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Vowel Replacement Patterns in the Mfantse Dialect of Akan

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Abstract

This paper investigates synchronic vowel replacement patterns in the Mfantse dialect of Akan. Hitherto, the Akan vowel harmony system has been the only aspect of vowel replacement process that has received extensive study in the literature, albeit a variety of ways by which vowel replacement comes about in the language exists. In this paper, therefore, we have organised V-replacement into vertical and horizontal vowel shifts. The vertical vowel shift has been subcategorized into upward and downward shifts which may also be referred to as vowel raising and vowel lowering, respectively. The direction of horizontal V shifting system is also parametric whereby a trigger vowel may spread leftwards or rightwards to a target vowel on its left or right, respectively. Furthermore, it will be demonstrated in this paper that a consonant might ostensibly condition vowel replacements in Mfantse but, in reality, such replacements are often brought about by floating

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vowels. This does not obscure the fact that labial and labial palatalized glides in Mfantse invariably induce replacement of the vowels that precede them.

Keywords: vowel-replacement, vowel-raising, vertical vowel-shifting, horizontal vowel-shifting, reduplication, consonant-induced vowel replacement

1. Introduction

A dialect of the Akan language, traditionally labeled *Fante* in the literature, is the one investigated for this paper. The label, Fante, has been in use ever since life began in Ghana, for the reason that non-Fante Akans and non-Akans alike call it Fante. However, I prefer to use the term *Mfantse* in place of *Fante* for the simple reason that the speakers of this dialect refer to themselves as *Mfantsefo* and the dialect, *Mfantse* (see Abakah 1993, 1998 for a detailed study). Mfantse comprises three main sub-dialects namely, Iguae, Anee, and Boka (Abakah 1993, 1998, 2002, 2003, 2004).

This paper is a synchronic comparative study of vowel replacement (V-replacement) patterns in these sub-dialects of Mfantse. Descriptive cum comparative analysis of three distinct subdialects invariably reveals similarities, regularities, and differences. So, underlying representations (URs) of morphemes will be posited throughout this paper so as to allow for the postulation of comprehensive derivational accounts (where necessary) with the widest range of applicability to the three subdialects. Some of the accounts will apply to all the three subdialects, others to two of the three, and still others will be limited to only one subdialect. Derivational accounts applicable to all the dialects will not be marked whereas those which apply to specific subdialects will be clearly isolated and dealt with. Where

these subdialects share similarities and differences with the other dialects of Akan, comparisons will be made, when fascinating, insightful, and appropriate, to Asante and Akuapem, the other major dialects of Akan, in which case Akan underlying forms shall be used.

1.1. The Topic

V-replacement is a linguistic universal or cross-linguistic phonological process by which a vowel that occurs in a phonological representation is replaced by another vowel with which it shares some featural identity at the phonetic surface through the conditioning influence of an adjacent vowel (V) or consonant (C). V-replacement is synonymous with vowel quality change, which operates across all languages of the world, inasmuch segmental sounds in every spoken language are subject to alternations in the cause of euphony. Failure of a V or a C to alternate within a particular phonetic environment in a language could lead to violation of that language's sequential constraints/ phonotactics. Hence, vowels and consonants in languages necessarily change to collocate appropriately with other sound segments within the framework of languages' sequence structure condition. It is important to note that segmental sound alternations either in the isolative style or in the combinative style within lexemes, phrases, or clauses of any description, within the context of the phonological parameter contributes crucially to the determination of constituent dialects of any spoken language.

V-replacement as studied in this paper has some semblance of Akan VH because they maximally share certain characteristics. Hence, the reader/phonologist who is conversant with Akan VH could be instantly confused. It is therefore worth pointing out at this point that even though both V-replacement and VH, in Akan, are V-replacement or V alternation processes, they are different to some extent. In V-replacement, an underlying V is replaced with

another V to harmonize with either a following V or C in certain distinctive feature(s) at the phonetic stage. In VH, on the other hand, an underlying V is replaced with another V *in order to agree with an adjacent V only* in being identical in terms of some distinctive feature(s). So, where a V alternates to agree with a following C, and not a V, it cannot be said to be a process of VH. This definition clearly distinguishes V-replacement, by which a V may be replaced with another V that agrees (or collocates more fittingly) with an adjacent V or C, from VH which specifies that a V alternating within a specified domain must necessarily agree with another (invariably an adjacent trigger V) in being of the same distinctive feature(s). Thus, in this paper we have V-replacement that can as well be referred to as VH as well as V-replacement that cannot be said to be VH.

2. Vowels of Akan

There seems to be tacit disagreement as to the number of Vs contained in the Akan vocalic inventory. Whereas some scholars argue that Akan has 9 Vs in phonological representations but 10 distinct ones at the phonetic surface, others assert that Akan has 9 vowels at both phonological and phonetic levels (Abakah 2003). Linguists who claim that Akan has 9 phonemic but 10 distinct phonetic vowels include Berry (1957), Stewart (1962, 1967, 1970), Dolphyne (1965, 1967, 1988), Schachter & Fromkin (1968), Abakah (1978, 1993, 2002, 2012), Dolphyne & Kropp Dakubu (1988), Eshun (1988, 1993), Durand (1990), and Boadi (1991, 2009). The 10 distinct vowels of Akan, according to these scholars, are [**i**, **ɪ**, **e**, **ɛ**, **u**, **ʊ**, **o**, **ɔ**, **a**, **æ**] all of which are autonomous phonemes except for the last one, **æ**, which is considered as an allophonic variant of **a** (Abakah 2003, 2012). Scholars such as Carr (1993), Archangeli & Pulleyblank (1994),

Kenstowicz (1994), Gussenhoven & Jacobs (1998), Oyebade (1998), and others, following Clements (1981), also argue that Akan has 9 Vs in its vocalic inventory in both phonological and phonetic representations (PRs)[1] (Abakah 2003).

Clements (1981) argues compellingly that what some scholars refer to as [+ATR] counterpart of the low vowel is in fact not a [+ATR] vowel at all. He states categorically that:

> The contrast between the vowels **a** and **ạ** is not phonemic in Asante. [ạ] is raised and fronted low vowel (often transcribed [ɜ]) which approaches [ɛ] in articulation, occurs to the exclusion of [a] in the following environments . . . (p. 114)

This argument tentatively cancels **æ** in the above list of vowels because, according to Clements (ibid.), the **æ** vowel does not exist in the Asante dialect. It is unfortunate that he used what he found in Asante to represent all the constituent varieties of Akan. The briefest study of the Mfantse vocalic inventory vis-à-vis the Akan vowel harmony (VH) process as it operates in the Mfantse dialect projects Clements' (ibid.) assertion as an overstatement. Even though this study does not directly focus on the Akan VH process, reference would be very often made to it where necessary, appropriate, and relevant. The following vowel chart gives a picturesque presentation of vertical V-raising process in Akan.

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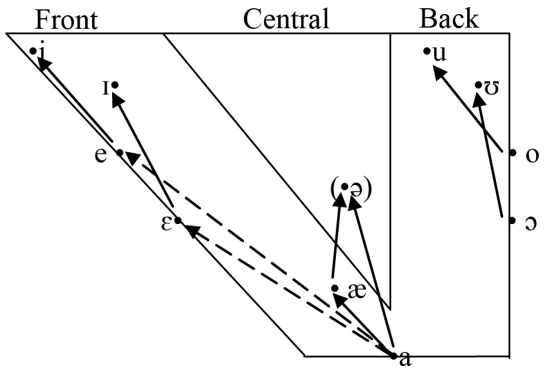
[1] PR stands for *phonetic representation*; to avoid acronym clash, *phonological representation* has been replaced with an identical term, *underlying representation* (UR), in a number of places in this paper.

Figure 1. The Akan V-raising Chart



The arrows in the above vowel chart demonstrate that mid front and mid back vowels raise to become high front and high back vowels, respectively. Consequently mid front **ɛ** and **e** raise to become high front **ɪ** and **i** vowels, respectively, while mid back vowels, **ɔ** and, **o** raise to become high back **ʊ** and **u** vowels, respectively. The low central vowel, **a**, may also raise to **æ** or **ə** within the central region, and in the Mfantse VH process it may raise to or be replaced by **ɛ** and **e** as the broken arrows show. The phonological processes that lead to such raisings which are synonymous with replacement are studied shortly.

2.1. Vowel Features of Mfantse and Radical Underspecification

Going by the multivalue distinctive feature theory of Chomsky & Halle (1968) and the contrastive specification theory (Steriade 1987, Archangeli 1988, Clements 1988, Mester & Itô 1989), we present in the Table 1 below, a catalogue of the fully specified systematic vowel phonemes of the Mfantse dialect of Akan.

Table 1. Full Specification of Mfantse Vowels

	i	i̱	ɪ	ɪ̱	e	ɛ	æ	æ̱	a	a̱	ɔ	o	ʊ	ʊ̱	u	u̱	ə[2]
High	+	+	+	+	-	-	-	-	-	-	-	-	+	+	+	+	-
Low	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-	-
Back	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	-
Round	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	-
Nasal	-	+	-	+	-	-	-	+	-	+	-	-	-	+	-	+	-
ATR	+	+	-	-	+	-	+	+	-	-	-	+	-	-	+	+	-
Reduced	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+

This feature matrix has pieces of redundant/unnecessary information. Going by the radical underspecification theory (see Archangeli 1984, Archangeli & Pulleyblank 1986, 1994, and others) with the fundamental assumption that redundant features are removed from the phonological representations of segmental melodies but are assigned by default rules (Ewen & van der Hulst 2001, Mutaka 2006), the segments above may be represented with the following underspecified features (see also Mutaka 2006).

Table 2. Underspecified Matrices of Mfantse Vowels

	i	i̱	ɪ	ɪ̱	e	ɛ	æ	æ̱	a	a̱	ɔ	o	ʊ	ʊ̱	u	u̱	ə
High	+	+	+	+									+	+	+	+	
Low							+	+	+	+							
Back											+	+	+	+	+	+	
Nasal		+		+				+		+				+		+	
ATR	+	+			+		+	+				+			+	+	

[2] It is important to note that the vowels **ɛ** and **ə** do not have any underlying feature specifications but we presume, following Mutaka (2006), that **ə** is distinguishable in its phonetic representation by the feature [Reduced].

It is perceptible from Table 2 that the feature [Reduced] is omitted completely from the lexical specification feature for the reason that no pair of vowels in Akan/Mfantse is distinguished by this vowel. The feature [Round] is equally removed from the phonological representations because in Mfantse, like all the other varieties of Akan, all [+Round] vowels are redundantly [+Back]. The radical underspecification theory, like the redundancy conditions theory, makes it possible, if not necessary, to present the vowels above with the following underspecified features. To obtain the full specification in Table 1 from the features contained in Table 2, the underspecified matrices of Mfantse vowels, we would have the following redundancy constraints in (1) and the set of default rules in (2)[3]:

(1) Redundancy Constraints
   a. [+Back] → [+Round]
   b. [+Low] → [-Back]
   c. [+Mid][4] → [-Nasal]

(2) Default Rules
   a. [ ] → [-High]
   b. [ ] → [-ATR]
   c. [ ] → [-Low]
   d. [ ] → [-Back]

We comment briefly on the motivation for these redundancy rules and what they are meant to accomplish. Rule (1a) states that a [+Back] vowel in Akan is redundantly [+Round]. In other words, it specifies: assign a [+Round] feature to a back vowel. Seeing that

[3] Table 2 is a replica of Mutaka's (2006) presentation. However, see Ewen & van der Hulst (2001: 77ff) for a detailed study.

[4] The feature Mid here stands for [-High, -Low], the standard feature specification for mid vowels.

all back vowels in Akan are redundantly [+Round], they are assigned this feature. Rule (1b) says that if a V is [+Low] in Akan then it is redundantly [-Back]. In other words: assign the feature [-Back] to low vowels. Inasmuch as the two low vowels in Akan are redundantly nonback, they receive the feature [-Back]. Rule (1c) says: mid vowels in Akan are redundantly [-Nasal] and for this reason assign the feature [-Nasal] to any vowel specified as [-High, -Low]. Thus, since mid vowels in Akan are redundantly nonnasal, they receive the feature [-Nasal]. Rules (2a), (2b), (2c), and (2d) state: assign the features [-High], [-ATR], [-Low], and [-Back], respectively, to vowels that are unspecified for these features. In other words, Vs that do not have [-High], [-ATR], [-Low], and [-Back] specifications in their feature matrices these features by default. Let us also comment briefly on the Akan vowels in terms of monovalent/unary features vis-à-vis V-Place articulation features by examining the Table 3 below.

Table 3. Unary Vowel Features of Akan

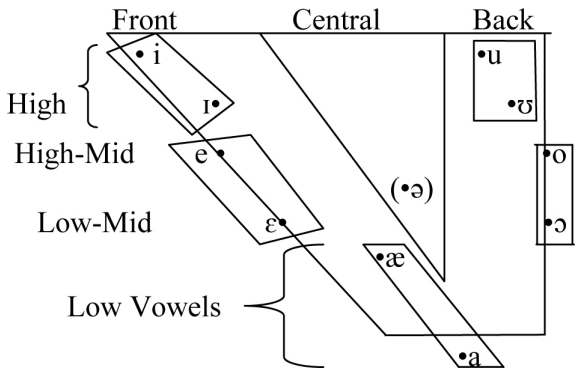
	i	ɪ	e	ɛ	æ	a	ɔ	o	ʊ	u
LABIAL							●	●	●	●
DORSAL							●	●	●	●
CORONAL	●	●	●	●						
RADICAL	●		●		●			●		●

It is discernible from the above unary feature matrix that the low vowel, /**a**/, does not have any V-Place articulation feature and that labial vowels are redundantly dorsal. Throughout this paper, the term labial is synonymous with dorsal.

2.2. The Akan Vowel Counterparts

The vowels of Akan move in matching pairs and, for this reason, the V-replacement process is not an unsystematic phenomenon. A vowel in any of the varieties of Akan is not replaced by just any vowel but by its counterpart only in any given phonetic environment/situation that elicits V-replacement. Two types of vowel counterpart, namely, *horizontal* and *vertical* are distinct in Akan. To facilitate understanding of the concept of vowel counterparts let us closely examine Figures 2, 3 and (3) below.

Figure 2. The Vertical or [+ATR]/[-ATR] Counterparts

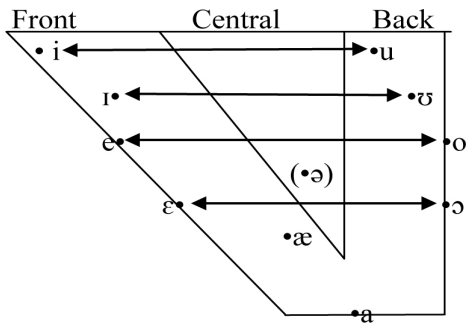


In Figure 2, each pair of vowels, enclosed in a "rectangle," constitutes counterparts. Graphically, the [+ATR] vowel is up with its [-ATR] counterpart down, below it. The [+ATR] vowel is produced with a higher tongue position than its [-ATR] counterpart. Throughout the Akan Phonology, if an underlying [+ATR] vowel spreads to any of the following [-ATR] vowels, /**ɪ**, **ʊ**, **ɛ**, **ɔ**, **a**/, the [-ATR] vowel will be replaced by its counterpart contained in the following set of [+ATR] vowels: /**i**, **u**, **e**, **o**, or **æ**/. Conversely, if any of the following [+ATR] vowels, /**i**, **u**, **e**, **o**, or **æ**/ is to be replaced in a [-ATR] environment, it is its

counterpart from [-ATR] set, /**ɪ**, **ʊ**, **ɛ**, **ɔ** or **a**/, only which the phonology will select to replace it.

Figure 3 below captures, in graphic terms, what we refer to as horizontal counterparts. Here, it demonstrates the fact that in a labializing environment, an underlying palatal/coronal [+ATR] or [-ATR] vowel is consistently replaced by its labial or dorsal counterpart. However, in a palatalizing environment, a labial/back vowel is replaced by its palatal/front counterpart and the bidirectional arrows in Figure 3 indicate the vowel counterpart scheme.

Figure 3. Horizontal Vowel or Front/Back Counterparts



It is important to note that no vowel can replace a vowel that is not its vertical or horizontal counterpart. The low vowel does not have a horizontal counterpart and, consequently, it is replaceable vertically only by **æ** but, depending essentially upon the phonetic environment, it may also be replaced by any other nonback mid vowel. In other words, **/a/** may shift vertically to **/ɛ/** or further up to **/e/** depending on the ATR value of the trigger, as noted above.

In terms of classification of vowels by feature geometry, three V-Place articulation features namely, [RADICAL], [CORONAL], and [LABIAL] are distinguishable. The dependent features of the V-Place [RADICAL] articulator feature specifically, [+ATR] and

[-ATR] constitute a traditional matching pair whereas V-Place [CORONAL] vowels (as can be discerned from (3a-c)) match with [LABIAL] vowels as counterparts.[5]

(3) a. [+/-ATR] Counterparts/Vertical Counterparts

[+ATR]	[-ATR]
i	ɪ
e	ɛ
æ	a
o	ɔ
u	ʊ

b. Coronal/Labial Counterparts

[CORONAL]	[LABIAL]
i	u
ɪ	ʊ
e	o
ɛ	ɔ

c. Lip Configuration/Horizontal Counterparts

[-Round]	[+Round]
i	u
ɪ	ʊ
e	o
ɛ	ɔ
æ	–
a	–

This reinforces our theory that, if a [LABIAL] vowel induces a [CORONAL] vowel to be replaced in a labializing environment, for

[5] Examples (3a-c) are adapted from Abakah (2012: 52).

instance, it is the [LABIAL] counterpart of that particular [CORONAL] vowel (as captured in (3b)) that the phonology selects to replace it and vice versa. The same process typifies the replacement of a [-ATR] vowel with a [+ATR] vowel and, vice versa. That the low vowel, **/a/**, and its allophonic variant, **/æ/**, have no V-Place of articulation feature is clearly manifested by its being neutral, belonging to neither V-Place [CORONAL] nor V-Place [LABIAL]/[DORSAL] articulation features as (3b) exhibits. (3c) shows further that the low vowel does not have any horizontal counterpart even as it forms a natural class with coronal vowels within the context of [-Round] featural value. Throughout this paper, it is realized that all V-replacement occurrences, be they vertical or horizontal shifting, are hitched onto the vowel counterpart selection scheme.

3. Vowel Shifts/Replacements

V-replacement, as noted above, is a cross-linguistic phenomenon which occurs via diverse ways differing from language to language, from dialect to dialect and from subdialect to subdialect. It could be brought about in a language through a number of phonological processes including VH, V weakening, V raising, V lowering, V fronting, V backing, umlaut, V rounding, among other processes. As regards its materialization in a language via vowel raising, a low or mid V in a phonological representation is replaced by another V of a higher tongue value so as to agree with an adjacent sound segment, V or C, in being [-Low].

It is worth explaining that when we say that **/a/** raises to **/e/**, for instance, in effect we are saying that **/a/** is replaced by **/e/** in a particular phonetic environment. It does not mean **/a/** transmutes to **/e/** during its production, which is articulatorily impracticable but rather the replacement is necessary either in order not to violate the sequential constraints of the language at the phonetic surface

or to facilitate pronunciation. V-replacement could also appear in the combinative style in a language in the cause of euphony. Hence, every language selects from its vocalic inventory a V which collocates/co-occurs appropriately and agrees with (an) adjacent segment(s) in some featural identicalness within a specified environment. As regards V-raising conditioned by [+High] vowels, innumerable scholars including Archangeli & Pulleyblank (1994), van der Hulst & van de Weijer (1995), Kiparsky (1995), Barnes (2006), and Boadi (2009) to name but only five have written about it. These studies are all tied in with VH in various languages. However, there are also a number of scholars who have written about V-raising/V-replacement that is not brought about by Vs but by Cs. These include, Bethin (1978), Gussmann (1980), Kenstowicz (1994), Mutaka & Bitjaa-Kody (2000), Mutaka (2006), Hsieh (2012), and others. Mortensen (2013) has also argued that in Shuijingping Mang, V-raising is tonally conditioned in diachronic terms, and that vowels are raised in certain tonal environments.

It is highly discernible from the foregoing that vowel change/vowel alternation/V-replacement comes about in the languages of the world not only through the window of segmental phonology but also through suprasegmental phonology exhibiting patterns which differ from language to language, from dialect to dialect and from subdialect to subdialect. Needless to say, it cannot be an exaggeration to affirm that there is no language in the world that does not operate any form of V-replacement process in its phonology. It therefore comes as no surprise that the study of aspects of V-replacement in the form of VH, V-raising, V-shift, V-lowering, V weakening, V lengthening, among others, in countless languages of the world abound in the existing literature. In the following sections through to the end of this paper, we study V-replacement processes in the Mfantse dialect of Akan by V-raising, V-lowering, horizontal V-replacement, and C-induced V-replacement which has nothing to do with VH.

3.1. Vowel Shifts/Replacements in Mfantse

"Vowel shifts," in the words of Kiparsky (1995: 662), "fall into a few limited types." Mfantse, like all the varieties of Akan, also exhibits two types of vowel shift namely, *vertical* and *horizontal*. Synchronic vertical vowel shift has two constituents, specifically:

- *Vowel raising*[6] by which low and mid vowels raise to become mid and high vowels, respectively, in the environment of a following high vowel.
- *Vowel lowering* by which an underlying high or mid vowel copies a preceding verb radical-final nonhigh vowel or a low vowel respectively, in a specified syntactic cum phonetic environment.

These shifts occur in wide-ranging phonetic environments. Kiparsky (1995: 662) has argued that in English, for instance, tenseness and laxness trigger raising and lowering, respectively, only in languages that have both tense and lax vowels in their vocalic inventories at some phonological level of representation. Kiparsky (ibid.) has also hypothesized that "tenseness can trigger vowel shift if it is present in the language's phonological representations." Akan does not have tense/lax distinction in its vocalic inventory but rather advanced tongue root ([+ATR]) and unadvanced tongue root ([-ATR]) vocalic distinction which occurs in both phonological and phonetic representations. This is not to obscure the fact that Akan vowels used to be classified dichotomously as tense/lax (see Abakah 2002 for a detailed study). Indeed, the behaviour of the so-called tense vowels (presently referred to as [+ATR]) in Akan generally gives credence to Kiparsky's (ibid.) assertion.

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[6] Boadi (2009) has studied A-raising in the Nzema language which is genetically related to Mfantse, and his findings are identical to our findings in Mfantse which are recorded in this paper.

It will be demonstrated in the essential parts of this paper that high vowels, regardless of type of dependent V-Place [RADICAL] feature specification, are prospective triggers of V-raising in Mfantse in sundry phonetic environments. But in certain situations in the Anee subdialect of Mfantse, [+ATR] high vowels only constitute raising triggers in nominal lexemes, whereas [-ATR]/lax vowels do not, which we discuss shortly.

3.2. Vowel Raising in Mfantse Nouns

Having given the underspecified features of Mfantse vowels and dilated extensively on vowel counterparts, let us study V-raising in Mfantse within nouns. In the isolative style, a low vowel preceding a high vowel in nominal lexemes is raised to [ɛ]/[e] in the Iguae and Anee subdialects of Mfantse whereas in the Boka subdialect of Mfantse and the Twi varieties of Akan, the low vowel does not undergo any shift in the same phonetic environment. However, where the trigger high vowel is specified as [+ATR], the /**a**/ vowel shifts to (or is replaced by) **æ** in Boka, as in (4b) whereas, in Iguae and Anee, it raises to [e] and [i], respectively. Let us study the following data for exemplification:

(4)		UR	Boka	Asante	Akuapem	Iguae/Anee	Gloss
a.	i.	ŋkatɪ	ŋkatsɪ	ŋkatɪɛ	ŋkatɪ	ŋkɛtsɪ	‘peanut’
	ii.	dasɪ	dasɪ	dansɪɛ	dansɪ	dɛsɪ	‘a witness’
	iii.	mpaɪ	mpaa	mpaɪ/mpaɪɛ	mpaɪ	mpɛɪ	‘prayer’
	iv.	akrantɪ	ɔkrantsɪ	akrantɪɛ	akraŋtɪ	akrɛntsɪ	‘grasscutter’
	v.	daɪ	daa	daɪ/daɪɛ	daɪ	dɛɪ	‘dream’
b.	i.	ɔfadum	ɔfædum	ɔfæsuo	fæsu	afedum (Ig.) afidum (An.)	‘wall’
	ii.	ɔfasin	ɔfæsi̯i	ɔfæsi̯i	ɔfæsi̯ŋ	afesi̯n (Ig.) afisi̯n (An.)	‘wall’
	iii.	adiban	ædzibɛi̯	ædu̯i̯anɪ	ædu̯i̯aŋ	edzibi̯n	‘food’
	iv.	ɔkwansin	ɔkwæ̯nsi̯n	ɔkwæ̯nsi̯i	ɔkwæ̯nsi̯ŋ	kwensin (Ig.) akwunsin (An.)[7]	‘mile’

In the above data, the underlying low vowel, **a,** in (4a) occurring before a [-ATR] high vowel in a noun, invariably raises to mid-low, **ɛ**, in the Iguae and Anee varieties of Mfantse whereas the Boka subdialect of Mfantse, like Asante and Akuapem, retains the input low vowel at the output level. Nevertheless, where the raising trigger vowel is specified as [+ATR] as in (4b) the input low vowel is raised to [**e**] in Iguae whereas in Boka Mfantse, like the Akuapem and Asante dialects of Akan, the input low vowel is replaced with its [+ATR] counterpart, **æ**. It is fascinating to note that where Iguae raises the input low vowel to [**e**], Anee raises it further to **i**/**u**. In other words, the raising of /**a**/ to [**e**] is a terminal rule in Iguae but a feeding rule for Anee to raise it to [**u**] or [**i**] depending upon whether the trigger vowel has the V-Place [LABIAL] or [CORONAL] articulation feature, respectively, in its feature geometry.

The following data, also on V-raising in Mfantse nouns, gives credibility to this assertion. Here, the target mid vowel in all the dialects of Akan do not receive any raising except for the Anee variety of Mfantse where such a vowel receives raising to labial high, **u**, if specified as [LABIAL] in phonological representation as (10a.i-ii) confirm. However, where a target mid V is specified as [CORONAL] at the underlying level (u-level) as in (5a.iii-iv) in Anee, it raises to I.

(5)	Iguae/Boka	Anee		Gloss
a. i.	k**o**fi	k**u**fi	—	'proper name'
ii.	bur**o**ni/bur**o**ɲi	bur**u**ni	—	'whiteman'
iii.	abir**e**ku	abir**i**ku	—	'an eel-like fish'
iv.	**ʤ**ed**ʤ**i	**ʤ**i**ʤ**idi	—	'faith/belief'
v.	bir**e**fi	bir**i**fi	—	'straw bag'
vi.	ak**o**ɛʯi	ak**uɛʯ**i	—	'falsehood'

[7] In this example the labialised consonant, **kw**, conditions the following raised vowel to become labial, [u].

b. i.	dʒɲɛɥɪr	dʒɲɛɥɪr	*dɯɲɛɥɪr	‘hour’
ii.	sɔdzɪ	sɔdzɪ	*sʊdzɪ	‘type of skin rashes’
iii.	pɔɥɪ	pɔɥɪ	*pʊɥɪ	‘rubber’
iv.	dɛtsɪ	dɛtsɪ	*dɪtsɪ	‘earth’
v.	ɱfɛndzɪ	ɱfɛndzɪ	*ɱfɪndzɪ	‘the end of the earth’
vi.	tɕɛnsɪ	tɕɛnsɪ	*tɕɪnsɪ	‘saucepan’

(5b) demonstrates that if the trigger high vowel is [-ATR] in Anee, then the mid-vowel raising or mid-vowel upward shifting freezes up. The starred version of (6b) exemplifies this fact which does suggest that the raising of mid vowels in the context before high vowels in Anee is [+ATR]-driven. This gives credibility to Kiparsky’s (1995) assertion noted above, that is, “tenseness can trigger vowel shift if it is present in the language’s phonological representations.”[8] This assertion is reinforced by data (6) below:

(6)	UR		Anee	Ig./Bk.	Gloss
a. i.	ɔ + sɥ	3sg + cry	u-sɥ	o-sɥ	‘s/he cries’
ii.	bɔ + tiri	create + head	abutsir	abotsir	‘headgear’
iii.	wɔ + di	3pl + eat	wu-di	wo-dzi	‘they eat’
iv.	jɛ + bu	1pl + break	ji-bu	je-bu	‘we break’
v.	abjɛ + dɥia	palm + tree	abjidɥia	abjedɥia	‘palm tree’
b. i.	ɔ + tɯ	3sg + pres flout	ɔ-tɯ	ɔ-tɯ	‘s/he transgresses’
ii.	wɔ + dzɪ	3pl + receive	wɔ-dzɪ	wɔ-dzɪ	‘they receive’
iii.	ɔ + fjɪ	3sg + vomit	ɔ-fjɪ	ɔ-fjɪ	‘s/he vomits’
iv.	atɛn + tɕɪw	judgment + crooked	atɛɲtɕɪw	atsɛɲtɕɪw	‘dishonest verdict’
v.	abjɛ + tsɪn	palm tree + straight	abjɛtsɪn	abjɛtsɪn	‘straight palm tree’

[8] It is important to point out that **i**, **u**, **e**, **o**, **æ** which are [+ATR] vowels were indeed classified as tense vowels until in the 1960s when phoneticians researching into the languages of West Africa relabelled these vowels as [+ATR] and **ɪ**, **ʊ**, **ɛ**, **ɔ**, **a** as [-ATR] (See Abakah 2002 for a detailed study). In my own estimation, it is credible to assume that tenseness and ATRness are, in this context, synonymous to a very large extent.

The phonetic environment for V-raising in (6) is identical to that of (5). The only disparity is that in (5) the V-raising occurs within words, specifically nominal lexemes, whereas in (6) it operates across morpheme and word boundaries in compounds and sentences, respectively. Like in (5), a mid vowel preceding a verb radical [+High, +ATR] vocalism raises to high vowel, **i/u**, in Anee as in (6a) whilst in (6b), the same mid vowels occurring in the same phonetic environment do not undergo any shift/raising simply because, the V-raising trigger is unspecified for the feature tense/[+ATR].

It is transparently obvious from data (5) and (6) that a [-ATR] high vowel trigger cannot cause a target mid vowel to raise in Anee. Hence, if the targets in (6b), which I list here and boldface for convenience, **ɔ-tʒ**, **wɔ-dzɪ**, **ɔ-fjɪ**, **atsɛntɕɪw**, and **abjɛtsɪn**, were raised like those in (6b) outputs unattested in the language viz. ***ʊ-tʒ**, ***wʊdzɪ**, ***ʊfjɪ**, ***atsɪntɕɪw**, and ***abjɪtsɪn**, respectively, would be generated.

3.3. Vowel Raising/Shift in Akan Verbs

In all the subdialects of Mfantse, V-raising in verbs is aspect-driven. It is productive in the past aspect form of the verb occurring in prepausal environment, provided the verb root ends in **/a/** at the u-level. The past aspect morpheme (PAM) in Akan is regularly suffixed or encliticised to the verb radical. It (the PAM) is the high coronal vowel, **I**, underspecified for any prosodic feature as well as V-Place [RADICAL] articulator feature and, consequently, it manifests itself at the phonetic level (p-level) as [**i**] or [**ɪ**], depending on whether the preceding verb root-final vocalism is [+ATR] or [-ATR], respectively. In other words, the PAM takes its dependent V-Place [RADICAL] articulation feature specification, [αATR], as well as nasality from the final vowel of the verb root to which it is suffixed/encliticised.

After the morphological process of suffixation has applied to

generate **a** + **I** vowel sequence at the verb root-final position, post-lexical phonological processes operate to bring about harmonization of the resultant vowel sequence. Specifically, the [+High] and [CORONAL] features inherent in the PAM condition the target, verb root-final low vowel to raise to [ɛ] in order to agree with it (the PAM) in coronality. The data below illustrate this type of vowel raising process.

The Mfantse examples in the data below exhibit diverse types of V-replacement processes.[9] (7a) demonstrates a vertical vowel shift process causing verb root-final low vowel target, as noted above, to raise or shift vertically to [ɛ] which agrees with the PAM in coronality, nonlabiality, and [-ATR] features. In (7b) and (7c) all the structures necessary for the application of the V-raising process are in situ but raising does not take place resulting in under-application of the process. Instead, the target labial vowels shift horizontally, and are thereby redundantly replaced by their coronal counterparts which harmonize with the PAM in coronality. Here, as well as in the entire data (7), reciprocal condition surfaces in that the target vowel in turn conditions the ATR-less, nasal-less trigger vowel to receive its inherent [αATR] and/or [β Nasal] feature specifications. In (7d), the PAM is suffixed/encliticised to verbs that end in coronal vowels and none of the target vowels receives any form of replacement even as the target consistently offloads its lexical features onto the trigger.

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[9] In this data, the pre-slash forms in prepausal environment are produced by non-Mfantse varieties of Akan whereas the post-slash forms are produced by Mfantse speakers only.

(7)	Present Aspect Form	Past Form		Past Forms in Prepausal Position	Gloss
	All Akan Dialects	As./Ak.	Mfantse		
a.	**pa** 'to fade'	**pa-ɪ**	**pɛ-ɪ**	atar nʊ **pa-ɪ/pɛ-ɪ**	'the dress faded'
	dɥia 'to plant'	**dɥia-ɪ**	**dɥiɛ-ɪ**	atʊ **dɥiaɪ/dɥiɛɪ**	'Ato planted (it)'
	sumą̀ 'to hide'	**sumą̀-ɪ̀**	**sumɛ̀-ɪ̀**	ebow **sumą̀ɪ/sumɛ̀ɪ**	'Ebow hid'
	sɥią̀ 'to learn'	**sɥią̀-ɪ̀**	**sɥiɛ̀-ɪ̀**	ebow **sɥią̀-ɪ̀/sɥiɛ̀-ɪ̀**	'Ebow learnt (it)'
b.	**bɔ** 'to break'	**bɔ-ɪ**	**bwɛ-ɪ**	bɔdambɔ **bɔ-ɪ/bwɛ-ɪ**	'a bottle broke'
	kʊ̀ 'to fight'	**kʊ̀-ɪ̀**	**kwɪ̀**	esi **kʊ̀-ɪ̀/kwɪ-ɪ̀**	'Esi fought'
	gɔ 'to cool'	**dzɥɔ-i** (Ak)	**gwe-i**	nsu nʊ̀ **dzɥɔ-i/gwe-i**	'the water cooled'
	wu 'to die'	**wu-i**	**wi-ɪ**	eɥi nʊ̀ **wu-i/wii**	'the thief died'
c.	**tɔ** 'to buy'	**tɔ-ɪ**	**tɥɛ-ɪ**	ɔ-**tɔɪ**/ɔ-**tɥɛɪ**	's/he bought (it)'
	so 'to hatch'	**so-i**	**sɥe-i**	ɔ-**soi**/o-**sɥei**	'it hatched'
	nɥ̀ 'to fish'	**nɥ̀-i**	**nɥi-i̇**	mɪ-**nɥ̀**i/mu-**nɥii**	'I fished'
	tʊ̀ 'to bake'	**tʊ̀-ɪ̀**	**tɥɪ̀-ɪ̀**	ɔ-**tʊ̀ɪ**/ɔ-**tɥɪ̀ɪ**	's/he baked (cake)'
d.	**di** 'to eat'	**di-i**	**dʑi-i**	aba **dii/ʤii**	'Aba ate (it)'
	dʑɪ 'to receive'	**dʑɪ-ɪ**	**dʑɪ-ɪ**	aba **dʑɪɪ**	'Aba received (it)'
	se 'to say'	**se-i** (Ak)	**se-i** (Bk)	aba **sei** (Bk)	'Aba said (it)'
	jɛ 'make/cook'	**jɛ-ɪ**	**jɛ-ɪ**	aba **jɛɪ**	'Aba made (it)'

4. Vowel Replacement by Vowel Lowering/Copying

All the examples that we have discussed so far occur in prepausal environment. However, when the past form of the verb occurs in a pre-complement/pre-object environment, a totally different V-replacement scenario emerges. Here, the traditional trigger and the target vowels swap roles. The latter becomes the trigger with the former as its target which lowers to the level of the new trigger. In simple terms, the former copies the latter. Hence, the direction of vertical shift in this environment is downwards, not upwards. In the data below, which illustrate this kind of V-replacement process in Mfantse, the same verb roots that occur prepausally in (7) are sited in pre-complement/pre-object environment.

It becomes clear in the above data that in prepausal environment, the lexical verb root-final vowel, if specified as [+Low] as in (8a), shifts or raises to [ɛ]. But, if the target vowel is [LABIAL] and [-Low] as exemplified by (8b-c) then it is replaced by its [CORONAL] counterpart. Nevertheless, in pre-object/pre-complement environment, as in (8c), the nonlow labial target vowel does not undergo any shift but it spreads to the trigger and replaces it completely. In (8d) the target vowel is coronal and, observably, yet another dimension to the V-replacement process emerges whereby the initial vowel of the object or complement, underlined in (8d), replaces both vowels of the original trigger and target. In this context, both the original trigger and target vowels conjointly serve as an unmarked target for the object-initial V of a trigger which replaces all the preceding contiguous vowels.

(8)	Past Aspect Form	Pre-Pausal Environment	Pre-Obj/-Comp Environment	Gloss
a.	pa + I [**pɛ-ɪ**] 'faded'	atar nʊ **pɛ-ɪ**	atar nʊ **pa-a** pasaa	'the cloth faded totally'
	dɥia + I [**dɥiɛ-ɪ**] 'planted'	atʊ **dɥiɛ-ɪ**	ebow **dɥia-a** baɲtɕɪ	'Ebow planted cassava'
	sumạ + I [**sumɛ̣-ɪ̣**] 'hid'	ebow **sumɛ̣-ɪ̣**	ebow **sumạ-ạ** fjie	'Ebow hid at home'
	sɥiạ + I [**sɥiɛ̣-ɪ̣**] 'learnt'	ebow **sɥiɛ̣-ɪ**	ebow **sɥiạ-ạ** jɛ (Ig.)	'Ebow learnt how to do it'
b.	bɔ + I [**bwɛ-ɪ**] 'broke'	kɔŋkɔ **bwɛ-ɪ**	atʊ **bɔ-ɔ** kɔŋkɔ nʊ̣	'Ato broke the tumbler'
	kɔ + I [**kwɛ-ɪ**] 'went/left'	atʊ **kwɛ-ɪ**	atʊ **kɔ-ɔ** hem	'Ato went to farm'
	ɡuo + I [**ɡwe-i**] 'cooled'	nsu nʊ̣ **gʷue-i**	nsu nʊ̣ **guo-o** koraa	'the water cooled totally'
	wu + I [**wu-i**] 'died'	eɥi nʊ̣ **wu-i**	eɥi nʊ̣ **wu-u** ntɛm	'the thief died quickly'
c.	tɔ + I [**tɥɛ-ɪ**] 'bought'	**ɔ-tɥɛ-ɪ**	**ɔ-twɔ-ɔ** ɲtɕɪn	's/he bought salt'
	suo + I [**sɥe-i**] 'hatched'	o-**sɥe-i**	o-**swuo-o** tɕirefuwa	'it hatched an egg'
	nɯ̣ + I [**nɥi-i̯**] 'fished	mu-**nɥi-i̯**	mu-**nwɯ̣-ɯ̣** dzi̯i̯	'I fished in silence'
	tʊ̣ + I [**tɥɪ-ɪ̣**] 'baked'	**ɔ-tɥɪ-ɪ̣**	**ɔ-twʊ̣-ʊ̣** tɕɛdzɪ	's/he baked cake'
d.	dzi + I [**dźi-i**] 'ate'	aba **dźi-i**	aba **dze-e** e̯dziban	'Aba ate food'
	sɪ + I [**sɪ-ɪ**] 'said'	aba **sɪ-ɪ**	aba **sʷo-o** o̯peɲin	'Aba said to Openyin'
	dzɪ + I [**dźɪ-ɪ**] 'received'	aba **dźɪ-ɪ**	aba **dźa-a** a̯sɛm nʊ̣	'Aba received the message'
	jɛ + I [**jɛ-ɪ**] 'cooked'	aba **jɛ-ɪ**	aba **jɔ-ɔ** o̯tɔ	'Aba prepared mashed yam'

5. Synchronic Vowel Shift in Reduplication Construction

One area of Akan Phonology where synchronic vowel shift operation is widespread resides in reduplication construction. Such scholars as Dolphyne (1988), Obeng (1989), Abakah (1993), Adomako (2012), and others who have researched into the Akan reduplication production argue, though not exactly convincingly, that in the Akan reduplication pattern, low and mid vowels in verbal bases raise to or are replaced by high vowels in the reduplicant whilst base high vowels are copied in that phonetic environment. That is to say, if the low vowel, /**a**/, happens to be a CV or CVN verbal base vocalism then it habitually shifts to /**ɪ**/ in the reduplicative template. In the same vein, mid vowels /**e**, **ɛ**, **o**, and **ɔ**/ are replaced by/shift to **i**, **ɪ**, **u**, and **ʊ**, respectively, in the reduplicant whereas any one of **i**, **ɪ**, **u**, and **ʊ**, serving as a CV/CVN verbal base vocalism, is duplicated in the reduplicant.

Abakah et al. (2010) and Abakah (To Appear) have presented a counterargument that the low vowel in Mfantse does not shift/raise to /**ɪ**/; but rather, it is the consonants of the stem that copy in the reduplicant thereby creating a consonantal sequence that does not tie in with the phonotactics of the language. Thus, to align the unattested consonantal sequences with the phonotactics of the language, the schwa, /**ə**/, which does not occur in the phonological representations of any of the varieties of Akan, is epenthesized between the said unattested consonantal sequences as (9) illustrate.

(9)	Verb Base	Reduplicative Output	
		Mfantse	Asante/Akuapem
a.	da ‘to sleep’	d**ə̲**-da	d**ɪ̲**-da
	kạ ‘to say’	k**ə̲**-kạ	k**ɪ̲**-kạ
	mạ ‘to give’	m**ə̲**-mạ	m**ɪ̲**-ma

	ba ‘to come’	bə̲-ba	bɪ̲-ba
	ʧɥæ ‘to cut’	ʧɥə̲-ʧɥæ	—
b.	tam ‘to pick up’	tə̲n-tam	tɪ̲n-tam
	kan̲ ‘to count’	kə̲ŋ-kan̲	kɪ̲ŋ-kan̲
	tar ‘to seal’	tə̲-tar	tɪ̲-tarɪ
	paw ‘to appoint’	pə̲-paw	pɪ̲-paw
	barɪ ‘to coil around’	bə̲-bar	bɪ̲-barɪ

It is noteworthy that reduplication of verbs in the Akan language triggers multiple occurrences of the action specified by the verb. Verbs in Akan usually exhibit pluractionality in terms of distributive (across space) and iterative (across time). Generally speaking, stative verbs in Akan get distributive semantic reading while active verbs receive iterative semantic reading (Boadi n.d.). A reduplicated Akan verb in a construct, whether active or stative, first and foremost, agrees with its arguments in plurality. Thus, we deem it inconsequential to gloss the reduplicated forms in this paper inasmuch as all the bases reduplicated in this paper are verbs; even as the foregoing makes the semantic readings of the reduplicated verb in Akan transparently manifest.

Abakah (To Appear) has also argued that /**ɪ**/ does not feature at all in reduplication involving such verb stems in Mfantse and that the act of positing the high front V, /**ɪ**/, in the reduplicants of the said CV and CVN[10] bases is influenced by the Mfantse orthographical representations that position the high coronal vowel in that phonetic environment. These orthographical representations were captured by Christaller (1875) but replicated in the literature thereafter. Welmers (1946) and Schachter & Fromkin (1968), being non-Akan speakers, adopted Christaller’s (1875)

[10] N in a CVN base refers to nasal consonant. Hence, a CV and CVN bases refer to a base composed of a consonant plus a vowel and a base composed of a consonant, a vowel and a nasal consonant, respectively.

orthographical representations of the reduplicated forms of these verbal bases in their study of Akan reduplication construction. Native Akan speaking phonologists, including Obeng (1989) and Abakah (1993) jumped onto the bandwagon by positing the high vowel in the reduplicative templates of the verbal bases in question. But this piece of information is not applicable to the Mfantse dialect as noted above and could be said to be misleading (see also Abakah (To Appear)). Adomako (2012) has delved into this phenomenon extensively in terms of the behaviour of the low vowel in the Asante reduplication pattern. His findings confirm our assertion that raising of the low vowel in verbal bases to ɪ/i operates in Asante as well as the other non-Mfantse varieties of Akan. Indeed, it is common knowledge that the orthography of a language does not invariably capture the true segmental melodies of that language seeing that orthographies are just arbitrary representations of the segmental sounds of a language.

It is conspicuous from the beginning of this paper up to this point that the low vowel in Mfantse always raises to [ɛ]/[e] in the context before a high vowel. Let us examine the following data which do not differ from the content of the preceding statement.

(10)	Verb Base	Reduplicative Form	
		Iguae/Anee	Iguae/Boka[11]
a.	sian ‘to untie’	sin-sian	sien-sian
	ɲi̱a̱n ‘to wake up’	ɲi̱n-ɲi̱a̱n	ɲi̱eɲ-ɲi̱a̱n
	ɯua̱n ‘to peel’	ɯun-ɯua̱n	ɯue̱n-ɯua̱n
	ʦi̱a̱ ‘to pile up’	ʦi-ʦi̱a̱	ʦie-ʦi̱a̱
b.	ʧɪa ‘to bend’	ʧɛ-ʧɪa	ʧɪɛ-ʧɪa
	tɥɪa ‘to join’	tɥɛ-tɥɪa	tɥɪɛ-tɥɪa

[11] The Iguae Mfantse speakers use both the Anee and the Boka forms interchangeably.

ɥɪa 'to crawl'	ɥɛ-ɥɪa	ɥɪɛ-ɥɪa
dɥɪa 'to arrest'	dɥɛ-dɥɪa	dɥɪɛ-dɥɪa

It is very evident from (10) that in the Iguae/Boka varieties of Mfantse where the low vowel does appear in the reduplicant, it shifts to [**e**] or [**ɛ**] depending on whether it precedes a trigger specified as [+ATR] or [-ATR] vowel, respectively, as in (10a) and (10b), respectively. In (10a), Iguae and Anee speakers drop **a** in the reduplicant as the trigger is specified as [+ATR]. But in (10b) where the trigger is [-ATR] it is the pre-**a** (V_1) trigger in the base that does not appear at the output level in Iguae/Anee thereby causing the /**a**/ to shift to /**ɛ**/ in the reduplicant in order to harmonize with the trigger in being [-ATR] and in being [CORONAL]. It is therefore untenable, bizarre, and counterintuitive for a low vowel in Mfantse (that does not raise/shift beyond mid vowel tongue height in the environment of a following high vowel) to raise to /**i**/ or /**ɪ**/ in the environment of a following low vowel in reduplication construction.

We repeat for emphasis and assume that even if in the context before a high vowel /**a**/ does not raise further than the mid vowel position, then we need to properly account for why /**a**/ shifts to [**i**]/[**ɪ**] rather than simply affirming that is how **/a/** behaves in the Mfantse reduplication construction. Let us consider another reason that neutralizes the traditional assertion that /**a**/ raises to /**ɪ**/ in the Mfantse reduplicative pattern involving a **Ca**/**CaN** base.

Generally speaking, in Mfantse, a high vowel occurring after a nonvowel sonorant in a word-final environment invariably deletes (see Abakah 2004 for a detailed study). So also in all the dialects of Akan does a [-ATR] high coronal vowel occurring in the environment of a following liquid in a word-medial position deletes. Examples include:

(11)	UR	PR	Gloss
	fɪrɛ	frɛ	'to call'
	tɕɪrɛ	tɕrɛ	'to show'
	pɪra	pra	'to sweep'
	bɪra	bra	'to come

It is clearly manifest from the above data that after the deletion process has applied, a consonant sequence results at the p-level. Here, no vowel is epenthesized to break up the sequence because it corresponds to the phonotactics of Akan. This sort of consonant sequence or cluster is not unique to Mfantse but is rather a common phenomenon to the languages of the West African sub-region. Clements (2000: 146) has observed that many West African languages have liquid clusters, **CL**, where **L** (standing for *liquid*) is realized as **r** or **l**. Clements (ibid.) argues that almost invariably these liquid clusters come about as a result of a vowel deleted in the history of the language: "CVLV > CLV." He concludes that in different languages, the liquid shows varying degrees of affiliation to the preceding consonant. He (ibid.: 146) then zeroes his study in on the Mfantse dialect of Akan, asserting:

> In the Fante variety of Akan, for example, vowel deletion is a synchronic process, and brief transitional vowel can still be heard at the intersection between the consonant and the liquids. In many words such as *ɔ̀pɾ́àà* 's/he swept' the liquid bears the tone **(and sometimes other features) of the deleted vowel**. As a consequence, the CLV sequence continues to pattern tonally like a bisyllabic CVLV sequence (boldface, our emphasis).

Clements' assertion is not exclusive to Mfantse but is absolutely true of all the dialects of Akan as data (11) above exemplify (see

also Abakah 2003 for a detailed study of this sort of vowel elision in Mfantse).

Considering the reduplication construction which (10) exemplify, the base vocalism, /a/, is dropped in the reduplicant. The articulation of the reduplicant is, in point of fact, characterized by heavy aspiration of the initial consonant of the resultant C_1C_2 sequence[12] and very brief transitional vowel can be perceived at the intersection between the C_1 and C_2 just in the same way as Clements' (2000) has described in the above quotation. One hardly perceives any high vowel in the reduplicant of a reduplicated **Ca/CaN** verb base in Mfantse. Due to the incidence of the weakning of the V perceived in-between the resultant CC sequence, following the dropping of /**a**/ in the reduplicant, it is not absurd to account for such transitional V as the direct result of epenthesization of /**ə**/ to break the CC sequence unattested in the language. We therefore deem it counterintuitive to presume that a high vowel, /**ɪ**/, which does not feature at all in this kind of reduplication construction, in Mfantse, ought to be positioned between the CC sequences in question. Placing the schwa, /**ə**/, as the interconsonantal V in the reduplicant in question does seem indisputable since it reflects the true phonetic fact. Besides, /**ə**/ is usually epenthesized in a phonetic environment in Mfantse where a lexical vocalic segment is lost.

5.1. Mid Vowel Raising in the Mfantse Reduplication Pattern

Mid vowels in CV/CVS[13] verbal bases in Mfantse consistently shift to high vowel in the reduplicant when reduplicated. Let us examine data (12):

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[12] C_1 and C_2 stand for first C and second C, respectively. Similarly, V_1 and V_2 stand for first V and second V, respectively.

[13] The S in CVS stands for nonvowel sonorant namely, m, n, r, l, w.

(12)	Class I: Verb Stem	Reduplicated Form
	dɔ 'to sink'	dʊ-dɔ
	fow 'to peel (husk)'	fu-fow
	tsɛw 'to transplant'	tsɪ-tsɛw
	dʒe 'to receive'	dʒi-dʒe
	fjew 'to suck/kiss'	fjifjew

It is evident from (12) that the underlying verb stem vocalism shifts vertically or raises to a high vowel position in the reduplicant, which is the pre-hyphen element of the reduplicated form. The resultant high V invariably agrees with the base vocalism in two dimensions of VH, in being [αATR] and in being [βRound]. In disyllabic and polysyllabic bases in Mfantse, V-raising in the reduplicated forms under-applies, except for stems whose initial and final syllables contain [+ATR] and [+Low] vowels, respectively, as in (13).

(13)	Polysyllabic Verb Base	Reduplicated Form
a.	dɥia 'to plant'	dɥie-dɥia
	dʒinạ 'to stand'	dʒinẹ-dʒinạ
	sumạ 'to stand'	sumẹ-sumạ
	fura 'be blind'	fure-fura
b.	dɥɪa 'to arrest'	dɥɪɛ-dɥɪa
	tsɪnạ 'to stay/sit'	tsɪnẹ-tsɪna
	sʊmạ 'to send (sb.)'	sʊmẹ-sʊmạ
	fʊra 'to mix'	fʊrɛ-fʊra
c.	ɲinsɛn 'be pregnant'	ɲinsɛn-ɲinsɛn
	pintẹn 'be on riot'	pintẹn-pintẹn
	piɲtɛẹn 'to draw near'	piɲtɛẹn-piɲtɛɛn

d.	purow ‘to stumble’	puro(w)-purow
	suro ‘to fear’	suro-suro
	pʊrɔw ‘to rot’	pʊrɔ(w)-pʊrɔw
	pirew ‘to roll’	pire(w)-pirew

In this scenario, the final vocalic segment of the reduplicant in (13a), that is to say, the low vowel, /**a**/, shifts vertically or raises to /**e**/ because the following vowel, being the initial syllable of the base, is the trigger specified as [+High, +ATR]. But where the trigger is [+High, -ATR], the target /**a**/ shifts or raises to /**ɛ**/ in order to harmonize with it (the trigger) in being [-ATR] as (13b) demonstrates. This seems to counterexemplify the axiomatic assertion in the existing literature that the low vowel of a CV base vocalism routinely shifts vertically, raising to /**ɪ**/ in the reduplicant. Nevertheless, where the vowel of the final syllable of the verbal base in question is [-High, -Low], the direction of vowel shift is horizontal, not vertical for which (13c) offers classic exemplification. Therefore, a [-ATR] target mid vowel occurring in the same phonetic environment, in the context before a [+ATR] trigger, is invariably replaced by its [+ATR] counterpart in the reduplicant.

In (13c) where the trigger and the target vowels are specified as [+ATR] and [-ATR], respectively, the target vowel naturally shifts horizontally to agree with the trigger in being [+ATR]. The radical difference between (13a) and (13c) is that whereas the shift in (13a) is vertical and raising, that of (13c) is horizontal and level.[14] Another significant difference between these two data is that despite the fact that all speakers of Akan adhere to the raising process in (13a), the Boka speakers of Mfantse always remain faithful to V-raising even in (13c). All other speakers of Akan,

[14] The term *level* here is antonymous with raising based on the vowel chart by which coronal and labial vowels counterparts are graphically at the two ends of a horizontal line identical to level a surface.

including all speakers of all other varieties of Mfantse, shelve V-raising in (13c) thereby cloning both the trigger and the target Vs in the reduplicant. However, where both the trigger and the target vowels have identical feature(s) in terms of V-Place [LABIAL], [CORONAL], or [RADICAL], raising is put on hold as in (13d). Here, either all the segmental melodies of the base are duplicated or the base-final labial velar glide is dropped in the reduplicative template.

6. Consonant-Induced Vowel Replacement in Mfantse?

In Akan, generally speaking, only a vowel serves as a trigger for V-replacement but in the Mfantse dialect, some consonants habitually trigger V-replacement/shift. Such consonants are, more often than not, labial palatalised Cs, restricted to the word-initial position. In cases where these consonants occur in a verb radical in a verb phrase (VP) construction, they condition all prefixal morphemes to be replaced by their labial counterparts. In the other dialects of Akan, this sort of V-replacement process is lacking as data (14) exemplify.

(14)	Verb Stem	Stems with Prefixes			Gloss
		Asantes	Akuapem	Mfantse	
a.	bɛn ‘be near’	mɪ-ɪ-bɛ̯ɪ	mɪ-rɪ-bɛ̯ŋ	mɪ-rɪ-bɛ̯n	‘I am getting near’
	pa̯m ‘to sew’	mɪ-ɪ-bɛ-pa̯m	mɪ-rɪ-bɛ-pa̯m	mɪ-rɪ-bɛ-pa̯m	‘I am coming to sew’
	fɪ ‘to vomit’	mɪ-ɪ-kɔ-fɪ	mɪ-rɪ-kɔ-fɪ	mɪ-rɪ-kɛ-fɪ	‘I am going to vomit’
	mi̯a̯ ‘to press’	mi-i-be-mi̯a̯	mɪ-rɪ-be-mi̯a̯	miribemi̯a̯	‘I am coming to press’
b.	ɕɛ ‘wear’	m-ɛ-ɕɛ	mɪ-bɛ-ɕɛ	mɪ-bɛ-ɕɛ	‘I will wear’
	tɕɛrɪ ‘delay’	mɪ-ɪ-tɕɛ	mɪ-rɪ-tɕɛrɪ	mɪ-rɪ-tɕɛr	‘I am delaying’
	dʑɪ ‘get’	mɪ-ɪ-bɛ-dʑɪ	mɪ-rɪ-be-dʑe	mɪ-rɪ-bɛ-dʑɪ	‘I am coming to get’
	ɲin ‘to grow’	je-e-ɲin	jɛ-rɪ-ɲiŋ	je-ri-ɲin	‘we are growing’

c.	ɕuɛ 'look'	m-ɛ-ɕuɛ	mɪ-bɛ-ɕuɛ	mʊ-bɔ-ɕuɛ	'I will look'
	duia 'to plant'	mɪ-ɪ-duia	mɪ-rɪ-duia	mu-ru-duia	'I am planting'
	tuɪa 'to join'	mɪ-ɪ-bɛ-twʊa	mɪ-rɪ-bɛ-twʊa	mʊ-rʊ-bɔ-tuɪa	'I am coming to join'
	nuɪa 'to cook'	mɪ-ɪ-nwʊa	mɪ-rɪ-nuɪa	mʊ-rʊ-nuɪa	'I am cooking'

It is perceptible from the above data that labial and palatalised consonants do not trigger any V-replacement in Mfantse, like the other dialects of Akan, as exemplified by (14a) and (14b), respectively. However, in (14c), whereas Asante and Akuapem consistently retain the regular vocalisms of the prefixal morphemes, Mfantse replaces all the vowels in question to agree with the stem-initial labial-palatalised consonant in labiality. The question to be addressed now is, if plain labial consonants are incapable of causing preceding vowels to be replaced by their labial counterparts then what qualities are contained in labial palatalised consonants that trigger V-replacement as seen in (14c)?

A closer look at all the examples in all the preceding data lays bare the fact that it is only the V-Place articulator feature inherent in trigger vowels that condition preceding target vowels to be replaced by their counterparts in agreement with their respective V-Place articulator feature. Therefore, it could be plausible to assume that there might be some vocalic element in labial palatalised consonants that induce V-replacement in Mfantse.

To be able to justify the plausibility of this assumption we have to necessarily go beyond the stem and look closely at the underlying representations of these stems. In Abakah (1993, 2003) it has been argued that such stems have initial CUV[15] strings that undergo various phonological processes to generate the final output as the following set of rules illustrates. This argument is strengthened by the fact that some Asante speakers produce **tɕuɪnɪ**

[15] The C in CUV stands for consonant as usual, U for high rounded vowel, that is, [+/-ATR], and V for a vowel which is not identical to the U in terms of labiality.

in **tʊ̄ tɕɥɪŋɻ** ‘throw (it) away’, **kwɪŋɻ**. In **kwɪŋɻ**, the underlying **kʊ̄ɪŋɻ** undergoes only one phonological process, that is, devocalisation of the underlying V_1 to generate the final output. Let us examine (15) meticulously.[16]

(15)	UR	a. # hʊ̄ɛ #	b. # dua #	c. # nʊ̄a #	d. # tui #
	Labialisation	# hwʊ̄ɛ #	# dwua #	# nwʊ̄a #	# twui #
	V-replacement/VH	# hwɪɛ #	# dwia #	# nwɪa #	# twii #
	Labialised C palatalisation	# ɕɥɪɛ #	# dɥia #	# nɥɪa #	# tɥii #
	Vowel simplification	# ɕɥɛ #	—	—	# tɥi #
	Final output	[ɕɥɛ]	[dɥia]	[nɥɪa]	[tɥi]

The underlying U of the strings in (15) labializes the preceding C before it is replaced with its coronal counterpart to agree with the following V-replacement trigger in coronality. It is important to point out that throughout the Phonology of Akan, a coronal vowel invariably conditions a preceding C to be coronalised or palatalised. So, after the labialisation rule has applied the u-level **CUa/ɛ** string, for instance, then becomes $\mathbf{C^{w}Ua/ɛ}$. Next, the VH process applies thereby causing the **U** in the string to be replaced by its coronal counterpart in order to agree with the following **a/ɛ** vowel in unroundness thereby generating $\mathbf{C^{w}Ia/ɛ}$. Subsequently, the **U** substitute, I, being a high front palatal V, palatalises the preceding, initial labialised C to generate $\mathbf{C^{ɥ}Ia/ɛ}$. This stage feeds the final rule of vowel simplification which truncates the V_1 of the V_1V_2 sequence, if the V_2 is specified as [-Low] as in (15a) and (15d). But where the V_2 is [+Low], the vowel simplification process is put on hold as (15b) and (15c) illustrate. It is worth noting that where the V_2 is [+Low], the derivation in Asante and other non-Mfantse varieties of Akan, except for Akuapem, terminates at the labialisation stage. Hence, (15c), for instance, is

[16] This account replicates Abakah’s (2012: 79-80) study of an identical process.

consistently produced as **nwʊa** by Akan speakers other than the Mfantse and Akuapem.

It is evident from the foregoing that all the vowels in the stems in (14c) (sample of which are the URs in (15) which I list here as follows for convenience /**hʊɛ**, **dua**, **ŋʊa**, **tui**/ are [+Round] at the u-level but they offload their V-Place [LABIAL] articulator feature onto preceding Cs under study at the p-level. It could be argued that the input rounded vowel in Mfantse does not delete after causing the preceding C to be labialised but floats at the phonetic surface to influence all the Vs of the prefixal morphemes to be equally [LABIAL]. In the other varieties of Akan even when the input [+Round] V happens to be in situ, the Vs of the prefixal morphemes remain [-Round] as (14c) shows.

The above argument could be rendered fairly untenable if one considered the fact that in the same Mfantse dialect a radical without an underlying [+Round] V segment conditions (a) prefixal morpheme(s) to be replaced with (a) [+Round] vowel(s) only because the initial C is specified as [+Round]. Let us examine the data below for illustration noting that in all the dialects of Akan, a coronal/palatal vowel does not follow the labial velar glide, /**w**/, in any morpheme; but, when it does as captured in the UR, it palatalises the /**w**/ into the labial palatalised glide, /**ɥ**/, as PR of (16a-b) exemplify.

It is transparently obvious that in (16a) and (16b), there is no underlying [+Round] vowel in the URs, however, all the vowels of the prefixal morphemes, being redundantly unrounded as shown in the outputs of the Asante and Akuapem dialects of Akan, are replaced with their [+Round] counterparts in Mfantse. It is very important to note that the egressive motional prefix in Akan, which immediately precedes the emboldened verb root and indicates a movement away from the deictic centre, is immutably **kɔ-** in the Asante and Akuapem varieties of Akan if the following V is [-ATR]; but if it precedes a [+ATR] V then it is produced

(16)

	Verb Stem		Stems with Prefixes		Gloss
	UR	PR	Mfantse	Asante/Akuapem	
a.	wɪ	**ɥɪ** ‘to chew’	mʊ-rʊ-kɔ-**ɥɪ**	mɪ-(r)ɪ-kɔ-**ɥɪ**	‘I am going to chew it’
	wɪa	**ɥɪa** ‘to crawl’	mʊ-rʊ-kɔ-**ɥɪa**	mɪ-(r)ɪ-kɔ-**ɥɪa**	‘I am going to crawl’
	wɛn̰	**ɲɥɛ̰n** ‘to guard’	mʊ-rʊ-kɔ-**ɲɥɛ̰n**	mɪ-(r)ɪ-kɔ-**ɲɥɛ̰ɪ̰**	‘I am going to guard’
	war	war(ɪ) ‘to marry’	mʊ-rʊ-kɔ-**war**	mɪ-(r)ɪ-kɔ-warɪ	‘I am going to marry’
	wia	**ɥ**ia ‘to steal’	mu-ru-ko-**ɥia**	mɪ-(r)ɪ-ko-**ɥ**ia	‘I am going to steal it’
	wiṉ	**ɲɥ**ḭn ‘to leak’	mu-ru-ko-**ɲɥḭn**	mɪ-(r)ɪ-ko-**ɲɥ**iṉ	‘I am going to leak it’
b.	wɪ	**ɥɪ** ‘to chew’	mʊ-rʊ-bɔ-**ɥɪ**	mɪ-(r)ɪ-bɛ-**ɥɪ**	‘I am coming to chew it’
	wɪa	**ɥɪa** ‘to crawl’	mʊ-rʊ-bɔ-**ɥɪa**	mɪ-(r)ɪ-bɛ-**ɥɪa**	‘I am coming to crawl’
	wɛn̰	**ɲɥɛ̰n** ‘to guard’	mʊ-rʊ-bɔ-**ɲɥɛ̰n**	mɪ-(r)ɪ-bɛ-**ɲɥɛ̰ɪ̰**	‘I am coming to guard’
	war	war(ɪ) ‘to marry’	mʊ-rʊ-bɔ-**war**	mɪ-(r)ɪ-bɛ-**warɪ**	‘I am going to marry’
	wia	**ɥ**ia ‘to steal’	mu-ru-bo-**ɥia**	mɪ-(r)ɪ-be-**ɥ**ia	‘I am coming to steal it’
	wiṉ	**ɲɥ**ḭn ‘to leak’	mu-ru-bo-**ɲɥḭn**	mɪ-(r)ɪ-be-**ɲɥ**iṉ	‘I am coming to leak it’

as **ko-** in these varieties. This shows that it is not the labial feature of the trigger C that influences the target V of the egressive motional prefix to be rounded but rather that vowel is, in these varieties of Akan, prelinked to the [+Round] feature specification whereas in Mfantse it is underspecified for the V-Place feature, [LABIAL].

However, the ingressive motional prefix which encodes a movement to the deictic centre and occurs in the same phonetic/syntactic environment as the egressive motional prefix, is preassociated to the [-Round] feature as the Asante/Akuapem data in (16b) show, yet Mfantse consistently replaces all the coronal vowels in the prefixal morphemes with their [+Round] counterparts. This adds force to our argument that it is not the trigger labial C that conditions the roundness of the V in the Asante/Akuapem egressive motional prefix in (16a).

On the strength of the foregoing evidence, it is unequivocally conceivable to argue that in Mfantse, labial, labialised, and labial palatalised Cs do trigger V-replacement. Hence, the concept of floating rounded Vs conditioning the replacement of nonround Vs, in this particular context in Mfantse, might not reflect the true state of affairs. At this juncture, if we are not to beg the issue, it could be argued that it is not the concept of the trigger segment being V or C that matters but rather the intrinsic or acquired V-Place articulator featural value associated with the trigger segment that matters as it serves as the sole trigger for this kind of vowel replacement.

The fact that plain labial Cs, as seen in (14a), do not on their own condition the Vs of preceding prefixal morphemes to be rounded, as we have seen in (16) above, but the labial velar C/glide and its palatalised counterpart do means that a second but harder look at the entire concept of consonant conditioning V-replacement is inevitably necessary. We repeat (14) here as (17) for easy reference.

(17)	Verb Stem	Stems with Prefixes			Gloss
	UR	Asante	Akuapem	Mfantse	
a.	bɛn ‘be near’	mɪ-ɪ-bɛ̰ɪ̰	mɪ-rɪ-bɛ̰ŋ	mɪ-rɪ-bɛ̰n	‘I am getting near’
	pa̰m ‘to sew’	mɪ-ɪ-bɛ-pa̰m	mɪ-rɪ-bɛ-pa̰m	mɪ-rɪ-bɛ-pa̰m	‘I am coming to sew’
	fɪ ‘to vomit’	mɪ-ɪ-kɔ-fɪ	mɪ-rɪ-kɔ-fɪ	mɪ-rɪ-kɛ-fɪ	‘I am going to vomit’
	mḭa̰ ‘to press’	mi-i-be-mḭa̰	mɪ-rɪ-be-mḭa̰	miribemḭa̰	‘I am coming to press’
b.	ɕɛ ‘wear’	m-ɛ-ɕɛ	mɪ-bɛ-ɕɛ	mɪ-bɛ-ɕɛ	‘I will wear’
	tɕɛrɪ ‘delay’	mɪ-ɪ-tɕɛ	mɪ-rɪ-tɕɛrɪ	mɪ-rɪ-tɕɛr	‘I am delaying’
	dʑɪ ‘get’	mɪ-ɪ-bɛ-dʑɪ	mɪ-rɪ-be-dʑe	mɪ-rɪ-bɛ-dʑɪ	‘I am coming to get’
	ɲin ‘to grow’	je-e-ɲin	jɛ-rɪ-ɲiŋ	je-ri-ɲin	‘we are growing’
c.	ɕɥɛ ‘look’	m-ɛ-ɕɥɛ	mɪ-bɛ-ɕɥɛ	mʊ-bɔ-ɕɥɛ	‘I will look’
	dɥia ‘to plant’	mɪ-ɪ-dɥia	mɪ-rɪ-dɥia	mu-ru-dɥia	‘I am planting’
	tɥɪa ‘to join’	mɪ-ɪ-bɛ-twʊ̰a	mɪ-rɪ-bɛ-twʊ̰a	mʊ-rʊ-bɔ-tɥɪa	‘I am coming to join’
	nɥɪa̰ ‘to cook’	mɪ-ɪ-nwʊ̰a̰	mɪ-rɪ-nɥɪa̰	mʊ-rʊ-nɥɪa̰	‘I am cooking’

For the moment, we would only presuppose that since all the Cs in (14c/17c) and (14) that condition underlying coronal vowels to be replaced by their labial counterparts are not only [LABIAL] but also [+High], then for a labial consonant to make such a V-replacement happen, it must necessarily be [+High]. This, for now, clarifies why plain labials in Akan, as shown by (14a/17a), lacking the feature [+High] do not bring about replacement of u-level coronal vowels by labial vowels at the p-level.

7. Conclusions

We have demonstrated in this paper that in Mfantse, the cross-linguistic process of V-replacement is often triggered by adjacent vowels even though consonants can also set off V-replacement. It has also been shown in this paper that identifiable patterns of V-replacement are, to all intents and purposes, vertical and horizontal with parametric directions. Whilst the vertical direction distinguishes upwards and downwards vowel shifts, horizontal direction makes a distinction between leftwards and rightwards vocalic shifts.

In this paper, we have also studied what we have referred to as *reciprocal condition* which occurs when the trigger and the target vowels occur contiguously at a morpheme boundary. We have shown that in this situation, as the trigger vowel of a PAM, which is underspecified for both segmental and prosodic features, conditions the target vowel to shift either vertically or horizontally, the target vowel in turn spreads its inherent prosodic features of [ATR] and [Nasal] to the trigger, thereby causing its original vocalism to be replaced by its [ATR] and/or [Nasal] counterpart. In this way, both the trigger and the target play dual roles of becoming the trigger as well as the target at the same time. However, where the trigger fails to trigger V-replacement, the

target becomes the trigger by spreading its inherent [+ATR] and/or [+Nasal] features onto it (the original trigger).

We have also revealed in this paper that the type of V-replacement, vertical or horizontal in Mfantse, is primarily tied in with the V-Place articulation feature of the target vowel. Where the target is the V-Placeless, i.e., the low /**a**/, it shifts/raises vertically to ɛ and is thereby redundantly replaced by that mid vowel specified as [-Round] and has the V-Place [CORONAL] articulator feature. But, where the target vowel is specified as V-Place [LABIAL] and is also nonlow, the shift/replacement is horizontal and, in this context, its coronal counterpart replaces it. We have also observed that when the target vowel occurs in a pre-object environment it replaces the trigger. However, when a nonlow target is coronal, a completely new-fangled V-replacement process occurs. Here, both the trigger and the target copy the initial vowel of the object. This means that the trigger and the target conjointly become the new-fangled target of the object-initial vowel trigger which runs over or replaces the original trigger and target vowels.

The concept of consonants influencing V-replacement/V-shift has been, in our own estimation, sufficiently dealt with in this paper actuating us to presume that consonants also can bring about V-replacement in Mfantse. Here, it is shown that it is only labial consonants that are also specified as [+High] that condition coronal vowels in phonological representations to be replaced with their labial counterparts at p-level.

Finally, we have argued that considering /**ɪ**/ as the reduplicant vocalism in reduplication construction involving CV/CVN bases whereby the V of the base is /**a**/ in the Mfantse reduplication construction is untenable. The issue is, if /**a**/ does not raise beyond a mid vowel in the context before a high V in all aspects of Mfantse phonology, then it is counterintuitive and bizarre to assume that in Mfantse reduplication construction /**a**/ is invariably replaced by /**ɪ**/ in the reduplicant in the environment of a following

base low vowel. We have assumed, based on the raising/shifting behaviour of /**a**/ in the Mfantse Phonology, that even if in the context before a high vowel /**a**/ does not raise further than the mid vowel then there is overriding need for Linguists interested in the study of Akan Phonology to properly account for why /**a**/ shifts to [**i**]/[**ɪ**] and not to simply assert that /**a**/ raises to /**ɪ**/ in the Mfantse reduplicative pattern involving **Ca**/**CaN** base.

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