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TONE MELODY AND TENSE, MOOD, ASPECT MARKING IN GUA

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ABSTRACT

Grammatical tones mark distinctions between grammatical structures like tense, mood, aspect, etc through different tone patterns. This paper reports on how tone melody and verbal prefixes combine to mark Tense, Mood and Aspect (TMA) in the Boso dialect of Gua, a Hill Guang language of Ghana. Primary data for the paper were collected from Boso for this analysis.

The paper demonstrates that there are tone melodies L, HL and LH on verbs to mark the TMA system, but no lexical tone in TMA marking. Prefixes additionally mark TMA forms, and utilize the same three tone melodies. The tone on the prefix is such that it does not clash with the tone melody on the verb root. Where there is HL on the root, the prefixes end in L tone. Where there is L on the root, the prefix ends in H tone. The data has been analyzed using right-to-left tone association and spreading theory and I show that Gua prefers tone differences across a morpheme boundary. In addition, Gua shows similar tone polarity between singular pronouns and TMA verb stems. In conclusion, I have shown that Gua utilizes both tone and prefixes to mark TMA forms, and the tone processes are best analyzed as tone melodies which involve tone spreading in a regressive fashion.

1.0 Introduction

Grammatical tones mark distinctions between grammatical structures like tense, mood, aspect, etc through different tone patterns. This paper examines tonal patterns in Gua and shows that, Gua has grammatical tone that can be analyzed as tone melodies (systematic tone patterns) L, LH and HL which are exponents of the Tense, Mood and Aspect (TMA) system. Tone melodies in Gua are found on verb roots and verbal prefixes. They are assigned such that they avoid tone clash between the prefixes and the verb roots.

Gua is a Hill-Guang language of Ghana, classified as part of the Tano branch of Kwa. It is estimated that there are about 17,600 speakers (2013 UNSD), spoken mainly in the Eastern region of Ghana. Gua has two dialects; Anum and Boso. The data for this study is based on the Boso dialect drawn from the author's native speaker's intuition as well as fieldwork conducted in Boso in Summer, 2017. In all, eight people comprising males, females, adult and young people participated in the data collection at Boso[1].

The paper shows that right-to-left association and spreading as the best model to account for the melodies since it captures all the tonal patterns in Gua. The rest of the paper is organized as follows. Basic tone marking is introduced in section 2 and grammatical tone patterns in section 3. Section 4 offers initial analysis of the patterns using the right-to-left tone association and spreading model whiles section 5 discusses the patterns with the verbal prefixes. Section 6 discusses tone between the subject and TMA stems while section 7 considers summary of findings, recommendations, and conclusion.

2.0 Basic Tone in Gua

Gua has 2 basic level tones: low (L) and high (H). The tone bearing unit (TBU) is the mora. Example (1) shows level tone distinctions between verbs and nouns in monomoraic words. The verbs have L tone while the nouns have H tone. All the examples expressing verbs connote the imperative forms of the verb.

(1) a. tè 'weed (along a path)!' té 'oath'
    b. bà̰ 'sew!' bá̰ 'garden'
    c. mḭ̀ 'swallow!' mḭ́ '1SG'

Falling (HL) tone occurs on some nouns as illustrated in (2). This happens on the final vowel of bimoraic nouns. These nouns have a noun class prefix that has a high tone. Verbs do not show contour tones on monomoraic vowels, as will be shown in section 3.

(2) a. ɔ́nî 'mother' b. ásî 'father'
    c. áfî 'an axe'

There are contour tones on verbs with diphthongs and long vowels. Yip (2002) notes that rising and falling tones result from the combination of two level tones. This appears to be the case in Gua. Example (3) shows cases of contour tones on diphthongs. Example (4) also considers contour tones on long vowels. The diphthongs only occur in the final position of words, but long vowels occur in all positions. The rising tones indicate imperative forms while the falling tones express past forms of the verbs.

(3) a. sìá 'leave (some behind)! síà 'left (some behind)
    b. bìá 'break!' bíà 'broke'
    c. bùá 'respond' búà 'responded'
(4) a. k͡pɔ̌: 'scald!' k͡pɔ̂: 'scald'
    b. nǔ: 'drink!' nû: 'drunk'
    c. dǐ: 'sleep!' dî: 'slept'

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3.0 Grammatical Tone Patterns

Tone can function either lexically or grammatically. Gua tone on verbs has only grammatical functions. The different tonal patterns that mark the tense, mood and aspect of the language are discussed in this section.

3.1 Habitual Aspect

In habitual constructions, bimoraic verbs have LL tone, trimoraic verbs have LLL and monomoraic verbs have L tonal patterns. Both bisyllabic (5a-b) and monosyllabic (6a-b) express the bimoraic forms of the verbs. (7) indicates trimoraic forms while (8) presents the case of monomoraic forms.

Bimoraic verbs
(5) a. ɛ́nì   kpɔ̀lì   dá
       2PL.SUBJ clean.HAB there
       'You clean there'
     b. ɛ́nì   bòlì   kókósí
       2SG.SUBJ break.HAB coconut
       'You break a coconut'
(6) a. ɛ́nì dàì̀ téì
       2PL.SUBJ cook.HAB food
       'You cook food'
     b. ɛ́nì   dìì
       2PL.SUBJ sleep.HAB
       'You sleep'

Trimoraic verbs
(7) a. ɛ́nì   bùrùfè   b. ɛ́nì fùrùtɕì
       2PL.SUBJ urinate.HAB   2PL fly.HAB
       'You urinate'   'You fly'

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Monomoraic verbs

(8) a. ɛ́nì kɛ̀   ɛ̀dɛ́
    2PL.SUBJ teach/show.HAB thing
    'You teach (something)'

  b. ɛ́nì tɛ̀   àkpɛ́   à
    2PL.SUBJ weed.HAB path/road DET
    'You weed along the path'

3.2 Past Tense

Past tense marking in Gua has HL on the bimoraic form, HHL on the trimoraic form while the monomoraic form has L. The monomoraic past forms are identical to the habitual forms. The examples in 9-12 below show the various forms of the verb based on tone pattern in the past. Examples (9) and (10) indicates the bimoraic forms while (11) shows the trimoraic forms. The monomoraic forms are outlined in example (12). These are the same roots that were used to illustrate the habitual forms above. This reinforces the claim that tone in verbs is grammatical. The verb forms in (10) also indicate that the diphthongs and the long vowels are bimoraic (cf. section 2.0). They have HL tone pattern realized on them, but there is only L tone on the monomoraic verbs.

Bimoraic verbs

(9) a. ɛ́nì   kpɔ́lì   dá
    2PL.SUBJ clean.PST there
    'You cleaned there'

  b. ɛ́nì   bólì   kókósí
    2SG.SUBJ break.PST coconut
    'You broke a coconut'

(10) a. ɛ́nì   dáî̀   téì
    2PL.SUBJ cook.PST food

    'You cooked food'
  b. ɛ́nì   díì
    2PL.SUBJ sleep.PST
    'You slept'

Trimoraic verbs
(11) a. ɛ́nì   búrúfè   b. ɛ́nì fúrútɕì
    2PL.SUBJ urinate.PST   2PL fly.PST
    'You urinated'   'You flew'

Monomoraic verbs
(12) a. ɛ́nì   kɛ̀   ɛ̀dɛ́
    2PL.SUBJ teach/show.PST thing
    'You taught (something)'
  b. ɛ́nì   tè   àkpɛ́   à
    2PL.SUBJ weed.PST path/road DET
    'You weeded along the path'

Since the bimoraic and trimoraic forms have HL and HHL, one would have expected a HL contour on the monomoraic form, and yet this does not occur. For instance, there are no words like *dû, *bâ or *dɔ̂ with a falling tone on the monomoraic words in Gua. This suggests that there is a restriction on the presence of contour tones on monomoraic words.

Due to the identical nature of the tone on monomoraic verbs, when speakers are asked to tell the differences between the habitual construction and the past, they find it difficult to point out. One of my consultants who attempted a distinction could only say that "there is no clear difference between them but when you utter them we can distinguish between them and know which construction you uttered. Another way is to add the specific time in the past to show the difference". Lɛtɛ has a similar situation and Akrofi Ansah suggests that a similar strategy is adopted to account

for the difference between past and present tenses in Lɛtɛ (2009).

3.3 Imperatives
Imperative forms of the verbs have LH pattern in bimoraic forms (13), LLH in the trimoraic forms (14) and the monomoraic forms have L pattern (15).

Bimoraic Verbs

(13) a. bòlí 'break!'   b. sòbí 'pull!'
     c. kwὲlέ 'fry!'   d. ʨùkʷí 'uproot!'

Trimoraic Verbs

(14) a. bùrùfé 'urinate!'   b. fùrùʨí 'fry!'
     c. kpìlàʨí 'vomit!'

Monomoraic Verbs

(15) a. tè 'weed (along a path)!'   b. kù 'cut!'
     c. mḭ̀ 'swallow!'

The data presented so far indicate that H-tone is dis-preferred in monomoraic verbs since all forms have L in the constructions. Again, there are L tones in all forms of habitual aspect. There are however, HL and HHL in the bimoraic and trimoraic past forms respectively while bimoraic imperatives have LH and their trimoraic counterparts have LLH patterns. The table in 1.0 below presents a summary of the various tone patterns in Gua.

Stem size/ TMA	HAB	PAST	IMP
Mono	L	L	L
Bi	LL	HL	LH
Tri	LLL	HHL	LLH

Table 1.0: Summary of patterns in habitual aspect, past tense and imperative forms.

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4.0 Initial Analysis of tone patterns

The patterns summarized in Table 1.0 presents the grammatical functions of tone on Gua verbs. I propose that tone melodies L, HL and LH can account for the observed patterns. A tone melody analysis is preferable to lexical specification of each pattern individually as L, LH, LLH, H, HL, HHL, LL, LLL. This is because tone melodies are more economical and capture shared properties.

The Analysis employed is to posit a HL tone melody to express Past tense. This melody is assigned to the verb root using right-to-left tone association and spreading in the same manner as Newman (1974) posits for Kanakuru. The theory associates tone from the right-edge to the left-edge and spreads the last assigned-tone to the available toneless TBU. According to the association conventions, when there are not enough TBUs, leftover tones attach to the last TBU (See: Goldsmith 1976, Hyman and Ngunga 1994). (16) shows that there is tone association from right-to-left in 1 and spreading in 2.

(16). **Right-to-Left association and Spreading**

1: Right-to-Left Association   2: Spreading
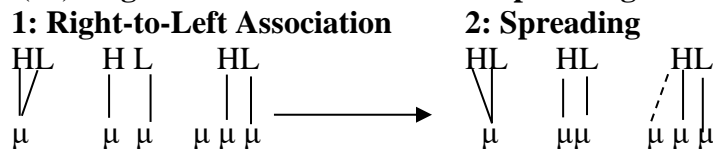
HL→ HL HL HHL (wrong result for monomoraic form in Gua.)

The right-to-left association and spreading captures the patterns for the bimoraic and trimoraic forms. However, due to the restriction that Gua places on monomoraic verbs that contour tones are disallowed, the HL melody cannot surface on a single mora. In view of that, there must be a constraint that ensures that only a single level tone

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associates with the monomoraic verb. The following deletion rule in (17) is therefore posited:

(17) HL $\longrightarrow$ L/#μ#

The rule acknowledges that the HL melody becomes L when it occurs on a monomoraic word. In this case, L tone would be chosen over the H tone so the H in HL gets deleted or delinked after association. The revised association pattern is presented below with the H tone deletion in the monomoraic forms.

(18) 1: Right-to-Left Association 2: Spreading and Deletion of H

HL   H L   HL $\longrightarrow$ HL   HL   HL

μ   μ μ   μ μ μ   μ   μμ   μ μ μ

HL→ L HL HHL (right result for past tense in Gua.)

The right-to-left association has proved helpful in the analysis of the past tense forms of the verbs. If the association and spreading were to occur in the opposite direction as in Mende (Leben 1973, 1978), the HHL and LLH patterns of Gua in the past tense and the habitual aspect respectively could not be produced. Instead, one would have expected HLL and LHH. The right-to-left association and spreading is therefore extended to other melodies in the habitual and imperative patterns outlined in Table 1.0. In (19), shows the application of the right-to-left association and spreading in the habitual forms. In habitual forms, the melody that is selected is L and it spreads to other forms leftward. The prediction shows L, LL, and LLL which is the pattern in Gua.

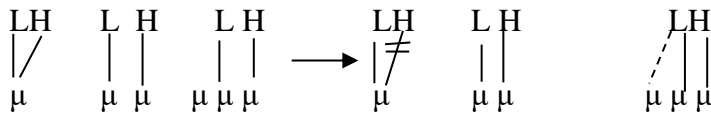**Right-to-left association and spreading analysis extended to L and LH:**

(19) Habitual forms
1: Right-to-Left Association   2: Right-to-Left Spreading

L   L   L   L   L   L

μ   μ μ   μμμ   ⟶   μ   μ μ   μ μ μ
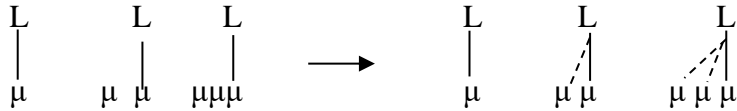
In (20), the melody LH is selected and the patterns H, LH and LLH is generated.

(20) Imperatives
1: Right-to-Left Association   2: Right-to-Left Spreading and H deletion

LH   L H   L H   LH   L H   LH

μ   μ μ   μ μ μ   ⟶   μ   μ μ   μ μ μ

However, Gua seems to prefer L tones on monomoraic verbs and disallows contour tones on a monomoraic verb (cf. 17 and 18) so to account for the data, the H in the LH melody in the monomoraic form gets deleted leaving L tone associated to the single vowel. This also happens in the HL melody as illustrated above. The phonological rule that accounts for this is the deletion rule below:

(21) LH ⟶ L/#μ#

The rule shows that LH melody becomes L when it occurs on a monomoraic word. When the rule is applied, and the H tone is deleted, what remains is the L tone. The tone deletion rule[2] applies after the association has taken place. The analysis captures the systematic melody on verb roots. It captures the fact that Gua shows the deployment of economy in its tone melodies.

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[2] The two tone deletion rules (17) and (22) can be united into a single general rule that reduces all contours to L in monomoraic verbs.

Since Gua does not allow rising or falling tones on monomoraic forms, anytime the analysis generates such forms, they will be considered ill-formed, hence, ungrammatical in the language[3]. The illustration in (22) indicates an ill-formed structure where a monomoraic form is used to host a contour tone. T1T2 indicates two different tones, and so rules out either HL or LH (See Zhang 2004).

(22) No contour tones on monomoraic verbs in Gua

TxTy
*μ

5.0 Tone Melody, prefix selection and TMA marking
The same tone melodies L, LH, and HL appear on verb roots in other tense, mood, aspect configurations, as well as on the prefixes that accompany them. These prefixes mark future tense as well as progressive and perfective aspects. The following sections discuss the tonal patterns of the prefixes and the roots. The melodies that are selected ensures that the Obligatory Contour Principle (OCP) is not violated. This means that, there is some well-formedness correspondence between the prefixes and the roots to ensure that OCP is respected, and it appears that the tone selection is driven by the roots and the prefixes ensure OCP adherence.

5. 1 Perfective
Perfective aspect in Gua is marked by HL melody on the root and a prefix ɛ́ɛ̀- which also has the HL melody. The perfective constructions have HL patterns in bimoraic

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[3] It is possible that the association conventions attach the L to the monomoraic form and due to the constraint against contour tones, the additional H tone fails to attach. I will show with other data that it is preferable to attach all tones and then delete.

forms (23), HHL in the trimoraic forms (24) and H pattern in the monomoraic forms (25). In the past forms without the prefixes, the monomoraic forms which had HL tone pattern reduced to L, but in the forms with the prefixes, the tone reduction becomes H (25)[4].

Bimoraic verbs

(23) a. ɛ́nì   ɛ́ɛ̀-kpɔ́lì   dá
    2PL.SUBJ PERF-clean.PERF there
    'You have cleaned there'

   b. ɛ́nì   éè-bólì   kókósí
    2PL.SUBJ PERF-break.PERF coconut
    'You have broken a coconut'

Trimoraic verbs

(24) a. ɛ́nì   éè-búrúfè
    2PL.SUBJ PERF-urinate.PERF
    'You have urinated'

   b. ɛ́nì éè-fúrútɕì
    2PL PERF-fly.PERF
    'You have flown'

Monomoraic verbs

(25) a. ɛ́nì   ɛ́ɛ̀-kɛ́   ɛ̀dɛ́
    2PL.SUBJ PERF-come.PERF thing
    'You have taught (something)'

   b. ɛ́nì   éè-té   àkpɛ́   à
    2PL.SUBJ PERF-weed.PERF path/road DET
    'You have weeded along the path'

---

[4] Gua has ATR vowel harmony, so the prefixes alternate their vowels depending on the ATR feature of the root.

5.2 Progressive

Progressive aspect is marked by L melody on the root and a prefix ɛ́ɛ́- which has LH melody. The bimoraic forms have LL pattern (26), LLL in the trimoraic forms (27) and L in the monomoraic forms (28).

Bimoraic verbs

(26) a. ɛ́nì   ɛ̀ɛ́-kpɔ̀lì   dá
    2PL.SUBJ PROG-clean.PROG there
    'You are cleaning there'

   b. ɛ́nì   ὲé-bɔ̀lì   kókósí
    2PL.SUBJ PROG-break.PROG coconut
    'You are breaking a coconut'

Trimoraic verbs

(27) a. ɛ́nì   ὲé-bùrùfè
    2PL.SUBJ   PROG-urinate.PROG
    'You are urinating'

   b. ɛ́nì ὲé-fùrùʨì
    2PL PROG-fly.PROG
    'You are flying'

Monomoraic verbs

(28) a. ɛ́nì   ɛ̀ɛ́-kɛ̀   ɛ̀dɛ́
    3PL.SUBJ PROG-come.PROG thing
    'You are teaching (something)'

   b. ɛ́nì   ὲé-tɛ̀   àkpɛ́ à
    2PL.SUBJ PROG-weed.PROG path   DET
    'You are weeding along the path'

5.3 Future Tense

The future tense has HL melody on the root and the prefix bὲ is L. The pattern on the bimoraic root has HL (29), HHL on the trimoraic forms (30) and H on the monomoraic forms (31).

Bimoraic verbs

(29) a. ɛ́nì   bɛ̀-kpɔ́lì   dá
      2PL.SUBJ FUT-clean.FUT there
      'You will clean there'
    b. ɛ́nì   bɛ̀-bólì   kókósí
      2PL.SUBJ FUT-break.FUT coconut
      'You will break a coconut'

Trimoraic verbs

(30) a. ɛ́nì   bɛ̀-búrúfɛ̀
      2PL.SUBJ FUT-urinate.FUT
      'You will urinate'
    b. ɛ́nì bɛ̀-fúrútɕì
       2PL FUT-fly.FUT
      'You will fly'

Monomoraic verbs

(31) a. ɛ́nì   bɛ̀-kɛ́   ɛ̀dɛ́
      2PL.SUBJ FUT-come.FUT thing
      'You are teaching (something)'
    b. ɛ́nì   bɛ̀-té   àkpɛ́   à
       2PL.SUBJ FUT-weed.FUT path/road DET
       'You will weed along the path'

The patterns discussed so far indicate that, there is a preference for L tone selection in the tonal patterns in the monomoraic forms without the prefixes. This is the case for HL and LH melodies. When the prefixes occur, however, the preference on the monomoraic form reduces to H tone. There is no LH root melody attested with prefixed forms.

The tone of the prefix is LH if the root is low-toned, but it is HL or L if the root has the HL pattern. This means that there is always a change of tone across the prefix-root boundary. Such a pattern suggests that the OCP may be

playing a role in the choice of prefix tone. Since the tonal patterns of the prefixes are the same as the tone melodies proposed for roots, L, HL, and LH, I propose that the prefixes select a tone melody that ensures no identical tones clash across the prefix-root boundary. Another form of evidence is the behavior of the monomoraic roots, which reduce the HL melody to H rather than L if there is a prefix. If they had reduced to L, there would be a L-L sequence across the morpheme boundary, a violation of the OCP. This means that both tones of the HL melody attach to the root, and whether HL reduces to L or to H is determined by the presence of a prefix. The tone patterns in Gua are summarized in Table 2.0 below.

Stem size/ TAM	HAB	PAST	IMP	PROG ὲέ-	PERF έὲ-	FUT bὲ-
Mono	L	L	L	LH-L	HL-H	L-H
Bi	LL	HL	LH	LH-LL	HL-HL	L-HL
Tri	LLL	HHL	LLH	LH-LLL	HL-HHL	L-HHL

Table 2.0: Summary of the TMA tone melody with their prefixes in Gua

Even though Gua prefers L tone on monomoraic verbs, it is constrained by the OCP to ensure that cross-morpheme tones are dissimilar. This explains why there is H tone in the monomoraic forms in future and perfective constructions while the progressive form maintains its L tone. Based on these, the following right-to-left tone association and spreading account for the forms with the prefixes.

5.4 Analysis of Tone Melody, prefix selection and TMA marking

Since a single mora cannot bear a contour tone, the perfective construction selects the HL melody but applies tone deletion rule to delete the extra low tone in the monomoraic form to satisfy OCP between the prefix and the root. There is no evidence that the L tone floats and docks onto the next TBU which seems to support the deletion analysis. The tone deletion rule applies after tone association.

(32) Perfective Aspect
1: Right-to-Left Association   2: Spreading

HL-HL HL-HL HL-HL   HL-HL HL-HL   HL- HL

μμ - μ   μμ -μμ   μμ-μμμ   μμ- μ   μμ- μμ   μμ -μμμ

HL-HL→   HL-H HL-HL HL-HHL (right result for perfective aspect in Gua.)

The prefix in the progressive form selects the LH melody while the root selects L tone melody. In the progressive form, there is no need for the deletion rule in the monomoraic form because there is only one tone in the melody on the root. When the root selects its tone, it selects the melody of the prefix in a way that will ensure that OCP is respected. This has been shown on the TBUs. 1 shows the association pattern while 2 indicates the spreading aspect.

(33) Progressive Aspect
1: Right-to-Left Association   2: Spreading

LH-L LH- L LH- L   LH-L LH- L   LH- L

μμ -μ   μμ -μμ   μμ- μμμ   μμ -μ   μμ- μμ   μμ -μμμ

 LH-L→ LH-L LH-LL LH-LLL (right result for progressive aspect in Gua.)

The prefix in the future tense selects HL melody on the root and L on the prefix. Here, there is L tone deletion in the root in the monomoraic forms.

(34) Future Tense
1: Right-to-Left Association 2: Spreading and Tone Deletion

L-HL L-HL L- HL   L-HL   L-HL   L- HL

μ -μ   μ -μμ   μ-μμμ   μ-μ   μ-μμ   μ -μμμ

  HL-HL→   L-H   L-HL L-HHL (right result for future tense in Gua.)
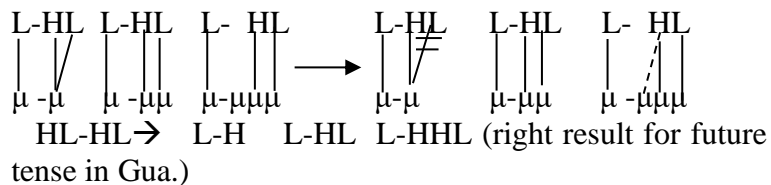
The analysis shows that there is the deletion of H tone if there is a morpheme boundary in the perfective aspect and future tenses in monomoraic verbs to satisfy OCP. There is no such deletion in the progressive aspect because there is a single L tone melody on the verb root.

6.0 Tone melody on Subjects and TMA interactions

The tone melody on the verb also has some significant effect on the choice of tone on subjects. This section considers tones on the verb and how they interact with the type of tone on pronouns and lexical subjects. I will illustrate this with singular and plural pronouns as well as monomoraic and bimoraic lexical subjects. I will not discuss the imperative forms here because they do not require a subject.

6.1 Monomoraic pronoun subjects for habitual aspect and past tense

In the habitual aspect constructions, all singular pronouns which are monomoraic have H tone and the verb stem has L tone as illustrated in (35a-c).

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(35) a. mí   hè   tù   sílὲ
        1SG fall.HAB throw land/soil
        'I fall on the ground'
     b. wú   hè   tù   sílὲ
        2SG fall.HAB throw land/soil
        'You fall on the ground'
     c. ɔ́   hè   tù   sílὲ
        3SG fall.HAB throw land/soil
        'He/she falls on the ground'

In contrast, the past tense has L tone on both the monomoraic pronoun[5] and the verb (36a-c).

(36) a. ǹ   hè   tù   sílὲ
        1SG fall.PST throw land/soil
        'I fell on the ground'
     b. ò   hè   tù   sílὲ
        2SG fall.PST throw land/soil
        'You fell on the ground'
     c. ɔ̀   hè   tù   sílὲ
        3SG fall.PST throw land/soil
        'He/she fell on the ground'

6.2 Bimoraic plural pronouns for habitual aspect and past tense

Bimoraic plural pronoun subjects have LH tone in first and third persons in habitual aspects while second person has HL tone (41a-c). The same LH tone in the first and third persons plural pronoun subjects in the habitual aspect is also found in past tense (42a-c). The monomoraic verb bears L tone in both habitual aspect and past tense.

(41) a. ὲní   hè   tù   sílὲ
        1PL fall.HAB throw land/soil
        'We fall on the ground'

---

[5] The 1SG and 2SG pronouns have different forms between the two TMAs: 1SG mí vs. ǹ and 2SG wú vs. ò.

    b. ɛ́nì hɛ̀   tù   sílɛ̀
      2PL fall.HAB throw land/soil
      'You fall on the ground'
    c. ɛ̀mú hɛ̀   tù   sílɛ̀
      3PL fall.HAB throw land/soil
      'They fall on the ground'
(42) a. ɛ̀ní hɛ̀   tù   sílɛ̀
      1PL fall.PST throw land/soil
      'We fell on the ground'
    b. ɛ́nì hɛ̀   tù   sílɛ̀
      2PL fall.PST throw land/soil
      'You fell on the ground'
     c. ɛ̀mú hɛ̀   tù   sílɛ̀
       3PL   fall.PST throw land/soil
       'They fell on the ground'

The patterns above show that unlike the monomoraic singular pronoun subjects which show differences in the subject between habitual aspect and past tense, their bimoraic plural counterparts do not show such differences. The plural pronouns are identical in both the habitual aspect and the past tense.

6.3 Monomoraic and bimoraic singular subject in habitual aspect and past tense

Monomoraic lexical nouns have H tone in both habitual aspect and past tense. The monomoraic lexical noun in (43a) has H tone for the habitual aspect and the same tone pattern for the monomoraic subject in the past (43b) as well. Monomoraic lexical subjects do not show tone alternations like monomoraic singular pronouns.

(43) a. tú   hɛ̀   tù   sílɛ̀
      gourd fall.HAB throw land/soil
      'A gourd falls on the ground'

b. tú　　hè　　　tù　　sílὲ
   gourd fall.PST　throw land/soil
   'A gourd fell on the ground'

Like their bimoraic plural pronoun subject counterparts, bimoraic lexical subjects do not show differences in habitual aspect and past tense forms. Examples (44a-b) show subjects with LH tone for habitual aspect and past tense respectively. Examples in (45a-b) show HL patterns for habitual aspect and past tense respectively.

(44) a. kòfí　　hè　　　tù　　sílὲ
        kofi fall.HAB throw land/soil
        'Kofi falls on the ground'
     b. kòfí　　hè　　　tù　　sílὲ
        kofi fall.PST　　throw land/soil
        'Kofi fell on the ground'
(45) a. kwámì　hè　　　tù　　sílὲ
        kwame　fall.HAB throw land/soil
        'Kwame falls on the ground'
     b. kwámì　hè　　　tù　　sílὲ
        kwame　fall.PST throw land/soil
        'Kwame fell on the ground'

The discussion so far shows that there is tone alternation on the monomoraic singular subjects. The form of the pronoun serves to differentiate the two TMA forms. The monomoraic singular pronouns have H tone in habitual aspect while the past tense has L tone. However, in monomoraic and bimoraic lexical subjects as well as bimoraic plural pronouns, there is no such distinction. The patterns suggest that the alternation does not relate to the size of the subject; rather the singular pronouns alternate their tone pattern because they may become prolitic onto the verb and therefore show greater phonological interdependence with the verb.

6.4 Monomoraic singular pronouns with prefixed verbs

The same tone pattern on the subjects are deployed when they occur before verb stems or verb roots with prefixes. Verb stems with prefixes also have an effect on the tone pattern of the singular monomoraic pronouns. Future tense has the future marker bὲ with L tone, perfective aspect has an ɛ́ɛ̀ marker with HL falling tone and progressive aspect has an ɛ̀ɛ́ marker with LH rising tone. When the future prefix begins with L tone, the tone of the monomoraic singular pronoun is H.

Examples in (46a-c) illustrate the tone pattern on the monomoraic singular subject with future stem. The singular subject pronoun has H tone.

(46) a. ḿ mὲ-hέ   tù   sílὲ
       1SG FUT-fall.FUT throw land/soil
       'I will fall on the ground'
   b. wú bὲ-hέ   tù   sílὲ
       2SG FUT-fall.FUT throw land/soil
       'You will fall on the ground'
   c. ɔ́ bὲ-hέ   tù   sílὲ
       3SG FUT-fall.FUT throw land/soil
       'He/she will fall on the ground'

The 1SG pronoun in the future is not mí as occurs with the habitual, but a single ḿ with H tone. It causes the following /b/ to assimilate completely. The other pronouns resemble those that appear with the habitual.

In perfective and progressive aspects, several phonological processes affect the form of the pronoun and its ability to bear tone. The vowel of the singular pronouns does not appear - it deletes, fuses or becomes a glide. Assuming that the pronoun is underlyingly -ATR, the high vowel of the first person singular pronoun /mɪ/ becomes [mj] before the front vowel prefix ɛɛ- or ee-. In the second person singular pronoun, the vowel of the pronoun (assumed to be /ʊ/)

combines with the prefix /ɛɛ/ to become [ɔɔ], or [oo] under vowel harmony. It cannot become a glide [w] as the onset is already [w]. The third person singular pronoun /a/ fuses with the prefix, and there is no change to the prefix vowel other than standard vowel harmony. The tone of the prefix is consistently HL in each of these cases for perfective aspect (47a-c) and LH for the progressive aspect (48a-c).

(47) a. mj-éè-hé   tù   sílὲ
        1SG-PERF-fall.PERF throw land/soil
         'I have fallen on the ground'

     b. wóò-hé   tù   sílὲ
        2SG.PERF-fall.PERF throw land/soil
        'You have fallen on the ground'

     c. ɔ́ɔ̀-hé   tù   sílὲ
        3SG.PERF-fall.PERF throw land/soil
        'He/she has fallen on the ground'

(48) a. mj-èé-hè   tù   sílὲ
        1SG-PROG-fall.PROG throw land/soil
         'I am falling on the ground'

     b. wòó-hè   tù   sílὲ
        2SG.PROG-fall.PROG throw land/soil
        'You are falling on the ground'

     c. ɔ̀ɔ́-hè   tù   sílὲ
        3SG.PROG-fall.PROG throw land/soil
        'He/she is falling on the ground'

Therefore, there is no independent tone pattern that appears on the singular pronouns in the perfective and progressive forms. Only the tone pattern of the verbal prefixes appears, either HL or LH.

6.5 Bimoraic plural pronoun subjects with prefixed verbs

Bimoraic singular pronouns have the full form with their tonal patterns in future tense, perfective and progressive aspects. In addition, the full form of the prefixes with their tone patterns are realized in the stem. There are no phonological changes. Examples in (49a-c) show the pattern in future tenses, those in (50a-c) are perfective forms, and examples in (51a-c) illustrate the progressive forms.

(49) a. ɛ̀ní bè-hé   tù   sílɛ̀
        1PL FUT-fall.FUT throw land/soil
        'We will fall on the ground'
    b. ɛ́nì bè-hé   tù   sílɛ̀
        2PL FUT-fall.FUT throw land/soil
        'You will fall on the ground'
    c. ɛ̀mú bè-hé   tù   sílɛ̀
        3PL   FUT-fall.FUT throw land/soil
        'They will fall on the ground'
(50) a. ɛ̀ní éè-hé   tù   sílɛ̀
        1PL PERF-fall.PERF throw land/soil
        'We have fallen on the ground'
    b. ɛ́nì éè-hé   tù   sílɛ̀
        2PL PERF-fall.PERF throw land/soil
        'You have fallen on the ground'
    c. ɛ̀mú éè-hé   tù   sílɛ̀
        3PL   PERF-fall.PERF throw land/soil
        'They have fallen on the ground'
(51) a. ɛ̀ní èé-hè   tù   sílɛ̀
        1PL PROG-fall.PROG throw land/soil
        'We have fallen on the ground'
    b. ɛ́nì èé-hè   tù   sílɛ̀
        2PL PROG-fall.PROG throw land/soil
        'You are falling on the ground'

    c. ɛ̀mú èé-hè   tù   sílɛ̀
        3PL   PROG-fall.PROG throw land/soil

'They are falling on the ground'

6.6 Lexical subjects with prefixed verbs

Lexical subjects do not change their tone pattern irrespective of their size and the TMA form the construction marks. There is H tone in monomoraic lexical subjects while the bimoraic lexical subjects could have LH, HL, or H-falling. Examples in (52a-c) illustrate the monomoraic lexical noun in future tense, perfective and progressive aspects respectively.

(52) a. tú   bè-hé   tù   sílɛ̀
        gourd FUT-fall.FUT throw land/soil
        'A gourd will fall on the ground'
     b. tú   éè-hé   tù   sílɛ̀
        gourd PERF-fall.PERF throw land/soil
         'A gourd has fallen on the ground'
     c. tú   èé-hè   tù   sílɛ̀
        gourd PROG-fall.PROG throw land/soil
        'A gourd is falling on the ground'

The bimoraic counterparts of the lexical subjects are in (53) and (55). They do not change their tone patterns although there are HL and LH tones. They have the same tone pattern on the subject across all the TMA forms. The examples in (53a-b) show future tense forms, (54a-b) indicate perfective forms and (55a-b) show the progressive aspect forms with bimoraic lexical subjects.

(53) a. kòfí   bè-hé   tù   sílɛ̀
        kofi   FUT-fall.FUT throw land/soil
        'Kofi will fall on the ground'
     b. kwámì bè-hé   tù   sílɛ̀
        kwame   FUT-fall.FUT throw land/soil
        'Kwame will fall on the ground'
(54) a. kòfí éè-hé   tù   sílɛ̀
        kofi   PERF-fall.PERF throw land/soil

        'Kofi has fallen on the ground'
   b. kwámì éè-hé   tù   sílὲ
      kwame PERF-fall throw land/soil
      'Kwame has fallen down'
(55) a. kòfí   èé-hè   tù   sílὲ
      kofi   PROG-fall.PROG throw land/soil
      'Kofi is falling on the ground'
   b. kwámì   èé-hè   tù   sílὲ
      kwame   PROG-fall.PROG   throw   soil
      'Kwame is falling on the ground'

The description with the subjects and the stems above indicate that when there are monomoraic singular pronoun subjects, the prefix on the stem keeps their tone – L for future tense, HL and LH for perfective and progressive aspects respectively. The singular pronoun is H before the future prefix, but there is no vowel to bear tone before the perfective and progressive aspects. When there are monomoraic and bimoraic lexical subjects as well as bimoraic plural pronouns, there is no change in the tone of the subject.

6.7 Analysis of the subjects with the prefixed verbs

The generalization here is that, the monomoraic singular pronouns undergo tonal alternation. This tonal alternation could be due to the same kind of tonal polarity effect already observed with the verbal prefixes. It avoids tone clash between the subject and the verb stem. However, the alternation does not affect lexical and plural subjects. It appears that tone changes in the monomoraic singular pronouns does not relate to only subject-size. Otherwise, the monomoraic lexical subjects also would have undergone alternations. It has to do with the pronouns

which are cliticized while the others – lexical and plural subjects – do not become proclitics.

The following analyses show that Gua avoids tone clash between the monomoraic singular pronouns and the verb stems. However, I will show analysis for only the monomoraic singular pronouns because they undergo the various alternations between the subject and the verb stem. I assume that, the association and spreading has taken place, and we will show the pronoun (with no tone) in front of the forms. Its tone will then be determined by the following tone.

I propose that, all singular pronoun subjects select the HL melody. Although the pronoun selects HL, only one of the two tones can surface; this will depend on the following tone of the verb stem. Let us first consider the habitual aspect form. This is to ensure tone polarity between the subject and the verb. In addition, we will appeal to a constraint that penalizes contour tones on moras in non-final position: *T1T2-μ/non-final. This constraint is justified by the fact that contours only appear on single moras in Gua on bimoraic nouns in word-final position. The constraint prompts the rule given below.

(56) HL $\longrightarrow$ H/μ....#

(57) Habitual forms

Since the bimoraic stem has LL in habitual aspect, I will show that first before I analyze the monomoraic form. The monomoraic singular pronoun before a LL stem surfaces as H toned.
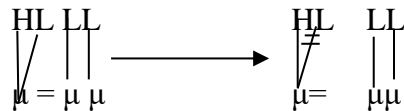
The final L of the singular pronoun subject in (57) has been deleted and shows tone polarity. The same tone polarity restrictions require the final L tone in the HL melody to

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delete when the verb stem is monomoraic with L tone as illustrated below.

(58)

HL L   ⟶   HL L

μ= μ   μ= μ
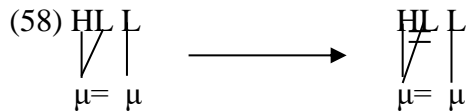
In the past tense, the monomoraic singular pronoun selects the HL melody and the root also selects HL. However, there is tone reduction in the melodies (cf. section 4.0 example 18). With bimoraic roots, this reduction process is not a problem, but with the monomoraic past tense, it is an issue, because the OCP predicts either H-L or L-H. The L-L form can be explained by appealing to two aspects. First, the pronoun is L before all the other past tense forms, so consistency in the paradigm favors L on the pronoun. Second, the monomoraic past tense is L with all other subjects. Therefore, consistency in the paradigm favors L on the root. These two factors come together to favor L-L over other candidates, even if there is an OCP violation. We will again consider the situation in bimoraic roots before the monomoraic roots.

Past Tense
(59) Right-to-left association

HL HL   ⟶   HL   HL

μ = μ μ   μ=   μμ
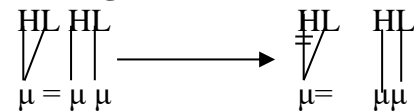
Like the bimoraic roots, the monomoraic L tone also motivates the deletion of the high tone on the pronoun melody.

HL L   HL L

μ= μ   ⟶   μ= μ
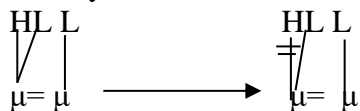
(60) Future Tense

The prefix in the future tense selects HL melody on the root and L on the prefix. The subject selects HL and deletes the L to ensure that there is tone polarity between it and the stem which begins with a L tone. Here the constraint requiring only one association necessitates the deletion of the H tone. The rule that applies here has been outlined below:

1: Right-to-Left Association   2: Spreading and Tone Deletion

HL L HL   →   HL L HL

μ = μ-μμ   μ= μ-μμ
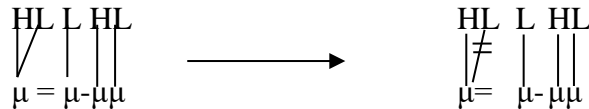
Since there is the need for tone polarity, the L tone in the melody on the subject pronoun deletes. I also show this in the monomoraic stems.

HL L-HL   →   HL L-HL

μ= μ -μ   μ= μ- μ
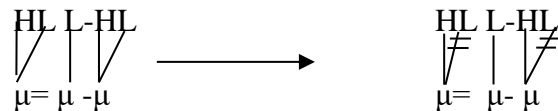
Since I have already explained what occurs with the perfective and progressive aspects, there is no tone analysis as there is no mora for the tone to appear on.

The above analysis on the interaction between the tone pattern on the subjects and the verbs also bears some similarities with the tone melody cases described in the verbal roots and the prefixes. The bimoraic plural pronouns and all the lexical subjects maintain their tone and are unaffected by the tone of the following verb. However, the monomoraic singular pronouns have different tone depending on the following verb. They show a tone polarity effect. The pronoun is H if the following verb stem begins with a L tone (habitual, future), and the pronoun is L if the following verb stem begins with a H tone (past). The fact that the habitual and future cause the same effects, even

though they have different tone melodies on their roots shows that it is the adjacent tone that dictates the tone of the pronoun. The monomoraic singular pronouns have a H tone, but this tone changes if it appears before a verb stem with a H tone. One may assume that singular pronouns are clitics that attach to the verb stem, and therefore behave differently with respect to tone than the comparable monomoraic lexical nouns (which are also always H). It appears that when the verb stem begins with a L tone, the singular pronoun becomes H or loses its H tone (cf. habitual aspect, future tense and perfective aspect) and when the stem begins with H singular pronoun is L. What appears to be happening is tone polarity process which ensures that there is no clash of H H or L L tones across word boundaries.

7.0 Summary of Findings, Recommendations, and Conclusion:

The description and the analysis show that Gua has tone patterns that can be analyzed as tone melodies L, HL and LH that are systematically selected based on the TMA forms they mark. The spreading of the initial tone of the melody depends on root size. Again, the same L, LH and HL melodies appear on TMA prefixes. In addition, the right-to-left tone association and spreading model better explains the surface tone patterns in Gua than the one that associates from left-to-right. Moreover, Gua adopts a strict adherence to OCP requirements between prefixes and roots. The tone of prefixes shows a polarity effect in that they are always opposite to the following verb root tone. Moreover, there is the same tone clash avoidance strategy between the singular pronouns and the verb stems.

The current work makes interesting contributions to tone theory and typological studies. Typologically, there are

cases for L tone spreading (Oaxaca Mixtec, Buckley 1991, Nash, 1992 and Buli, Akanlig-Pare and Kenstowicz 2003 and Kukuya, Hyman 2009) and H tone spreading (Moro, Jenks and Rose 2011, Sotho, Zerbian 2006) to mark tones on all TBUs. However, Gua also shows tone spreading of both L and H within verb roots. The discussion has shown that Gua prefers low tones on monomoraic verbs to high tones, but will accommodate a H tone to avoid an OCP violation. The paper opens an opportunity and a discussion for further studies into the grammatical tone patterns of Guang languages.

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