... ZAOULI N°15, Septembre 2026, pp. 644-673 ISSN : 2788-9343

Received: 02/08/2026 **Accepted:** 03/09/2026 **Published:** 20/10/2026

What Morphological Approach for Kwa Languages? Evidence from Abbey

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Abstract
This article reexamines morphological exponence in Kwa languages within the framework of inferential-realisational morphology (Stump 2001). While classical morpheme-based approaches conceive words as linear concatenations of discrete morphemes (focusing on roots, prefixes and suffixes), developments in autosegmental phonology and prosodic morphology have shown that grammatical distinctions may be realised through non-segmental, discontinuous and prosodic units. Data from Agni, N'zima, Ehotilé, Maasai (…) demonstrate that tone, nasal features and discontinuous patterns bear grammatical properties. In English, stress shift conversion exhibits the same property. These facts challenge the one-to-one form-meaning assumption and the concept of zero morphemes as an account for morphological facts. Based on Abbey, a Kwa language of Côte d'Ivoire, this study proposes a realisational analysis of noun and verb inflection. Noun inflection involves three classes where definiteness and number are realised by segmental, tonal and discontinuous exponents, including cumulative exponence. Verb inflection displays five classes where tense is realised solely by tonal melodies [H, M, H-L, L-L, H-M]. Formalised in Blocks A-E, the analysis uses Realisational Rules of the type RRn,τ,C(<X,σ>) =def <Y',σ>. I argue that realisational morphology provides a more adequate and predictive inflectional model for Abbey and for Kwa languages generally.

Keywords: realisational morphology, Kwa languages, Abbey, tone, exponence,

Resumé
Cet article réexamine l'exponence morphologique dans les langues kwa à travers le prisme de la morphologie réalisationnelle inférentielle (Stump 2001). Alors que les approches classiques morphématiques conçoivent le mot comme une concaténation linéaire de morphèmes discrets (organisés en termes de racines, suffixes et préfixes), la phonologie autosegmentale et la morphologie prosodique ont montré que les distinctions grammaticales peuvent être réalisées par des unités non-segmentales, discontinues et prosodiques. A partir de données de l'agni, du n'zima, de l'éhotilé, du maasaï (…) cet article démontre que le ton, la nasalité et les patrons discontinus peuvent réaliser des propriétés grammaticales. Ces faits remettent en cause le principe de correspondance biunivoque forme-sens et le recours au morphème zéro dans les analyses morphologiques. Focalisée sur l'abbey, cette étude propose une analyse réalisationnelle de la flexion nominale et verbale. La flexion nominale présente trois classes où la définitude et le nombre sont réalisés par des exposants segmentaux, tonals et discontinus avec exponence cumulative. La flexion verbale présente cinq classes avec le temps grammatical réalisé uniquement par des schèmes tonals [H, M, H-B, B-B, H-M]. Les analyses sont formalisées par des Règles de Réalisation du type RRn,τ,C(<X,σ>) =def <Y',σ et sont organisées en Blocs A-E. Ce travail montre que la morphologie réalisationnelle offre un modèle flexionnel plus adéquat et prédictif pour l'abbey et pour les langues kwa en général.

Mots-clés: morphologie réalisationnelle, langues kwa, abbey, ton, exponence

Received: 02/08/2026 **Accepted:** 03/09/2026 **Published:** 20/10/2026

Introduction

Morphology has traditionally been concerned with the internal structure of words and the mechanisms through which grammatical and lexical information are encoded. Influenced largely by evidence from Indo-European languages, early morphological theories commonly conceived words as combinations of discrete, segmentable, and linearly concatenated morphemes (Bloomfield 1933, Nida 1949, Hockett 1954). Within such approaches, morphological analyses focused primarily on observable units such as roots, prefixes, suffixes, and inflectional endings, and morphological structure was generally assumed to be reducible to the arrangement of segmental units.

Studies of multiple exponence in Basque (Igartua 2026) have shown that morphological realisation may involve the construction of a grammatical category or information through multiple formal forms, challenging morpheme-based accounts of morphology. Contemporary morphology recognises a wide range of exponents, including affixation, stem alternation, tonal realisation, reduplication, and other non-concatenative mechanisms (Spencer 1991; Stump 2001; Haspelmath & Sims 20). Such findings suggest that morphological exponence is often more diverse and complex than traditionally assumed. The challenge is particularly acute in many African languages, where grammatical distinctions are frequently realised through tonal, prosodic, non-segmental and discontinuous patterns (Welmers 1959, Pulleyblank 1986). Hyman (2013) explicitly argues that tonal morphology can express the same functions as segmental

morphology and sometimes more. Within the Kwa language family, morphological categories are not always expressed by identifiable segmental affixes. Instead, crucial grammatical information may be encoded through tonal modifications, suprasegmental properties, feature manipulations, or combinations of segmental and non-segmental units (Creissels 2019; Hyman 2013). These characteristics raise important theoretical questions regarding the nature of morphological representation and the adequacy of morphological models developed primarily from a segmental and a concatenative point of view.

Using evidence from Abbey, this article examines the extent to which existing morphological theories can account for such patterns of exponence. More specifically, it addresses the following question: What kind of morphological theory is required for an adequate analysis of Kwa languages? By investigating morphological phenomena that involve tonal, non-segmental, and discontinuous realisations, the paper argues that the traditional conception of morphology as the organisation of contiguous segmental morphemes is insufficient for capturing the full range of morphological processes attested in Abbey. This paper proposes that the morphology of Abbey, and potentially of Kwa languages more generally, is best understood within a framework that recognises segmental, non-segmental, and discontinuous mechanisms as equally legitimate forms of morphological exponence. Consequently, morphological theory must move beyond a predominantly segment-centered conception of word structure and provide a suitable account of the diverse means through which morphosyntactic information is realised.

Received: 02/08/2026 Accepted: 03/09/2026 Published: 20/10/2026

1. Classical Morphology

1.1. Morpheme-Based Approach

Critics against morpheme-based approaches to morphology have consistently emerged with the development of prosodic morphology, which is deeply enrooted in suprasegmental phonology. In fact, from a diachronic point of view, morphology has long been viewed as an heir of phonological analyses from which operations, notions and facts were inspired (phonemes / morphemes, phonotactics/ morphotactics, phones/morphs, allophones/ allomorph). The view of phonological strings as made up of phonemes associations or operations is just copied and applied to morphological facts (Hyman 2013, p.1). A word is then a morpheme or an association of morphemes. This conception has guided and influenced what is referred to as classical morphology, traditional morphology and morpheme-based morphology. For Bloomfield (1933, p.161), morphological analyses consist in identifying and combining morphemes or *simple form* - idea steadily grounded in American structuralism – that he defined as "*a linguistic form which bears no partial phonetic-semantic resemblance to any other form*". In short, his treatment of word structures is fundamentally morphemic.

Much of the early work in morphology was carried out within this morpheme-based framework. For example, Nida (1949), who defined morphology as "*the study of morphemes and their arrangements in forming words*", developed a series of six (6) principles designed to identify morphemes. Following this conception, many linguists adopted the morpheme-based morphology, viewing words as combination of discrete meaningful units (morphemes) and morphemes as the

fundamental units of morphological analyses (Gleason 1961, Harris 1951, Hill 1958).

1.2. Hockett's Morphological Distinction

Still in the American structuralism tenet, seeking to account for the internal structure of words, Hockett (1954) proposed two major models of grammatical description: the Item-and-Arrangement model and the Item-and-Process model. These models became highly influential in twentieth-century morphology, by governing the post-Bloomfidian period and contributing significantly to the development of morpheme-based approaches to words structure.

In the Item-and-Arrangement approach, which is an essentially morphemic approach, in which Item could mean the component (morpheme) and arrangement, the construction modelling or pattern. It is an approach which is interested in words immediate constituents and the concatenative-like organisation or association. Then the morphologists' task is to state the morpheme and its arrangement. Hockett (1954, p.212) clearly explained that: "*The pattern of the language is described if we list the morphemes and the arrangements in which they occur relative to each other in utterances*". Words are analysed as sequences of discrete morphemes arranged according to specific structural patterns. The Morphological analyses therefore consist primarily in segmenting words into identifiable meaningful units and describing their combinatory properties.

For instance, words such as *unhappiness*, *depopulation* and *organisationally* may be respectively analysed as the arrangement morphemes: *un-* + *happy* + *-ness*, *de-*+*populate*+*-ion* and *organ*+*-ise*+*-ation*+*-al*+*-ly*.

Received: 02/08/2026 Accepted: 03/09/2026 Published: 20/10/2026

the Item-and-Arrangement approach assumes that a linguistic form, which is a morpheme, can be simple or composite (that is made up of more immediate constituents) and can stand independently or form a constitute. In this perspective, immediate constituents are organised or arranged in the way that each of them is "*the partner of the others*" in the structural systematic way (Hockett 1954, p.214).

While forms and meaning guide IA analyses, another approach is resorted to as the response to problems when two or more morphemes are conflated in only one morph as it is the case with words like *men* and *took* ({man} and {-s} ; {take} and {-ed}. Assuming that not all morphological phenomena could be satisfactorily described through simple concatenations, Hockett also proposed the Item-and-Process, a model in which the most important is the correlation between a structure and function; that is, a word can undergo series of modifications to form a new one: Items go through processes. These processes cans involve suffixation, prefixation, vowel change, consonant change, juxtaposition, reduplication, suppletion, infixation… It is a model in which morphological structure may result from the application of processes to an underlying form (a single or complex immediate constituent)

For example, words like *took* and *waited* can be interpreted as the result of a *singular operation* applied respectively to *take* and *wait* since the grammatical distinction is expressed through a modification of the stem rather than by an overt affix (Hockett 1954, p.227).

Although the Item-and-Process model represents a significant departure from strictly segment-based analyses, both approaches remain fundamentally rooted in the

assumption that morphology can be described through identifiable formal units and operations. As a result, these models proved particularly effective for languages in which grammatical information is predominantly realised through segmental material, but they raise important questions when confronted with languages whose morphological systems rely extensively on tonal, non-segmental, or discontinuous forms of exponence.

2. Critiques Against Classical Approach to Morphology

Before arguing against the morpheme-based approach, it is important to note that this framework was originally developed to address linguistic concerns arising from Native American languages, many of which exhibit highly isomorphic and concatenative morphological structures. In such languages, the segmentation of words into discrete morphemes often proves relatively straightforward. Consequently, the morpheme-based approach has been particularly relevant and successful in the analysis of many Native American languages (Fought 2010; Luís 2023).

Morphology, which is most of the time viewed as a task involving the decomposition of words into smaller meaningful units (Davies & Elder, 2004, p.36), generally regarded as the *most elemental units* (Fromkin et al., 2010, p.37), is progressively moving toward the idea that "*the segmentation of words into morphemes is largely untenable within the field of inflectional morphology*", as noted by Luís (2023, p.279).

Boundaries cannot be a reliable criterion for morphological analysis, just as form-meaning mapping cannot constitute the exclusive task of morphology because, across languages, many phenomena challenge this way of approaching

Received: 02/08/2026 **Accepted:** 03/09/2026 **Published:** 20/10/2026

morphology. This point of view is summarised by Luís (2023, p.279) as follows:

> "Some word forms can be intuitively broken down into smaller units and seem to have a transparent additive structure, others do not exhibit any obvious boundaries between units but are nonetheless highly systematic, diverse and abundant cross-linguistically (…) Meaning and form can be associated in more complex ways: form may be meaningless; meaning can have no form; one form can have several meanings, and one meaning can be expressed by multiple sets of form. So, contrary to the sometimes oversimplified view contained in textbook exercises, empirical diversity poses significant challenges to morphemes."

The inadequacy of a strictly morpheme-based conception of morphology becomes particularly evident in three domains: the recourse to zero morphemes, the existence of discontinuous morphological exponence, and the role of prosodic phenomena such as tone and intonation in the realisation of grammatical categories

2.1. Zero Morphemes as a Theoretical Rescue Device

One of the most structured counterarguments to the notion of the zero morpheme is proposed by Hockett (1954, p.216-224), who questioned its relevance within morpheme-based morphology (IA). According to him, such an analysis is arbitrary because it assigns grammatical meaning to an element that has no phonological realisation. Taking the example of *took* from *take*, he observed that the recognition of zero morphs requires "*carefully formulated supplementary criteria*", suggesting that they are not naturally motivated linguistic entities, but rather theoretical devices introduced to

preserve the assumption that every grammatical distinction must correspond to a morpheme.

2.2 Discontinuity and the Limits of Morphemic Segmentation

One of the challenges to morpheme-based morphology is based on discontinuous and non-concatenative morphological phenomena, in which morphosyntactic properties are not represented by a single contiguous segmental unit. As observed by Luís (2023)[1], there are many morphological phenomena which show deviations from the traditional (one) form-(one) meaning correspondence of classical traditional approach. They include multiple exponence (many-to-one), cumulative exponence (one-to-many), and other constructions beyond segments concatenations (Luís 2023, p.285-290). In the same perspective, McCarthy (1981, p.374) argues that Arabic forms such as ***k****a****t****a****b****a*** 'he wrote', ***k****a****tt****a****b****a*** 'he caused to write', ***k****aa****t****a****b****a*** 'he corresponded', ***t****a****k****aa****t****a****b****uu*** 'they kept up a correspondence', ***k****i****t****aa****b****un*** 'book (nom.) … cannot be just simple linear combinations of morphemes. In fact, the *consonantal root* (*k-t-b*) interacts in a discontinuous way with independent prosodic templates or morae (vowel distributions and combination). Another issue in inflectional morphology can be observed with English words like *children* from *child*, *written* from *write* in which, plural is expressed by an ablaut (aɪ → ɪ) and {-(r)en}. The same phenomenon is shown with the German word *Bücher* 'books' inflected from *Buch* 'book'. This word combines an affixation of {-er} and a process called umlaut (Luís 2023, p.286). Likewise, past

[1] And many other linguists : Matthews 1991, Haspelmath and Sims 2010, McCarthy 1981, Stump 2001, Crysmann and Sailer 2021 …

Received: 02/08/2026 Accepted: 03/09/2026 Published: 20/10/2026

participle in German is realised by circumfixes {ge-…*-t}* in ***ge****spiel****t*** 'played' and ***ge****sag****t*** 'said'. Similarly, discussing Swahili negative past forms such as ***ha****-tu-****ku****-taka* 'we did not want', Stump (2001, p.141-142) illustrates a case of multiple exponence in which negation is realised through the discontinuous combination of {ha-} and {-ku-}. In French, circumfixes can be observed in derivational constructions (deadjectival verbs). For example, from *pauvre* 'poor' to ***a****ppauvr****ir*** 'impoverish' and *large* 'large' to ***é****larg****ir*** 'enlarge', the representation of morphosyntactic categories is done through discontinuous units ({é-….-ir} and {a-…-ir}). Circumfixes – and infixes– are also discussed by Aronoff and Fudeman (2023, p.4) as challenges for the traditional notion of a morpheme as an indivisible unit.

Such phenomena demonstrate that meaning may be distributed across several positions within a word, rather than being associated with a single segmentable morpheme. These examples are evidence of deviations and limit from the expected one-to-one relationship between morphosyntactic features and their morphological expressions as advocated by traditional morphology. Consequently, the assumption that morphology can always be reduced to identifiable, contiguous and concatenated morphemes becomes increasingly difficult to maintain.

2.3 Prosodic Exponence as a Challenge to Morpheme-Based Morphology

As already mentioned, prosody is one of the keystone bases for the shift for inserting and considering suprasegments and non-segmental units in morphological analyses. It constitutes one of the strongest challenges for

morpheme-based morphology. Evidence from many languages show that morphological analyses can rely on non-segmental units; be they concatenated or not (as it is the case in traditional morphology). In the morphological background, they also show the importance given to tone and stress.

First, as far as tones are concerned, Hyman (2013) discussed the case of many African languages in which tonal units can play morphological and grammatical roles. The table below summarises morphological tone relevance in about nine languages from Hyman (2013, p.18-22).

Table (1) Morphological functions of tone in African languages

Language	**Family**	**Morphological function of tone**
Maasai	Nilotic	Tone marks case (nominative vs. accusative)
Chimwiini	Bantu	Tone marks person distinctions in verbal paradigms
Kalabari	Ijoid	Tone functions as part of pronoun morphology and as replacive morphology and phrasal morphology
Gban	Mande	Tone expresses person and tense distinctions
Kunama	Nilo-Saharan	Tone realises number in possessive paradigms
Dinka	Nilotic	Tone is involved in derivational and inflectional constructions

Received: 02/08/2026 **Accepted:** 03/09/2026 **Published:** 20/10/2026

Leggbó	Cross River	Tone realises tense, aspect, mood and negation
Giphende	Bantu	Tone is associated with syntactic and discourse relations
Kikuria	Bantu	Tone realises tenses

The table shows evidence that tones can function not only as mere lexical phonological units but as very important aspects in morphology. This is why Hyman (2013, p.16) mentions that " (i) Tonal morphology can do anything that non-tonal morphology can do; (ii) tonal morphology can do more than non-tonal morphology can do; (iii) tonal morphology often obscures the compartmentalization of phonology, morphology, and syntax"

The same idea is supported by prosodic morphology developed by McCarthy (1981) in which non-linear units such as syllables, morae, feet and tonal structures can display and represent morphological features. Morphological categories such as aspect, person, number modality, (…) can also be realised not only with segments units (root, suffix, prefix). The same case is possible in English with stress patterns. Stress pattern in English, as a prosodic unit, can also serve as a means for morphological purposes namely through the notion known as conversion or stress shift conversion. In fact, as noted by Marchand (1969) and Haspelmath & Sims (2010), pairs such as 'permit/per'mit, 'record/re'cord, 'export/ex'port, 'abstract/ab'stract 'discount/dis'count, 'import/im'port/, 'permit/per'mit, 'transfer/trans'fer exibit category change without the addition of a segmentable derivational morpheme. In these cases, prosodic structure alone serves as the exponent of the morphological. It aligns

with Anderson (1992) who claims that morphology should not be treated as a manipulation (concatenation and addition) of morphemes.

3. Realisational Morphology: An Alternative for Kwa Languages Inflectional Morphology

Among the approaches that emerged in response to the above-mentioned difficulties, realisational morphology has become one of the most influential. It was developed by linguists such as Anderson (1992), Stump (2001) and Spencer (2003). It rejects the assumption that every grammatical and lexical information must correspond to a discrete morpheme and vice versa. Valin (2005, p.161), cited in Boutin 2013, p.1) puts that "[i]t is necessary to think of the lexicon as having at least two parts, one the traditional storehouse of words and morphemes, and the second a 'workshop' where lexical rules and other lexical processes can create new lexical forms which would not otherwise be stored" This point of view shows that morpheme-based approach just limits to one facet of words organisation.

3.1 What is realisational morphology?

Realisational morphology is a lexeme-based approach to morphology; that is, an approach in which morphological phenomena are accounted for in terms of operations on lexemes with possible exponents (traditionally referred to as affixes). This point of view is summarised in the following: "In a realisational approach to morphology, inflectional morphemes are replaced by rules [morphological and/or phonological] that relate an inflected word's form to its morphosyntactic representation" (Boutin 22013, p.1). Stump (2001) refers to it as *inferential realisational morphology*. For him,

Received: 02/08/2026 **Accepted:** 03/09/2026 **Published:** 20/10/2026

"realisational theories are fully compatible with the widespread incidence of extended exponence : in realisational theories, there is no expectation that a given morphosyntactic property will be realised by at most one marking per word (…) (Stump, 2001, p.4)". Affixes (infixes, prefixes, suffixes, circumfixes, suprafixes) and zero morphemes are consequently possible exponents of operations realised by the association of a lexeme and (a) morphosyntactic feature(s). For example{-s}, in a word-form *likes* is the realisation of the morphosyntactic properties 3rd sg subject agreement, present tense and indicative mood on the lexeme LIVE (Stump, 2001, p.1, 3).

A more advanced analysis goes through the elaboration of a Realisational Rule (RR) – which formalises and summarises all the data, operations and morphosyntactic features – explaining and defining the potential output or inflected words. RR are designed as followed:

$RR_{n,\tau,C}$ (<X,σ >) = $_{def}$ <Y',σ>[2] and is read: the realisation of the morphosyntatic feature τ for the class C applied to form X with the feature σ yields the form Y'. *n* is the index for the block to which the rule belongs, C the grammatical category, τ the morphosyntactic feature and X, which is the lexeme, is an extension of C and σ an extension of τ.

The realisation rule for the word-form *likes* is illustrated below[3]:

[2] A realisational rule can be organised into blocks; that is a set of rules operating on the same domain or common environment.

[3] In this RR the index $_{V\,[\ _(\text{-Vo})\#]}$ represents the verbs ending in voiceless sounds. Other rules in the same blocks (A_2. , A_3. … dealing for voiceless sounds, sibilant … can be set.

(1)

A1. $RR_{A, \{Mood : IND. Tense : PRES. Number : SING. 3. PERS.\}, V [__(-Vo)\#]}$ $(<X,\sigma>)$

$= _{def} <Xs,\sigma>$

LIKE-PAS $\Rightarrow$ *likes*

Rather than *like*+*s* , this word-form is the realisation of indicative mood, present tense and 3rd person singular by the segmental exponent -s (based on the voiceless nature of the final sound of the "stem") on the lexeme LIKE.

3.2 Why Is Realisational morphology Suitable for Kwa Languages?

A major reason for considering realisational morphology as a suitable framework for Kwa languages relies on the typology of many African languages. The typological diversity of African languages has been discussed by Greenberg (1963) in which he highlighted the structural diversity of the Niger-Congo phylum, to which the Kwa languages belong. Subsequent researches have shown that many of these languages rely extensively on tonal, morphophonological, and prosodic units to express grammatical information.

A striking illustration is provided by the expression of negation. In a typological study of several Kwa languages, Bogny (2008) shows that negation may be realised through a variety of morphophonological strategies, including syllabic nasals, tonal morphemes, discontinuous markers, and purely prosodic features. In Agni, for example, negation can be expressed by the discontinuous pattern {Ǹ-... -má}, while in other constructions it is realised exclusively through a Low tone carried by an aspectual marker Bogny (2008, p.3-4). He observes that in certain aspectual contexts one component of

Received: 02/08/2026 Accepted: 03/09/2026 Published: 20/10/2026

the discontinuous negation disappears and is replaced by an aspectual marker, suggesting a close interaction between aspect and negation. He also shows that negation may be expressed solely through tonal modification of the verb tone (ò kɔ̀ 'he passed'/ ò kɔ! 'he did not pass' Bogny (2008, p.6)). No additional segmental material is introduced. In Maasai, tone can mark nominative and accusative case (èncùmàtá 'horse.Nom' vs. èncùmátá 'horse.Acc' (Hyman 2013, p.17)).

The same phenomenon is observed in other Kwa languages. In N'zima and Ehotilé, negation is associated with a nasal feature that spreads onto the verbal root or the subject pronoun. (N'zima. ɔ̀ lɛ́ bɔ̰̀kà kòfí 'he helps Koffi / ɔ̰̀ mɔ̰́kà kòfí 'he does not help Koffi') Bogny (2008, p.6)). In these languages, negation is realised not by an independent morpheme but by a prosodic or featural modification affecting existing forms.

The central role of tone in Kwa languages is further confirmed by Akan. According to Kügler (2018), Akan (Asante Twi) uses tone both lexically and grammatically. Tonal contrasts distinguish lexical items, but tonal operations also express grammatical distinctions such as aspect (pápá 'good', pàpà 'fan', and pàpá 'father' / , Kofi dʒ̀ínà hó 'Kofi stands there' (habitual) / Kofi dʒ̀ìnà hó 'Kofi is standing there' (stative) (Kügler 2018, p.3)). He notes that habitual and stative forms may differ exclusively in their tonal configuration despite identical segmental content. He further argues that the grammatical role of tone in Akan may be more significant than its lexical role.

These observations converge with the broader conclusions reached by Hyman (2013) who demonstrates that tone may serve as the exponent of case, person, number, tense, aspect,

mood, negation and derivation. He therefore concludes that tonal morphology can perform all the functions typically associated with segmental morphology.

4. Evidence from Abbey: A Realisational-Approach-Based Analysis

Much of the data presented in this section is drawn from Mambo (2022), which addresses Abbey morphology in general and subsequent developments regarding verb classification are found in Mambo (2026). The present study by provides an analysis of both noun and verb inflection.

4.1. Evidence from Noun Inflection in Abbey

As is the case with many languages, nouns inflection in Abbey is related to grammatical information such as definiteness and number.

The inflectional organisation of Abbey nouns displays three noun classes summarised in the table below.

			Inflectional realisation			
Morphosyntactic features / Lexeme			Singular		Plural	
			indefinite	definite	indefinite	definite
Class	1	**jíɣɔ̄**	mo̱ ví **jíɣɔ̄**	mo̱ mú **jíɣɔ̄nó̱**	mo̱ mú **èjíɣɔ̄** (a̱ɲú)	mo̱ mú
	2	**wó**	me̱ dí **wó**	kè dí **wónó̱**		**wónêlɛ̄** kè jí
	3	**ɟɛ̀**	ǹta̱mo̱ hó **ɟɛ̀**	jàpí **ɟɛ̀nó̱ jí**	n ǹta̱mo̱ hó **ɟɛ̀lɛ̄** o̱ní	jàpí **ɟɛ̀nêlɛ̄** kè jí
Exponents			{ø}	**- nó̱**	Class1 : **-è** Class 3 : **-lɛ̄**	n ´ - (**nó̱** . **èlɛ̄**)

Table (2) Inflectional realisations nouns in Abbey

Received: 02/08/2026 **Accepted:** 03/09/2026 **Published:** 20/10/2026

From a realisational approach, two main morphosyntactic categories are displayed on inflected nouns in Abbey: ***Definiteness*** and ***Number*** with their respective properties DEF / INDEF and SING / PLU:

- jíɣɔ̄ , wó and ɟè are the realisations of the morphosyntactic feature [***Det*** : INDEF. ***Numb*** : SING] respectively on the lexemes jíɣɔ̄ , wó and ɟè. The realisation is done with no overt segmental unit. Then:

(2)- X.INDEF.SING → X-{ø}

- jíɣɔ̄nṵ , wónṵ and ɟènṵ are the result of [***Det*** : DEF. ***Numb*** : SING] on the lexemes jíɣɔ̄ , wó and ɟè by the segmental (suffixal) exponent [nṵ].
-

(3)- X.DEF.SING → X- nṵ

- plural forms in Abbey exibit internal organisations. èjíɣɔ̄ is constructed by the morphosyntactic feature [***Det*** : INDEF. ***Numb*** : PLU] on the class1-lexeme jíɣɔ̄ by the prefixal segment [è-]. And ɟèlē is the realisation of [***Det*** : INDEF. ***Numb*** : PLU] on the class2-lexeme ɟè by the suffixation of [-lē] (whose deep form is èlē).
-

(4)- X.INDEF.PLU → è-X_{cl-1} ; X_{cl-3}-lē

As for Class 2 nouns (the most productive in the language), [***Det*** : INDEF. ***Numb*** : PLU] is not morphologically constructed. The complete fulfilment of that morphosyntactic feature is phrasal; that is, it relies on distinct lexical units

through syntactic organisation. For example, in the sentence kè ɲí wó ōní 'they caught five dogs', ōní helps contruct the idea of plurality.

The word-forms èjíɣɔ̄nêlē, wónêlē and ɟɛ̀nêlɛ̄ display a common form : -nêlē. It is the exponent of [***Det*** : DEF. ***Numb*** : PLU]. It combines the features [***Det*** : DEF] ([-nʊ́) and [***Numb*** : PLU] (èlɛ̄) through the elision of [ʊ][4] and a tone combination (High of the elided [ʊ] and Low of [è] in (èlɛ̄) forming a High-Low (H-L) tone sequence.

(5)- ***Det . Number***

DEF . PLU
nʊ́ . èlɛ̄
n ´ . èlɛ̄
[nêlē]

As showed in the illustraion below, [***Numb*** : PLU] is discontinuously realised revealing multiple exponence in Abbey inflection.

(6)- X.DEF. PLU → **PLU**.X_{cl-1}.DEF.**PLU**

è- jíɣɔ̄ - nʊ́ . èlɛ̄
è- jíɣɔ̄ - n ´ . èlɛ̄
è- jíɣɔ̄ - nêlē
èjíɣɔ̄nêlē

The grammatical information involved in Abbey noun inflectional constructions is generally realised through segmental units (prefixes and suffixes) accompanied by tonal modifications, specifically falling pitch contours. This

[4] Mambo (2022, p.201) showed that [ʊ] is an epenthetic unit whose function is to carry tone (TBU), the nasal feature resuls from a progressive assimilation from [m].

Received: 02/08/2026 **Accepted:** 03/09/2026 **Published:** 20/10/2026

realisational analysis allows nouns to be classified into three classes, which in turn inform the realisation rules outlined below:

(7) **Block A** – realisation rules for the property SING

A1. $RR_{A, \{ Det : INDEF, Number : SING \},N}(<X,\sigma >) =_{def} <\mathbf{X},\sigma>$

wó-.SING.INDEF ⇒ wó

A2. $RR_{A, \{ Det : DEF, Number : SING \},N}(<X,\sigma >) =_{def} <\mathbf{X}nʊ́ >$

wó-SING.INDEF ⇒ **wó**nʊ́

(8) **Block B** – realisation rules for the property PLU

B1. $RR_{B, \{Det : INDEF, Number : PLU \},Ncl\text{-}1}(<X,\sigma >) =_{def} < è\mathbf{X},\sigma>$

PLU.INDEF- jíɣɔ̄ ⇒ èjíɣɔ̄

B2. $RR_{B, \{ Det : DEF, Number : PLU \},Ncl\text{-}1}(<X,\sigma >) =_{def} < è\mathbf{X}nêlē,\sigma>$

PLU- jíɣɔ̄ -DEF. PLU ⇒ è**jíɣɔ̄**nêlē

B3. $RR_{B, \{ Det : DEF, Number : PLU \},Ncl\text{-}2}(<X,\sigma >) =_{def} < \mathbf{X}nêlē,\sigma>$

wó-DEF.PLU ⇒ **wó**nêlē

B4. $RR_{B, \{Number : PLU \},Ncl\text{-}3}(<X,\sigma >) =_{def} < \mathbf{X}lɛ̄,\sigma>$

ɟɛ̀l-PLU ⇒ ɟɛ̀lɛ̄

Noun inflection in Abbey is analysed from a realisational approach, incorporating segmental, discontinuous and tonal factors to explain how surface forms are constructed. Specifically, this analysis establishes two disjunctive blocks (A and B) comprising six realisation rules (A_1, A_2, B_1, B_2, B_3, and B_4). These rules not only summarise noun inflection across the language but also serve to predict novel inflected forms within the paradigm.

4.1. Evidence from Verb Inflection in Abbey

The table below is extracted Mambo (2026, p 104). It displays verbs organisation in their grammatical environment.

		Grammatical environment		
	Representations	**past** (tonal pattern)	**présent** (tonal pattern)	**future** (tonal pattern)
Class 1	CV	(H)	(H)	(M)
Class 2	($C_1V_1C_{1'}V_{1'}$)$_{V\ tr}$	(H-L)	(L-L)	(L-L)
Class 3	($C_1V_1C_{1'}V_{1'}$)$_{V\ intr}$	(H-L)	(L-L)	(L-L)
Class 4	(CVCV)	(H-L)	(L-L)	(L-L)
Class 5	[- ʃĩ #]	(H-M)	(H-M)	(H-M)

Table (3) tonal patterns of verb classes in grammatical environment

This table summarises the organisation into five (5) verbal classes in Abbey based on two criteria: the morphological structure of the root and its tonal behaviour according to grammatical environment (past, present, future).

Class 1: This is the minimal class. It groups monosyllabic verbs (CV structure). Tonally, it is distinguished by a binary opposition: High tone (H) in the past and present vs Mid tone (M) in the future.

Classes 2, 3 and 4: These three classes share the same tonal scheme: (H-L) in the past and (L-L) in the present and future. They differ on the morpho-syntactic level (valency and syllable structure):

Received: 02/08/2026 **Accepted:** 03/09/2026 **Published:** 20/10/2026

- Class 2: Transitive verbs with reduplicated structure $(C_1V_1C_1V_1;)V_{tr}$
- Class 3: Intransitive verbs with reduplicated structure $(C_1V_1C_1V_1;)V_{intr.}$ The opposition between 2 and 3 confirms that transitivity is a classification factor in Abbey.
- Class 4: Simple disyllabic verbs (CVCV).

Class 5: This is the exceptional class marked by the suffix [-ʃi#]. It is tonologically invariable: its scheme (H-M) remains stable regardless of the grammatical context.

A realisational approach will propose the interpretations below (Mambo, 2026, p.4):

(9) a. Class 1:

- [***Tens***: PRE] } → (H) / $V_{[cl-1]}$___/
- [***Tens***: PAS] }
- [***Tens***: FUT] → (M) / $V_{[cl-1]}$___/

b. Class 2, 3, 4:

- [***Tens*** : PAS] → (H-L)/ $V_{[cl-2-4-3]}$ ___/
- [***Tens*** : PRE] } → (L-L)/ $V_{[cl-2-4-3]}$ ___/
- [***Tens*** : FUT] }

c. Class 5:

- [***Tens*** : PAS] }
- [***Tens*** : PRE] } ⟼ (H-M)/ $V_{[cl-5]}$ ___/
- [***Tens*** : FUT] }

These analyses show how tone distributions are involved in Abbey verb inflection. They also reveal the role and the necessity of resorting to approaches like realisational morphology to account for internal organisation of words,

which include prosodic features. The other aspect of these analyses is the elaborations of Realisation Rule which act as the formalisation of inflectional constructions of verbs in abbey. The rules illustrated below account for Abbey verbs inflection and help predict the tonal realisation once their class and their TAM are known.

(10) **Block C** – realisation rules for class 1 verbs

C1. $RR_{C, \{ Tens : PRE \}, VCl\text{-}1}$ $(<X,\sigma>) =_{def} <X^{(H)},\sigma>$

PRE.ve ⇒ vé 'buy'

C2. $RR_{C, \{ Tens : PAS \}, VCl\text{-}1}$ $(<X,\sigma>) =_{def} <X^{(H)},\sigma>$

PAS.ve ⇒ vé 'bought'

C3. $RR_{C, \{ Tens : FUT \}, VCl\text{-}1}$ $(<X,\sigma>) =_{def} <X^{(M)},\sigma>$

FUT.ve ⇒ vē 'will buy'

(11) **Block D** – realisation rules for Classes 2, 3 and 4 verbs

D1. $RR_{D, \{ Tens : PRE \}, Vcl\text{-}2\text{-}4\text{-}3}$ $(<X,\sigma>) =_{def} <X^{(L\text{-}L)},\sigma>$

PRE.bɔbɔ ⇒ bɔ̀bɔ̀ 'resemble'

D2. $RR_{D, \{ Tens : PAS \}, V\ cl\text{-}2\text{-}4\text{-}3}$ $(<X,\sigma>) =_{def} <X^{(H\text{-}L)},\sigma>$

PAS.bɔbɔ ⇒ bɔ́bɔ̀ 'resembled'

D3. $RR_{D, \{ Tens : FUT \}, V\ cl\text{-}2\text{-}4\text{-}3}$ $(<X,\sigma>) =_{def} <X^{(L\text{-}L)},\sigma>$

FUT.bɔbɔ ⇒ bɔ̀bɔ̀ 'will resemble'

(12) **Block E** – realisation rules for Class 5 verbs

E1. $RR_{E, \{ Tens : PRE \}, Vcl\text{-}5}$ $(<X,\sigma>) =_{def} <X^{(H\text{-}M)},\sigma>$

PRE.baʃɪ ⇒ báʃī 'keep'

E2. $RR_{E, \{ Tens : PAS \}, V\ cl\text{-}5}$ $(<X,\sigma>) =_{def} <X^{(H\text{-}M)},\sigma>$

PAS. baʃɪ ⇒ báʃī 'kept'

E3. $RR_{E, \{ Tens : FUT \}, V\ cl\text{-}5}$ $(<X,\sigma>) =_{def} <X^{(H\text{-}M)},\sigma>$

FUT . baʃɪ ⇒ báʃī 'will keep'

Received: 02/08/2026 Accepted: 03/09/2026 Published: 20/10/2026

The realisation rules formalised in Blocks C, D and E constitute the core of the analysis. Block C, dedicated to Class 1 verbs (CV structure: ve), opposes a high tone (H) in the present and past (C_1, C_2: vé) to a mid tone (M) in the future (C_3: vē), illustrating a simple binary tonal alternation. Block D, covers Classes 2, 3 and 4. It exhibits a more complex pattern with a similarity between present and future (D_1 = D_3: L-L, bɔ̀bɔ̀) versus past (D2: H-L, bɔ́bɔ̀). It demonstrates that the same tonal exponent can realise two distinct cells of the paradigm. Finally, Block E, dedicated to Class 5 verbs (baʃɪ), is characterised by total invariance: E_1 = E_2 = E_3 = :H-M (báʃɪ̄ for all tenses). This invariance confirms that the tonal melody (H-M) is lexically associated with the class itself and that tense features are neutralised in this class (in this case, tense distinctions depend on discontinuous tone and syllable distribution (Mambo 2022, p.184-185)). Altogether, the three blocks show that tonal melodies are not just phonological units, but genuine morphological exponents conditioned by both tense features and verb class, which justifies a realisational-based approach.

Conclusion

The evidence examined in this article shows that the traditional conception of morphology as the organisation of contiguous segmental morphemes is insufficient to account for morphological exponence in Kwa languages. The examination of zero morphemes, multiple exponence, and prosodic exponence has revealed systematic deviations from the expected one-form/one-meaning correspondence that

underlies Item-and-Arrangement models. Evidence from a wide range of Kwa and African languages confirms the unavoidable role played by tonal units in morphology. As demonstrated in Sections 2 and 3, grammatical categories such as negation, definiteness, number and tense are frequently realised through tonal, prosodic, featural or discontinuous mechanisms.

The analysis of Abbey provides the decisive argument. As for nouns, Blocks A and B formalise three noun classes: Block A [SING] opposes indefinite to definite, Block B [PLU] captures indefinite vs definite. Concerning verbs, Blocks C, D and E formalise five verb classes in which tense is realised by tonal patterns conditioned by verb class. Block C (Class 1) opposes (H) in present and past to (M) in future (C_1-, C_2 and C_3). Block D (Classes 2, 3 and 4) exhibits syncretism: PRE = FUT = (L-L) [bɔ̀bɔ̀] vs PAS = H-L [bɔ́bɔ̀] (D_1, D_2 and D_3). Block E (Class 5) shows total invariance H-M [bá ʃ̄ī] for all tenses (E_1, E_1 and E_3). This result confirms that tonal melodies are genuine morphological exponents conditioned by morphosyntactic features and verb class.

Altogether, tonal melodies are not phonological epiphenomena but genuine morphological exponents. This study therefore proposes that the morphology of Abbey, and potentially of Kwa languages more generally, is best understood within an inferential-realisational framework that, through Realisational-Rule-based analyses, recognises segmental, non-segmental, tonal and discontinuous exponents as equally legitimate forms of exponence.

Received: 02/08/2026 Accepted: 03/09/2026 Published: 20/10/2026

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