Journal of West African Languages

Volume 46.1 (2019)

RULES AND RULE RELATIONS IN AKAN DAY NAMES

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Abstract
This paper examines the formation of day names in Akan within linear (rule-based) and non-linear phonology. It reveals the mechanisms available in Akan phonology for lexicalization of day names: phonological rules apply to weaken, delete, insert or modify linguistic units in the derivation of day names. The paper provides evidence for the rule ordering in the derivation. The rule relations of feeding, bleeding, counterfeeding and counterbleeding, can be supported in the formation of day names in Akan. Differences in Twi and Fante day names are functions of differences in rule ordering in their subgrammars of the Akan language. For example, there is the dispreference of **ja** after a syllable **(*ʊ.ja)** in day names. This is repaired by either deleting the syllable preceeding **ja**, or by deleting **ja** itself. The fact that Twi and Fante dialects of Akan order the two rules differently accounts for the formal difference in day names such as: **aba** (Fante) ~ **jaa** (Twi); **kwaw** (Fante) ~ **jaw** (Twi); and **esi** (Fante) ~ **akos**ˈ**ija** (Twi). There are other formal differences between the two dialects that are equally due to difference in their rule ordering.

Keywords: day-names, Akan, feeding, bleeding, counterfeeding, counterbleeding

1. Introduction

The Akan people recognize seven deities which they believe to govern the seven days of the week; one deity for each day. Each of the seven deities has its unique attributes and duties that persons born on that day must live by (Christaller 1933: 598). To be born on a day is to stay true to the attributes and duties of the deity of the day for the duration of one's life here on earth. In response to one's promise to the Supreme Being before one comes down to this earth, one would have to live by these attributes and responsibilities while on earth. The divine sealing of this promise is the fact that the Supreme Being permits this person to be born on the day belonging to the deity whose attributes and duties one has promised to live by. The person born on this day shows his or her affiliation to the deity, and his or her commitment to keeping the promise by taking on the name of the deity of this day. Following are names of each of the seven spirits of the Akan days of the week.

(1)
(a) **àwúsí** 'the god of Sunday'
(b) **àdwy** 'the god of Monday'
(c) **bíná** 'the god of Tuesday'
(d) **wùkú** 'the god of Wednesday'
(e) **jàẁ** 'the god of Thursday'
(f) **æ̀fi̋** 'the god of Friday'
(g) **àmíń** 'the god of Saturday'

(Christaller 1933: 599)

The day name which denotes its bearer's affiliation with a day and the deity of the day is called *kra-din* 'spirit or soul name' (Christaller 1933: 262). There are male and female day-names of each of the seven days, making a total of fourteen day-names. The goal of the current paper is to examine the formation of day names in Akan within linear (rule-based) and non-linear phonology. Particularly, the paper aims to establish the phonological rules and the rule relations responsible for variation in day names in the Twi and Fante dialects of Akan.

This paper has the following subdivisions. Section 2 focuses on theory. Section 3 concerns some basic issues in Akan phonology. Section 4 establishes the underlying morphological structure of day names in Twi and Fante dialects of Akan, and the

phonological processes that target the core morpheme of day names. Section 5 is devoted to phonological processes associated with the suffix **-ba** in female day names. Section 6 accounts for segmental and featural changes at the right periphery of male day names. Section 7 deals with phonological processes associated with **kwa-** (in male and female day names); and section 8 is the conclusion.

2. Theoretical background

In the formation of day names, it is not every phonological or morphemic unit of input that is (fully) realized in the final output, and there are morphological and phonological conditions that motivate such behavior. This paper investigates the formation of day names in Akan within rule-based and non-linear phonology (Chomsky and Halle 1968, Clements and Hume 1995). For the current purpose, a background on the principles of generative phonology – particularly, explanation of the workings of the four rule relations: feeding, counterfeeding, bleeding and counterbleeding (in linear phonology), and a review of the autosegmental theory and also the theory of prosodic morphology (non-linear phonology) – are essential in accounting for the formation of day names in Akan.

The following classical Generative phonology principles are followed in analyzing the formation of day names in Akan. One, a day name in Akan is an "output of a sequence of phonological rules which act upon an underlying form" (Goldsmith and Bernard 2006: 8). Two, according to Kenstowicz and Kisseberth (1979: 34), "[p]honological rules are operations upon strings of feature matrixes. Each rule assigns one or more feature specifications to a matrix when that matrix appears in a certain context. In the statement of the rule, … [targets and triggers] are identified by mentioning all of the features necessary to uniquely indicate just those particular sets." Three, there is often "a number of non-designated levels intermediate between the underlying and surface levels. Non-designated levels are the result of sequential application of phonological rules" (McCarthy 2007: 101).

Conditions involved in the formation and variation of day names in Twi and Fante are in support of the need to order rules. The rule relations, feeding, bleeding, counterfeeding and counterbleeding are all present in the formation of day names in Akan. Following is a brief introduction of these rule relations.

The counterfeeding and counterbleeding are inverse rule relations of feeding and bleeding relations, respectively. Counterfeeding and counterfeeding are subsumed under opacity. Kiparsky (1976) defines opacity (i.e. result of counterfeeding and counterbleeding) as follows:

(2) A phonological rule P of the form A → B / C___D is opaque if there are surface structures with any of the following characteristics:

(a) instances of A in the environment C__D.
(b) instances of B derived by P that occur in environment other than C__D.
(c) instances of B not derived by P that occur in the environment C__D.

(McCarthy, 2007: 108)

Two of the above opacities that matter to this study are those in (2a) and (2b). An instance of (2a) is when a rule context is available in the output, but the rule cannot apply. A counterfeeding relation between rules is what results in this type of opacity. The counterfeeding type of opacity results when the context in which a rule applies is derived after the rule's tenure of application has passed. That is, the output has the context in which the rule must apply and yet the rule cannot apply because its tenure of application has passed and the rule is not cyclic. This rule is said to be not surface true (Kiparsky

1971, 1973, and McCarthy 2007: 108) for the fact that its phonological context of application is available/ready, or exists but the rule cannot apply. In other words, the preferred output form has a context which is in violation of a preceding rule. A reverse application of the rules concerned puts such rules in a feeding relation.

Phonological opacity as expressed in (2b) is realized when the phonological context in which a rule applies is altered after the said rule has applied. Here, the phonological context in which a rule applied is said to be not surface-apparent (Kiparsky 1971, 1973, and McCarthy 2007: 108). In other words, the effect of a rule is realized in an output but the context which triggered it is erased by a late rule. The relationship between these two rules is one of counterbleeding. A reverse application of the two rules results in a bleeding relation.

The syllable underlies several segmental processes involved in the formation of day names and it is for this reason that basic principles of autosegmental phonology and also principles of the theory of prosodic morphology (a subtheory of autosegmental phonology) are relevant to the current study. Autosegmental phonology assumes that some phonological units are situated on different, independent tiers; and that well-formedness is achieved through association conventions that apply to link units of the different tiers together. Classical prosodic morphology "is a theory of how prosodic structure impinges on templatic and circumscriptional morphology. [It] says that templates and circumscription must be formulated in terms of the vocabulary of prosody and must respect the well-formedness requirements of prosody" (McCarthy and Prince 1996: 318). The following principles of the theory of classical prosodic morphology are important and are adhered to in this study.

(3) Principles of Prosodic Morphology (McCarthy and Prince 1996: 318)

(a) Prosodic Morphology Hypothesis: Templates are defined in terms of the authentic units of prosody: mora (μ), syllable (σ), foot (F), prosodic word (PrWd).

(b) Template Satisfaction Condition: Satisfaction of templatic constraints is obligatory and is determined by the principles of prosody, both universal and language-specific.

(c) Prosodic Circumscription: The domain to which morphological operations apply may be circumscribed by prosodic criteria as well as by the more familiar morphological ones.

3. Background on the segmental phonology of Akan

This section briefly provides some basic phonological information on Akan. Dolphyne (1988) identifies thirty one consonants for Akan twenty of which have been represented in the table below. '✓' indicates the presence of a privative feature (i.e. a place feature).

(4) **Consonants in Akan**

(4a)

	p	**b**	**t**	**d**	**tʃ**	**dʒ**	**tʃʲ**	**dʒʲ**	**k**	**kw**	**g**	**gu**
[cons]	+	+	+	+	+	+	+	+	+	+	+	+
[son]	-	-	-	-	-	-	-	-	-	-	-	-
[approx.]	-	-	-	-	-	-		-	-	-	-	-
[cont]	-	-	-	-	+	+	+	+	-	-	-	-
[voice]	-	+	-	+	-	+	-	+	-	-	+	+
[nas]	-	-	-	-	-	-	-	-	-	-	-	-
[lab]	✓	✓					✓	✓		✓		✓
[cor]			✓	✓	✓	✓	✓	✓				

[high]	-	-	-	-	-	-	-	-	+	+	+	+

(4b)

	m	**n**	**r**	**F**	**s**	**w**		**j**
[cons]	+	+	+	+	+	-	-	-
[son]	+	+	+	-	-	+	+	+
[approx]	-	-	+	-	-	+	+	+
[cont]	-	-	+	+	+	+	+	+
[voice]	+	+	+	-	-	+	+	+
[nas]	+	+	-	-	-	-	-	-
[lab]	✓			✓		✓	✓	
[cor]		✓	✓		✓		✓	✓
[high]	-	-	-	-	-	+	-	-

There are ten oral vowels in Akan. The term labial is used as a cover term for round vowels and labial consonants. Also, I follow Clements and Hume (1995:277) in using the term coronal to describe front vowels in Akan: /i, ɪ, e, ɛ/. Akan has inherently nasal vowels which have not been represented here.

(5) Vowels in Akan:

	a	Θ	E	e	I	i	□	o	Y	u
[hi]/[high]	-	-	-	-	+	+	-	-	+	+
[low]	+	+	-	-	-	-	-	-	-	-
[round] ([back])	-	-	-	-	-	-	+	+	+	+
[nas]	-	-	-	-	-	-	-	-	-	-
[atr]	-	+	-	+	-	+	-	+	-	+
[cor]			✓	✓	✓	✓				
[lab]							✓	✓	✓	✓

Vowel Harmony (advanced tongue root harmony): Akan operates the advanced tongue root ([ATR]) harmony. Advanced ([+ATR]) vowels are: /i, e, æ, u, o/ and, their unadvanced ([-ATR]) counterparts are /ɪ, ɛ, a, ʊ, ɔ/. [-ATR] vowels (/ɪ, ɛ, a, ʊ, ɔ/) change to [+ATR] ([i, e, æ, u, o] respectively) to harmonize with an abutting vowel in the feature [+ATR]; for example: **/ɔbɛdi/** 'S/he will eat' is spoken as **[obedi]** 'S/he will eat' in Twi. Vowel Harmony (Rounding harmony/Labial harmony): The Asante Twi (As.) and Fante (Fa.) dialects of Akan also operate round harmony, and also labial harmony which holds between a consonant and an abutting vowel. The sentence, **/ɔbɛkɔ/** 'S/he will go' is pronounced [**ɔbɔkɔ]** in Fante due to vowel harmony. In Asante Twi, a prosodic -E when attached after **–fo** becomes **-□**, as in **/ghanafo/** 'Ghanaians' becoming **[ganafY□]** 'Ghanaians'.

Tone in Akan: Akan has two contrastive tones, a high /´/ and a low /`/ tone as in the words, **dá** 'sleep!, or 'day' and **dà** 'never' respectively. The syllable in Akan: In terms of the syllable, Dolphyne (1988) mentions three: CV, V and C. The syllabic consonants are the nasals: /m, n, ŋ, N/; /r/, the roll in the Fante dialect, and /w/ in all the dialects of Akan especially in Akuapem Twi (Ak.).

4. The underlying morphological structure of day names in Akan, and phonological processes that target the core morpheme

This section defines the morphological constituents of day names and the phonological processes that target the core-root morphemes of day names. A male day name in Akan as in (6), has the morphological structure: a prefix, **kwa-** 'masculine

marker' plus a root/core morpheme which is the name of a deity. A female day name as in (7) has the underlying structure: a prefixal morpheme which is **a-** 'a feminine prefix', followed by name of a deity, and followed by **–ba** 'a feminine suffix'.[1]

(6) **Male day names:**

(i) Input: kwa-Deity	(ii) Twi	(iii) Fante (Fa.)	(iv) English
(a) **kwà-wúsí**	**kwæ̀sí ~ àkwàsí**	**kwèsí**	'male.Sunday-born'
(b) **kwà-d||ó**	**kwæ̀d||ó**	**kòd||ɔ̀**	'male.Monday-born'
(c) **kwà-bíná**	**kwàbíná ~ kwàbɾ́a)́**	**èbò**	'male.Tuesday-born'
(d) **kwà-wùkú**	**kwæ̀ɛ́kú**	**kwèɛ́kú**	'male.Wednesday-born'
(e) **kwà-jàẁ**	**jàẁ**	**kwàẁ, ɛ̀kɔ̀ẁ**	'male.Thursday-born'
(f) **kwà-fí**	**kòfí**	**kòfí**	'male.Friday-born'
(g) **kwà-míń**	**kwàámì**	**kwámínà**	'male.Saturday-born'

(7) **Female day names in Akan:**

(i) Input: a-Deity-FM	(ii) Twi	(iii) Fante (Fa.)	(iv) English Gloss
(a) **à-wúsí-bá**	**àkós|íjá ~ àkósúwá**	**ésí**	'female.Sunday-born'
(b) **à-dwÝ-bá**	**àd||ówá**	**àd||ówá**	'female.Monday-born'
(c) **à-bíná-bá**	**àbínáá ~ àbɾ́a)́a)́**	**árábá**	'female.Tuesday-born'
(d) **à-wùkú-bá**	**æ̀k|íjá ~ Θ̀kúwá**	**èkúwá**	'female.Wednesday-born'
(e) **à-jàẁ-bá**	**jàá**	**ábá**	'female.Thursday-born'
(f) **à-fí-bá**	**æ̀fíjá ~ æ̀fúwá**	**èfúwá**	'female.Friday-born'
(g) **à-míń-bá**	**áḿmá**	**áḿbá**	'female.Saturday-born'

The analyses below focus on the prosodic and segmental processes that target the root morphemes of day names as opposed to their affixes. The analyses have been subdivided into four with the different subdivisions focused on outlining the phonological processes that target these root morphemes: (4.1) the root of Twi male day names; (4.2) the root of Twi female day names; (4.3) the root of Fante male day names; and (4.4) the root of Fante female day names.

4.1. The root of Twi male day names

Root units that are missing from output forms of male day names in Twi are: wu in (1a) and (1d) and /n/ in (1g). In Akan in general, a high vowel is deleted in the environment stated below:

(8) [+high] vowel deletion: [+high, αlab] → O / $CVC_{[+high, +cont, \alpha lab]}$ __CV

The rule in (8) applies to reduce /wu/ to /w/ in both (6a) and (6d) and to create the intermediate outputs, **kwà.w.sí** (6a) and **kwà.w.kú** (6d). The rule applies to create the wC (i.e. ws and wk) consonant sequence which is later reduced to C as given in (9) below. The rule in (8) feeds the rule in (9). That is, the rule in (9) applies to prevent the wC

[1] **-ba** as a suffix in Akan has a range of senses: it functions diminutively when it is attached after adjectives where it is realized as **–ba**, **-wa** or **–a** (e.g. **tsea-ba/teatea-a** 'slender', **kete-wa** 'small', **korkoro-wa** 'round and small') (Dolphyne 1988: 86). **–ba** in this usage is a grammaticalized form of the Akan word **(ɔ)ba** 'offspring, child, daughter, son' (Christaller 1933). The suffix is a feminine marker in female names in Akan. This usage of the suffix derives from the Akan word for female **(ɔ)ba(a)/(ɔ)b(ɪ)a** as in the Twi female names **Ofori-wa** 'female with the name Ofori', **Agyei-wa/Agyei-bea/Agyei-waa** 'female with the name Agyei' (Ofori 2006: 6-10).

consonant sequence. This rule has relevance in the formation of female day names also especially in the derivation of the day name jàá 'female.Thursday-born' from **/a-jaw-ba/**: i.e. **jawba → jaba → jawa → jaa)**.

(9) /w/ deletion: /w/ → O / __C

There is also /n/ deletion in the formation of **kwàámì** from **kwà-mĺń** 'male.Saturday-born' in Twi. The process is very productive in the Twi dialects (Asante Twi especially) and applies in the context in (10) below:

(10) /n/ deletion: /n/ → O / ṽ __#

The three deletion processes: /u/, /w/ and /n/ deletion, are responsible for the reduction in root morphemes observed in Twi male day names.

There are also rules that apply optionally to change the root morpheme, **bíná** (1c-ii) to **bŕã́**, in both Twi male and female day names. The phonological processes that are responsible for the observed changes are: vowel nasalization, /n/ denasalization (/n/ → [r]) and /ɪ/ deletion. The rules apply in that sequential order with a preceding rule always creating the context for the application of a succeeding rule as shown in (11) below.

(11) Phonological processes that affect **bíná**, root of Tuesday (male/female name)

	Input:	**bíná**
a.	Vowel nasalization: $V_{[-Nas]}$ → [+Nas] / $C_{[+Nas]}$ __	**bína)́**
b.	/n/ denasalization: /n/ → [-Nas] /v __ v)	**bíra)́**
c.	/ɪ/ deletion: /ɪ/ → O / C __ rV	**bŕa)́**
	Output:	**bŕa)́**

The rule that deletes /ɪ/ removes the context for /n/ denasalization. In other words, there is a counterbleeding ordering of the /ɪ/ deletion and /n/ denasalization rules in Twi. There are other phonological processes that are shared by the Twi and Fante dialects of Akan which I have reserved for discussion under (4.1.3) Fante male day names.

4.2. The root of Twi female day names

Every rule established in (4.1.2), for Twi male day names, applies in Twi female day names also. These are:

(12)
(a) [+high] vowel deletion: [+high, αlab] → O / $CVC_{[+high, +cont, αlab]}$ __CV
(b) /w/ deletion: /w/ → O / __C
(c) /n/ deletion: /n/ → O / ṽ __#
(d) vowel nasalization: $V_{[-Nas]}$ → [+Nas] / $C_{[+Nas]}$ __
(e) /n/ denasalization: /n/ → [r] /v __ v)
(f) /ɪ/ deletion: /ɪ/ → O / C __ rV

If there is any difference between the male and female name dataset, it is in when an empty syllable (i.e. an empty syllable due to segment loss) should be preserved and when it should be truncated. In female day names, a left-edge empty syllable with a high tone must be preserved and this is observed by inserting **kwa-** where the empty syllable is. This is evident in the derivation of **àkós i já ~ ákósú(w)á** 'female.Sunday-born' in Twi. The input: **à-wúsi-bá** changes to become **à-ósi-bá** (as a result of rules in (7a) and (7b) to delete /u/ and /w/ respectively); **kwa-** is inserted to derive: **à-kwá-si-ba; kwa** finally changes to **[ko-]** through series of phonological processes to be advanced later on to derive, **àkós i já ~ àkósú(w)á.** In male day names, syllables of root morphemes must be

preserved, and this is achieved through either vowel insertion or lengthening; vowel lengthening applies and, therefore, an empty syllable is preserved only when the conditions for vowel lengthening are present. A consecutive application of the deletion rules in (8) and (9), in the formation of male day names in Twi, provide the context for either vowel insertion or lengthening. In other words, these deletion rules precede and feed vowel insertion and lengthening. For example [**a-**] is inserted before **kwa-** in **àkwásí** due to the loss of the root segment /wu/, and /a/ is lengthened in **kwàákú** and **kwàámì** due to loss of /wu/ and /n/, respectively.

4.3. The root of Fante male day names

The phonological processes that truncate /u/ and /w/ in Twi male and female day names apply in Fante male day names also; and so is the vowel insertion and lengthening rules that apply to redeem the empty syllable(s) that result from these segmental loses: **kwa-wuku → kwa-ɑku → kwaaku → kwèékú** 'male-Wednesday-born'; **kwámín** becomes **kwámínà** 'male.Saturday-born'. That is, in Fante, the final /n/ is never deleted; it rather attracts [a] insertion and by so doing is able to escape deletion. That is, the rule that inserts [a] bleeds the rule that deletes the final /n/; /n/ deletion is able to apply in Twi because the rule on [a] insertion succeeds the rule on /n/ deletion; and in Twi /n/ feeds vowel lengthening. In Fante, [a] insertion bleeds vowel lengthening also. This explains why in Fante, **kwà-míń** becomes **kwámínà**, but not **kwàámì** (as in Twi).

Also, the input **kwà-d⏐⏐ó́** becomes **kòd⏐⏐ó́** 'male.Monday-born'. That is, the final vowel /ʊ/ ([+High, -ATR]), of the root morpheme, is lowered to [o] ([-High, +ATR]). The phonological rule that apply to convert /kwa/ to [kɔ] or [ko] has received attention in section (7).

Fante also selects the segment **bí** (which is equal to a syllable) from the root morpheme, **bína**, and derives the day name **èbò** 'male.Tuesday-born' from it. There is a vowel labialization rule that converts /ɪ/ to [ʊ], and a vowel lowering rule that converts [ʊ] to [o], in the semblance of **kwà-d⏐⏐ó́** having its final high round vowel lowered to become **kòd⏐⏐ó́**. The vowel labialization and lowering rules that affect the root morpheme have all been represented and exemplified in section (6).

A unique characteristic of Fante (male) day names is the dispreference of ja after a syllable, hence ja deletion in (6e-iii) – the input **kwà-jàẁ** is reduced to **kwàẁ** 'male.Thursday-born'. This phenomenon is in operation in Fante female day names. The segment sequence ja is deleted in the formation of ábá. The deletion of ja and of /w/ do not need any crucial ordering in Fante: (7e-i) **à-jàẁ-bá (ja deletion & /w/ deletion) → aba** 'female.Thursday-born'. They apply simultaneously. The rule that truncates /ja/ in Fante day names can be expressed as:

(13) /ja/ deletion: /ja/ → O /σ__

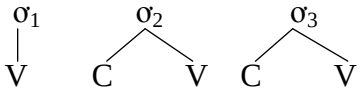
The day name, **kwàẁ**, is also pronounced as **ɛ̀kɔ̀ẁ** by some native speakers of Fante. Kwa changes to [kɔ] by phonological processes discussed in section (7) below.

4.4. The root of Fante female day names

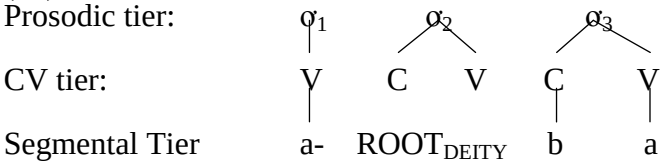
Disyllabic root morphemes can be argued to reduce to a monosyllable in Fante female day names. An argument along this line would also have to include that /ja/ deletion, as defined in (13) above, is a late rule (i.e. ja-deletion applies after **ja** has been circumscribed for day name formation). My analytical position is that the rightmost CV segments of a core root morpheme are preferred and are selected for the formation of female day names in Fante, and that their selection is motivated by the templatic/prosodic

requirement as defined in (14) below. The representation in (15) shows the arrangement of the morphemic constituents of Fante female day names.

(14) The prosodic template for female day names in Fante

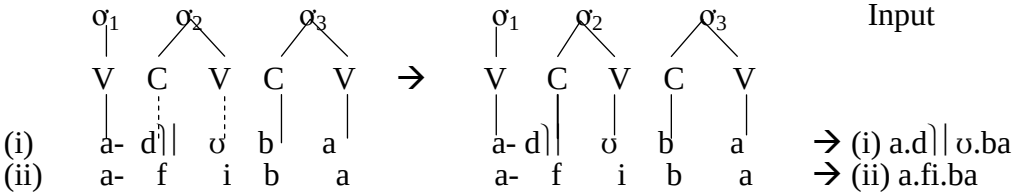


(15)



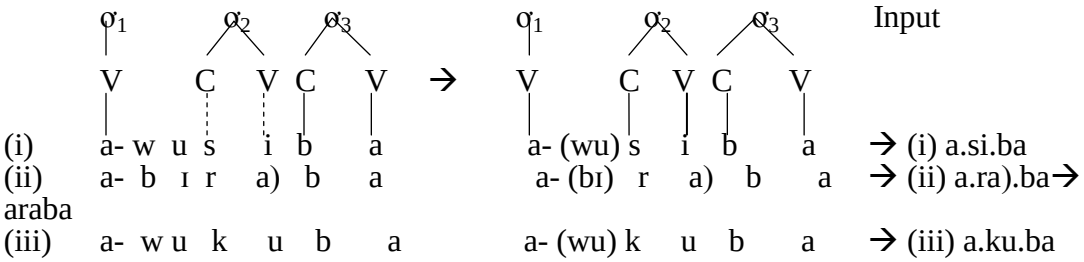
On the realization of the segmental content of the templatic structure in (14), σ_1 and σ_3 are prespecified with their segmental contents which are /a/ and /ba/ respectively, as in (15); association of segments of root morphemes to σ_2 begins from right to left as represented from (16) to (18) below.

(16) The case of monosyllabic root morphemes
(16a) Illustration:



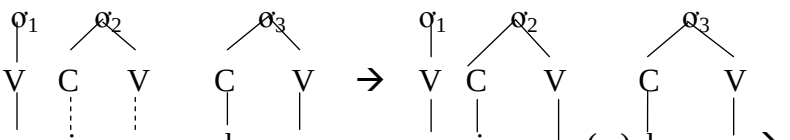
(16b) Data: (i) **à-dʊ́-bá → à-dʊ́-wá** "Monday.female"
(ii) **à-fí-bá → è-fúwá** "Friday.female"

(17) The case of disyllabic CVCV morphemes
(17a) Illustration:



(17b) Data:
(i) **à-wú$_1$.sí$_2$-bá → é-Ø$_1$.sí$_2$-Ø** 'female.Sunday-born'
(ii) **à-bí$_1$.ná$_2$-bá → à-bírá-ba → á-Ø$_1$.ra)́$_2$-bá → árábá** 'female.Tuesday-born'
(iii) **à-wù$_1$.kú$_2$-bá → è-Ø$_1$.ku$_2$-wá** 'female.Wednesday-born'

(18) The case of disyllabic CVC morphemes
(18a) Illustration:



(i) a- j a w b a → a- j a (w) b a → (i) a.ja.ba → a.ba
(ii) a- m ɪ n b a → a- m ɪ (n) b a → (ii) a.mɪ.ba → a.m.ba

(18b) Data:
(i) **à-jà$_a$.ẁ$_b$-bá → à-jà$_a$.Ø$_b$-bá** ‘female.Thursday-born’ (**à-jà$_a$.Ø$_b$-bá → à-Ø.Ø$_b$-bá**)
(ii) **à-mí$_a$.ń$_b$-bá → à-mí$_a$.Ø$_b$-bá** ‘female.Saturday-born’ (**à-mí$_a$.Ø$_b$-bá → à-mØ$_a$.Ø$_b$-bá**)

(19) **/ɪ/ deletion:** /ɪ/ → [Ø] / C$_{[+Nas]}$ __ C
(as in: **à.mí.bá → á.ḿ.bá** ‘female.Saturday-born’)

Following are some comments on the derivation of **árábá** in (17a-ii), and **áḿbá** in (18a-ii). In (18a-ii), /ɪ/ deletes from the input **amıba** to derive **áḿbá**. The rule that deletes /ɪ/ is as stated in (19). In Fante female day names, just like in Twi, the vowel nasalization and /n/ denasalization applies but vowel nasalization is erased by a subsequent vowel denasalization rule as expressed in (20d). Consonant (i.e. /n/) denasalization feeds vowel denasalization in Fante; and vowel denasalization (a late rule) removes the context of consonant denazalization. That is, the consonant denasalization and vowel denasalization order is counterbleeding (i.e. vowel denasalization counterbleeds consonant denasalization) in the sense that there is no evidence of the context of /n/ denasalization with the application of vowel denasalization in the Fante female day name, **árábá**.

(20) Derivation of **árábá** ‘female.Tuesday-born’ in Fante

	Input:	**à-bíná-bá**
a.	Vowel nasalization: V$_{[-Nas]}$ → [+Nas] / C$_{[+Nas]}$ __	**à-bína)́-bá**
b.	/n/ denasalization: /n/ → [-Nas] /v __ v)	**à-bíra)́-bá**
c.	Association of the rightmost CV to σ$_2$.	**á-ra)́-bá**
d.	Vowel denasalization: V$_{[+Nas]}$ → [-Nas] / C$_{[-Nas]}$ _ C$_{[-Nas]}$	**á-rá-bá**
	Output:	**á-rá-bá**

As the rule in (20d) indicates, the vowel loses its nasality because it is interconsonantal and none of the surrounding consonants is nasal. In male and female day names in Twi where the vowel retains its nasality, it is not followed by a consonant: **àbína)́á** ~ **àbŕáá́** “Tuesday.female” and **kwàbŕá** “Tuesday.male”. Vowel denasalization does not apply in the male day name **kwàbŕa)́** because the context of its application is lacking in this day name. The input for **àbína)́a)́** ~ **àbŕa)́á́** is **/abınaba/**; vowel nasalization applies to yield **[abına)ba]**; consonant denasalization applies to yield **[abıra)ba]**. Now, the question is why [a)] is not denasalized in Twi, but in Fante. We can address this by saying that the rule that weakens /b/ to [w] and the rule that applies to delete [w] precede the rule on vowel denasalization. In other words, /b/ weakening and [w] deletion apply consecutively to block the application of the vowel denasalization rule in Twi. In Fante, the condition that selects a rightmost CV over a leftmost CV for female day name formation precedes and bleeds /b/ weakening (and therefore [w] deletion) in araba (see section 5 on the context of /b/ weakening and consequently [w] deletion

between low vowels). The vowel denasalization rule applies in Fante because the /b/ weakening and [w] deletion rules do not apply to remove a succeeding consonant (/b/) of the nasalized vowel. On /ɪ/ deletion between /b/ and [r], we have no way of verifying whether the rule applies in Fante for the fact that it is the entire bɪ constituent of the core root morpheme which is omitted in the formation of Fante female day names – **bɪ** is unassociated and for that matter undergoes stray erasure, hence not being realized phonetically.

In conclusion, the fact that there is a tri-sylabicity requirement on Fante female day names, and that the **a-** and **-ba** morphemes already occupy two of the three syllable-slots are what motivate the realization of just two root-morpheme segments for female day names in Fante. The circumscription is guided by the alignment condition that segments of a root-morpheme associate with σ_2 (which is a CV) from right to left.

5. **Phonological processes associated with –ba 'the feminine suffix' in female day names**

The feminine suffix {-ba} has these varied phonetic (or allomorphic) manifestations in female day names: [-ma], [-wa], [-a], [-ba], [-ja], and [-O] (a zero morph). The female data in (21) has been regrouped accordingly. This section aims to identify the underlying phonological conditions and rules on {-ba} allomorphy (i.e. varied phonetic realizations).

(21) **Female day names in Akan:**

(i) Input: a-Deity-FM	(ii) Twi	(iii) Fante	(iv) English Gloss
(a) **à-kwásiˊ-bá**	**àkósi̩ ́já ~ akosu(w)a**	**ési**	'female.Sunday-born'
(b) **à-dwŶ-bá**	**àd̩|ówá**	**àd̩|ówá**	'female.Monday-born'
(c) **à-bíná-bá**	**àbi̩náá ~ àbɾa)́a)́**	**árábá**	'female.Tuesday-born'
(d) **à-wùkú-bá**	**æ̀ki̩ ́já ~ Θ̀kú(w)á**	**èkúwá**	'female.Wednesday-born'
(e) **à-jàẁ-bá**	**jàá**	**ábá**	'female.Thursday-born'
(f) **à-fiˊ-bá**	**æfi̩ ́já ~ æfúwá**	**èfúwá**	'female.Friday-born'
(g) **à-míń-bá**	**áḿmá**	**áḿbá**	'female.Saturday-born'

The morpheme {-ba} changes to [-ma] in (22a) in Twi, but remains [-ba] in Fante. The input is subjected to /n/ and /ɪ/ deletion to derive amba. The rule that applies to delete /ɪ/ is expressed in (22b). The output of /ɪ/ deletion, **amba,** is an intermediate output which is waiting to undergo place assimilation (homorganicity). Place assimilation (homorganicity) involves a shared place node. Representationally the /mb/ sequence has to have a single labial node in order for us to say that place assimilation has applied (as illustrated from (22e-ii) to (22e-iv). The second of the adjacent place (labial) nodes becomes doubly associated and the first place node becomes stranded once place assimilation has applied. Place assimilation in Akan is a regressive process as shown in (22e-ii).

(22) {-ba} → [ma] / m __ (in Twi); and {-ba} → [-ba] / C__ (in Fante)

(a) Input: **à-míń-bá**
Output: **áḿmá** (Twi)/ **__ (áḿbá)** (Fante) 'female.Saturday-born'

(b) /ɪ/ Deletion: /ɪ/ → O / **[+Nas] __ C**[2]

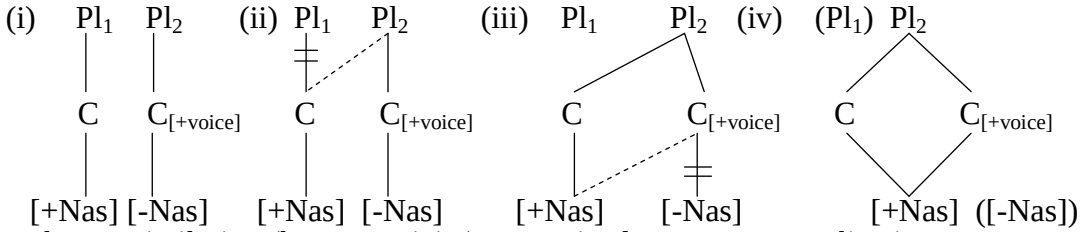
(c) Place assimilation (i.e. derivation of a homorganic nasal):

[2] There is evidence to this process beyond the current data in compounds. The compound word, **àhíḿfié** "palace" is derived from **a-hɪmɪ-fie**. There is /ɪ/ deletion, and then /n/ changes to [ɱ] to agree with /f/ in place of articulation, in being labiodental.

[+Nasal] → [αlab, Bcor, γdor] / __ [αlab, Bcor, γdor]

(d) Voiced consonant nasalization:
[+voice, αlab, Bcor, γdor] → [+Nas] / [+Nas, αlab, Bcor, γdor] __

(e) A non-linear representation of place assimilation and voiced consonant nasalization:



The voiced consonant nasalization rule applies on the output of the place assimilation rule as shown in (22d) and in (22e-ii) (i.e. linearly and non-linearly). In other words, voiced consonant nasalization is dependent on the existence of homorganicity: the consonants involved in this process must be homorganic. Voiced consonant nasalization is a progressive assimilation rule: the trigger, a nasal consonant, precedes the target, a non-nasal consonant.

In Twi, voiced consonant nasalization succeeds homorganicity, as illustrated in (22e). The application of place assimilation (i.e. homorganicity, or a shared place node) feeds voiced consonant nasalization. This rule ordering underlies **ámbá** eventually becoming **ámmá** in Twi. In Fante, however, voiced consonant nasalization strictly precedes place assimilation (i.e. homorganicity) such that voiced consonant nasalization cannot even apply after place assimilation has applied to create the phonological context for voiced consonant nasalization. In other words, place assimilation (homorganicity) counterfeeds voiced consonant nasalization in Fante. The place assimilation rule derives the context for voiced consonant nasalization (i.e. **ámbá**), but voiced consonant nasalization cannot apply for the fact that the voiced consonant nasalization rule strictly precedes the place assimilation rule in its application.

In (23), {-ba} is realized as [-wa]. Some of the Twi female day names in (23) have limited usage among native speakers hence their enclosure in bracket.

(23) {-ba} → [-wa] 'feminine suffix'
(a) Input: **à-dwŸ-bá** Output: **àd⏐⏐ówá** (Twi) / **àd⏐⏐ówá** (Fante) 'Monday-born'
(b) Input: **à-wùkú-bá** Output: **__ ~ (Θkúwá)** (Twi) / **èkúwá** (Fante) 'Wednesday-born'
(c) Input: **à-fi-bá** Output: __ ~ **(æfúwá)** (Twi) / **èfúwá** (Fante) 'Friday-born'
(d) Input: **à-kwási-bá** Output: **__~(àkósú(w)á)** (Twi)/_(Fante) *esuwa 'Sunday-born'

There is a weakening (or dorsalization) of /b/ to [w] after a high vowel in (23), and [w] is preserved so long as the preceding high vowel is rounded.

In (24) are variant day names of Twi day names in (23). In (24), [w] as in (23) is replaced by [j]; and a preceding high round vowel of [w] in (23) becomes unrounded (in 24). That is, an [uw] sequence in (23) is realized as [ij] in (24).

(24) {-ba} → [-ja]
(a) Input: **à-kwási-bá** Output: **àkós⏐íjá** (Twi) / __ (Fante) "Sunday-born"
(b) Input: **à-wùkú-bá** Output: **èk⏐íjá** (Twi) / __(Fante) "Wednesday-born"

(e) Input: **à-fí-bá** Output: **æ̀fíjá** (Twi) / __ (Fante) "Friday-born"

In terms of daily usage, forms in (24) in Twi are more preferred than their counterparts in (23). In Fante, the [ija] ending for day names is dispreferred. A Fante female day name ends in either [uwa] or [ʊwa], or a zero realization of these endings. That is, the [ja] sequence is completely dispreferred in Fante day names and, by the current study, this dispreference accounts for the realization of the Sunday female day name in Fante as esi, not esija, as would be illustrated and explained later.

Another interesting observation is the fact that in (23c) and (23d), /i/, in the input, is realized as [u], in the output, suggesting that there is /i/ labialization/rounding. While there is /i/ labialization/rounding in (23c) for both Twi and Fante, in (23d), the /i/ labialization rule applies in Twi, but not in Fante. In (23c) where the /i/ labialization rule holds for both Twi and Fante, the surrounding consonants of /i/ are labial, while in (23d), it is only the succeeding consonant of /i/ which is labial. In other words, the contexts of /i/ labialization in (23c) and (23d) are different, and the difference is in terms of the direction of assimilation (i.e. spread) of the feature labial: progressive labial assimilation of /i/ in (23c), but regressive labial assimilation in (23d). In application in Fante is progressive labial assimilation, not regressive labial assimilation, and accounts for why (23d) is empty for Fante. There is also the preference for regressive labial assimilation over progressive labial assimilation in Twi, evidenced by the fact that forms in (24) are preferred over those in (23) in Twi.

Data in (24) show an omission of [w], and in its stead, the emergence of [j] (through a j-glide formation rule), which by the current study applies after the application of a vowel delabialization rule. What looks like the replacement of [w] by [j] in (24) in Twi, thus, can be expressed as the deletion of [w], followed by the spread of [i] (a high nonround vowel) to a succeeding onset slot – the slot once occupied by [w]. (24b) shows evidence of vowel delabialization: the underlying vowel there is /u/, but /u/ comes to be realized as [i] in the output. The fact that a preceding consonant of /u/ is labiopalatalized in the output suggests that the rule on vowel delabialization succeeds the rule on consonant labialization. My position is that a labialized consonant becomes labiopalatalized when it occurs before a high nonround vowel, which is after the vowel delabialization rule has applied. In other words, the rule on vowel delabialization precedes and feeds j-glide/onset formation (i.e. the spread of a high nonround vowel, [i], to a succeeding onset slot as [j]). The context of vowel delabialization, I argue, is after [w] (from /b/ weakening) has been deleted to create the $C^{w}V_{[+High]}V_{[+Low]}$ sequence. Glide/onset formation between vowels which is realized as [w] in a [+High/+round][+Low] vowel sequence, but as [j] in a [+high/-round][+low] vowel sequence, applies to prevent the $V_{[+High]}V_{[+Low]}$ vowel sequence in both Twi and Fante. The w-glide/onset formation is a case of a preceding vowel, [u], spreading to a following onset slot to prevent the $V_{[+High]}V_{[+Low]}$ vowel sequence. The rule on vowel delabialization precedes and feeds the j-glide rule. Also, the vowel labialization rule feeds the w-glide/onset formation rule.

There is no known Fante day name with the [ja] ending. This is captured by a rule in (25i). Also, ja is dispreferred after a word-initial syllable as expressed in (25j). This dispreference of the ja syllable after an initial syllable holds in both Fante and Twi, but the two dialects are different in how they resolve a violation of this condition. The sequence **ja** is never realized in Fante day name outputs and suggests that the rule on ja deletion as indicated in (25i) succeeds the rule on glide/onset formation. In Twi, however, it is **ja** which is always preserved, so an initial syllable deletes before **ja** in (25j) below. This suggests that the rule in (25j) – initial syllable deletion before **ja** – precedes and bleeds the rule in (25i) – ja-deletion after a syllable – in the derivation of the Twi day names **jàẁ** "male.Thursday-born" and **jàá** "Thursday.female" from **/kwa.jaw/** and

/a.ja.ba/, respectively. Furthermore, **ja** is preserved at the ending of Twi day names suggesting that the rule in (25i) – ja-deletion after a syllable – applies before the rule on j-glide/onset formation (i.e. the rule that creates **ja**). The j-glide/onset formation rule counterfeeds the rule that deletes ja after a syllable as expressed in (25i) – that is, their ordering is one of counterfeeding.

(25)
(a) /b/ weakening (dorsalization/continuancy): /b/ → [w] / [+hi] __ [+low]
(b) vowel labialization (regressive): /i/ → [u] / COR __ wa
(c) [w] deletion: [w] → O / [+hi] __ [+low]
(d) vowel labialization (progressive): /i/ → [u] / lab __ [+low]
(e) Consonant labialization: $C_{cor/dor}$ → C^{w}/ __ $V_{[+Hi, +round]}$ a
(f) Vowel delabialization: [+hi, +round] → [-round] / $C_{[Labial(ized)]}$ __a
(g) Labiopalatalization: C^{w} → C^{j} / __ [+hi, -round][+low]
(h) Glide/Onset formation: O → [+approx, αcor, γlab] / [-cons, αcor, γlab] __ [+low]
(i.e. O → [j] / [+hi/-round] _ [+low]; O → [w] / [+hi/+round __ [+low])
(i) ja deletion after a syllable: ja → O /σ __
(j) Initial syllable deletion before ja: σ → O /#__ ja (does not hold for data in (18) and (19))

Thus in Fante glide/onset formation (25h) precedes and feeds ja-deletion after a syllable (25i), and ja-deletion after a syllable (25i) precedes and bleeds initial syllable deletion before ja (25j). In Twi, however, initial syllable deletion before ja (25j) precedes ja deletion after a syllable (25i); and ja deletion after a syllable (25i) precedes j-glide/onset formation (25h). Reversive orderings and therefore applications of the three rules in Fante and Twi, as shown (26), account for dialectal variation.

(26)
(26a) Fante: This ordering is not favorable to ja-retention

(1) glide formation	(2) ja-deletion after a syllable	(3) initial syllable deletion before **ja**

(26b) Twi: This ordering if favorable to ja-retention

(1) initial syllable deletion before **ja**	(2) ja-deletion after a syllable	(3) glide formation

In other words, rule ordering accounts for why **ja** is never realized or preserved in Fante day names, but is always realized and preserved in Twi day names.

The context of vowel delabialization as expressed in (25f) has been broadened to cover a similar segment change that occurs between an inherently labial consonant and the low vowel, also, in Twi dialects of Akan. This is observed in some Twi native speakers' pronunciation of the word **bua** "to answer" as [bija], **fua** "single" as **fija**. Again, the fact that in (24a), the underlying vowel is /i/ and yet /s/ is labiopalatalized ([s^{j}]) supports the fact that there is regressive labialization of /i/ to [u]. The change of /i/ to [u] then creates the context for consonant labialization – the rule on regressive vowel labialization (25b) and [w] deletion (25c) apply consecutively to feed consonant labialization (25e). Consonant labialization converts /s/ to a labialized consonant, [s^{w}]. Consonant labialization feeds vowel delabialization; and vowel delabialization feeds the palatalization of a labialized consonant (i.e. labiopalatalization) – C^{w} then comes to be realized as C^{j} after labiopalatalization. In (24a), vowel delabialization has a reversive effect: in other words, it applies to reverse the output of vowel labialization (/i/ → [u] → [i]).

The tables and the explanations on them below advance the rule ordering relations that motivate variation in day names in (23) and (24).

(27) Twi: rule ordering for day name outputs with the $V_{[+hi/-round]}$ja ending

Input (intermediate):	(i) à-ko[si -bá]	(ii) æ-[kú-bá]	(iii) æ-[fi -bá]
(a) /b/ weakening	à-ko[si -wá]	æ-[kú-wá]	æ-[fi -wá]
(b) vowel labialization (reg.)	à-ko[sú-wá]	N/A	N/A
(c) vowel labialization (prog)	N/A	N/A	N/A
(d) [w] deletion	à-ko[sú-á]	æ-[kú-á]	æ-[fi-á]
(e) consonant labialization	à-ko[s^{w}ú-á]	æ-[k^{w}ú-á]	N/A
(f) vowel delabialization	à-ko[s^{w}í-á]	æ-[k^{w}í-á]	N/A
(g) Labiopalatalization ($C^{w} \rightarrow C^{j}$)	à-ko[s^{j}í-á]	æ-[k^{j}í-á]	N/A
(h) ja deletion after a syllable	N/A	N/A	N/A
(i) Glide formation	à-ko[s^{j}í-já]	æ-[k^{j}í-já]	æ-[fi-já]
Output:	à-ko[s^{j}í-já]	æ-[k^{j}í-já]	æ-[fi-já]

Rules on vowel labialization – i.e. regressive and progressive vowel labialization – precede [w] deletion. The regressive vowel labialization rule applies, but the progressive vowel labialization rule which is dependent on the deletion of [w] cannot for the fact that [w] deletion applies late (i.e. after the progressive vowel labialization rule). This means that [w] deletion applies to create the context for progressive vowel labialization, but the rule (i.e. progressive vowel labialization) cannot apply for the fact that it strictly precedes [w] deletion (e.g. **æfíá** after [w] deletion does not become ***æfúá**, because progressive vowel labialization can only apply before [w] deletion, not after it). [w] deletion, therefore, counterfeeds progressive vowel labialization (as in 27d-iii). On the other hand, [w] deletion (27d) feeds consonant labialization (27e), which in turn feeds vowel delabialization (27f). Vowel delabialization (27f) feeds labiopalatalization (27g) – i.e. the palatalization of a labialized consonant. Also, vowel delabialization (27f) feeds j-glide/onset formation (27i) and also palatalization of labialized consonants (i.e. labiopalatalization) (27g). The fact that the rule on j-glide/onset formation succeeds the rule on ja deletion (after a syllable) explains why ja is preserved in day names in (24) in Twi – j-glide/onset formation counterfeeds ja deletion after a syllable.

Below in (28) is the illustration for rule ordering for Twi day name alternations in (23). These day names end in **–wa**, and **–wa** is always preceded by a high round vowel.

(28) Twi: rule ordering for day name outputs with the $V_{[+hi/+round]}$ja ending

Input (intermediate):	(i) à-ko[si-bá]	(ii) à[d͡ʒ]ó-bá]	(iii) æ-[kú-bá]	(iv) æ-[fi-bá]
(a) /b/ weakening	à-ko[si -wá]	à[d͡ʒ]ó-wá]	æ-[kú-wá]	æ-[fi -wá]
(b) vowel labialization (regressive)	à-ko[sú-wá]	N/A	N/A	N/A
(c) [w] deletion	à-ko[sú-á]	à[d͡ʒ]ó-á]	æ-[kú-á]	æ-[fi -á]
(d) vowel labialization (progressive)	N/A	N/A	N/A	æ-[fú-á]
(e) Glide formation	à-ko[sú-wá]	à-[d͡ʒ]ó-wá]	æ-[kú-wá]	æ-[fu-wá]

In (28), [w] deletion interrupts the two vowel labialization rules: regressive vowel labialization precedes [w] deletion, and [w] deletion precedes progressive vowel labialization. Glide formation applies after the application of the two vowel labialization rules and explains why the resultant glide is [w], not [j], in (23) and in (28) in Twi. In (28), [w] deletion feeds progressive vowel labialization, and progressive vowel

labialization in turn feeds w-glide/onset formation as in the derivation of **æfúwá**. Also, /b/ to [w] weakening feeds regressive vowel labialization in (28b); [w] deletion applies to remove the context of regressive vowel labialization – that is, there is a counterbleeding relation between vowel labialization and [w] deletion; [w] deletion feeds glide formation.

The rule relations in (29) apply in Fante female day names. Just as in Twi, /b/ is weakened to [w] in Fante. [w] deletion applies immediately after /b/ weakening. In Twi, [w] deletion either succeeds the two vowel labialization rules or interrupts them. In Fante, [w] deletion precedes the two vowel labialization rules. The fact that [w] deletion precedes regressive vowel labialization explains why the regressive vowel labialization rule does not apply in Fante. Regressive vowel labialization applies in Twi for the fact that [w] deletion succeeds it. Of the two vowel labialization rules, only progressive vowel labialization applies in Fante and this is due to its position in the ordering: progressive vowel labialization succeeds [w] deletion. That is, [w] deletion applies to create the context for progressive vowel labialization in Fante (e.g. **èfíá → èfúá**) – [w] deletion feeds progressive vowel labialization.

(29) Rule relations for the Fante day name data in (23)

Input (intermediate):	(i) **é[si˝-bá]**	(ii) **à[d͡|ó-bá]**	(iii) **è-[kú-bá]**	(iv) **è-[fi˝-bá]**
(a) /b/ weakening	**é[si˝-wá]**	**à[d͡|ó-wá]**	**è-[kú-wá]**	**è-[fi˝-wá]**
(b) [w] deletion	**é[sí-á]**	**à[d͡|ó-á]**	**è[kú-á]**	**è-[fí-á]**
(c) vowel labialization (reg.)	N/A	N/A	N/A	N/A
(d) vowel labialization (prog)	N/A	N/A	N/A	**è-[fú-á]**
(e) Glide formation	**é-[sí-já]**	**à-[d͡|ó-wá]**	**è-[kú-wá]**	**è-[fú-wá]**
(f) ja deletion after a syllable	**é-[sí]**	N/A	N/A	N/A
Output:	**ésí**	**àd͡|ówá**	**èkúwá**	**èfú-wá**

The non-application of regressive vowel labialization which is due to the fact that [w] is deleted by an earlier rule (i.e. [w] deletion) explains why the glide is [j] (as in **ésíjá**). The glide is realized as [w] as in **èfúwá** where the progressive vowel labialization rule applies – it can therefore be said that progressive vowel labialization feeds w-glide formation in day names. In Fante, day names do not end in ja for the fact that the rule that deletes **ja** after a syllable succeeds glide formation – ja deletes to derive **ésí** (see 26a). In Twi, however, ja-deletion precedes glide formation, hence, the preservation of final **ja** in day names in Twi (see 26b). Vowel delabialization and labialized consonant palatalization (i.e. labiopalatalization) rules can only apply when consonant labialization applies immediately after [w] deletion; and consonant labialization can only apply when [w] deletion succeeds the two vowel labialization rules.

There is another /b/ to [w] weakening that holds between low vowels; the resultant [w] eventually deletes. Associated with /b/ weakening here is syllable counting. Here, /b/ of **-ba** "feminine marker" is targeted for weakening when -ba is the second or the fourth syllable of a day name. Below in (30) and (31) are the data concerned; and the new rule on /b/ weakening is expressed in (32).

(30) Twi: {-ba} → [-a]
(a) (i) **à.jà.ẁ.bá** (/w/ deletion; σ → O /#_ja) → (ii) **jà.bá** (/b/ weakening)
→ (iii) **jàwá** (w deletion) → (iv) **jàá** "Thursday.female"
(b) (i) **à.bí.ná.bá** → (ii) **à.bí.ná.bá** (/b/ weakening) → (iii) **à.bí.ná.wá** (w deletion)
→ (iv) **à.bí.ná.á** "Tuesday.female"

(31) Fante: {-ba} → [-ba] (-ba retention)
(a) **à.ná.bá → á.rá.bá** (/b/ weakening: N/A) "Tuesday.female"
(b) **à.mí.bá** (/ɪ/ deletion) **→ á.ḿ.bá** (/b/ weakening: N/A) "Saturday.female"
(c) **à.jà.bá** (/b/ weakening: N/A) →) **à-jà-bá** (ja deletion: ja → O /ơ_) → **ábá** "Thursday.female"

(32) /b/ weakening: /b/ → [w] / [+low].__ $[+low]_{EVEN}$

In (30), /b/ weakening applies in forms in (ii). In (30a), /b/ weakening applies after the rule that deletes an initial syllable before ja has applied in Twi. In (31a) and (31b), **-ba** is not the second or the fourth syllable (as it is the case in 30a and 30b in Twi), for this reason, /b/ weakening does not apply in these day names in Fante. In (31c), the rule that weakens /b/ to [w] strictly precedes the rule that deletes **ja**. Therefore, the context for /b/ weakening emerges after ja-deletion and at a derivational stage where the /b/ weakening rule does not apply. The ja-deletion rule, therefore, counterfeeds the /b/ weakening rule. It is very late for /b/ weakening to apply on ábá (for the fact that the rule that weakens /b/ strictly precedes ja deletion). In Twi, where /b/ weakening applies after the rule that deletes an initial syllable before ja the same Thursday female day name is realized as **jàá** (i.e. **ajaba → jaba → jawa → jaa**) as opposed to **ábá**.

6. Segmental/Featural Processes at the right periphery of male day names.

In this Section the focus is on how impermissible final segments are treated in Fante and Twi male day names. Aspects of the data in (33) in consideration here are in (34) and (35).

(33) **Male day names:**

(i) Input: kwa-Deity	(ii) Twi	(iii) Fante	(iv) English
(a) **kwà-wúsí**	**kwæ̀sí**	**kwèsí**	'male.Sunday-born'
(b) **kwà-d⏐⏐ó**	**kwæ̀d⏐⏐ó**	**kòd⏐⏐ò́**	'male.Monday-born'
(c) **kwà-bíná**	**kwàbíná ~ kwàbɾ́a)́**	**èbò**	'male.Tuesday-born'
(d) **kwà**-wù**kú**	**kwæ̀ǽkú**	**kwèékú**	'male.Wednesday-born'
(e) **kwà-jàẁ**	**jàẁ**	**kwàẁ, èkɔ̀ẁ**	'male.Thursday-born'
(f) **kwà-fí**	**kòfí**	**kòfí**	'male.Friday-born'
(g) **kwà-mĺń**	**kwàámì**	**kwámínà**	'male.Saturday-born'

(34) Fante male day names:

(a) **kwà-d⏐⏐ʊ́**	**kòd⏐⏐ó**	'Monday-born'
(b) **bíná** → ɛbɪ	**èbò**	'Tuesday-born'
(c) **kwà-mĺń**	k**wàmíná**	'Saturday-born

(35) Twi male day names

(a) **kwà-d⏐⏐ʊ́**	**kwæ̀d⏐⏐ó**	'Monday-born'
(b) **kwà-mĺń**	**kwàámí**	'Saturday-born'

In the Fante data, just as in the Twi data, a word final high vowel is realized as [o] – in (34a) and (35a) the high vowel is /ʊ/ a high rounded unadvanced vowel; in (34b) the high vowel is /ɪ/, a high unrounded unadvanced vowel. Both /ɪ/ and /ʊ/ are realized as [o], a mid (or a non-high) rounded advanced vowel. High advanced vowels at the word final position do not undergo the said change; only high unadvanced vowel do. In (35b) kwàámí ends in a high unadvanced vowel and yet it does not change to become [o]. In

(35b) in Fante, [a] is inserted after /n/. We can conclusively say that a high unadvanced vowel is dispreferred at the word final position in (male) day names. We can account for this by a feature dissimilation rule that converts a word final high unadvanced vowel to a non-high advanced vowel as expressed in (36a) below.

(36)
(a) Feature dissimilation: [+high, -ATR] → [-high, +ATR] / __#
(b) Vowel labialization: [-high, +ATR] → [lab] / [lab] __#
(c) [a] insertion: O → [a] /n__#
(d) word final /n/ deletion: /n/ → O /ṽ __#
(e) [+ATR] harmony: [-ATR] → [+ATR] / __ $C_0V_{[+ATR]}$

Now questions of how a word final /ɪ/ is retained in kwàámí (35b), and also why a word final /ɪ/ of (34b) ɛbɪ changes to [o] as opposed to [e], by the rule in (36a), arise. We can account for kwàámí by saying that the feature dissimilation rule in (36a) precedes word final /n/deletion (36d) – in other words, word final /n/ deletion (36d) counterfeeds high unadvanced feature dissimilation at word-final position (36a) in Twi. In Fante, [a] insertion after /n/ (36c) precedes and bleeds word final /n/ deletion (36d). Now, on why /ɪ/ of (34b) changes to [o] and not [e]; we can account for this by the vowel labialization rule in (36b), /b/ being the trigger of labialization. The feature dissimilation rule in (36a) feeds vowel labialization as obtained in (36b). Feature dissimilation (36a) also feeds regressive [+ATR] harmony (36e); that is, the added [+ATR] feature of the word final vowel goes on to transmit it newly acquired [+ATR] feature to a preceding unadvanced vowel just as inherently [+ATR] vowels do. This explains why the initial vowels of the day names (34a) **kòd⎮⎮ó** 'male.Monday-born', (34b) **èbò** 'male.Tuesday-born', (35a) **kwæ̀d⎮⎮ó 'male.**Monday-born' deviate from their underlying representations in being [+ATR] (i.e. [o], [e] and [æ], respectively).

The final issue to be dealt with concerns the different treatment of the final consonant segment, /n/, by the Twi and Fante dialects of Akan. In Twi, the final /n/ (which is equal to a syllable) is deleted and the first vowel of the word is lengthened to preserve trisyllabicity. Fante preserves trisyllabicity using a different mechanism; it inserts [a] after /n/ to avoid a word final /n/ and to preserve or restore trisyllabicity. In other words, /n/ deletion in Twi and [a] insertion in Fante are different mechanisms available in Akan for prevent a word final nasal consonant in day names. There is the preference for a vowel final day name over a nasal consonant final day name in Akan. The two rules exist in the grammar to help achieve this requirement. Below in (37) and (38) are the respective rule ordering relations in Twi and Fante, respectively; rule ordering accounts for dialectal variation in day names.

(37) Rule relations in Twi

	Input:	**kwà-d⎮⎮ɔ́**	**kwa̰-mĺń**
a.	Feature dissimilation: [+high, -ATR]→[-high, +ATR]/ __#	**kwàd⎮⎮ó**	N/A
b.	Vowel labialization: [-high, +ATR] → [lab] / [lab] __#	N/A	N/A
c.	[+ATR] harmony: [-ATR] → [+ATR] / __ $C_0V_{[+ATR]}$	**kwæd⎮⎮ó**	N/A
d.	Word final /n/ deletion: /n/ → O /ṽ__#	N/A	**kwa̰-mĺ**
e.	[a] insertion: O → [a] /n__#	N/A	N/A
	Output: (Note: **kwàmí** becomes **kwàámí** after [-high] lengthening to preserve trisyllabicity.)	**kwæd⎮⎮ó**	**kwàámí**

(38) Rule relations in Fante

	Input:	**kwà-d⎤⎜ʊ́**	**kwa̖-mɪ́ń**	**ɛbɪ**
a.	Feature dissimilation: [+high, -ATR] → [-high, +ATR] / __# (Note: /a/ labializes to [ɔ] in: [lab] __ [+cont, lab]; and there is consonant delabialization: [C^w] → [C] /_ $V_{[lab]}$: k^wad⎤⎜o → k^wɔd⎤⎜o → **kɔ̀d⎤⎜ó**)	**kwàd⎤⎜ó → kɔ̀d⎤⎜ó**	N/A	**ɛbe, ɛbo**
b.	Vowel labialization: [-high, +ATR] → [lab] / [lab] __#	**N/A**	N/A	**ɛbo**
c.	[+ATR] harmony: [-ATR] → [+ATR] / __ $C_0V_{[+ATR]}$	**kòd⎤⎜ó**	N/A	**ebo**
d.	[a] insertion: O → [a] /n__#	N/A	**kwa̖mɪ́ná**	N/A
e.	Final /n/ deletion: /n/ → O /ṽ__#	N/A	**N/A**	N/A
	Output	**kòd⎤⎜ó**	**kwa̖mɪ́ná**	**èbò**

7. **Phonological processes associated with kwa- 'masculine marker' in male and female day names**

The prefix **kwa-** has the phonetic alternations, **[kwa-]**, **[kwΘ-]**, **[kwe-]**, **[ko-]**, **[k□-]** and **[O-]** (i.e. a zero morph) depending on the phonological context.

(39) **Day names with kwa in their underlying structure:**

(i) Input: kwa-Deity-(ba)	(ii) Twi	(iii) Fante	(iv) English
(a) **à-wúsi ́-bá**	**àkós⎜i ́já ~ akosu(w)a**	**ési ́**	"Sunday.female"
(b) **kwà-wúsi ́**	**kwæ̀si ́**	**kwèsi ́**	"Sunday.male"
(c) **kwà-d⎤⎜ʊ́**	**kwæ̀d⎤⎜ó**	**kòd⎤⎜ɔ̀**	"Monday.male"
(d) **kwà-bína ́**	**kwàbína ́ ~ kwàbŕa) ́**	**èbò**	"Tuesday.male"
(e) **kwà**-wù**kú**	**kwæ̀ǽkú**	**kwèékú**	"Wednesday.male"
(f) **kwà-jàẁ**	**jàẁ**	**kwàẁ, ɛ̀kɔ̀ẁ**	"Thursday.male"
(g) **kwà-fi ́**	**kòfi ́**	**kòfi ́**	"Friday.male"
(h) **kwa̖-mɪ́ń**	**kwàámì**	**kwámínà**	"Saturday.male"

Data in (39) has been regrouped according to the different phonetic forms of kwa, into: (40) [kɔ-], (41) [ko-], (42) [kwe-], (43) [kwΘ-] ~ [akwæ-], (44) [O-] and (45) [kwa-]. Three phonological processes account for the realization of kwa- as [kɔ-] in Fante in (11). The three phonological rules are: /ja/deletion (11b-i), /a/ labialization (11b-ii) and consonant delabialization (11b-iii).

(40) kwa- → [kɔ-] in Fante

(a) Input: **/kwà-jàẁ/** Output: __ (Twi) / **ɛ̀kɔ̀ẁ** (Fante) 'male.Thursday-born'

(b) Application of rules

Input	**/k^wà-jàẁ/**
(i) /ja/ deletion: /ja/ → O /σ __	**k^wà-w**
(ii) /a/ labialization: /a/ → [ɔ] / [lab] __ [+cont, lab]	**k^wɔw**
(iii) consonant delabialization: C^w → C / __ $V_{[lab]}$	**kɔw**

Output	**ɛkɔw** (ɛ-prefixation to derive three syllables)

The three rules in table (40b) are in a feeding relation: a rule feeds the rule that follows it – that is, /ja/ deletes to create the context for the application of /a/ labialization, and /a/ labialization in turn feeds consonant delabialization. Phonological processes in (40b) also apply to data in (41a) and (41b) where kwa- is realized as [ko-]; the [kɔ-] and [ko-] allomorphs are only different in their [ATR] values which are [-] and [+] respectively. [kɔ-] in (11a) is a case of [ɔ] retaining the [-ATR] feature of the low vowel (/a/); in (41) where kwa is followed by a [+ATR] vowel, there is [+ATR[harmony, hence the realization of [kɔ-] in (40a) as [ko-] in (41). This suggests that there is a fourth rule, [+ATR] harmony as in (41d) which applies strictly after /a/ labialization and converts [ɔ] to [o]; /a/ labialization feeds [+ATR] harmony in (41).

(41) kwa- → [ko-] in Twi and Fante

(a) Input: /**kwà-d͡ʒ́ó**/	Output: **___** (Twi) / **kòd͡ʒ́ó** (Fante)	‘Monday-born’
(b) Input: /**kwà-fi** /	Output: **kòfi** (Twi) / **kòfi** (Fante)	‘Friday-born’
(c) Input: /**à-kwá-sí-bá**/	Output: **àkósí já** (Twi) / (Fante)	‘Sunday-born’

(d) [+ATR] harmony: [-ATR] → [+ATR] / __ $C_0V_{[+ATR]}$

/a/ labialization applies before d͡ʒ in Fante, but does not apply before d͡ʒ in Twi; this is the reason behind the dash before **kòd͡ʒ́ó** in Fante. The Twi version of **kòd͡ʒ́ó** is kwæ̀d͡ʒ́ó, without /a/ labialization. The fact that d͡ʒ, an affricate, has the [-cont][+cont] contour (Sagey 1986) accounts for the disparity. In Twi, the [-cont] arm of this contour is more active, hence the non-application of /a/ labialization in Twi; the opposite condition holds in Fante where the /a/ labialization rule applies, the [+cont] subpart of the contour is more active than the [-cont] arm. So the difference between the two dialects lies in which of the contour features of d͡ʒ is more active than the other in which dialect. We cannot talk of /a/ labialization in Fante version of the Sunday female day name (i.e. **ésí**) because kwa- is not an input in the derivation of this day name; **ésí** is derived from **/a-si-ba/**, not from **/a-kwa-si-ba/**.

In (42), the low vowel of kwa changes to [e]. Two phonological processes underlie this change: /a/ to [ɛ] raising as in (42c) followed by [+ATR] harmony which finally converts [ɛ] to [e].

(42) kwa- → [kwe-] in Fante

(a) Input: **kwà**-wú**si**	Output: **kwèsí** (Fante)	‘male.Sunday-born’
(b) Input: **kwà-wùkú**	Output: **kwèékú** (Fante)	‘male.Wednesday-born’

(c) Low raising: /a/ → [ɛ] / __ C $V_{[+Hi, +ATR]}$

The rule on low vowel raising precedes the rule on [+ATR] harmony and explains why the low vowel /a/ changes to [e] in Fante as opposed to [æ]. Also, the rule on low vowel labialization precedes the rule on [+ATR] harmony and explains why /a/ changes to [o]. Also, there is [-High] vowel lengthening. The [-High] does not lengthen when the preceding syllables are [si] (as in: **kwæsi/kwesi**), [d͡ʒ] (as in: **kwæd͡ʒ́o/kod͡ʒ́o**], [**bına**] (as in: **kwabına**), [w] (as in: **kwaw ~ ɛkɔw**), [fi] (as in: **kofi**) and [**mına**] (as in: **kwamına**). [-High] lengthens when the succeeding syllables are: [ku] and [mɪ] and when a root morpheme has lost a syllable. The vowel of kwa-, therefore, lengthens to compensate for the loss of a root syllable. This explains why [**kwaabına**] cannot become the output of /kwa-bına/, instead the output is just like the input, [**kwabına**]. The fact that **bına**, the root morpheme, does not lose a syllable means there is nothing to compensate

for in kwabına; in other words, no syllable to preserve. In Fante, /**kwa-mın**/ is realized as [**kwamına**]; there is no deletion of a syllable of the root morpheme, **mın**; if anything, root morpheme is even solidified through [a] insertion which occurs after /n/. In Twi, however, /n/ (i.e. a root-syllable) is deleted and mın comes to be realized as [mı]; the loss of the root syllable is compensated for through /a/ lengthening and the output is realized as [**kwaamı**]. The phonological rules mentioned so far are: /n/ deletion, [a] insertion and vowel lengthening to restore a root syllable (and create a trisyllabic output). The fact that the two dialects order these rules differently, as represented in (43) and (44), accounts for the [**kwaamı**] (Twi) and [**kwamına**] (Fante) formal difference.

(43) Twi: Derivation of **kwaamı** (i.e. with a vowel lengthened) 'male.Saturday-born'

Input:	**/kwa-mı.n/**
(a) Word final /n/ deletion: /n/ → O /ṽ__#	**kwamı**
(b) Vowel lengthening to preserve an empty root-syllable: $CV_{[-Hi]1} \rightarrow CV_{[-Hi]1}.V_{[-Hi]1} / \#\ \_]_{\sigma}.CV]_{\sigma}$	**kwa.a.mı**
(c) [a] insertion: O → [a] /CV.n__#	N/A
Output:	**kwa.a.mı**

(44) Fante: Derivation of **kwamına** (i.e. without a vowel lengthened) 'male.Saturday-born'

Input:	**/kwa-mı.n/**
(a) [a] insertion: O → [a] /CV.n__#	**kwamına**
(b) Word final /n/ deletion: /n/ → O /ṽ__#	N/A
(c) Vowel lengthening to preserve an empty root-syllable: $CV_{[-Hi]1} \rightarrow CV_{[-Hi]1}.V_{[-Hi]1} / \#\ \_]_{\sigma}.CV]_{\sigma}$	N/A
Output:	**kwa.mı.na**

In Twi, as represented in (43), the rule that deletes /n/ (i.e. a syllable of the root morpheme) feeds vowel lengthening, and vowel lengthening blocks the application of [a] insertion. In Fante, as in (44), however, [a] insertion is the first rule to apply and, it applies to block the application of the /n/ deletion and [-High] vowel lengthening rules.

So [-High] lengthening applies to restore a syllable and to preserve trisyllabicity. The fact that there is no syllable loss in **kwabına**, and this day name is already trisyllabic explains why [-High] does not lengthen here. The day name **kwamına** in Fante is also without [-High] vowel lengthening because there is root-syllable loss, [a] is inserted to prevent /n/ deletion in this day name. Making root-syllable loss a condition for [-High] vowel lengthening raises a question for the fact that the day name, **kwæsi** (Twi) ~ **kwesi** (Fante) "Sunday.male", also loses a root-syllable (i.e. **wu**), and yet the rule that lengthens a nonhigh vowel fails to apply. Is the restoration of an emptied syllable the sole condition for [-High] vowel lengthening? The **kwæsi** ~ **kwesi** day names suggest a contradiction. The fact of the matter is that the loss of a root-syllable is not an enough condition for [-High] vowel lengthening. There is more to the context of application of [-High] vowel lengthening than has been defined. There is a feature requirement just as there is a prosodic one that unify to either promote or block [-High] vowel lengthening. A syllable is restored and the trisyllabicity of a day name preserved through [-High] vowel lengthening when the consonant immediately after the [-High] vowel is [-cont]; the consonants: /k/ and /m/ in kwææku (45b), **kweeku** (42b) and **kwaamı** (46b) are [-cont] and, also, there is the need to restore a root-syllable, and so the [-High] vowel lengthening rule applies. [-High] vowel lengthening does not apply in, kwæsi (in Twi in (45c) ~ kwesi (in Fante in 42a), even though /wu/ is deleted from the root morpheme (wusi); this is the case because, /s/, the consonant that immediately succeeds the [-High] vowel, is [+cont]. This additional requirement (i.e. a feature requirement) calls for

modification of the rule as in (43b/44c) to (45d), with the [-cont] feature of the succeeding consonant specified.

(45) kwa- → [kwΘ-] in Twi
(a) Input: **kwà-d⏌⏌ó** Output: **kwæ̀d⏌⏌ó** (Twi) 'Monday.male'
(b) Input: **kwà**-wù**kú** Output: **kwæ̀ǽkú** (Twi) 'Wednesday.male'
(c) Input: **kwà-wúsí** Output: **kwæ̀sí** (Twi) ~ **àkwǽsí** (Asante Twi) 'Sunday.male'

(45d) Vowel lengthening to preserve an empty root-syllable:
$CV_{[-Hi]1} \rightarrow CV_{[-Hi]1}.V_{[-Hi]1} / \#\_]_{\sigma}.C_{[-cont]}V]_{\sigma}$

(45e) Restoration of trisyllabicity in Asante Twi:
O → [a] / #__.kwa.si.

In data in (45), **kwa** is realized as **kwæ-**. The low vowel changes to [æ] after it has received the [+ATR] feature from a succeeding vowel; the advanced low vowel, [æ] is also lengthened as in **kwæ̀ǽkú** because there is a root-syllable loss and the low vowel is succeeded by a noncontinuant consonant. Asante Twi, has a unique way of restoring trisyllabicity in the day name **kwæ̀sí** where a succeeding continuant consonant, /s/, impedes the application of [-High] vowel lengthening to restore a stranded syllable. Asante Twi does so by inserting [a] before **[kwæ-]** hence (45c) **[akwæsi]** in Asante Twi. In (45e) is the rule on [a] insertion before [**kwæ̀sí**] in Asante Twi. There is no [-High] vowel lengthening in these other day names: **kwæ̀d⏌⏌ó** ~ **kòd⏌⏌ó**, **kwàẁ** ~ **ɛ̀kɔ̀ẁ** ~ **jàẁ** and **kòfí**, where the conditions for lengthening are not present.

In data (46), **kwa** is omitted from an output (i.e. it becomes a zero morph) because the syllable /ja/ is dispreferred after an initial syllable. The rule is as given in (46b) below. This rule applies to convert **/kwa-jaw/** to **[jaw]** "Thursday.male" as in (46a).

(46) **kwa- → [O-]**
(a) Input: **kwà-jàẁ** Output: **jàẁ** (Twi)
(b) σ → O / #__ja
(c) ja → O /σ__

The Twi dialects resolve this anomaly by deleting the initial syllable. This condition underlies the realization of the female day name version of jaw as **jaa** in Twi. The underlying form for **jaa** is /**a-jaw-ba**/; /w/ deletes to derive [**a-ja-ba**]; initial syllable per the rule in (46b) deletes to derive [**jaba**]; /b/ weakens to derive [**jawa**]; and finally there is [w] deletion to derive the eventual output [**jaa**]. The attempt to avoid ja is certain prosodic domains exists also in Fante day names. Fante resolves this by always deleting ja as opposed to deleting a preceding syllable (as in Twi); the rule that deletes ja is as repeated in (46c). A careful look at Fante day names would reveal that there is no occurrence of /ja/; this suggests that the rules in (46b) and (46c) apply simultaneously in Fante.

In Twi, however, the formation of the j-glide to derive [ja] in some day names interrupts the application of (46b) and (46c). In other words, the rule that applies to delete ja (46c) precedes the rule that generates [j] (a glide) to derive [ja]. In the end, the context for ja deletion is present or created and yet the rule that must apply to delete **ja** cannot apply. In other words, ja-deletion is not a cyclic rule. It strictly precedes j-glide formation in its application where the phonological context of its application is not available, or not yet created. The j-glide formation rule applies later to derive **ja** and even though the phonological context for ja-deletion is present or created, the ja-deletion rule cannot apply for the sole reason that the application of the ja-deletion rule strictly precedes j-

glide formation, not after j-glide formation. The j-glide/onset formation rule counterfeeds the ja deletion (after a syllable) rule; that is, j-glide formation relationship with ja deletion after a syllable is one of counterfeeding.

In (47), **kwa-** is without modification for reasons that conditions for /a/ raising, [+ATR] harmony, /a/ labialization, consonant delabialization, or kwa truncation are not present.

(47) kwa- retention
(a) Input: **kwà-bínà** Output: **kwàbíná ~ kwàbɾ́a)** ˊ(Twi)**/kwàbíná** (Fante) 'Tuesday-born'
(b) Input: **kwà-míǹ** Output: **kwàámì** (Twi)**/kwámìná** (Fante) 'Saturday-born'
(c) Input: **kwà-jàẁ** Output: ____ (Twi)/**kwàẁ** (Fante) 'Thursday-born'

The /a/ in **kwa** undergoes lengthening as in (47b) in Twi or is without [-High] lengthening in (47a), (47b, Fante) and (47c, Fante) for reasons for [-High] vowel lengthening or the non-application of it which I have already established above. /**kwà-jàẁ**/ emerges as [**kwàẁ**] due to the complete dispreference of the ja subunit in Fante day names which is due to the fact that the two rules in (47b, c) apply concurrently in Fante.

8. **Conclusion**

This paper has revealed the mechanisms available in Akan phonology for lexicalization of day names. The following phonological processes have been identified to apply in the formation of day names in Akan. There are three weakening processes: (i) /b/ to [w] weakening between a high and a low vowel; (ii) /b/ weakening to [w] between low vowels when **ba** is the second or the fourth syllable at the derivational stage where the /b/ weakening holds between low vowels in a dialect; and (iii) /n/ to [r] denasalization between a high non-nasal vowel and a nasalized vowel. There are eight deletion processes. (i) /ɪ/ deletes in the environment /C_r; and between a labial nasal and a labial consonant. (ii) /u/ deletes in the environment CVw_$CV_{[+ATR]}$. There is consonant deletion: (iii) /n/ deletes at word final position after a nasal(ized) vowel; (iv) /w/ deletes in a wC consonant sequence; and (v) [w] from /b/ weakening deletes after a vowel before the low vowel. There are two delabialization processes: a round vowel delabializes after a labial or labialized consonant before the low vowel; a consonant delabializes before a round vowel and a consonant. There are five labialization processes. Both vowels and consonants serve as triggers of labialization and both vowels and consonants may act as targets of labialization. (i) A nonlabial (i.e. a coronal and a dorsal) consonant undergoes labialization to C^w before a high round vowel and the low vowel; (ii) /i/ undergoes labialization before [w] (i.e. regressive labialization); (iii) /i/ undergoes labialization after a labial consonant before the low vowel (i.e progressive labialization); (iv) there is /ɪ/ labialization at the word final position after /b/ in Fante; (v) /a/ undergoes labialization to [ɔ] or [o] due to [+ATR] harmony interlabially before a continuant (i.e. between k^w __ $C_{[lab]}$). By this rule **kwa** comes to be realized as **kɔ** or **ko** in some day names. The conversion of **kwa** to **kɔ** or **ko** is evidence that kw is not a single sound unit and phonemic as it has been treated in Dolphyne (1988). By the current study kw as obtained in the orthography, phonologically, consists of /k/, a primary articulation, and a secondary articulated phonetic feature [^{w}] which together must be represented as [k^w]. Christaller's (1933) underlying representation of **kwa** as **kʊ-ba** "war child, or slave" supports the current analysis. The processes that applied to derive the grammaticalized unit **k^wa-** "masculine marker" from **/kʊ-ba/** "war-child" are: **/kʊ-ba/** (/b/ → [w] weakening) → **kʊ-wa** ([w] deletion) → **kʊ-a** (consonant labialization and ʊ deletion) → **k^wa**. The rule on consonant delabialization in day names changes [k^w] back to [k] once /a/ has been labialized in the day names, **kòfí**, **kòdó**, **àkósíjá**. In other words, consonant

delabialization succeeds and, therefore, counterbleeds /a/ labialization. There is labiopalatalization or the palatalization of a labialized consonant before high unround vowel and the low vowel. There also homorganic nasal assimilation where a nasal consonant shares in the place of articulation of a succeeding consonant – i.e. the two consonants come to be dominated by a single place node. There are two nasalization processes and two denasalization processes. (i) A vowel is nasalized after a nasal consonant; (ii) a voiced consonant is nasalized after a homorganic nasal consonant, and a shared place node is a precondition for voiced consonant nasalization after a nasal consonant. (iii) /n/ is denasalized between an oral and a nasal vowel; and (iv) a nasalized vowel is denasalized between oral consonants.

There are phonological processes involving an entire syllable: In Fante, an alignment condition for female day names favors the rightmost CV segment (or syllable) over a rightmost C segment or a leftmost CV. The low vowel is inserted on two occasions: at the word initial position in Asante, and at the word final position after /n/ in Fante for prosodic reasons. There is /a/ lengthening to preserve an empty syllable in male day names. The syllable ja is dispreferred after a syllable **(*ơ.ja**) and is repaired by either deleting an initial syllable before **ja** or by deleting **ja** after a preceding syllable. We observed that the Twi dialects preserve ja in day names whiles the Fante dialects truncate it. The fact that the two dialects order rules that border on the ja subunit differently accounts for this formal difference. In Twi, rules are ordered against other syllabic units in favor of ja-retention; the same rules are ordered differently in Fante in a way that disfavors ja-retention. For reasons of space, tone processes have been reserved for a separate study.

The tables below represent the rule ordering relations involved in the formation of day names in Twi and Fante. There are several dialectal differences (such as described above) that are motivated by the fact that the Twi and Fante dialects order rules that border on such items differently.

(48) Feeding: A rule in (A) feeds a rule in (B).

Column (A)	Column (B)
a. /ɪ/ deletion: /ɪ/ → O /[+Nas/lab] __ [lab]	Place assimilation (homorganicity): [+Nasal] → [αlab, Bcor, γdor]/__ [αlab, Bcor, γdor] (for Twi; applies after voiced consonant nasalization in Fante)
b. [+high] vowel deletion: [+high, αlab] → O / $CVC_{[+high,\ +cont,\ \alpha lab]}$ __CV	/w/ deletion: /w/ → O / __C (These rules apply in Twi in the formation of the day names kwaaku and kwasi)
c. Place assimilation (homorganicity): [+Nasal] → [αlab, Bcor, γdor] / __ [αlab, Bcor, γdor]	Voiced consonant nasalization: [+voice, αlab, Bcor, γdor] → [+Nas] / [+Nas, αlab, Bcor, γdor] __ (for Twi; the reversive order for Fante)
d. /b/ weakening: /b/ → [w]/[+High]_[+low]	[w] deletion: [w] → O /[+High]_ [+low] (immediately after /b/ weakening in Fante)
e. /b/ weakening: /b/ → [w]/[+High]_[+low]	Regressive /i/ labialization: /i/ → [u] /$C_{[COR/DOR]}$ _ wa (in Twi)
f. Regressive /i/ labialization: /i/ → [u] /$C_{[COR/DOR]}$ _ wa	[w] deletion: [w] → O /[+High]_ [+low] (in Twi)
g. [w] deletion: [w] → O /[+High]_ [+low]	Progressive /i/ labialization: /i/ → [u] /$C_{[lab]}$ _ a (in Fante & Twi)
h. [w] deletion: [w] → O /[+High]_ [+low]	Consonant labialization: $C_{cor/dor}$ → C^{w}/ __ $V_{[+Hi,\ +round]}$ a (in Twi)

i. Consonant labialization: $C_{cor/dor} \rightarrow C^w / \_\_ V_{[+Hi, +round]}$ a	Vowel delabialization: [+hi, +round] → [-round] / $C_{[Labial(ized)]}$ __a (in Twi)
j. Vowel delabialization: [+hi, +round] → [-round] / $C_{[Labial(ized)]}$ __a	Labiopalatalization: $C^w \rightarrow C^{\downarrow}$ / __ [+hi, -round][+low] (in Twi)
k. Vowel delabialization: [+hi, +round] → [-round] / $C_{[Labial(ized)]}$ __a	Glide/Onset formation: O → [+approx, αcor, γlab] / [-cons, αcor, γlab] __ [+low] (in Twi)
l. Glide/Onset formation: O → [+approx, αcor, γlab]/[-cons, αcor, γlab] __ [+low]	ja deletion after a syllable: ja → O /σ __ (in Fante)
m. /u/ deletion: /u/ → O /#CVw_$CV_{[+ATR]}$.	/w/ deletion: /w/ → O / __C (Twi/Fante)
n. core root syllable segment loss	Vowel lengthening: $CV_{[-Hi]1} \rightarrow CV_{[-Hi]1}.V_{[-Hi]1}$ / # _]σ.$C_{[-cont]}V]_\sigma$ (Twi/Fante) [a] insertion: O → [a] /#__kwasi (in Asante)
o. Inter-low /b/ weakening: /b/ → [w]/[+low] _ $[+low]_{EVEN}$ (in Twi)	[w] deletion: [w] → O /[+low] _ [+low] (in Twi)
p. Vowel nasalization: $V_{[-Nas]} \rightarrow$ [+Nas] / $C_{[+Nas]}$ __	/n/ denasalization (/n/ → [r]): /n/ → [-Nas] /v __ v) (in Twi and Fante)
q. Vowel nasalization: $V_{[-Nas]} \rightarrow$ [+Nas] / $C_{[+Nas]}$ __	Word final /n/ deletion: /n/ → O /ṽ__# (in Twi in the derivation of kwaamĩ)
r. /n/ denasalization (/n/ → [r]): /n/ → [-Nas] /v __ v)	/ɪ/ deletion: /ɪ/ → O / C __ rv)
s. /a/ labialization: /a/ → [ɔ] / [lab] __ [+cont, lab]	Consonant delabialization: $C^w \rightarrow C$ / __ $V_{[lab]}$
t. /a/ labialization: /a/ → [ɔ] / [lab] __ [+cont, lab]	[+ATR] harmony: [-ATR] → [+ATR] / __ $C_0V_{[+ATR]}$
u. Feature dissimilation: [+high, -ATR] → [-high, +ATR] / __#	[+ATR] harmony: [-ATR] → [+ATR] / __ $C_0V_{[+ATR]}$
v. /na/ truncation (to derive [ebo]): /na/ → O /bɪ__# (in Fante)	Vowel labialization: [-high, +ATR] → [lab] / [lab] __# (in Fante)
w. Vowel labialization: [-high, +ATR] → [lab] / [lab] __# (in Fante)	[+ATR] harmony: [-ATR] → [+ATR] / __ $C_0V_{[+ATR]}$

(49) **Bleeding:** A rule in column (A) bleeds a rule in column (B).

Column (A)	**Column (B)**
a. /ɪ/ deletion: /ɪ/ → O /[+Nas/lab] __ [lab]	/b/ weakening: /b/ → [w]/[+High]_[+low] (in Twi and Fante)
b. Initial syllable deletion before ja: σ → O /#__ ja	ja deletion after a syllable: ja → O /σ __(in Twi)
c. Vowel delabialization: [+hi, +round] → [-round] / $C_{[Labial(ized)]}$ __a (in Twi)	Glide/Onset formation: O → [+approx, αcor, γlab]/[-cons, αcor, γlab] __ [+low] (particularly: O → [w]/

	[+hi/+round] __ [+low]; w-glide formation) in Twi
d. Rightmost root CV circumscription /a.[$CV_{LEFT}.CV_{RIGHT}$].ba/ → [a.CV_{RIGHT}.ba]	/b/ weakening: /b/ → [w] / [+low].__ $[+low]_{EVEN}$ (in araba, in Fante)
e. ja deletion after a syllable: ja → O /σ __	Initial syllable deletion before ja: σ → O /#__ ja
f. [a] insertion after a word-final /n/: O → [a] /n__#	Word final /n/ deletion: /n/ → O /ṽ__# (in Fante)
g. [a] insertion after a word-final /n/: O → [a] /n__#	Vowel lengthening: $CV_{[-Hi]1}$ → $CV_{[-Hi]1}.V_{[-Hi]1}$ / # _]$_{\sigma}$.$C_{[-cont]}V]_{\sigma}$ (in Fante)
h. [w] deletion: [w] → O /[+High]_ [+low] *(immediately after /b/ weakening in Fante)*	Regressive /i/ labialization: /i/ → [u] /$C_{[COR/DOR]}$ _ wa (in Fante)
i. Progressive /i/ labialization: /i/ → [u] /$C_{[lab]}$ _ a	Glide/Onset formation: O → [+approx, αcor, γlab]/[-cons, αcor, γlab] __ [+low] (particularly: j-glide formation: O → [j] /[+high/-round] __ [+low] (in Fante, and optionally in Twi)

(50) Counterfeeding: A rule in (B) counterfeeds a rule in (A), or rule (B) is in a counterfeeding order or relation with rule (A).

Column (A)	**Column (B)**
a. Place assimilation (homorganicity): [+Nasal] → [αlab, Bcor, γdor] /__ [αlab, Bcor, γdor]	Voiced consonant nasalization: [+voice, αlab, Bcor, γdor] → [+Nas] / [+Nas, αlab, Bcor, γdor] __ (Fante)
b. Word final /n/ deletion: /n/ → O /ṽ__#	Vowel labialization: [-high, +ATR] → [lab] / [lab] __# (Twi, kwaamı)
c. Word-final /n/ deletion: /n/ → O /ṽ__#	Feature dissimilation: [+high, -ATR] → [-high, +ATR] / __# (Twi)
d. j-glide formation Glide/Onset formation: O → [+approx, αcor, γlab]/[-cons, αcor, γlab] __ [+low] (particularly: j-glide formation: O → [j] /[+high/-round] __ [+low] (in Fante, and optionally in Twi)	ja deletion after a syllable: ja → O /σ __ (Twi)
e. ja deletion after a syllable: ja → O /σ __	Inter-low /b/ weakening: /b/ → [w]/[+low]_$[+low]_{EVEN}$ (Fante, aba)
f. [w] deletion: [w] → O /[+High]_ [+low]	Progressive /i/ labialization: /i/ → [u] /$C_{[lab]}$ _ a (Twi, in the derivation of æfija)
g. Word final /n/ deletion: /n/ → O /ṽ__#	Feature dissimilation: [+high, -ATR] → [-high, +ATR] / __# (Twi)

(51) Counterbleeding: (A) counterbleeds (B), or (A) is in a counterbleeding order or relation with (B).

Column (A)	Column (B)
a. /ɪ/ deletion: /ɪ/ → O / C __ rv)	/n/ denasalization (/n/ → [r]): /n/ → [-Nas] /v __ v) (in Twi)
b. Vowel nasalization: $V_{[-Nas]}$ → [+Nas] / $C_{[+Nas]}$ __	/n/ denasalization (/n/ → [r]): /n/ → [-Nas] /v __ v) (in Fante: ara)ba → araba)
c. Vowel delabialization: [+hi, +round] → [-round] / $C_{[Labial(ized)]}$ __a	Consonant labialization: $C_{cor/dor}$ → C^w/ __ $V_{[+Hi, +round]}$ a (in Twi)
d. [w] deletion: [w] → O /[+High]_ [+low]	Regressive /i/ labialization: /i/ → [u] /$C_{[COR/DOR]}$ _ wa (in Twi)
e. Vowel denasalization: $V_{[+Nas]}$ → [-Nas] / $C_{[-Nas]}$ _ $C_{[-Nas]}$	/n/ denasalization (/n/ → [r]): /n/ → [-Nas] /v __ v) (in Fante)
f. Consonant delabialization: C^w → C / __ $V_{[lab]}$	/a/ labialization: /a/ → [ɔ] / [lab] __ [+cont, lab] (in Twi and Fante, d⎮⎮ patterns as [+cont] in Fante therefore kod⎮⎮ o in Fante)
g. /w/ deletion: /w/ → O / __C (Twi/Fante, but not Fante female day names)	/u/ deletion: /u/ → O /#CVw_$CV_{[+ATR]}$.

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