A Unified Account of Grammatical Tone and Length in Gã

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Roadmap

Background: STAMP Morphs

Portmanteau **S**ubject, **T**ense, **A**spect, **M**ood, **P**olarity morphs (Anderson 2016)

Areal feature of the Macro-Sudan Belt

STAMP morphs exhibit properties of both pronominals and auxiliaries

Offer a look at the phonology-morphology interface, division of labor between phonology and morphology

Have received little attention in the literature so far (Anderson 2011, 2015, 2016; Konoshenko 2020, Felice 2021)

A challenge to implement in many theoretical models

Implications for our understanding of diachronic change

STAMP in Gã

In many languages with STAMP morphs, the fused pronoun-auxiliary complexes have been grammaticalized and are not synchronically separable.

Data from Gã [Kwa: Ghana] offers insight into the formation and synchronic morphophonology of STAMP morphs.

New data from work with a native speaker consultant supports an analysis in which pronominals and aspect morphemes are synchronically separable, and undergo fusion in certain phonological contexts.

Overview

Observation: Many tense, aspect, mood and polarity (TAMP) distinctions in Gã are exponed by changes in tone realized on a bound subject pronoun. When no such pronoun is present, those grammatical distinctions are exponed on verbal prefixes.

Previous Analyses: This phenomenon has previously been analyzed as a case of allomorphy involving portmanteau morphemes (Paster 2003).

Challenge: I present new data showing that pronouns and TAMP morphemes are synchronically separable, which cannot be easily accounted for under an allomorphy-based account.

Analysis: The surface forms of STAMP morphs are fully predictable from regular phonological processes within Gã.

Background: Gã

Kwa language spoken by around 9 million people in and around Accra (Ethnologue)

Possible syllable structures: V, CV(V), N, CVN

Lexical and grammatical tone, two phonemic tone heights (H and L)

Extensive description of tone in Gã (Kotei 1969, Okunor 1969, Trutenau 1972, Kropp Dakubu 1986, Wentum 1997, Kropp Dakubu 2002, Paster 2003)

Background: Gã

Data: corpus of 5299 sentences, compiled from elicitation sessions with native speaker consultant Tracy Mensah between August 2019 and May 2020

Gã Orthography

IPA	Gã
dʒ	j
j	y
ʃ	sh
tʃ	ts

Table: Orthographic representations

Tone is not traditionally represented in the orthography: however, I will mark all surface tones for clarity.

Overview

Tone in Gã

On monosyllabic words, there is a 2-way contrast between L and H.

	L	**H**
Noun	là ‘blood’	lá ‘fire’
	wù ‘husband’	wú ‘bone’
Verb	là ‘dream’	lá ‘sing’
	bɛ̀ ‘beckon’	bɛ́ COP.NEG’

Table: L vs. H in Gã

Tone in Gã

This 2-way surface contrast reflects an underlying 3-way distinction between toneless (∅), L and H.

	∅	**L**	**H**
Verb	ba ‘come’	là ‘sing’	bí ‘ask’
Perfective	è-bà	è-là	è-bí
Imperative	bá	làá	bí

Table: Three-way underlying tonal contrast in Gã

Tone in Gã

A contour generally cannot surface on a single mora.

> yòó ‘woman’
>
> *yǒ

There are a few lexical exceptions to this generalization, however, and one morpheme-specific exception.

> Some verbs of the shape CVV surface with a HL contour on the final mora when they appear at the end of an intonational phrase.
>
> A H tone directly preceding the progressive marker Ǹ- surfaces with a HL contour on a single mora.

Downstep

A L tone in between two H tones causes the second H to surface as downstepped.

Perfective exponed by floating L tone:

(1) a. è-**bí** lɛ̀
3SG-ask 3SG.ACC
'He asked her.'

b. kòfí ↓**bí** lɛ̀
Kofi ask 3SG.ACC
'Kofi asked her.'

Overview

Pronouns in Gã

Subject pronouns are prefixed to the verb.

They are unspecified for tone, and instead receive their surface tone from elsewhere.

	SG	PL
1	ĩ	wɔ
2	o	ɲɛ
3	e	amɛ

Table: Subject pronouns in Gã

Pronouns in Gã

Subject pronoun prefixes are not agreement markers, but rather bound pronouns:

(2) a. **è**-jò
3SG-dance
'She danced.'

b. yòó-$^{\downarrow}$ɛ́ jò
woman-DEF dance
'The woman danced.'

c. *yòó-$^{\downarrow}$ɛ́ **è**-jò
woman-DEF **3SG**-dance
intended: 'The woman danced.'

Overview

Grammatical Tone and Length in Gã

Perfective

è-bà ‘He came.’

Perfect

é-bà ‘He has come.’

Progressive

èè-bà ‘He is coming.’

Perfective

The perfective is marked by a floating L verbal prefix.

(3) è-bà
3SG-come
'He came.'

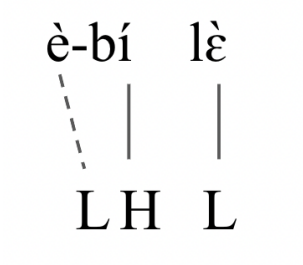
The effects of this floating tone are visible between H tones, as downstep results.

(4) a. è-bí lɛ̀
3SG-ask 3SG.ACC
'He asked her.'

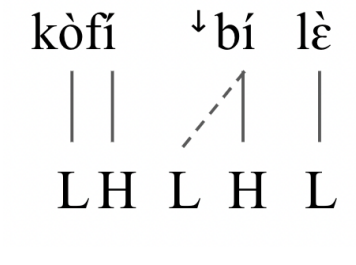
b. kòfí ↓bí lɛ̀
Kofi ask 3SG.ACC
'Kofi asked her.'

Perfective

(5) è-bí lɛ̀
3SG-ask 3SG.ACC
'He asked her.'



(6) kòfí ↓bí lɛ̀
Kofi ask 3SG.ACC
'Kofi asked her.'



Exponents

	PFV
Bound pro	L verb prefix
Other	L verb prefix

Table: Summary of exponents: Perfective

Perfect

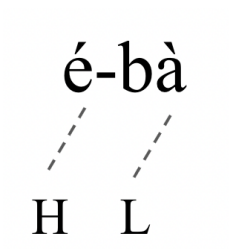
The perfect is multiply marked: the subject pronoun surfaces with a H tone and the verb carries a floating L prefix.

(7) a. é-bà
3SG.PRF-come
'He has come.'

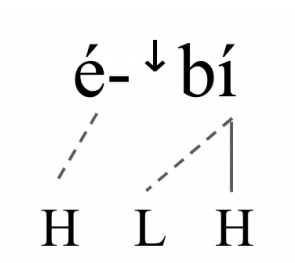
b. é-$^{\downarrow}$bí
3SG.PRF-ask
'He has asked.'

Perfect

(8) é-bà
3SG.PRF-come
'He has come.'



(9) é-↓bí
3SG.PRF-ask
'He has asked.'



Perfect

When the subject is non-pronominal, the surface form looks remarkably similar:

(10) a. é-bà
3SG.PRF-come
'He has come.'

b. kòfí é-bà
Kofi PRF-come
'Kofi has come.'

New Data: Intervening Constituent Constructions

Certain PP constituents can intervene between the subject pronoun and verb: the form of the perfect prefix *é-* is invariable throughout, providing evidence that this is not simply another instance of a pronoun.

(11) a. ì̀ kɛ̀ lɛ̀ **é**-bà
1SG with 3SG.ACC PRF-come
'I have come with her.'

b. ò kɛ̀ lɛ̀ **é**-bà
2SG with 3SG.ACC PRF-come
'You have come with her.'

c. è kɛ̀ lɛ̀ **é**-bà
3SG with 3SG.ACC PRF-come
'He has come with her.'

New Data: Intervening Constituent Constructions

Instrumentals, like ‘with a pen’, can either intervene between the pronoun and verb, or appear after the verb:

(12) a. **ḯ**-ŋmà kɛ̀ pɛ́ŋ
1SG.PRF-write with pen
‘I have written with a pen.’

b. **ì** kɛ̀ pɛ́ŋ **é**-ŋmà
1SG with pen PRF-write
‘I have written with a pen.’

Exponents

	PFV	PRF
Bound pro	L verb prefix	H subject tone
		L verb prefix
Other	L verb prefix	*é-* prefix
		L verb prefix

Table: Summary of exponents: Perfective and perfect

Progressive

When the subject is singular and pronominal, the progressive is marked by a change in the vowel length of the subject pronoun prefix.

(13) a. mm̋̃-↓bá
1SG.PROG-come
'I am coming.'

b. òò-bà
2SG.PROG-come
'You are coming.'

c. èè-bà
3SG.PROG-come
'He is coming.'

Progressive

When the subject is a plural pronoun (or non-pronominal), however, the progressive is marked by a homorganic nasal consonant prefix on the verb.

(14) a. wɔ̀-m̀-bà
1PL-PROG-come
'We are coming.'

b. ɲɛ̀-ǹ-jò fwì
2PL-PROG-run PART
'You (pl.) are running.'

c. àmɛ̀-ŋ̀-hòó nn̂̂
3PL-PROG-cook thing
'They are cooking.'

New Data: Intervening Constituent Constructions

(15) a. ì̃ kɛ̀ lɛ̀ m̀-bà
1SG with 3SG.ACC PROG-come
'I am coming with her.'

b. ò kɛ̀ lɛ̀ m̀-bà
2SG with 3SG.ACC PROG-come
'You are coming with her.'

c. è kɛ̀ lɛ̀ m̀-bà
3SG with 3SG.ACC PROG-come
'He is coming with her.'

Progressive

Although the progressive has no effect on the tone of the verb, it does affect a preceding H tone.

(16) a. kòj**ó** bà
Kojo come
'Kojo came.'

b. kòj**ô** m̀-bà
Kojo PROG-come
'Kojo is coming.'

Summary

	PFV	PRF	PROG
Bound pro	L verb prefix	H subject tone L verb prefix	$\mu\mu$ subject length
Other	L verb prefix	*é-* prefix L verb prefix	*Ǹ-* prefix

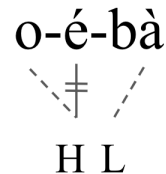
Table: Summary of exponents

Overview

Previous Analyses: Kropp Dakubu (2002)

The phenomenon in which an aspect prefix alternates with pronoun tone results from the synchronic deletion of the prefix after a pronoun. The tone of the prefix delinks and reassociates to the pronoun.

(17) ó-bà
2SG.PRF-come
'You have come.'



Previous Analyses: Paster (2003)

Paster (2003), on the other hand, argues that the process of prefix deletion after pronouns is not part of the synchronic phonology.

- Claims this would not pattern with vowel hiatus resolution strategies elsewhere in Gã (i.e. there is no process in Gã such that /e/ is deleted after /o/)
- Proposes that pronouns should be analyzed as portmanteaux, in which the pronoun itself expones aspectual features
- The realization of segmental prefixes exponing aspect is morphologically blocked when the subject is a prefix

Previous Analyses: Paster 2003

		SG	PL
Perfective	1	ɲ̀ĩ̀	wɔ̀
	2	ò	ɲɛ̀
	3	è	àmɛ̀
Perfect	1	ɲ́ĩ́	wɔ́
	2	ó	ɲɛ́
	3	é	àmɛ́
Progressive	1	mɲ̋ĩ̋	
	2	òò	
	3	èè	

Table: Portmanteau subject pronouns in Gã (based on Paster, 2003)

Gaps in Previous Analyses

Neither Kropp Dakubu (2002) nor Paster (2003) make any reference to the constructions in which a PP constituent can intervene between the subject and verb.

If the process of prefix deletion before pronouns is not part of the synchronic phonology, as Paster argues, how can we account for these constructions?

Paster claims that the prefixes exponing aspect are subject pronouns in all contexts: this analysis cannot account for the constructions in which both subject pronouns and aspect prefixes are realized in a single sentence.

Overview

Analysis

Subject pronoun prefixes undergo predictable phonological alternations with aspect prefixes when the subject pronoun is bound.

Prefix deletion should be considered part of the synchronic phonology: aspect prefixes are clearly separable from pronouns, as evidenced by the intervening constituent constructions.

There is no need to resort to the assumptions underlying a portmanteau analysis: instead, we can account for surface forms using regular phonological processes found elsewhere in Gã.

Vowel Hiatus Resolution in Gã

Throughout the language, when a V prefix is added to a V-initial root, the initial V of the root deletes.

(18)
a. òmɔ́
rice
'rice'

b. è-mɔ́
3SG-rice
'his rice'

c. *è-òmɔ́
3SG-rice
intended: 'his rice'

d. *èè-mɔ́
3SG-rice
intended: 'his rice'

Vowel Hiatus Resolution in Gã

This process exactly parallels what we find with the alternations between pronouns and prefixes.

(19) a. kòfí é-bà
Kofi PRF-come
'Kofi has come.'

b. é-bà
3SG.PRF-come
'He has come.'

c. *è-é-bà
3SG-PRF-ask
intended: 'He has come.'

Vowel Hiatus Resolution in Gã

However, VV sequences are allowed elsewhere in Gã: for instance, deletion does not occur with a CV prefix attached to a V-initial root (20c):

(20) a. àtàlé
dress
'dress'

b. è-tàlé
3SG-dress
'his clothes'

c. ŋɛ̀-àtàlé
2PL-dress
'your (pl.) clothes'

Therefore, we can restate this observation as a constraint on initial VV sequences.

Constraint-Based Account

*#VV: Assign a violation for an instance of a VV sequence at the left edge of a word.

MAX-TONE: Assign a violation for each input tone not present in the output.

MAX: Assign a violation for each input segment segment not present in the output.

/ĩ-é-^{L}-ba/	*#VV	MAX-TONE	MAX
a. ĩ̀-é-bà	*!		
☞ b. ĩ́-bà			*
c. ĩ̀-bà		*!	

(21) ĩ́-bà
1SG.PRF-come
'I have come.'

Interim Summary

PFV	PRF
L verb prefix	*é-* prefix L verb prefix

Table: Revised summary of exponents

Progressive

We need to take a different approach with the progressive:

Surface forms cannot be accounted for with vowel hiatus resolution strategies, since there is no vowel hiatus involved.

However, tone is still a relevant factor:

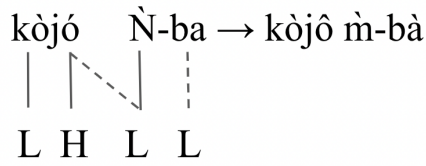
(22) a. **èè**-bà
3SG.PROG-come
'He is coming.'

b. kòjô **m̀**-bà
Kojo PROG-come
'Kojo is coming.'

Progressive

Exponent of progressive as a doubly linked L tone: associated with a nasal consonant bearing L tone and floating to the left

(23) kòjô m̀-bà
Kojo PROG-come
'Kojo is coming.'



Progressive

Fusion of the subject pronoun with the progressive is limited by phonological shape: only pronouns of the shape V may undergo fusion.

Attributable to regular phonotactic and phonological restrictions in Gã:

A syllable cannot have a coda with no onset: VN is not a possible syllable in Gã.

Mid +ATR vowels /o/ and /e/ have no nasal counterparts.

Constraint-Based Account

*VN: Assign a violation for a syllable of the shape VN.

*$\tilde{\text{E}}$: Assign a violation for a nasal mid +ATR vowel.

[IDENT[CONS]]: Assign a violation for an output segment which differs from the input in the feature [consonantal].

/e-$^{\text{L}}$-Ǹ-ba/	*VN	*$\tilde{\text{E}}$	MAX-TONE	*#VV	IDENT[CONS]
a. èm̀bà	*!				
☞ b. èèbà				*	*
c. ɛ̀̃ɛ̀̃ba		*!			*
d. ɛ̀̃ba			*!		

Summary

PFV	PRF	PROG
L verb prefix	*é-* prefix L verb prefix	*Ǹ* prefix L prefix

Table: Revised summary of exponents

Overview

Conclusions

New data collected with a native speaker of Gã sheds light on STAMP processes

Examples involving intervening PP constituents have not previously been discussed in the literature

This data provides support for a fusion-based account in which pronominals and aspect prefixes are synchronically separable

Surface forms of STAMP morphs are fully predictable from other phonological processes in the language

Contribution to theoretical literature on STAMP morphs; particularly those that are synchronically separable

Offers insight into how now-grammaticalized STAMP morphs may have functioned and developed in the past

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Tonal Processes: HL Rule

The sequence HL surfaces as H$^{\downarrow}$H before pause:

(24) a. è-**tsúmɔ̀** shìkpɔ̰́-ɔ̰̀
3SG-clean floor-DEF
'He cleaned the floor.'

b. è-**tsú$^{\downarrow}$mɔ́**
3SG-clean
'He cleaned.'

Subjunctive

The subjunctive is marked by a H tone on the subject pronoun prefix with a pronominal subject. The resulting surface form is attributable to the HL Rule.

(25) **é**-↓bá
3SG.SBJV-come
'He should come.'

With non-pronominal subjects and intervening constituent constructions, we see the verbal prefix *á-*.

(26) a. è kɛ̀ lɛ̀ **á**-↓bá
3SG with 3SG.ACC SBJV-come
'He should come with her.'

b. kòfí **á**-↓bá
Kofi SBJV-come
'Kofi should come.'

Irregular Forms: Fusion

Irregular 1st person singular pronominal forms:

(27) a. má-bà (from ĩ + á)
1SG.SBJV-come
'I should come.'

b. m̋ĩ̋-fò blòdò (from ĩ + $^{\text{L}}$Ǹ)
1SG-PROG-cut bread
'I am cutting bread.'

Progressive Constructions

Kropp Dakubu (2002):

(28) a. èè-bà
3SG.PROG-come
'He is coming.'

b. tɛ̀té mi̍̀ì-bà
Tettey PROG-come
'Tettey is coming.'

Paster (2003) reports a different progressive formation. Unfortunately, the only examples of the progressive provided are with the first person pronoun, so it is unclear what the rest of the paradigm looks like:

(29) mí́-ḿ-fò àkò
1SG-PROG-cut Ako
'I am cutting Ako.'

Intervening Constituent Constructions

Instrumentals:

(30) ò kɛ̀ pɛ́ŋ é-ŋmà
2SG with pen PRF-write
'You have written with a pen.'

Comitatives:

(31) ò kɛ̀ lɛ̀ é-bà
2SG with 3SG.ACC PRF-come
'You have come with her.'

Locatives:

(32) ì̀ yɛ skû ŋ̀-ká↓né nîĩ̂
1SG in school PROG-read thing
'I am reading in school.'

Perfective vs. perfect

The perfective, which is exposed solely through a floating L tone, never has any segmental component (unlike the perfect, progressive and subjunctive).

(33) a. è kɛ̀ lɛ̀ bà
3SG with 3SG.ACC come
'He came with her.'

b. è kɛ̀ lɛ̀ é-bà
3SG with 3SG.ACC PRF-come
'He has come with her.'