 1968:274, cf. also Williamson & Blench 2000:29), two groups which are labelled by Heine 1968 according to their respective word for ‘meat’. Ameaka (2002:90) points out that the genetic unity of Ghana-Togo Mountain languages is in doubt, since efforts have been made (cf. Stewart 1989:221) to classify the Na languages comprising Lelemi in the Nylo branch (i.e., closer with Potou-Tano) and the Kwa languages in the Left Bank branch (i.e., closer with Gbe).

With regard to internal variation, there is a split into two major dialects, Lelemi and Lefana, the latter with further subdivisions, which seem to differ in phonology and lexicon to a moderate degree (cf. Allan 1973:20ff). Within our project, we have so far concentrated on the Lelemi dialect spoken in Baglo, like Höftmann and Allan, although data from the Lefana variety spoken in Borada has been elicited as well.

2. General Language Traits

The language under consideration displays several traits which are well attested in its closer genetic group as well as in the wider region. As a characteristic for Ghana-Togo Mountain languages, also referred to as Central Togo languages (cf. Kropp Dakubu & Ford 1988), Lelemi has a basic SVO word order and head-final associative constructions. The order remains the same – whether the respective constituents are lexically or pronominally represented. Noun and verb modifiers on the other hand follow their head.

Like most West African languages, Lelemi is a tone language. Though still far from being exhaustive, Allan 1973 provides several insights. In line with Höftmann 1971, he posits three level tones (High, Mid, Low) and attributes tone a lexical and grammatical function. The former function is subject to some restrictions (rare minimal triplets, apparent lack of High stem tone) and concerns nouns and verbs alike, as illustrated (on the basis of Allan 1973:78, 80):

(1) bɔ-dù ‘to kill’ bɔ-dù ‘to bite’
      bɔ-ʃa ‘fire’ bɔ-ʃa ‘husband’

Höftmann and Allan note that the lexical tone of a verb can be altered in certain constructions. The high relevance of grammatical tone, especially with regard to verbs, has been confirmed by our own studies. Verbs form different tone classes within the verbal paradigm when considered together with their prefix tone, as indicated by three tone classes for monosyllabic verbs in the following example.

(2) ‘buy’ ‘hear’ ‘ask’ ‘see’ ‘eat’

Verb!
‘Let us verb!’
‘I verbed’
‘he verbed (before)’
‘he is verbing’

Unfortunately, it has not been possible so far to run a more detailed study on tone in analyzing the own data and confront them with the other researchers’ findings. For my moment, the tone transcription should be regarded with caution, since it is just based on the auditory impression while the general principles and rules concerning tone have not yet been systematically worked out.

5 Total contours are not phonemic, but can be analyzed as tone combinations within the syllable (cf. also Allan 1973:76).

Language code ISO 639-3: lef (Gordon 2005).

In the transcription of the Lelemi examples the following divergencies from IPA occur with respect to consonants: j/R is noted as ɗ/ɗ, j/R as ɗ/ɗ, d/y as ɗ/ɗ, k/E as <c>- and long vowels are represented by vowel sequences. Tones are marked by diacritics as /‘/ for High tone, /‘/ for Mid tone, /‘/ for Low tone. Marked structures expressing emphasis on certain sentence constituents (i.e. marked focus or topic occurrences) are reflected by capital letters in the English translation.

4 Cf. Höftmann 1971:15 concerning some illegitimate postulations and problems in this work due to lack of access to the language area and partly unreliable information by a single speaker.
Further characteristic features for Ghana-Togo Mountain languages which are also found in Lélemi are represented by regular vowel assimilation processes making up certain type of vowel harmony and by the prefixing nature of nouns and verbs, these two issues will now be taken up in the following section.

3. Vowel Harmony

That vowel assimilation is systematically applied within the phonological word and plays an important part in nominal and verbal structure since it affects all vowels of the stem and its affixes has been addressed by any recent linguistic work on Lélemi (cf. Höfmann 1971:23ff. and Allan 1973:55ff.). The most comprehensive analysis in this respect is provided by Allan 1973 who establishes a vowel system with seven phonemic oral vowels and considers the language (the Baglo dialect) to have „cross-height vowel harmony” based on the vowel’s advanced tongue root ([ATR]) feature (cf. Stewart 1971:198ff.). The height-crossing type which is common in African languages is defined by Stewart (1971:198) as follows: „Vowel harmony is of this type if, on the basis of the harmony, the vowels of the language in question can be divided into two mutually exclusive sets such that (i) the tongue positions of the vowels of one of the sets are high in relation to the tongue positions of their counterparts in the other set, but (ii) the tongue position of at least one member of the relatively high set is lower than the tongue position of at least one member of the relatively low set.”

Like Höfmann 1971, Allan acknowledges only seven phonemic surface vowels in Lélemi /i, e, a, ɔ, o, u/, but he nonetheless posits a system of nine underlying vowels due to certain harmony traits (1973:58). The most relevant observations made by him in this respect are summarized here:

In describing the stem-based harmony (i.e. conditioning the selection of vowels which occur in prefixes), Allan establishes a general pattern of „full” vowel harmony (1973:62ff.):

3.1 Revision of the [ATR] based Vowel Harmony

While Allan is certainly right in his conclusion of an underlying nine oral vowel system and makes several valuable observations, he sketches it in a somehow peculiar way (like /i/ and /u/ as [+ATR] vowels besides /i/ and /u/) and leaves some odd ends (like the two harmony patterns). In revisiting the vowel harmony system, I am therefore proposing a slightly modified scheme, sketching it from a diachronic angle here.

Diachronically, Lélemi had the following system of nine oral vowels organized as two exclusive sets due to the [ATR] parameter.

Prefixes harmonize with the [ATR] feature of the stem, but unlike Allan, I assume the high vowels rather than mid vowels to be among the three archiphonemes.

The [-ATR] high vowels were lost and merged with their [+ATR] counterparts, yielding the currently left seven surface vowels.

As for prefix vowels, a parallel merging was intolerable, since they were required to harmonize with the [ATR] feature of the stem vowel. Due to this pressure, the [ATR] feature dominated over tongue height in the resolution of the emerged gap, achieving the synchronically well attested prefix vowel pairs.

Thus, the substitution of the high [-ATR] vowels by the non-high [-ATR] vowels guaranteed the continuation of the vowel harmony program, the latter already

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6 Phonological nasalization and length are not treated in detail here. According to Allan (1975:994) five (/, e, a, ɔ, u/) of the „vowels may be phonologically nasalized (and, in other dialects, phonetically nasalized as well); in the Baglo dialect, however, the only phonetic correlation to phonological nasalization occurs when the vowel which is phonologically nasalized precedes a stop consonant within the same Noun Phrase” (Allan 1973:55). Allan remains silent with respect to vowel length, while Höfmann postulates its linguistic relevance on the basis of some minimal pairs even though she is aware that the lengthening is sometimes the result of a syllable replacement (1971:22).
established by Allan. For illustration serves an adopted extraction (changed vowel archiphones) from one of his examples. It represents a verb form prefixed with the subject marker in what he calls the „Affirmative Simple Past” (1973:64).

\[(9)\]

(i) bû-tê ‘to give’  
(ii) bû-tê ‘to judge’

1sg ‘I’  
2sg ‘you’  
3sg (noun class) ‘she’  
1pl ‘we’  
2pl ‘you’  
3sg (noun class) ‘they’

Apart from this „full” vowel harmony of prefixes, Allan also reports a kind of „Reduced Vowel Harmony” with respect to subject prefixes at verbs already marked for „Aspect” (1973:66ff; cf. (4)). Transferred into my analysis, the „reduced harmony set” just reflects the lack of [-ATR] vowel harmony among high vowels. Hence, it results from the same merging of high [-ATR] vowels with their [+ATR] counterparts, as already established for stem vowels above (cf. 7).

\[(10)\]

<table>
<thead>
<tr>
<th>Prefixes</th>
<th>A</th>
<th>I</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>[−ATR]</td>
<td>e</td>
<td>i</td>
<td>u</td>
</tr>
<tr>
<td>[+ATR]</td>
<td>a</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The phenomenon is illustrated again by an adapted example from Allan (1973:68) using a minimal verb pair concerning the stem vowel’s [−ATR] feature. In the „Negative Past” a negative marker -tê- is immediately prefixed to the verb stem. Unlike the subject prefixes in (9), if the prefix vowel before the harmonizing „Aspect marker” is high, it is apparently not harmonizing with a [-ATR] stem vowel.

\[(11)\]

(i) bû-tê ‘to give’  
(ii) bû-tê ‘to judge’

1sg ‘I’  
2sg ‘you’  
3sg (noun class) ‘she’  
1pl ‘we’  
2pl ‘you’  
3sg (noun class) ‘they’

I conclude from the restriction of the „Reduced Vowel Harmony” to verb forms with „Aspect” prefixes immediately affixed to the verb stem, that the saturation of the harmonizing requirement by the „Aspect” prefix closer to the verb stem that allows a subject prefix with high vowel to refrain itself from harmony. The current variation of high vowel prefixes with respect to [−ATR] vowel harmony (yielding Allan’s „General vs. Reduced Vowel Harmony”) can be explained as follows:

7 Allan develops a complex and quite different historical scenario in order to explain the observa-

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Harmony Reluctance: High vowel prefixes are synchronically reluctant to [ATR] vowel harmony, since having merged historically with former /i/ and /u/ (cf. 7 and 10), synchronic high vowels already comprise both [-ATR] and [+ATR] features.

Harmony Requirement: Since prefixes are generally required to harmonize with respect to [ATR] with the verb stem, even high prefix vowels are forced to surface with an overt [-ATR] vowel. Synchronically, they can express the [-ATR] feature only by abandoning their original tongue height. However, if the need for overt harmony is already accomplished by a prefix closer to the stem, a high prefix vowel is not forced to harmonize itself again.

Finally, it can be noted that the general historical merger of both [ATR] counterparts among the high vowels in word stems in favour of the [+ATR] feature has led to synchronic minimal pairs which are only distinguished by the [ATR] feature of their prefix. The following example of two verbs in the „Affirmative Simple Past” has been adapted once more from Allan (1973:65):

\[(12)\]

(i) bû-dû ‘to arrive’  
(ii) bû-dû ‘to bite’

1sg ‘I’  
2sg ‘you’  
3sg (noun class) ‘she’  
1pl ‘we’  
2pl ‘you’  
3sg (noun class) ‘they’

In the inflected verb forms of bû-dû ‘to bite’, the underlying [-ATR] feature of the original stem vowel /i/ is still reflected in the corresponding prefix vowel. Resulting is an ambivalent, „opaque” vowel that functions as [+ATR] vowel in some stems and as [−ATR] vowel in others (cf. Clements 2000:137).

3.2 Harmonizing Noun and Verb Prefixes

In Lelemi, stem conditioned [ATR] vowel harmony generally operates on prefixes which are the most pervasive affixes throughout the language and dominate in nominal as well as in verbal morphology.

Like several of its close sister languages within the Ghana-Togo Mountain group as well as with its numerous cousins, aunts, etc. within the Niger-Congo phylum Lelemi provides an inherited semantically based system of categorizing nouns in form of a complex and overtly marked noun class system (cf. Hofmann 1966, 1971, 1973:71-75) which I do not follow.

8 The high vowel archiphone A shows no parallel disfavour but harmonizes regularly. This suggests that the synchronic lacking low [+ATR] vowel did not result of any parallel recent merging process from a 10-vowel system.
Heine 1968, and Allan 1973). Gender is marked on the nouns themselves by way of nominal class prefixes, and concord is expressed by prefixed morphemes, too.

(13) Noun class prefixes

<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ū-ũi</td>
<td>bē-bi</td>
<td>'child'</td>
</tr>
<tr>
<td>3-ŋpiná</td>
<td>bō-ŋpiná</td>
<td>'friend'</td>
</tr>
<tr>
<td>kāh</td>
<td>lē-kāh</td>
<td>'car'</td>
</tr>
<tr>
<td>ū-ũi</td>
<td>lē-ũi</td>
<td>'road'</td>
</tr>
<tr>
<td>lē-bwi</td>
<td>ĕ-bwi</td>
<td>'pot'</td>
</tr>
<tr>
<td>kē-vili</td>
<td>kō-vili</td>
<td>'spoon'</td>
</tr>
<tr>
<td>kē-mō</td>
<td>mō-mō</td>
<td>'farm'</td>
</tr>
<tr>
<td>ū-ũi</td>
<td>-</td>
<td>'water'</td>
</tr>
<tr>
<td>bē-dū</td>
<td>-</td>
<td>'biting', 'to bite'</td>
</tr>
</tbody>
</table>

Concord operates at some determiners, the cardinal for 'one', ordinal numbers and participles as well as pronouns in different functions which agree with their antecedent's class. The resulting class system is outlined here by its major and well-estabished genders, citing Allan with regard to semantic content (1973:97ff). Nominal prefixes as well as concord prefixes harmonize with the [ATR] feature of the respective stem vowels, as indicated by the allomorphs in (15). As my analysis of the prefixes is based on the vowel analysis outlined above, the gender labels given in (15) differ from the ones of previous authors in attributing high vowels to several class prefixes rather than mid vowels.

(14) Concord prefixes

<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>bō-bō</td>
<td>lē-bō lē-wōbî</td>
<td>'new room'</td>
</tr>
<tr>
<td>kē-mō kā-mō</td>
<td>mō-mō bō-mō</td>
<td>'that farm'</td>
</tr>
<tr>
<td>3-ŋpiná 3-dī</td>
<td>bō-ŋpiná bō-dī</td>
<td>'certain friend'</td>
</tr>
</tbody>
</table>

(15) Class prefixes and semantics of Lelemi genders

<table>
<thead>
<tr>
<th>Gender Noun prefix</th>
<th>Concord prefix</th>
<th>Basic semantics</th>
</tr>
</thead>
<tbody>
<tr>
<td>ū-ũi</td>
<td>ū-ũi</td>
<td>humans</td>
</tr>
<tr>
<td>li-</td>
<td>li-</td>
<td>artfacts, domesticated crops</td>
</tr>
<tr>
<td>li-ja</td>
<td>li-ja</td>
<td>ethnonyms, birds, bats</td>
</tr>
<tr>
<td>ke-</td>
<td>ke-</td>
<td>kitchen utensils, derivations of bush animals</td>
</tr>
<tr>
<td>ke-ja</td>
<td>ke-ja</td>
<td>diminutives</td>
</tr>
<tr>
<td>ku-</td>
<td>ku-</td>
<td>(few) miscellaneous (few) animals</td>
</tr>
</tbody>
</table>

Prefixes also dominate among the bound morphemes used in the verbal complex. Hence not only nouns and several other nominals, but also almost all finite verb forms – with the exception of the affirmative imperative addressing a single person – require the existence of at least one prefix which encodes information on the subject and/or conveys some tense-aspect-modality-polarity (TAMP) specification. The subject prefixes which are to be used obligatorily in several verb forms are summarized in table (16).

(16) Subject Pronouns

<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>li-</td>
<td>li-</td>
</tr>
<tr>
<td>li-</td>
<td>li-</td>
</tr>
<tr>
<td>li-</td>
<td>li-</td>
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<tr>
<td>ke-</td>
<td>ke-</td>
</tr>
<tr>
<td>ku-</td>
<td>ku-</td>
</tr>
<tr>
<td>ku-</td>
<td>ku-</td>
</tr>
</tbody>
</table>

An unexpected rich range of pronouns occurs with the first person singular as three different prefixes li-, mli-, N- are available, whose distribution is conditioned by TAMP circumstances. In third person, the prefixed pronouns agree with the antecedent's noun class. Here, the same concords as those prefixed to determiners and modifiers within the noun phrase (cf. 14) are used. As indicated by the allomorphs above and illustrated by example (17), the vowel of the subject prefix harmonizes with the [ATR] feature of the verb stem vowels.

(17) ū-čuli 3-čeli 3-čeli ū-sěe Kumasi, 3-person U-DEM, PROX 3-leave U-go Kumasi 'This person left for Kumasi.'

The principle of vowel harmony is also obeyed by subject prefixes which were probably originally not immediately adjacent to the verb stem, as in (18a/b). The long vowel of the subject prefix, here li- respectively ke- for the 1st person singular is probably the result of the compensation for a lost syllabic TAMP prefix.

(18) a. lii-yě 1sgPL,P-buy A-beans 'I have bought beans.'

9 Occasional gaps in my data concerning the class pronouns in the pronominal paradigm were completed by the information provided in Allan (1973:211ff, 238ff).
b. lè-bè dëi a-kàbë i-nì nà é-fùló̩.
1sg(lg),P-cat A-beans A-REL CNJ 2sg(A)-boil
'I have eaten the beans which you boiled.'

The following examples illustrate that vowel harmony operates at any prefix vowel immediately preceding the verb stem, irrespective of the function or information it conveys. For example, there are certain environments in Lelemi in which the common verb prefixes are not appropriate and in which the verb rather displays special prefixes without subject agreement (cf. Schwarz, to appear) but which nonetheless harmonize with the stem, as the default prefix n- in the perfective does in (19).

(19) a. Who bought beans?
   òbù nè-yè a-kàbë.
   1pl.DJ DP-buy A-beans
   'WE bought beans.'

b. Did YOU sweep the room?
   òdùwò, òmòmì nà-kpàlù.
   no Emomì DP-sweep
   'No, EMOMI swept it.'

If a verb stem is provided with more than one prefix vowel, vowel harmony is in general obeyed by every prefix vowel, as example (20) shows.

(20) bà-cëli bà-nỳò bà-tà-tìbò bà-të-sè Tamale.
   BA-people BA-DET BA-NEG(TA)-leave BA-NEG(TA)-go Tamale
   'The people didn’t leave for Tamale.'

Exceptional are only prefixes with high vowels which do never harmonize by their [-ATR] mid vowel counterpart as long as the harmony requirement is already fulfilled by a stem-closer prefix, as discussed in section 3.1.

(21) ù-nì ù-tà-kpàlù-ì.
   U-mother U-NEG(TA)-call-U
   'His mother didn’t call him'

Pronouns with object function are not prefixed but rather follow the verb stem and are probably best analyzed as enclitics or suffixes.

(22) Object Pronouns

<table>
<thead>
<tr>
<th></th>
<th>Singular</th>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-mì</td>
<td>-bù</td>
</tr>
<tr>
<td>2</td>
<td>-ò</td>
<td>-mì</td>
</tr>
<tr>
<td>3</td>
<td>-ì (U)</td>
<td>-nà (BA)</td>
</tr>
<tr>
<td></td>
<td>-nì (l.l)</td>
<td>-nù (l.l, A)</td>
</tr>
</tbody>
</table>

Comparison with the subject prefixes above reveals that the onset of most of the non-prefixed pronouns is a nasal whereas it is a voiced consonant or completely absent in the prefixed pronoun (n vs. l, m vs. b, n vs. ŋ) – with the exception of the 1st person plural which has the same labial stop in both occurrences.

(23) bù-nàmbì bù-nỳò bù-të-bì-ì.
   U-boy U-DET U-NEG-hit-U
   'The boy didn’t hit him.'

Leaving position and tone aside, two other features distinguish the verbal affixes in subject and object function. First, while overt subject reference by a verb affix is very common and obligatory in most sentence constructions, object reference is comparatively rare and the conditioning factors for its occurrence still need further study. Second, although the object pronoun immediately follows the verb stem, it is not subject to [ATR] based vowel harmony, as example (24) shows.

(24) ù-të-mà ù-sè.
   U-give-BA A-goat
   'He gave them a goat.'

4. Conclusion

In this paper I have focussed on a phonological trait of Lelemi which is found in several African languages (cf. van der Hulst & van de Weijer 1995;511) including Kwa, however with the notable exception of Gbe languages (cf. Clements & Rialland, in press): the [ATR] based vowel harmony operating stem-controlled up to the word-level. Based on previous descriptions and somewhat adapted analyses of vowel harmony phenomena, it has been shown that despite the fact that at the surface, Lelemi provides only seven oral vowel phonemes, the language has been able to retain its underlying system of nine oral vowels, i.e. it is adhering to a system including the [ATR] high vowels /i/ and /u/. With respect to its vowel harmony system, Lelemi thus fits well with other Potou-Tano languages, but not with Ewe, the neighbouring and regionally important Gbe language.

During this initial study, it has emerged that it is the prefixes prevailing throughout the language which primarily harmonize, but in how far derivational suffixes and other components regularly applied in word formation and composition are also subject to vowel harmony is a matter still pending for investigation.

Certain harmony irregularities, like the at first sight unmotivated use of [-ATR] prefixes with a subgroup of stems containing opaque [+ATR] vowels and the so-called 'reduced' vowel harmony at certain prefixes, were identified as remnants of the basic cross-height [ATR] vowel harmony model. In fact, the 'reluctance' of high vowel prefixes to harmonize with [-ATR] stems according to the new 7-vowel stan-
dard (/U → /I rather than /s/) can also be regarded as an instrument to maintain the presumably inherited height-crossing property rather than representing a threat for the overall system.

List of abbreviations

ATR advanced tongue root
DEM demonstrative
DJ disjunctive
DP default prefix
n.d. no data available
NEG negative
P Perfect
PL plural
prox proximal
QU qualification
REL relative
SG singular
TAMP Tense/Aspect/Modality/Polarity

References