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VOWEL HARMONY IN GURENƐ

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Abstract

This paper discusses vowel harmony; a type of assimilatory process in Gurenɛ (Mabia language), within the Autosegmental phonology framework (Goldsmith 1976, 1990, Clements 1977). The phenomenon exists in many African languages and has received descriptive analyses in previous studies on Gurene (see Azagesiba 1977, Dakubu 1996, Nsoh 1997, Adongo 2008). These works were however limited in scope and lacked theoretical grounding. This paper employs the feature spreading approach within Autosegmental phonology to characterise cases in which segments share the same specifications or assimilate to a feature or a group of features (Ewen &Van der Hulst 2001: 30-31). For instance, in Gurenɛ, vowels in a specific harmonic domain in any given word are either all [+ATR] or all [-ATR]. Data for this study was collected through recording of utterances of twelve native speakers from six Gurenɛ speaking communities in the Upper East region of Ghana. Our findings showed that vowels in Gurenɛ words are strictly governed by vowel harmony rules. Therefore, only vowels of the same qualities or features [±ATR] can co-occur in words. Consequently, we confirm that ATR harmony operates at two levels in Gurenɛ: the root and the suffix in the domain of a word. We show that vowel harmony operates all through; from CVCV to multisyllabic words. Even though there are cases when harmony is blocked and does not operate across word boundaries particularly in compounds, the paper established that many Gurenɛ loanwords and compounds are governed by vowel harmony rules. We also found out that the language has vowel-consonant harmony and rounding harmony.

Keywords: Gurenɛ, vowel harmony, autosegmental, phonology, assimilation

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1.0 Introduction

Harmony is a widespread phenomenon in which all phonological segments of a particular type within a particular domain (the morpheme, the stem, the word, etc.) are required to agree with respect to some phonological property (Hansson 2001). Hansson posits that within morphemes, harmony manifests itself as a static co-occurrence restriction that prohibited disharmonic combinations but allows harmonic ones. Hansson explained further that however when harmony reaches beyond the confines of individual morphemes, it can be directly observed 'in action', as it results in assimilation. A potentially disharmonic combination is made harmonic by forcing one segment to agree with another in the phonological feature in question.

Generally, harmony processes regulate the distribution of a given feature or feature complex in specific but not necessarily contiguous phonemes of a word. For example, in Finish words the back-front contrast in rounding, and in low vowels agree with that of the stem, whereas in Navaho words the contrast of anterior- non-anterior in coronal affricates and continuants is determined by the last coronal affricate or continuant in the word (Halle & Vergnau 1981).

The analysis of vowel harmony has been a major focus of generative research because it exhibits many of the 'action-at-a-distance' properties displayed by tone. On the nonlinear representation of vowel harmony, autosegmental approach captures the basic insight of the root-marker theory, which says that the harmonic feature is a property of the entire root morpheme rather than any one of its individual vowels. Since autosegmental representation permits a one-to-many relation between features and positions in a string, harmonic contrast may be represented in phonological terms with each root lexically selecting a [+ATR] or a [-ATR] specifications. The harmonic feature is represented on an autosegmental tier separate from the other features and the universal association convention (UAC) associates the autosegment to the leftmost or rightmost relevant segment which is usually a vowel (Kenstowicz 1994).

The paper discusses vowel harmony, in the Gurenɛ dialect of the Farefari language. The phenomenon is reported in many Mabia languages such as Dagaare, Kusaal, Dagbani, Buli, Gurenɛ, Nankarɛ, Dagaare, Dagbani, Kusaal and Sisaali (Bodomo & Abubakari 2017, Musah 2017, Abubakari 2018, Apeligiba 2015). Vowel harmony is a phonological process in which the vowels in a given domain share or harmonise for a particular feature. It differs from other processes affecting adjacent vowels such as umlaut in that typically all the vowels of the language participate in the harmonic constraint within the domain of usually the word. Features such as vowel height, backness, rounding, nasality, and pharyngeal

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opening or [ATR], which are used to distinguish vowels, are said to be part of a harmonic system (Kenstowicz 1994**)**. Data for this study was collected through recording of utterances of twelve native speakers from six Gurenɛ speaking communities in the Upper East region of Ghana. Secondary data came from the Gurenɛ dictionary, glossary, and student works at the Department of Gur-Gonja Languages Education of the University of Education, Ghana. Various types of harmony in Gurenɛ are discussed in the next section. Among the types of harmony are vowel harmony, consonant harmony, vowel-consonant harmony and nasal place harmony. The domain of harmony in Gurenɛ is the phonological word, which in terms of its morphology consists of the root and suffix (see Dakubu 1996). We employed autosegmental representations to demonstrate that plural suffixation, loanword adaptation and compounding may be governed by vowel harmony.

1.1 Background of the language

Gurenɛ is one of the five major dialects of Farefari (Frafra) spoken in the Upper East Region of Ghana (Atintono 2004, 2013, Nsoh 1997, 2011, Apeligiba 2015, Adongo 2013, Atipoka 2008, Dakubu 1996, Naden and Schaefer 1973). The language stretches into Burkina Faso where it is called Nikãrɛ or Nankarɛ (Nsoh 2011, Apeligiba 2015). It is a Mabia (Gur) language and a member of the Niger-Congo language family. The Farefari speaking area is boarded by other Mabia languages such as Kusaal (in the East), Moore (in the North), Mampruli (in the South), and Kasem and Buli (in the West). It has a population of about 441,059 (2010 Population and Housing Census).

Relatively, Gurenɛ has received a lot of linguistic literature, as most of the studies in Farefari seem to focus on this dialect. Some previous phonological studies on Gurenɛ include Adongo's (2008) 'Spectrographic analysis of Gurenɛ short oral vowels', which gives an acoustic description of short oral vowels of the five dialects of the Farefari language namely Boone, Gurenɛ, Nabt, Nikarɛ and Talen. Adongo compared vowels of the five dialects, produced by male and female speakers as well as young and old adult speakers. She also performed ANOVA test on the data and compared the results for levels of significance. To check similarities and differences in the vowel quality, paired-sampled Test was performed on seven pairs of vowels for all the dialects. The data were recordings of utterances of sixty speakers and the adaptive dispersion theory was used to account for the vowels of the specific dialects and the language as a whole. Adongo's findings show that vowels of four dialects (Boone, Gurenɛ, Nabt and Nikarɛ) seem to occupy eight areas in the vowel space because [ʊ] and [o] were close to each other in the vowel chart. However, Tongo speakers' vowels and the vowels of the Gurenɛ language, in general,

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occupy nine areas with [ʊ] and [o] close to each other. She explained that the front vowels follow a similar pattern in all the dialects while the back vowels show some inconsistencies. Bodomo and Hasiyatu (2017) compared some features of five Mabia languages (Buli, Dagaare, Dagbani, Gurenɛ, Kusaal). These features include the sound systems, tone, noun-class systems, and serial verb construction. In their discussion of the consonant phonemes of these languages, the authors claim that most of the consonants are common to all the languages with few instances of differences. For instance, only Buli lacks the glottal stop /ʔ/, only Kusaal lacks the affricates /tʃ, dʒ/, while Gurenɛ and Buli do not have the glottal fricative /h/, with Gurenɛ lacking the labial velars /pk, gb, ŋm/. However, Bodomo and Hasiyatu's claim that Gurenɛ does have labial velars and the glottal stop is contrary to what has been attested in previous studies that the labia-velar consonants (/pk, gb, ŋm/) are part of the Gurenɛ consonant inventory (Dakubu 1996, Nsoh 1997, 2011, Atintono 2011, 2013, Atipoka 2008, 2018 – forthcoming).

Bodomo and Hasiyatu (2017) also presented eight oral vowel of Gurenɛ as /i, e, o, u ι, ɛ, ɔ, a/ and six nasal vowels as /ĩ, ũ ɩ̃, ɛ̃, ɔ̃, ã/. Again, this finding is contrary to the findings of previous studies, which confirm that Gurenɛ has nine oral vowels and seven distinct nasal vowels of which all the oral vowels may be nasalized in the environment of nasal consonants (Dakubu 1996, Nsoh 1997, 2011, Atintono 2011, 2013, Atipoka 2008, 2018 – forthcoming).

Another work on Gurenɛ is 'the prosodic features of the Gurenɛ verb' (Dakubu 2006). The paper described accent, tone, and the glottal stop within the Gurenɛ verb. With minimal pairs of the patterns H/L, H/HL, L/HL and LH, Dakubu demonstrated that tone is contrastive in Gurenɛ, both lexically and grammatically. However, she claimed that there are no minimal pairs of LH pattern in the language. On Gurenɛ word accent, Dakubu indicated that the first syllable of any lexical stem (noun, verb, adjective or adverb) without a prefix can carry accent and the glottal stop.

Other related works on Gurenɛ include brief descriptions of the syllable structure of Gurenɛ (Dakubu 1996, Atintono 2011 and Nsoh 1994) and some description of the tone of Gurenɛ (Dakubu 1996, 2006) and Atintono (2004, 2011, & 2013). There is also a brief description of the phonology and clause of the Zuwɔrenɛ sub-dialect, (Schaefer, Robert 1974/75, Schaefer, Nancy 1975).

Some work has also been done on the grammar of Gurenɛ (Dakubu 1996, 2006, Nsoh 1997, 2002, 2010 & 2011, Atintono 2011, 2013) and the bilingual Gurenɛ-English dictionary and the English-Gurenɛ Glossary (Dakubu et al. 2007).

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1.2 Statement of the problem and theoretical framework

Vowel harmony requires that, vowels in the word, which is the harmonic domain share the same value of some vowel feature, known as 'harmonic feature'. Harmonic features may include [±ATR], [±back]. In this work, harmonic domain is defined as the phonological word. In the case of Advanced Tongue Root (ATR) harmony, the harmonic feature is [ATR]. For instance, in languages with ATR harmony where some of the vowels usually have the property [+ATR] while others have the property [-ATR], vowels in a specific harmonic domain in any given word are either all [+ATR] or all [-ATR].

Vowel harmony exists in many African languages and has been described in previous research works in Gurenɛ (see Azagesiba 1977, Dakubu 1996, Nsoh 1997, Adongo 2008). These works were however limited in scope and lacked theoretical grounding. This work therefore, aims at providing a more comprehensive treatment of the phenomenon and thereafter employ the autosegmental phonology as a nonlinear approach to characterise cases in which segments share the same specifications for a feature or a group of features. With the support of the autosegmental theoretical approach and in contrast to the linear approach employed in earlier analyses, we were able to account for [±ATR] feature spreading and others that are non-linear features. The study contributes to the literature on vowel harmony especially in providing evidence for generalisations within autosegmental phonology.

Autosegmental phonology (Goldsmith 1976) began as a theory of tone in which tones are not regarded as features of vowels but as separate, autonomous units that have a separate level, or tier of representation, which are related to segments by rules of association. According to Kenstowicz (2006), in this theory, there are conditions governing a well-formed association of tones and vowels such as one-to-one mapping and from left-to-right without unassociated tones or vowels deriving the surface patterns by simple rules operating in local environments. Instead, tone stability occurs; since tones are autonomous, when a vowel is deleted, the tone persists on its own tier and maps to an adjacent syllable to ensure maximal association. Phenomena such as stress, the syllable, vowel harmony (Clements 1976) and nasalisation, which could not be represented in SPE were addressed in generative phonology in order that phonological processes could be expressed in autosegmental terms (Hyman 1982 cited in The Routledge Linguistics Encyclopaedia, 2010, Clements & Keyser 1983).

Hence, vowel harmony, which involves two vowels showing agreement in the values for a particular feature can be represented within this theory of autosegmental phonology using feature spreading. For instance, using the feature [ATR] within the

domain of a word in a language, all vowels in a word must have the same value for a particular feature [±ATR] (Ewen &Van der Hulst 2001: 46).

For non-linearity, Goldsmith (1976) proposed that phonological representations should be composed of multiple tiers of segments, which correspond to the different gestures of speech and differ according to the features that are specified for the segments on them. So that, different features may be placed on separate tiers. Hence, three tiers/levels of representation linked by association lines are employed as follows;

- The feature tier (harmonic tier), which is represented as **ATR**
- The skeletal tier is represented as **X -** the intermediate tier that links segments on the feature tier to segments on the segmental tier
- The segment tier is represented as **Sec -** features are assigned to segments by association lines.

Based on the well-formedness condition for Vowel harmony, all vowels are associated with the harmonic feature with lines that link segments on the feature tier to segments on the segmental tier **(**association lines) defined as follows;

- A solid association line indicates pre-linking.
- A broken association line indicates active linking (by means of spreading).
- A crossed-through association line shows delinking or disassociation
- Brackets show the boundaries of a phonological form.

In the autosegmental representations, assimilation is represented by spreading a feature from one anchor to another, represented by a broken association line.

2.0 Methodology

Data for the research was collected from both primary and secondary sources. For the primary data, we consulted and recorded utterances of twelve native speakers who have spent most part of their lives in the language area. They comprised 6 females and 6 males with their ages ranging between twenty and sixty. This was to maintain gender balance as well as check variations in the pronunciations of old and young speakers of the language. Seven of them were teachers, two farmers, two traders and one high school dropout. However, all the speakers were Gurenɛ lectors in their respective churches. The participants come from six towns, which include, Zʊwɔreŋɔ (which is to the East of Bolgatanga), Tɩndʊʊmɔlegɔ (to the South), Namʊʊ (to the North), Sʊregɔ (West), Zɔkɔ and Sumbrungo

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(to the North-West of Bolgatanga). The selection was to enable us ascertain whether the vowel harmony occurred in the sub-dialects in the language. The speakers were selected based partly on their ability to read in the language. They were given a list of minimal pairs and phrases to read and their utterances were recorded. Recording was done in a quiet and secluded area in order to minimise noise. Thereafter the data was cleaned, transcribed and translated into English. The secondary source of data was collected from the Gurenɛ-English dictionary. In addition, the researchers' intuitive knowledge of the language as native speakers was useful.

3.0 The Gurenɛ syllable

In the sections that follow, we consider syllable structure and vowel harmony in the language. The commonest syllable type is the CV (Azagsiba 1977, Schaefer 1975, Dakubu 1996). This has been reported as the most occurring syllable in Mabia languages. The vowel in this syllable type may be lengthened in some phonetic environments to CV: in some word forms (see Atintono 2004, 2011). We also observed that other syllable types such as CVC, CVCC, CVN, V, VN also occur in more restricted contexts. These syllables may function in mono-syllabic and poly-syllabic/multi-syllabic structures. In this paper, we discuss vowel harmony in disyllabic and poly-syllabic structures. In addition, harmonisation between the root and suffix vowels is also considered. Thereafter, the various harmony types including [±ATR], rounding and backness harmony and high-low harmony, are discussed. Alongside the description of the vowel harmony types, vowel harmony processes are captured in autosegmental representations.

4.0 Vowel harmony in Mabia

It has been observed that vowel harmony is a feature of mostly Niger-Congo languages and of some Nilo-Saharan languages (Welmer 1973, Mutaka 2000). Since Mabia languages are a subgroup of the Niger-Congo, it is therefore not surprising that the phenomenon is common among languages of this group. It is very noticeable in Kasem, Vagla, Sissali, Safaliba, Koulango, Dagaare, Kusaal, Dagbani, Buli, Gurenɛ and many other languages of this group (Bendor Samuel 1971, Naden 1989, Bodomo 1997, Schaefer 2003, Elders 2008, Bodomo & Abubakari 2017, Musah 2017, Abubakari 2018). It is also widely reported in other Ghanaian languages such as Akan and Ewe (see Dolphyne 1988, 2006, Clements 1985). Among Mabia languages, various vowel harmony types such as ATR, height,

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rounding, vowel-consonant harmony also operate. These features may derive either from a segment or may be a floating one.

4.1 Gurenɛ Vowel Harmony

The earliest known work that discussed the Farefari vowel was Rapp (1966). He identified ten vowels including the schwa. There was, however, no indication that the phenomenon existed in the language. Schaefer (1975) was completely devoted to field notes collected on the phonology of Farefari. The vowel constituted much of the discussion but there was no mention of vowel harmony. Vowel harmony in Farefari was probably first reported in Azagesiba (1977). Since then the phenomenon has been discussed in recent works (Dakubu 1996, Nsoh 1997, Adongo 2008, Atintono 2011). The approach has been descriptive. The emphasis has also been on the [±ATR] harmony.

   In Gurenɛ just like most languages with vowel harmony, the vowels fall into two harmonic sets, [+ATR] and [-ATR] (see Stewart 1967, Dolphyne 1988, Dakubu 1996, Akanlig-Pare 2002, 1994). Gurenɛ has a nine-vowel system which consists of four [+ATR] vowels and five [–ATR] vowels and harmony is triggered by stem vowels. With the exception of /**a**/ which does not have a [+ATR] counterpart, all the four [–ATR] vowels have their [+ATR] harmonic counterparts as shown in (1).

(1) a.   **[+ATR]**   b.   **[-ATR]**
     i   **u**   ɪ   ʊ
     e   **o**   ɛ   ɔ
                 a

In the language, only vowels of the same quality or features can co-occur in a word. In other words, words in which [+ATR] vowels are, [-ATR] vowels do not occur and vice versa as shown in the following examples;

(2) a. [+ATR] gloss   b. [-ATR] gloss
   [pirǝge] 'to cut open'   **[pɪrǝgɛ]** 'to untwist/untie'
   [pugǝlum] 'to create filth'   **[pʊgǝlʊm]** 'to appear as a boil on part of the
                      body'

   [kolǝgo] 'personal shrine'   **[kɔlǝgɔ]** 'a local spice'

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Nouns and adjectives do not permit the occurrence of the high front vowels [ɪ, i] in final position while verbs do not license [ʊ, u, ɔ] in that position. This type of harmony may mimic the high-low harmony mentioned in Bendore-Samuel (1971:154) in which highs only follow highs or low vowels and low vowels may only follow a low but never a high vowel.

4.1.1 Vowel harmony in CVCV words

In this section, we discuss vowel harmony in CVCV syllable structures. These syllables occur in all four major word classes and some minor classes. The vowels in both syllables are constrained to agree in tongue root features as illustrated in (3) below.

(3) a. **[+ATR]**
[pike] 'to catch a person in an act'
[weke] 'to hatch'
[kuko] 'heap'
[yoko] 'a hole'

  b. **[-ATR]**
[pɪkɛ] 'open one's eyes'
[wɛkɛ] 'divide by breaking'
[kʊkɔ] 'ghost'
[yɔkɔ] 'clay'

In the above examples, all the vowels in the words agree in the feature [±ATR]. Thus, all the vowels in examples (3a) are [+ATR] while those in examples (3b) are [-ATR]. The data also show that the feature [ATR] is phonemic in Gurenɛ, particularly in CVCV as shown in the above examples (3).
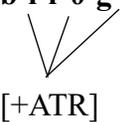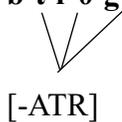
4.1.2 Vowel harmony in polysyllabic words

Vowel harmony not only operates in disyllabic words in Gurenɛ but also in multisyllabic words. In multisyllabic words, all the vowels agree in the feature [±ATR] and other features with medial vowels occurring as neutral vowels as in (4) and (5) below:

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                        [+ATR]

(4)   a. **/birigo/ [birəgo]** 'stammer'

                  b**. /pelege/ [peləge]** 'to become white'

                  c. **/goroge/ [gorəge]** 'raise your head'

                  d. **/du:rusi/ [du:rəsi]** 'guitar '

                        [-ATR]

(5)   a**. /bɪrɪgɔ/ [bɪrəgɔ]** 'type of vegetable'

                  b. **/pɛrɛsɛ/ [pɛrəsɛ]** 'to iron'

                  c. **/gɔrɔgɔ/ [gɔrəgɔ]** 'bed'

                  d. **/dʊ:lɪsʊ/ [dʊ:ləsʊ]** 'members of the dʊʊləgɔ community'

The data above show that ATR harmony in multisyllabic words is between stem and suffix vowels, with the schwa being neutral to harmony. In the underlying forms, the stem vowel spreads their [±ATR] feature onto following vowels. However, in the output forms, the word medial vowels are realized as neutral and transparent to harmony. Therefore, it is observed that suffix vowels harmonise with the stem vowels in ATRness from the left to the right as in the examples above. Examples in (6) are non-linear representations showing the occurrence of schwa with [+ATR] and [–ATR] vowels respectively in multisyllabic words:

                   [+ATR]   **[-ATR]**

(6) a.   **b-i-r-ə-g-o** 'stammer'   b.   **b-ɪ-r-ə-g-ɔ** 'type of vegetable'

                              \\/   \\/

                   [+ATR]   **[-ATR]**

It may be observed from harmonisation in disyllabic and polysyllabic words that various harmonic forms may occur. For instance, in terms of vowel height, high vowels may co-occur, just as do low vowels. Alternatively, vowels with height differences may also co-occur in the same word. Similarly, vowels with rounding qualities may function in different combinations in words. All these examples may be in (4) and (5) above. We discuss some of these harmonisation features in subsequent sections.

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4.2 Neutral vowels

As stated earlier, the [**a**] vowel may co-occur with any of the harmony sets but has [-ATR] features and therefore belongs to the [-ATR] set. In word-medial position vowels may sometimes be realized as schwa [ə]. The two vowels, [ə] and [**a**], are therefore considered as neutral in the harmony process even though [a] belongs to one harmony set but the schwa does not belong to any of the two sets. According to the neutral vowel theory of Van der Hulst and Smith (1986) cited in (Polgárdi 1998), neutral vowels belong to one of the two vowel sets defined by harmony and co-occur with vowels of both harmonic sets. That is, they themselves (neutral vowels) either possess the harmonic feature or they lack it. So that, neutral vowels that possess the harmonic feature are transparent, whereas neutral vowels that lack the harmonic feature are opaque (Hulst & Smith 1986 cited in Polgárdi 1998). In our particular case, these vowels are transparent to the vowel harmony process and tend to co-occur with both sets of vowels. Also, these vowels do not trigger or undergo the process of harmonisation even though [**a**] possesses the [-ATR]. Both vowels are therefore neutral vowels from their behaviour in the harmonic domain. Below are words with Gurenɛ neutral vowels ([**ə**] and [**a**]) co-occurring with [+ATR] vowels in (7) and [-ATR] vowels in (8):

(7)   **Neutral vowels and [+ATR]**
            a. /**mitiŋa**/   [**mitəŋa**] 'straw'
            b. /**muka**/   [**muka**] 'in full'
            c. /**kuliga**/   [**kuləga**] 'act of going home'
            d. /**bakologo**/   **bakoləgo** 'community intercessory shrine'
            e. /**pelege**/   **peləge** 'shame a person'
            f. /**gulugo**/   **guləgo** 'a kind of drum'

(8)   **Neutral vowels and [-ATR]**
            a. /**sɪtʊŋa**/   [**sɪtəŋa**] 'chisel'
            b. /**mɔka**/   [**mɔka**] 'termites'
            c. /**kʊlɪga**/   [**kʊləga**] 'stream'
            d. /**dakɪrɛ**/   [**dakərɛ**] 'poem'
            e. /**kɔlɔgɔ**/   [**kɔləgɔ**] 'dawadawa spice'
            f. /**wʊsʊgɔ**/   [**wʊsəgɔ**] 'many, several'

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Non-linear representations of the co-occurrence of /**a**/ with [+ATR] and [–ATR] vowels respectively in (9) below:

(9)   a.   **k-u-l-i-g-a**   b.   **k-ʊ-l-ɪ-g-a**

            [+ATR] [-ATR]   **[-ATR]**
            'the act of going home'   'stream'

In (9a), even though [a] belongs to the [-ATR] vowel set, it co-occurs with the [+ATR] vowels /**u**, **i**/ which are in a different set. Therefore, its association line is distinct from the two vowels. That is, /**u & i**/ are associated with the [+ATR] feature, while /**a**/ is associated with the [-ATR] feature. In (6b) on the other hand, the stem vowels are [-ATR] just like the [**a**] vowel. Consequently, all three association lines are connected to the same [-ATR] feature.

4.3 Vowel harmony and suffixation in Gurenɛ

Gurenɛ is a suffixing language (Nsoh 1997, 2010, 2011, Atintono 2004, 2010). Stems of all four major word classes and some minor ones take suffixes. It is only in very restricted cases that nouns may take prefixes and they are all derivational affixes in all cases. With the exception of monosyllabic words, all other stems must carry affixes. In nouns and adjectives, they are class affixes marking noun class, number, and gender, while in verbs they are tense and aspectual markers. Thus, in disyllabic nouns and verbs, for instance, the second syllable is an affix. Examples are:

(10) a. **di** 'to eat'   b. **di-ti** 'eat-PROG'
(11) a. **baa** 'dog'   b. **baa-sɪ** 'dog-PL'

In these examples, the second syllable in ***diti*** and ***baasɪ***, is the suffix while the first syllable is the stem. Hence, ***diti*** has [-**ti**] as its progressive marker while in baasɪ, [-**sɪ**] marks plural. Vowels of both suffixes, however, agree in the feature [±ATR] with vowels of the verb and noun stems respectively. Words are therefore usually analysed as stem + affix in the language.

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ATR harmony has been observed to operate across morpheme boundaries in the language. In this process, suffix vowels harmonise with vowels of the roots in ATRness. Harmony therefore, propagates from the stem onto suffixes resulting in progressive harmony. Vowels of singular and plural morphemes in nouns, tense and aspect markers in verb for instance, agree in the feature [±ATR] with the vowels of the stems to which they are affixed. The examples in (12-14) are all nouns grouped according to noun classes (see Dakubu 1996, Azagsiba 1977:41, Nsoh 1997, 2002, 2011) with singular and plural markers in italics.

(12) a.   **[+ATR]**

	Singular		**[-*si*] plural**
	/**pesego**/	[**pesəgo**]	[**pĩisi**] 'sheep'
	/**niiŋa**/	[**nĩiŋã**]	[**nĩisi**] 'bird'
	/**zu'a**/	[**zũʔã**]	[**zũʔũsi**] 'fly'
	/**buliga**/	[**buləga**]	[**buləsi**] 'well'
	/**duŋa**/	[**dũŋã**]	[**dũsi**] 'animal'

                                           [-ATR]

	Singular		**[-*sɪ*] plural**
b.	/**bʊa**/	[**bʊa**]	[**bʊʊsɪ**] 'goat'
	/**sʊ'a**/	[**sʊʔa**]	[**sʊʔʊsɪ**] 'knive'
	/**lʊŋa**/	[**lʊŋã**]	[**lʊsɪ**] 'drum'
	/**bɔka**/	[**bɔka**]	[**bɔgəsɪ**] 'stream'
	/**sɛ̃ka**/	[**sɛ̃ka**]	[**sɛ̃ɣəsɪ**] 'corners'

(13)   **[+ATR]**

	Singular		**[-*ro*] plural**
a.	/**to'o**/	[**toʔo**]	[**toʔoro**] 'baobab fruit'
	/**mu'o**/	[**muʔo**]	[**muʔuro**] 'type of fruit'
	/**yoko**/	[**yoko**]	[**yogəro**] 'hole'

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		[-ATR]		
	Singular		**[-*rɔ*] plural**	
b.	/dɔɔ/	[dɔ:]	[dɔ:*rɔ*]	'wood'
	/sɔɔ/	[sɔ:]	[sɔ:*rɔ*]	'broom'
	/yɔɔ/	[yɔ:]	[yɔ:*rɔ*]	'grave'

(14)

		[+ATR]		
	Singular		[-*to*] **plural**	
a.	/fuo/	[fu*o*]	[fu*to*]	'dress'
	/deo/	[de*o*]	[de*to*]	'room'
	/zonko/	[zon*ko*]	[zon*to*]	'hair'
	/zuo/	[zu*o*]	[zu*to*]	'head'

		[-ATR]		
	Singular		[-*tɔ*] **plural**	
b	/gɔrɔgɔ/	[gɔrəgɔ]	[gɔ*tɔ*]	'bed'
	/bɪrɪgɔ/	[bɪrəgɔ]	[bʊ*tɔ*]	'veg'
	/dɔrɔgɔ/	[dɔrəgɔ]	[dɔ*tɔ*]	'ladder'
	/va'am/	[vaʔam]	[vɔ*tɔ*]	'farm'

(Azagesiba 1977, adopted and modified)

4.4 Vowel harmony in verbs

Harmony is also observed in verbs and across morpheme boundaries just like the nouns as shown above. Again, we observe harmony between the stem verb and its suffix, where the stem vowel determines the harmonic feature of the suffix. Hence, all vowels in (15) are [+ATR], while all vowels in words of example (16) are [-ATR]:

(15)   [+**ATR**]

Verb		Progressive form	
[dige]	'to drive someone away'	**[digeri]**	'to drive someone away'
[tuke]	'to drive a car'	**[tukeri]**	'driving a car'
[buke]	'to carry on the shoulder'	**[bukəri]**	'carrying on the shoulder'
[lorege]	'to untie'	**[loregəri]**	'untying'
[pirege]	'to cut open'	**[piregəri]**	'cutting open'

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[firege] 'to open eyes widely' **[firegəri]** 'opening the eyes widely'
[turege] 'to thrust' **[turegəri]** 'thrusting'

In (15), the suffix is [-ri] with its harmonic feature as [+ATR], harmonises with the [+ATR] harmonic feature of the stem vowels.

(16) [-**ATR**]
a. Verb b. Deverbal
dɪkɛ 'to take' dɪkərɛ 'the act of taking'
tʊkɛ 'bring down from the head' tʊkərɛ 'to bring down from the head'

bʊkɛ 'to guess' bʊkərɛ 'the act of guessing'
kɔrɛgɛ 'to slaughter' kɔrɛgərɛ 'the act of slaughtering'
pɪrɛgɛ 'to unshell by rubbing the fingers' pɪrɪgərɛ 'the act of unshelling'
fɪregɛ 'to remove seed from its covering' fɪrɪgərɛ 'the uncovering of a seed'
tʊregɛ 'to bruise' tʊrɪgərɛ 'bruising'
tɪregɛ 'to put in effort' tɪrɪgərɛ 'the act of putting in effort'

In example (16), the suffix [-**rɛ**] is a nominaliser, which derives deverbal nouns in (b). The vowel of the suffix harmonises with the stem vowels in the feature [-ATR]. This kind of harmony is referred to as symmetric vowel harmony system (Azagsiba 1977:41; also see Aoki 1968) where the vowels of the stem determine the series of vowels in the whole word.

4.5 Harmony in loanwords

All human languages are replete with examples of languages borrowing from one or more languages (Bloomfield 1933, Thomason & Kaufman 1991, Payne 1997, Nsoh 1997). Borrowed or loans words are therefore a major component of the lexicon of all natural languages. It is also known that less known languages borrow from dominant languages. For instance, Akan and Hausa are very widely used as lingua franca in Ghana, while English is the national language. This complex linguistic demographic situation that Farefari finds itself has resulted in extensive borrowing into the language. However, as the words are borrowed into the language they become integrated phonologically and morphologically into the language (Ayambire 1980, Nsoh 1997:54-60). These include among other features integration into the phonotactics, vowel harmony system, tone and

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nasalisation. Morphologically, they may develop affixes including noun class and other inflectional affixes.

Vowel harmony is one major feature that loanwords adopt in the language. Gurɛnɛ loanwords are governed by vowel harmony rules. In Gurɛnɛ as in many other languages, loanwords are mostly from the noun class. Consequently, our examples are taken from this part-of-speech. All vowels in loanwords in Gurɛnɛ harmonise in the feature [±ATR] as shown in the following example;

	[+ATR]	
(17) a.	**[teebule]**	'table'
	[alopele]	'aeroplane'
	[sukuu]	'school'
	[torogo]	'push truck'
	[foote]	'photo'
	[bilete]	'blade'
	[loore]	'lorry'
	[asibitin]	'hospital'

	[-ATR]	
b.	**[tɛɛla]**	'tailor'
	[pʊləŋa]	'police'
	[aŋkɪtɛ]	'handkerchief'
	[bɔgɔtɛ]	'bucket'
	[dɔɣɔta]	'doctor'
	[wʊdɔba]	'rubber'
	[kɔpɪ]	'cup'
	[bɔlɪpɪ]	'bulb'
	[dɔləba]	'driver'

4.6 Harmony in compounds

Compounding is a regular morphophonological process in most languages. The phenomenon is very widespread in Gurɛnɛ (Dakubu 1996, A-inkonge 2013, Nsoh 1997, 2011). Vowel harmony is again observed in Gurɛnɛ compounds. Vowels of both constituents of the compound agree in [±ATR] feature. In the language, compounds may

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be composed of only nouns, noun + adjective, noun + verb, verb + adjective or only verbs. However, noun-noun and noun-adjective compounds are more recurrent than other forms. (18) is an illustration of ATR harmony in noun-noun compounds.

(18)   **ATR harmony in Noun-compounds**

a,   [+ATR]
        /deo/   +   tine/   →   [detine] 'hut'
        /kʊʊrɛ/   +   yire/   →   [kuyire] 'funeral house'
        /zom/   +   ko'om/   →   [zonko'om] 'beverage made from millet'
        /kuto/   +   yefo/   →   [kutoyefo] 'bicycle'
        /deo/   +   bia   →   [deobia] 'cat'
        /duŋa/   +   fole   →   [dunfole] 'grazing land'
        /fuo/   +   nifo   →   [funifo] 'pocket'
        /pʊʊrɛ/   +   pee   →   [pʊpɛɛla] 'kind hearted person'
        /yire/   +   zuo   →   [yizuo] 'clan'

b.   [-ATR]
        /bʊdaa   +   pɔka/   →   [bʊdapɔka] 'manwoman'
        /sʊkaam +   pɔkɔ/   →   [sʊkaampɔkɔ] 'groundnut shell'
        /nɛra   +   saala/   →   [nɛrəsaala] 'human being'
        /ma'anɛ +   kɛ'ɛŋa/ →   [ma'ankɛ'ɛŋa] 'dried okro'
        /dãam   +   dʊkɔ/   →   [dãdʊkɔ] 'pito pot'
        /nʊa   +   dɔɔ/   →   [nʊdɔɔ] 'cock'
        /bʊa   +   tɩla/   →   [bʊtɩla] 'billy goat'
        /sagebɔ +   dʊkɔ/   →   [saɣədʊkɔ] 'TZ pot'

In examples (18a), the two constituents of the compound are nouns and the vowels of both constituents are [+ATR]. Hence, all the vowels in the compounds agree in the feature [+ATR] while in (18b), the vowels are [-ATR].

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(19)   **ATR harmony in noun-adjective compounds**

a.   [+ATR]
            kurega   +   **woko** →   **[kurə-woko]**
            trousers   +   long   'trousers'
            kurega   +   **girega** →   **[kurə-girega]**
            trousers   +   short   'shorts'
            zuo   +   **be'o** →   **[zube'o]**
            head   +   bad   'bad luck'
            pʊʊrɛ   +   **pee**   →   **[pupeelum]**
            stomach   +   white   'happiness'

b.   [-ATR]
            nɛra   +   **zaŋa**   →   **[nɛrə-zaŋa]**
            human   +   nothing   'a nobody'
            bɔʔɔ   +   **kʊŋɔ**   →   **[bɔ-kʊŋɔ]**
            room   +   big   'big room'
            buraa   +   **dabɛrɛ**→   **[bura-dabɛrɛ]**
            man   +   huge   'stout man'
            nɛra   +   **mɔlega** →   **[nɛrəmɔɔləga]**
            human   +   red   'fair in complexion'
            pɔka   +   **nya'aŋa** →   **[pɔɣənya'aŋa]**
            woman   +   old   'old woman'

In (19a), the compounds are made of noun-adjective and all vowels harmonise in [+ATR] while in (19b) the vowels are [-ATR]. What is common with (19a) and (19b) is that, in the formation of the compounds, syllable reduction, syllable deletion and vowel change occur in the first part of the compound. For instance, when the first part of the compound is monosyllabic with a long vowel, the final syllable deletes and if it is disyllabic, either the whole of the second syllable deletes or the final vowel changes to a schwa.
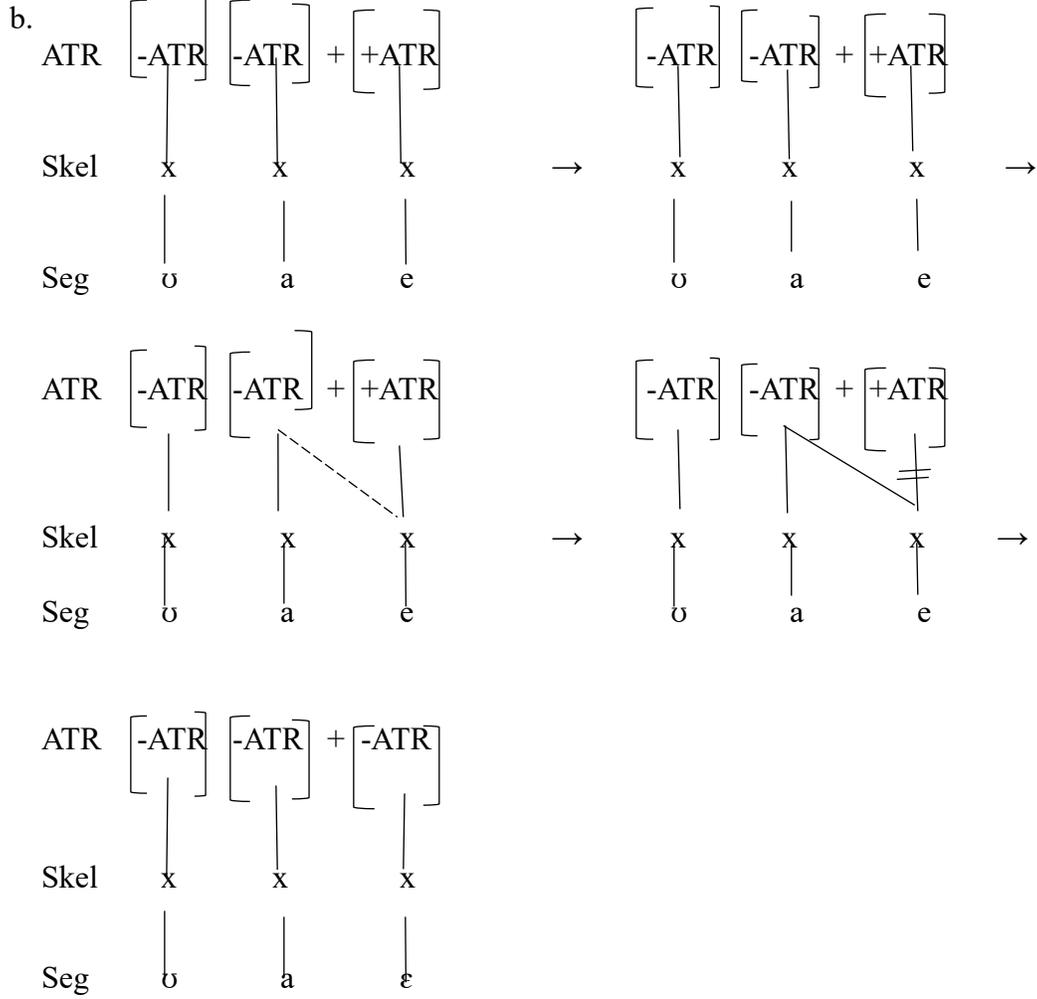
(20)   **ATR harmony in noun-verb compounds**

        a. **pɔka**   + **bɔ**   →   **[pɔgə-bɔrɛ]**
           woman   want   'courting'

_____

       b. **deo**   + **ga'arɛ** →   **[de-ga'arəgɔ]**
          room   + sleep →   'bedroom'
       c. **paləŋa**   + **ɛkɛ**   →   **[palən-ɛka]**
          heart   + jump →   'danger'
       d. **pɔka**   + **zoi**   →   **[pɔgə-zɔrɛ]**
          woman + run   →   'marriage'
       e. **kʊka**   + **delum**→   **[kʊgə-dɛləŋa]**
          chair   + lean   →   a chair with backrest'

Just like the noun-noun and noun-adjective compounds, harmony also manifest in the vowels of noun-verb compounds as shown in (20). In (20d & e), we observe spreading of the ATR feature. Vowels of the second stem assimilate to the [-ATR] feature of the first stem. For instance, in (20e), the vowels in the first stem *kʊka* 'chair' are [-ATR], while the vowels in the second stem *delum* 'to lean on' are [+ATR]. However, in the compound, the [-ATR] feature of the vowels of the first stem spreads onto the vowels of the second stem. Hence, the [+ATR] vowels [e & **u**] as in /delum/ change to the [-ATR] vowel [ɛ] plus the nominalising suffix [ŋa] as in [dɛlɛŋa]. This means that **/delum/** becomes **[dɛlɛŋa]** as illustrated in (20).

      In the autosegmental representations, assimilation is represented by spreading a feature from one anchor to another, represented by a broken association line as illustrated in (21b).

(21) a. /kʊka + delum/→ [kʊgə-dɛləŋa]

b.

ATR	[-ATR] [-ATR] + [+ATR]		[-ATR] [-ATR] + [+ATR]	
Skel	x x x	→	x x x	→
Seg	ʊ a e		ʊ a e	

ATR	[-ATR] [-ATR] + [+ATR]		[-ATR] [-ATR] + [+ATR]	
Skel	x x x	→	x x x	→
Seg	ʊ a e		ʊ a e	

ATR	[-ATR] [-ATR] + [-ATR]
Skel	x x x
Seg	ʊ a ɛ

_____

In (21), the [-ATR] feature of the vowels of the first stem spreads onto the vowels of the second stem as indicated by the broken association line. Also, a crossed-through association line is used to show delinking or disassociation of the [+ATR] feature. Hence, the vowels [e & u] as in /delum/ lose their [+ATR] feature and acquire the [-ATR] feature to become [ɛ] & [ə] plus the nominalising suffix **[ŋa]** which gives us the derivational form **[dɛlɛŋa].**

It may be observed that vowel harmony occurs both within and across constituents of the compound. In the vowel harmony process that has been discussed to this point, the simple word comprised of a stem and affix and is the harmonic domain. However, in cases where harmony occurs across word boundaries (constituents of the compound), vowels in both constituents of the compound agree in [±ATR] harmony. The following are examples of harmony across word boundaries in bold:

[+ATR]

(22)   a,   **/bia/   + /woko/** → **[biwoko**]
            'child + long   →   tall child'

[+ATR]

       b.   **/bia/   + /bila/** → **[bibila**]
            'child + little → little child'

_____

[-ATR]

(23) a. **/bʊraa/ + /mɔləga/ → [bʊramɔləga]**
man + red → 'fair in complexion man'

[-ATR]
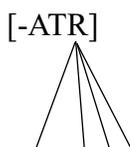
b. **/kɔma/ + /pɪgə-sʊ/ → [kɔmpɪgəsʊ]**
children + little → 'little children'

There are instances where harmony does not spread across two constituents of the compound. In other words, harmony is blocked at the end of the first constituent. Thus, harmony occurs only within constituents of the compounds. For instance, when vowels of the first constituent of the compound agree in the feature [+ATR], vowels of the second constituent will have [–ATR] feature and vice versa as shown in the following representations.

[+A] [-A]

(24) a. **/bia/ + /mɔləga/ → [bimɔləga]**
child + red → 'fair in comp. child'

[+A] [-A]

b. **/bia/ + sabɪlɪga → [bisabəlɪga]**
child + black → 'dark in comp. child'

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$$[-A] \quad [+A]$$

(25) a. **/bʊraa/ + /woko/ → [bʊrawoko]**
man + long → 'tall man'

$$[-A] \quad [+A]$$

b. **/kɔma/ + /bibəsi/→[kɔmbibəsi]**
children + little→ 'little children'

4.7 Rounding and backness harmony

The literature shows that languages that show rounding harmony usually also show harmony for another feature. Therefore, most languages that show rounding harmony, also show backness harmony (see Mutaka 2000:58). For instance, in the Niger-Congo languages like Dagaare and Chumburung (spoken in Ghana), and Igbo (spoken in Nigeria), rounding harmony is said to occur with ATR harmony (van der Hulst and van de Weijer 1995, Krämer 2003 cited in Rose & Walker 2011). This observation is applicable to the Gurenε data. For instance, the following examples demonstrate that ATR harmony occurs with rounding harmony and backness harmony.

		Singular		**plural**	**output form**	
(26)	a.	**/kʊkɔ/**	'ghost'	**/kʊɣɔrɔ/**	**[kʊɣərɔ]**	'ghosts'
	b.	**/dʊkɔ/**	'pot'	**/dʊɣɔrɔ/**	**[dʊɣərɔ]**	'pots'
	c.	**/yɔkɔ/**	'clay'	**/yɔɣɔrɔ/**	**[yɔɣərɔ]**	'clay'
	d.	**/lɔkɔ/**	'object'	**/lɔgɔrɔ/**	**[lɔɣərɔ]**	'objects'
	f.	boko	'pit'	/boɣoro/	**[boyoro]**	**'pit**
	g.	**yoko**	**'hole'**	**/yoɣoro/**	**[yoɣoro]**	**'holes'**
	h.	**fɛkɔ**	**'one eye person'**	**/fɛɣɔrɔ/**	**[fɛɣɔrɔ]**	**'one eyed person'**
	i.	**dɛkɔ**	**'dirt'**	**/dɛɣɔrɔ/**	**dɛɣɔrɔ**	**'dirts'**

Our assumption is that the singular noun serves as input to the plural noun. That means the singular noun suffix is visible to plural suffix. Therefore, rounding harmony in Gurenɛ is triggered in the plural suffix by the final vowel of the singular suffix vowel. The phenomenon is illustrated in (26) above and (27) below. Thus, it is unlike the [ATR] harmony which is triggered by the root vowel. For example, in (26h-i), even though the root vowel is /ɛ/ in both nouns, which is [-round], the plural suffix vowel is /ɔ/ in both plural nouns because it harmonises with the [+round] suffixes of the singular nouns. Thus, the examples of nouns manifesting rounding harmony occur between the singular suffix and the plural suffix vowels as shown in (26). Similarly, in (27) the vowels /i ɪ/ in the plural suffixes are [-Round] because the /a/ vowel in the singular suffixes are-[Round]. If the plural suffixes in **kʊɣə-sɪ** 'chairs' and **vuge-si** 'mounds' were to be triggered by the root vowel, then the suffix vowel will have been rounded as well.

		Singular	**plural**	**output form**	
(27)	a.	/daka/	/daga+si/	[daɣəsɪ]	'boxes'
	b.	/vaka/	/vaga+si/	[vaɣəsɪ]	'coop'
	c.	/paka/	/paga+si/	[paɣəsɪ]	'hut'
	d.	/kʊka/	/kʊga+si/	[kʊɣəsɪ]	'chairs'
	e.	/vuka/	/vuga+si/	[vugəsi]	'bed-farm'

Thus, in (27), the singular noun suffix vowel triggers rounding in the plural suffix vowel. The data also shows that the low unrounded vowel alternates with ATR vowels. When the low unrounded vowel /a/ occurs with [+ATR] vowels, the plural suffix vowel is realized as [+ATR], and when it occurs with [–ATR] vowels, the plural suffix vowel is realized as [–ATR]. In addition, the low vowel /a/ agrees with the plural suffix vowel in [±round] feature. Therefore, both the singular suffix vowel and the plural suffix vowel are [-round] in feature. Apart from nouns, rounding harmony also occurs between the verb and the deverbal nouns as shown in (28).

		Underlying form		**output form**
(28)	a.	/dɪkɛ/ 'to take'	/dɪkɪrɛ/	[dɪkərɛ] 'the act of taking'
	b.	/pike/ 'to discover'	/pikire/	[pikəre] 'the act of discovering'
	c.	/fike/ 'to break'	/fikire/	[fikəre] 'the act of breaking'
	d.	/pɪkɛ/ 'to open one's eye'	/pɪkɪrɛ/	[pɪkərɛ] 'the act of opening the eye'

_____

e.	/**puke**/ 'to powder'	/**pukere**/	[**pukəre**] 'the act of putting on powder'
f.	/**tuke**/ 'to drive'	/**tukere**/	[**tukəre**] 'the act of driving'
g.	/**fʊkɛ**/ 'to remove'	/**fʊkɪrɛ**/	[**fʊkərɛ**] 'the act of removing'

In (27), harmony is between the final vowel of the verb stem and final vowel of the deverbal noun. The final vowel of the suffix, which is also a nominalizing morpheme of the deverbal noun, harmonises with the final vowel of the verb stem in rounding. Thus, if the final vowel of the stem is [±round], the final vowel of the deverbal noun must also be [±round] including all other vowels in the word as illustrated above. Generally, the data on rounding and backness harmony show that initial stem vowels are not affected by harmony.

4.8 Vowel-consonant harmony

Consonant harmony is a kind of long-distant assimilation, usually across intervening vowels or consonants. In the vowel-consonant harmony process, vowels and consonants are required to agree with each other in a harmonic feature such as nasalization or pharyngealization (Hansson 2001). According to Hansson (ibid), vowel-consonant harmony usually shows fixed directionality which could take the form of either leftward or rightward spreading, or sometimes a combination of both. The phenomenon is mostly caused by some kind of consonants just like consonant harmony. However, vowel-consonant harmony is different from consonant harmony in that all segments, which include both vowels and consonants are affected by the harmonic process. In other words, the harmonic feature in question spreads through every segment in the word. In Gurenɛ, an example of this type of harmonic system involves the interaction of /**g**/ with other segments. In other words, vowel-consonant harmony occurs between the oral velar stop and [-ATR] vowels.

Rose and Walker (2011) describe vowel-consonant harmony as an assimilatory process, which may operate over a string of multiple segments. Hence, harmony may occur from a distance across at least one seemingly unaffected segment as shown in (28a), or it may involve a continuous string of segments as in (28b-f) below;

(28)	a. /**biwoko**/	→	[**biwoko**] 'tall boy'
	b. /**bʊdamələga**/	→	[**bʊra-mələga**] 'fair main'
	c. /dɛgərɔ/	→	[dɛɣərɔ] 'dirt'

_____

d. /pɛgəra/ → [pɛɣəra] 'pages'
e. /dɔgəra/ → [dɔɣəra] 'parent'
f. /tɔgəri/ → [tɔɣərɪ] 'talking'.

In the examples in (28), the vowels in each word agree in [±ATR] feature across a sequence of intervening consonants. However, in (28c-f), we observe continuous harmony as all intervening segments participate in the process. This means that all the segments except the initial onsets are affected or involved in the harmony process. Thus, the string of segments as indicated in bold; [dɛɣərɔ] 'dirt', agree in the feature [+continuant]. [+cont] segments are those that in their production, there is a lack of central occlusion in the vocal tract. Thus, vowels, glides and fricatives are [+cont] while plosives, nasal consonants, and lateral are [-cont] (see Gussenhoven & Jacobs 2013).

## 4.8.1 /g/ interaction with [-ATR] vowels

In Gurenɛ, the voiced velar stop /g/ is realized as a velar fricative [ɣ] when it occurs between [-ATR] vowels. This is a case of spirantization where a stop or plosive changes to a fricative as illustrated in (29) below:

[-ATR]
(29) a. **/bʊgɛ/** → [bʊɣɛ] 'to hit one with the fists'
/pɔga/ → [pɔɣa] 'wife'
/baga/ → [baɣa] 'gods'
/bagɛ/ → [baɣɛ] ' to adorn'
/dɛgerɔ/ → [dɛɣərɔ] 'dirt'
/sagʊm/ → [saɣʊm] 'to spoil'/destroy'
/sɔgɔrɔ/ → [sɔɣərɔ] 'rubbish'
/lɪgʊm/ → [lɪɣʊm] 'tickle'

b. [+ATR]
/tuge/ → *[tuɣe] 'weave'
/lige/ → *[liɣe] 'block'
/dige/ → *[diɣe] 'chase'
/kuge/ → *[kuɣe] 'pile'

The data in (29) may be generalised as follows,

$$(30) \quad /g/ \rightarrow [\gamma] \Big/ \begin{bmatrix} \text{-ATR} \end{bmatrix} \underline{\quad\quad} \begin{bmatrix} \text{-ATR} \end{bmatrix}$$

The above rule implies that the voiced velar stop is realized as a velar fricative in the environment of [-ATR] vowels. A non-linear representation of this phenomenon is illustrated below;

31.
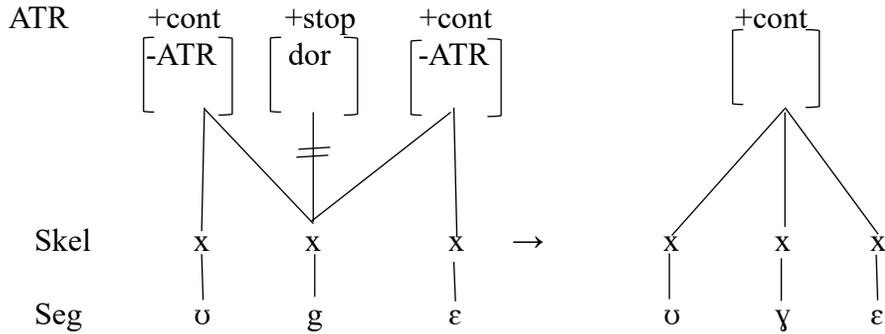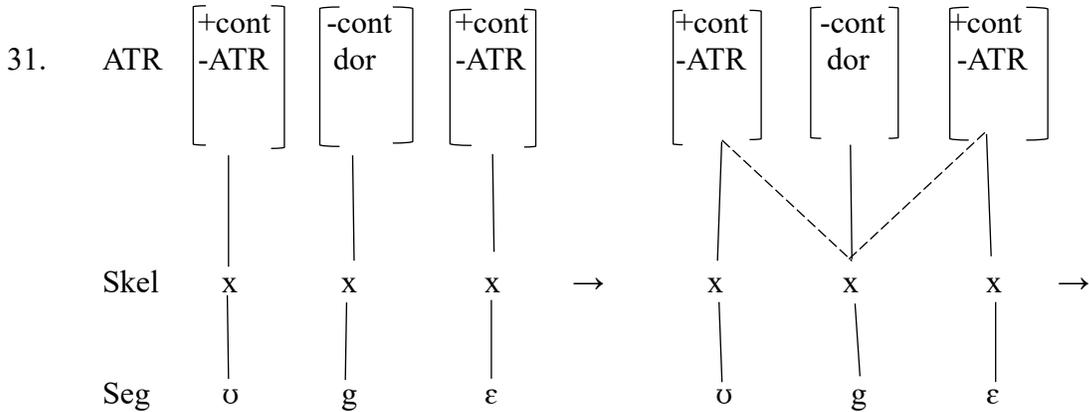
In the non-linear representation, we see the vowels spread their [+continuant] feature onto the velar stop, thereby causing the velar stop to change to velar fricative with a [+cont] feature. Here, we observe the change of a segment from stop to fricative resulting in vowel-

consonant harmony in the string. Thus, in Gurenɛ /**g**/ changes to /ɣ/ in the environment of the feature [-ATR] (i.e. when it occurs between [-ATR] vowels).

5. Conclusion

In this paper, we discussed vowel harmony in Gurenɛ. This included tongue root vowel harmony (ATR), vowel-consonant harmony, and rounding harmony. We have demonstrated that vowels in Gurenɛ words are strictly governed by vowel harmony rules. Therefore, only vowels of the same qualities or features [±ATR] can co-occur in words. Vowel harmony operates at two levels in the domain of a word: ATR harmony, which is triggered by root vowels, and rounding harmony, which is triggered by suffix vowels. Vowel harmony operates all through from CVCV to multisyllabic words, with suffix vowels agreeing in the feature [±ATR] with vowels of the roots. In addition, loanwords and compounds are also governed by vowel harmony rules even though, there are cases where harmony is blocked and does not operate across word boundaries particularly in compounds. The language has two neutral vowels, the schwa /ə/ (any word-medial vowel) and the low, back, central vowel /**a**/. These vowels are neutral to harmony process as they are transparent, co-occur with vowels of both sets of ATR harmony and do not seem to either trigger or undergo the harmony process.

      Another type of harmony that exists in the language is vowel-consonant harmony which involves the interaction of the velar stop /**g**/ with [-ATR] vowels. The voiced velar stop /**g**/ is realized as a velar fricative [ɣ] in the environment of [-ATR] vowels. We have also indicated the presence of rounding harmony in Gurenɛ. ATR harmony in Gurenɛ occurs with rounding such that vowels in a word agree with each other in terms of the features [±ATR], and [±round].

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