

Parsing morphology: the theory and its implications

Zygmunt Frajzyngier
Dept. of Linguistics, University of Colorado*

Abstract

Most morphological theories assume that a morphological change affects the meaning of a lexical item or indicates a specific relationship of the lexical item to some other lexical items in the utterance. Moreover, for item and arrangement morphology, most theories assume that a given morphological change may have only one lexical category in its scope. Most theories do not envision the existence of an inflectional marker that has different lexical categories in its scope and does not change the meaning of a lexical category. Moreover, no theories of morphology envision inflectional markers that have in their scope other grammatical morphemes. The present study proposes the existence of a morphological marking that differs significantly from the types of marking recognized so far. The main characteristics of this morphological marking are as follows: (1) It is not associated with any specific lexical category and can occur with all lexical categories in the language; (2) the marking may have in its scope derivational and inflectional morphemes; and (3) the marking is not associated with any specific function relating to the specific grammatical or semantic domain. The specific function of this marking is extrapolated each time from the preceding and ensuing material. The

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bulk of evidence for the existence of this type of morphological marking is drawn from analysis of word-final forms in Wandala (Central Chadic). The additional evidence is brought from Slavic languages and from word-initial consonant alternation in Celtic languages.

The parsing morphology has interesting implications for the theories of the structure of utterances, for the encoding of meaning, and for the theories of grammaticalization.

1. Introduction

1.1 Categorical morphology

‘Categorical morphology’ is the type of morphology that has been described in countless grammars of individual languages and in all textbooks of morphology.¹ Fundamental assumptions of categorical morphology are that morphological change affects the meaning of a lexical item undergoing change (Bybee 1985, chapters 2, 3, 4) or that a morphological change indicates specific relationships between one element of the utterance and another element. Typical examples of categorical morphology involve inflectional changes to code person, tense, aspect, number, mood, voice, case, and a host of derivational categories, including derivation of one lexical category from another or derivation of a lexical item within the same category from another lexical item. A frequent outcome of inflectional coding is a paradigm wherein different forms (which may include zero forms) code the same function across categories of person, number, gender.

Within the categorical morphology, the same marker may have different functions in different syntactic frames. The genitive case marker in Polish codes a relationship between nouns in one environment, while in other environments it may code the second argument (‘object’) of a negative predication or the complement of some prepositions.

Spencer 1998 has drawn much-needed attention to morpho-phonological processes, among which he lists apophony, consonant mutation, tone, vowel length, truncation, and subtractive morphology. Although Spencer does not mention it, the important characteristic of morpho-phonological processes, as opposed to item and arrangement morphology, is that even within one language, morpho-phonological processes can carry different functions when applied to different lexical categories. However, a given morpho-phonological process is categorical even if it carries different functions when applied to different lexical categories. Its categoriality rests in the fact that the application of the process to any lexical category carries a specific function confined to that category. Thus a vowel change, when applied to preverbal pronouns in Hausa, codes an aspectual distinction (the specific derivation of these forms is not relevant to the argument advanced):

	Completive aspect	Preterite
1SG	naa	na
2SG.M	kaa	ka
3SG.M	yaa	ya (Newman 2000: 569-571)

Vowel shortening derives proper names from ordinary nouns:

Proper name	Ordinary noun	
Angò	angòò	‘groom’
Azùmi	azùmii	‘month of fasting’
Saabo	saaboo	‘new’ (Newman 2000: 443)

Various types of reduplication in Hausa code a variety of specific functions when applied to various lexical categories:

- When applied to nouns and verbs, reduplication codes nominal or verbal plurality
- When applied to adverbs, reduplication codes intensification
- When applied to adjectives, reduplication codes augmentative
- When applied to numerals, reduplication derives distributives (Newman 2000: 508-509)

The addition of high tone to the directional preposition *da* in Hdi indicates that the ensuing noun is inherently locative, while low tone indicates that the ensuing noun is not inherently locative. The marking is categorical, since with a different grammatical category it marks a specific semantic function:

- (1) *dzà'á dá xdí*
 go PREP Hdi:1SG
 ‘I am going to Hdi’
- (2) *sán dà wá ká*
 hear PREP who 2SG
 ‘at whose place did you hear that?’

High tone on the preposition *tá* indicates that the ensuing noun is an object, while low tone on the preposition *tà* indicates that the ensuing noun is a stative locative complement:

- (3) *ndá ñgh-í tá ptà*
 STAT see-1SG OBJ mat
 ‘I saw the mat’
- Cf.:
- (4) *ndá ñgh-í tà ptà*
 STAT see-1SG PREP mat
 ‘I saw it on the mat’ (Frajzyngier with Shay 2002)

Among morpho-phonological processes, reduction is particularly important for the present study. Spencer 1989 mentions ‘truncation’, treated here as an instantiation of reduction, with respect to proper names such as Michael-Mike, and Patricia-Trish. Morphological reductions are well known in a large number of languages and are by no means limited to proper names, e.g. French *manif* from *manifestation*, *ordi* from *ordinateur* ‘computer’ and *petit dej* from *petit déjeuner* ‘breakfast’. Such reductions appear to be an effect of the frequency of use, resulting in predictability for common lexical items. For proper names, reductions also encode familiarity, as in the French *Véro* from *Véronique*, or endearment, as in the Russian *Ol’* from *Ol’ga*. Such reductions play virtually no role in the grammatical system of the language. The present study

describes phonological reduction as one of the processes of parsing morphology. I shall demonstrate the existence of morpho-phonological reduction that plays an important role across the grammatical system of the language.

1.2 Parsing morphology

Parsing morphology enables the listener to divide the stream of the utterance into various parts, such that the relationships within one part are computed before the relationship between that part and other parts of the utterance is computed. The parts defined by parsing morphology do not have to correspond to phrases, as determined by any aprioristic approach to phrase-structure rules. In parsing morphology, the same morphological process can be applied across different lexical and, as will be demonstrated, grammatical categories. Parsing morphology does not code any one specific semantic function, either by itself or in combination with the category to which it is applied. The number of coding means in parsing morphology appears to be limited to a contrast between two forms. Recall that in categorial morphology the number of coding means applied to a given category may be quite large, e.g., a case system may consist of seven or more distinct markers. Parsing morphology may be of an item and arrangement type or it may be processual as defined in Spencer 1989. Each of the coding means in parsing morphology is an algorithm which, when applied to different lexical categories, subcategories, and grammatical morphemes, marks different relationships among the elements of the utterance. Its function is thus within the realm of inflectional rather than derivational morphology. This type of coding is non-categorial in two senses[†]: (1) The processes or markers may apply across a large number of lexical categories and, most importantly, across a large number of grammatical morphemes; and (2) the outcomes of such applications are not linked to any specific semantic function. In some cases there is no semantic function at all, if we understand a semantic function to be some relationship within the functional domains coded in the language or a relationship within the cognitive system of speakers. Parsing morphology plays a crucial role in the structure of grammars, supplementing other coding means such as categorial morphology, linear orders, lexical categories, and, especially, prosodic means.

The present study provides the evidence for the existence of parsing morphology in a Central Chadic language, Wandala. Every lexical or grammatical morpheme in this language can have the root or root + *a* form in clause-internal position. The evidence for parsing morphology consists of demonstrating that:

Morphological changes involve different lexical and grammatical categories;

Neither of the forms carries one specific function in different environments or constructions.

After providing a description of hitherto-undescribed facts in Wandala, the study provides the argumentation that consonantal mutation in Celtic languages also represents an instantiation of parsing morphology, albeit with completely different formal means.

[†] The double nature of parsing morphology, as proposed in this study, was pointed out to me by Amina Mettouchi. Her observation was instrumental in the framing of this study.

2. Basic information about Wandala

Wandala is a Central Chadic language spoken in the Far North Province of Cameroon and in Northeastern Nigeria. The phonological information provided below is important for the ensuing discussion of the function and grammaticalization of vowel alternations in Wandala.

The language has three underlying vowels, *a*, *u*, and *i*. In addition to these, the phonetic vowels include the high-central vowel, represented for typographical reasons as *ə*, the mid front vowel *e*, and the mid round vowel *o*. The high-central vowel is always epenthetic and occurs in clause-initial, word-initial, and word-internal position. It cannot occur in sentence-final position. The mid vowels *e* and *o* are products of vowel fusion and vowel lowering. In sentence-final position, a lexical item must end in one of the vowels *a*, *e*, or *i*. Which vowel occurs in sentence-final position cannot be predicted from the phonological structure of the word. The three vowels in sentence-final position have, however, different distribution. The only lexical items that have the vowel *i* in sentence-final position are a few nouns that appear to be relatively recent borrowings from Fula (West Atlantic, Niger-Congo, a vehicular language of Northern Cameroon). The vowel *e*, particularly important for the argumentation to follow, occurs predominantly at the end of adjectives, numerals, and some pronouns, where it may well represent a morpheme deriving these lexical categories. With respect to verbs, the vowel *e* is demonstrably a derivational marker, indicating the separation of the subject or the object from the source. Comparative data from other Central Chadic languages support this hypothesis. In Hdi, the verbal extension *i* codes a separation of the object from the source (Frajzyngier with Shay 2002). The sentence-final ending *i* in Hdi corresponds to the sentence-final ending *e* in Wandala.

<i>tsè</i>	‘rise’, ‘leave’
<i>fyè</i>	‘peel, take the bark of a tree, take a page out of many’
<i>plè</i>	‘detach’
<i>tàsè</i>	‘husk’ (separate grains from their cover)
<i>hè</i>	‘crush grains’ (which results in separation of parts), but not yam, whose pounding does not result in the separation of the parts!

Such well-defined lexical and semantic classes point to two different functions of the vowel *e*. One is a derivational morpheme that derives verbs of separation, and the other is a derivational morpheme that derives adjectives, numerals, and some pronouns. There are also a dozen nouns that have the vowel *e* in sentence-final position. These nouns do not display any other common semantic or phonological properties:

<i>ʔàkáté</i>	‘friend’
<i>zàhè</i>	‘snake’
<i>áfkè</i>	‘forehead’
<i>láhè</i> ,	‘song’
<i>gyálè</i>	‘girl’
<i>bùcè</i>	‘mat’

These nouns may be considered to end in the historically high-front vowel *i*, as the vowel *e* is not otherwise an underlying vowel in Wandala. Given that the vowels *a* and *e*

(</i>) occur in sentence-final position (and also in citation forms), one may conclude that both vowels are part of the underlying representation.

Lexical items ending in *a* in sentence-final position include the overwhelming majority of nouns and verbs and a host of grammatical forms, including some determiners, the negative marker, and one numeral.

In all aspects but one, the pragmatically neutral affirmative verbal clause in Wandala has the form Subject pronoun Verb (Q/NEG) (Noun phrase) (Prep Phrase), where Q represents a content question word and NEG represents the negative marker. While the subject pronoun is obligatory, the noun phrase or the prepositional phrase that follows the verb is not. The distinction between subject and predicate in equational clauses, which have no copula in Wandala, is marked by the relative order of noun phrases, the first noun being the subject the second noun being the predicate. The subject pronoun is not a prefix, as it can be separated from the verb by other material. The verb may be followed by a negative marker or by a content question marker. A single noun phrase can follow the verb or the negative or content question marker, if those are present. Such a noun phrase can be either the subject or the object. The verb cannot be followed by two noun phrases, i.e. the subject and object. The clause may have two noun phrases only if one noun phrase precedes the verb for topicalization or some other pragmatic function that requires the placement of an argument in clause-initial position. In negative clauses and in one aspect (perfect), the subject pronoun is suffixed to the verb.

Many grammatical and semantic relations between the predicate and noun phrases and between the components of the noun phrase are marked by the inflectional morphology consisting of contrast between two forms and applying across all lexical and grammatical morphemes.

3. The morphology of the two forms

In clause-internal position, every morpheme, whether lexical or grammatical, can occur in the root form or the root + *a* form. Forms that end in *e* in sentence-final position can also end in *e* in clause-internal position. Forms ending in a consonant (followed by an epenthetic vowel, if phonological conditions require) are referred to as ‘root forms’. The form with the vowel *a* is called the ‘root + *a* form’. The root form consists of all unpredictable segments, i.e. it consists of the underlying structure minus the sentence-final vowel. The following table represents the clause-internal and clause- or sentence-final alternations (C represents the last consonant of the lexical or grammatical marker):

Sentence-final and citation form	<i>Ce</i>	<i>Ca</i>
Clause-internal	C + <i>a</i> , C (epenthetic vowel)	C + <i>a</i> , C (epenthetic vowel)

One needs to resolve the question of derivation of the clause-internal and clause-final forms. The most frequent approach in Chadic linguistics is to consider the clause-internal forms as representing the reduction of pre-pausal forms (Mafa (Barreteau and Le Bléis 1990), Hausa (Newman 2000), Hdi (Frajzyngier with Shay 2002), Mina (Frajzyngier, Johnston, with Edwards 2005), and Gidar (Frajzyngier 2008)). This

approach would correctly derive the clause-internal root forms, but not root + *a* forms or forms ending in the vowel *e*. Here is an illustration of the derivation of the root forms. The noun *làhè* (sentence-final form) ‘song’ has the clause-final form *làh*:

- (5) *ágdzà nà á blà làhè*
 child DEM 3SG sing song
 ‘The child sings the song.’[‡]
- (6) *làh yánnà mú stà-rà*
 song DEF FOC DEM-Q
 ‘This song is how?’ [‘How does the song go?’]

The question word for the inanimate entity *wè* (sentence-final form) ‘what’ can have the root form *w* in clause-internal position:

- (7) *ábáyánè kòndáyǵù kòbíunà*
á bá yànnè kò nd-á-n gè w
 3SG say 3SG 2SG say-GO-3SG TO what
kò bwá nà
 2PL two DEM
 ‘He says, “Why do you say the two of you?”’
- (8) *máfàtǵrm skùwámhùdávà*
má fà-tǵr-m skù w á-m hùd-á vwà
 HYP put-3PL-IN like what PRED-IN belly-GEN body
 ‘What should one put into their bodies?’

Compare the sentence-final form *wè*:

- (9) *tà sá wè*
 3PL come:GO what
 ‘what did they bring?’

[‡] A capital letter at the beginning of the translation line in Wandala examples indicates that the example is drawn from the natural discourse. A lower-case letter indicates that the example is elicited, most often on a pattern of a similar natural discourse examples. The first line of an example consists of the transcription, reflecting pauses and vowel deletions. A characteristic of Wandala is that a word or a grammatical morpheme can be broken up in such a way that one part is a component of the preceding unit and the second part constitutes a unit of its own or is a part of the following unit. The boundaries are mainly pauses, but some may be intonation units. The mechanics of the division of words or morphemes is not clear. I suspect that it has to do with the metrical rhythm characteristic of utterances, but that remains to be studied.

Some clause-internal forms are derived through the addition of the vowel *a* to the root, as evidenced by the fact that the forms that end in the vowel *e* in sentence-final position can end in the vowel *a* in clause-internal position, as is the case with the adjective *úmlè* ‘another’:

- (10) *ɔ̀kɛ́-úmlè*
 cow-another
 ‘another cow’

In the sequence Adjective-Noun the adjective ends in the vowel *a*, even though the adjective ends in the vowel *e* in sentence-final position:

- (11) *úml-à kɛ́*
 another-*a* cow
 ‘another cow’

The question word *wè* may have the clause internal form root + *a* form:

- (12) *kái kándángwà kónà*
kái ká ndá-n gɔ̀ wà kà únà
 EXCL 2SG say-3SG TO what 2SG DEF
 ‘hey, why do you say this?’

Morphemes, whether lexical or grammatical, that have *a* in sentence-final position can also have the root + *a* form in clause-internal position, e.g. the verb *kɔ̀kɛ́* ‘count’ and the noun *kùlà* ‘calculus’:

- (13) *mábà kɔ̀kɛ́ kùlà wá ájìyù kɔ̀gìyà*
má bà kɔ̀kɛ́ kùlà wá
 HYP FOC count calculus COM
à jì-y-ú k gɔ̀ ìyà
 3SG surpass-1SG-VENT NEG TO 1SG
 ‘If it concerns counting, nobody surpasses me.’

Grammatical morphemes can also display the alternation C (root), *Ce* and *Ca*, as illustrated below for the marker *s*, which indicates movement away from the source (‘source extension’). This marker has the sentence-final vowel *e*, as it involves separation from the source (recall that verbs involving separation end in the vowel *e* in sentence-final position):

- (14) *tà tɔ̀gà-n-sé*
 3PL distribute-3SG-S
 ‘they shared among themselves’

In clause-internal position, the marker can have the root form [s], which may be followed by an epenthetic vowel:

- (15) *tànábàhàl-sà á dóm hùdá bùhá ǰàbádàlyè*
tà nábà hál-sà á d-á-m hùd-á bùhá ǰàbè
 3PL then gather-S PRED go-IN belly-GEN sack yet
á dàlyè
 PRED again
 ‘They gathered [the sesame off the mat] into the sack again.’

The source extension can also have the root + *a* form (high tone on the marker *a* is a characteristic of forms preceding content question markers):

- (16) *à mbà-n-sá wàr léy nà*
 3SG teach-3-S:PB[§] who writing DEM
 ‘who taught him how to write?’

The fact that the distinction between root and root + *a* forms can have grammatical morphemes in its scope underscores the distinction between categorial and parsing morphology. In categorial morphology, inflectional markers undergo only phonologically conditioned changes, each of which is represented by an allomorph. In Wandala, grammatical morphemes may or may not undergo further morphological changes to indicate how a given form should be interpreted in connection with the ensuing material.

One could ask whether the facts described here properly belong to the domain of morphology rather than phonology. The justification for their inclusion in morphology is straightforward. One of the means described above, viz. phonological reduction, is not predictable from any other factors in the utterance. Although phonological in nature, it is not motivated by the inherent structure of the lexical item. The other means, the addition of the vowel *a*, does not differ in its mechanics from other morphological means involving addition. Both phonological reduction and addition provide information about how to interpret a given lexical item, and hence perform a function similar to that of other morphemes. The two means are thus as much part of the morphology as any other morpheme or morphological process.

4. Functions of the two forms

The fundamental question is what are the functions of the root form and the root + *a* form. Since neither form indicates by itself a specific relation to a specific element in the utterance, to any specific element in reality, or to any specific element in a cognitive system, and since these are not part of any semantic domain encoded in the language, the functions of the two forms must lie in a realm other than those covered by categorial morphology.

[§] I gloss the form *a* as PB for ‘phrasal boundary’, reflecting an assumption, to be justified later in this study, that the form has grammaticalized from a clausal boundary marker.

4.1 Hypotheses

The two forms constitute algorithms, i.e. instructions as to how to interpret a sequence of lexical and grammatical items within the utterance. The algorithms divide the utterance into various parts (hence the term ‘parsing’), which allows for the interpretation of the relationships within the utterance. Coding of specific relations is not the function of the algorithms, nor is it the primary motivation for the existence of the formal means. The algorithms state which parts of the utterance should be interpreted first, before their relationship with other parts is taken into consideration. The two algorithms have in their scope a large variety of lexical and grammatical morphemes, both free and bound.

The use of the root form of a lexical or grammatical item indicates that the ensuing material should be interpreted together with the preceding material before the role of the whole phrase in a larger part of the utterance is taken into consideration. To rephrase: A lexical or grammatical item in the root form should first be interpreted in the context of what **follows** (and includes) the root form, while the root + *a* form should first be interpreted in the context of what **precedes** (and includes) the root + *a* form. This admittedly broad functional distinction between the two forms constitutes a foundation of the syntax of Wandala. As demonstrated further in this study, the two algorithms do not coincide with any preconceived notion of phrase structure rules, nor do they coincide with the distinctions between head and dependent marking.

The root algorithm implies that what follows is expected, given the lexical and grammatical properties of the lexical or grammatical item having the root form. The root + *a* algorithm implies that what follows is not the expected follow-up or does not belong to the preceding phrase. The functions that can be inferred from the two algorithms include, but are not limited to, grammatical and semantic relationships between the predicate and noun phrases; relationships between the predicates and adjuncts; relations between the noun and its modifiers; modal functions; pragmatic functions including topicalization and focus; and distinctions between the adverbial phrase and the topicalization phrase. The two algorithms are thus the fundamental coding means within the grammar of Wandala.

The evidence for the hypotheses is organized as follows. I first describe the use of the root form and demonstrate in what ways the material that follows the root form may be considered to be expected, given the categoriality of the root form and its narrower semantic properties. I then proceed to discuss the use of the root + *a* form and to demonstrate in what ways the material that follows the root + *a* form is, in comparison to the material that follows the root form, a less-expected follow up.

4.2 Evidence for the function of the root algorithm

What follows are the major conditions where the root algorithm is applied.

4.2.1 Prepositions before the noun phrase

Prepositions always occur in the root form, because they are always followed by their complements. There are no instances of prepositions not followed by a noun phrase in Wandala (‘preposition stranding’, as known in English, is not allowed):

- (17) *nóŋwá nè yénjátwáfká pàtrònrwà*
nó ŋàné yá njà á tù wáfk-á
 PRES 3SG 1SG sit PRED before face-GEN
patron-á-rwà
 boss-GEN-1SG
yá šà-tr-ú gə̀ žámá
 1SG speak-3PL-VENT TO population
 ‘Here I sit in front of my boss. I speak to people.’ (the vowel *u* of the preposition *tù* is epenthetic, determined by the labial glide in the next morpheme)
- (18) *tà hál-s-á-m bùhá yánnà*
tà hál-s á-m bùhá yánnà
 3PL gather-S PRED-IN bag DEF
 ‘They gathered the bag.’ (the sentence-final form of the preposition *m* is *mè* (as extrapolated from the form of the question word *mé* ‘where’))
- (19) *yò ágdzè kínnànízùŋwé bàtánmàtà tàrà màrà árg dàdà*
yò ágdzè kínnà-ní zùŋwé bà t-án
 hence child C.FOC-INTENS first of all FOC 3PL-ASSC
màtà tàr á màrà á r g dàdà
 attach 3PL PRED mother PRED ON TO father
 ‘And therefore, as for the daughter, she is more attached to her mother than to her father.’

4.2.2 Root form of nouns before adjectives

Nouns have the root form before adjectives. The order Noun-Adjective is the default order for some adjectives:

When the adjective follows the head noun, the head noun has the root form:

- (20a) *krə̀ nàmlàkè* ‘dirty dog’
krə̀ dónwè ‘black dog’
krə̀ dzàyé ‘white dog’
- (20b) *ágdzər žílé* [pause] *má ndàvə̀ndà və̀ mùksè*
ágdzər žílé má ndàvə̀-ndàvə̀ mùksè
 child boy HYP ask-ask girl
 ‘A young man, if he asks for a woman,’

For another class of adjectives, the default order is Adjective-Noun. In that order, the adjective has the root + *a* form:

- (21) *ámjùgwà mùksè/žílé/ lvà*
 old woman/man/word
 ‘an old woman/man/word’
- gdzà gyálè*
 ‘a young girl’

m̀dìgwá l̀v̀à
'an old word'

m̀dìgwà gyáalè/ d̀awàlè
'an old girl/man'

Possessive pronouns, just like nouns, have the root form before adjectives:

- (22) *m̀áà k̀àtə̀j̀àr̀úmlè*
m̀á t̀àk̀àtə̀ j̀àr̀ úmlè
HYP fellow 3SG another
'or [with] one of his buddies'

4.2.3 Verbs have root forms before adverbs

Verbs have the root form before adverbs modifying the verb. This is the expected, default function of adverbs. Consider the verbs *ptsà* 'return', *hàlà* 'gather' (all citation forms) before the adverbs *ḡàbè* 'again', *šágrà* 'well', and *bàdé* 'for nothing':

- (23) *t̀á pts̀ə̀ ḡàbè á d̀ám gyàk̀àrà*
3PL return again PRED go:IN cemetery
'they return/are returning again to the cemetery'

Similarly with adverbs of manner:

- (24) *t̀à h̀ə̀rdə̀ šágrà/bàdé*
3PL farm well/for nothing
'they farmed well/for nothing'

- (25) *àlhámdùliláhi m̀aná b̀ə̀ḡàl m̀áḡàrà*
àlhámdùliláhi m̀á nábà ḡàl m̀áḡàr
May God be praised (Ar) 1INCL then depart now
'May God be praised. Now we can go.'

- (26) *ḡóḡə̀ m̀ə̀ḡàrà*
finish:VENT-finish now
'That has finished now.' [about an end of a story]

Compare the same verb in the sentence-final position when it ends in the vowel *a*:

- (27) *àlhámdùliláhi m̀aná b̀ə̀ḡàlà*
àlhámdùliláhi m̀á nábà ḡàlà
May God be praised (Ar.). 1INCL then depart
'May God be praised. We can go.'

- (28a) *má šá-p-tə-šè/ə* *cəkwá ɲgùdì*
má šá-p-tə-š *cəkwá ɲgùdì*
 HYP find-APPL-T-find a little bit
 ‘If she is a little bit free . . .’

The verb cannot end in the vowel *a* before a modifying adverb:

- (28b) **má šá-p-tə-šà* *cəkwá ɲgùdì*
 HYP find-APPL-T-find a little bit
 ‘If she is a little bit free ...’

There are a few verbs in Wandala that have an underlying final vowel *a*. The form that receives the vowel *a* in the root + *a* form, has an epenthetic glottal continuant inserted between the final vowel of the verb and the suffix *a*. This is the case with the verb *ndàhà* ‘talk’. These verbs retain the verb-final (root) vowel before adverbs:

- (29) *tà ndá ʒàbè/ šágrà/bàdé*
 3PL say again/well/for nothing
 ‘they said again/well/for nothing’

When elements other than the verb precede an adverb that modifies the verb, such elements end in the vowel *a*. An adverb is not a natural follow-up after a noun or a determiner. Thus ‘father’ is *dàdà* (sentence-final form) rather than *dàdə* (the root form) and the definite marker is *ɲánnà* (sentence-final form) rather than *ɲánnə* (the root form):

- (30a) *ée àbàdàdàʒàbádàlyè ámúvgəɲánnà*
ée à bà dádà ʒábá dàlyè á-m úvgə
 eh, 3SG say father again again PRED-IN grave
ɲánnà
 DEF
 ‘And the father in the grave said again,’

- (30b) *əgdzə ɲánnà blà làhɲánnà ʒábá dàlyé*
əgdzə ɲánnà à blà làh ɲánnà ʒábá dàlyé
 child DEF 3SG send song DEF again again
 ‘The child sings the song again.’

The punctual extension *hè* (the sentence-final form) has only the root form (with an epenthetic vowel) before an adverb. The extension is part of the verb:

- (31) *tà ptsə-hó ʒàbé á də-m gɲàkàrà*
 3PL return-PNCT again PRED go-IN cemetery
 ‘they returned again to the cemetery’

The ventive extension *wà* (sentence-final form) has the root form before the adverb *hwà* (citation form) ‘outside’. The adverb itself has the root form, realized as *hù*, before the interrogative marker *mtù* ‘or’:

- (32) *kàdúhùm tù*
kà dúw hw mtù
 2SG go:VENT outside or
 ‘Did you go anywhere?’

The borrowed noun *làrúsà* ‘marriage, bride’ ends in a consonant before the rhetorical question marker *kwà*. The rhetorical question marker *kwà* in turn has the root form before the adverb *màḡàrà* ‘finally’, which modifies the whole clause:

- (33) *yó ásòhára làrúskùmàḡàrà*
yó á sà-w hár-á làrús
 well 3SG come-VENT day-GEN marriage
kw màḡàrà
 RQ now
 ‘Well, there finally comes the day of the marriage.’

4.2.4 Root forms before prepositions

All lexical categories have the root form before prepositions. Recall that the structure of the pragmatically neutral clause in Wandala is Pro Verb NP (PP). Although a prepositional phrase can be added to any clause and cannot be said to be expected, its presence does not contradict the expectations created by the preceding material. There are no prepositional phrases in clause-initial position:

- (34) *à bàrdá-n-ú ḡín gè málm-á-rà*
 3SG pull out-3SG-VENT peanuts TO teacher-GEN-3SG
 ‘he pulled out peanuts for his teacher’ (from somebody)

Compare the noun *ḡínà* ‘peanuts’ in the sentence-final position:

- (35) *à dá bàrdà ḡínà*
 3SG FUT pull peanuts
 ‘it/he will grab peanuts’

Similarly, the noun *vwà* ‘body’ (citation form) has the form *vù* (a product of the change of the labial glide to the high round vowel (after deletion of the underlying final *a*) before a preposition):

- (36) *táfà-nmámvù gèdàdà táfà-nmámvù gèmàmà*
tá fà-n-m á-m vw gè dàdà
 3PL put-3SG-IN PRED-IN body TO father
tá fà-n-m á-m vw gè màmà
 3PL put-3SG-IN PRED-IN body TO mother
 ‘They announce to the father, they announce to the mother.’

The negative marker *kà* (sentence-final form) has the form *k* (with an epenthetic vowel) preceding a preposition:

- (37) *mábà kə̀ʒà kùlà wá ájìyù kə̀gìyà*
má bà kə̀ʒà kùlà wá
 HYP FOC count calculus COM
à jì-y-ú k gə̀ iyà
 3SG surpass-1SG-VENT NEG TO 1SG
 ‘If it concerns counting, nobody surpasses me.’

The source extension *s* has the root form before the human locative marker *z*. The phrase with the human locative marker occupies the same position as the prepositional phrase:

- (38) *tá ptsà-sə́ z-rùwà*
 3PL return-S HL-1SG
 ‘they return to me’

4.2.5 Root form of verbs before objects

The root form of a transitive verb in the perfect aspect indicates that the following noun phrase is the object. The object is the expected follow-up for a transitive verb. As we will see in the next section, the subject is not the expected follow-up for transitive verbs, and the grammatical relation subject is coded by different means for such verbs:

- (39a) *yò dīkdī zárvàŋánnà kīnī*
yò dyà-k-dyì zárvà ŋánnà kīnī
 well know-2SG-know sesame DEF C.FOC
 ‘You know sesame, don’t you?’ (the form *dyì* ends in an epenthetic high front vowel added to the root *dy*)

- (39b) *má šá-n-šə́ gdzà šúngù*
 HYP find-APPL-T-find small:PB money
 ‘if she found a bit of money . . .’

Grammatical morphemes suffixed to transitive verbs have the root form before the object as well:

- (40) *àmá áfàrùksòŋwìrè gə̀ddàdà*
àmá á fà-r ùksòŋw ìrè gə̀ ddàdà
 but 3SG put-ON idiot head TO father
fàr ùksòŋwìrè gə̀màmà
á fà-r ùksòŋw ìrè gə̀ màmà
 3SG put-ON idiot head TO father
 ‘He makes an idiot of the father, he makes an idiot of the mother.’

Compare the root + *a* form of the same morpheme to indicate that the ensuing element is the subject:

- (41) *əgdz-á-rwà* *à* *ptsà-rà* *ǰágǰágì*
 child-GEN-1SG 3SG return-ON:PB fever
án *vàdǰyá*
 ASSC night
 ‘... the fever returned to my child at night’

The negative existential predicate *ǰákà* ‘there is not’ has the root form before a noun. Hence, the single argument of this predicate is marked in the same way in which the object of a transitive verb is marked. The following example contains also the evidence that the negative existential ends in the vowel *a* in sentence-final position:

- (42) *ǰá* *kùrtátàttàyà* *à* *júg-íyì* *ǰákà*
ǰák *ùr* *tà* *tàttàyà* *à* *j-ú* *g-íyà*
 NEG.EX person 3PL search 3SG surpass-VENT TO-1SG
ǰákà
 NEG.EX
 ‘One does not look for a person to surpass me.’ (lit. ‘there is no person that one may look for to surpass me’)

If one considers the fact that the default, i.e. expected, argument of the negative existential predicate is the entity whose existence is being negated, then the root form of the negative existential predicate is fully justified. The grammatical relation of the single argument of the negative existential clause is irrelevant as far the form of the predicate is concerned.

Recall that grammatical morphemes are as much in the scope of parsing morphology as lexical items. Thus, the root form of the source extension *s* indicates that the following question word *wè* ‘what’ is the object rather than the subject (the form *sú* below contains the epenthetic *u* inserted in front of a labial glide):

- (43a) *mándà súwèe kìnì* *əgdzárwá* *áǰipǰyè* *káǰàbè*
má *á* *ndà-s* *wèe* *kìnì* *əgdz-á-r* *wá*
 HYP 3SG say-S what C.FOC child-GEN-3SG COM
á *ǰì-p-ǰyè* *ká* *ǰàbè*
 3SG accept-APPL-accept NEG again
 ‘whatever he says, his child should accept, shouldn’t she?’

Compare the root + *a* form of the extension before the subject:

- (43b) *tà* *ndà-s-à* *nwáǰà*
 3PL speak-S-PB women
 ‘women talked’

The root form of an object pronoun suffixed to the verb indicates that the ensuing noun phrase is an object. The second-person singular object pronoun has the form *kà* in sentence-final position, and the form *k* to indicate that the following noun phrase is an object. (The noun has the root form plus an epenthetic *i*, before the ensuing adjective):

- (44) *yé šà-k úyì cùkwá ngùdì*
 1SG tell-2SG story small small
 ‘I will tell you a short story’ (*úyà* ‘story’)

The root form of an inherently intransitive verb that has been transitivized by means of an object pronoun indicates that the ensuing noun phrase is an object:

- (45a) *ḡà-r-ná-ḡḡ lvá hàrdā*
 finish-3PL-3SG-finish business farming
 ‘when they finished farming’

Adding a final *a* to the transitivized verb with a noun phrase following it yields an ungrammatical utterance:

- (45b) **ḡà-r-ná-ḡḡ lvá hàrdā*
 finish-3PL-3SG-finish:PB business farm
 for ‘when they finished farming’

The ending *a* on the intransitive verb *ḡà* ‘finish’ indicates that the ensuing noun phrase is the subject:

- (46) *àstùwá ḡóḡà nàrwàndzàḡánnà*
àstù wá ḡóḡà nàrwàndzà ḡánnà
 like that COM finish:PB story DEF
 ‘Like that finished this story.’ (*nàr-wà-ndzà* ‘language-mouth-past’)

4.2.6 Root form of morphemes before the focus marker

Focus on any element can be marked by the particle *bà* preceding the element. The focus phrase may occur in clause-internal position. Lexical and grammatical categories preceding the focus phrase have the root form. The explanation for the root form is that the focus phrase is not an unexpected component of the clause in that it does not contradict the expectations created by the preceding material. In the following example, the verb *màgà* ‘do’ occurs in the root form before the focus marker:

- (47) *bà nàzù nà nî á ḡàbà nánkàa*
bà nàzù nà nî á wàyà-ná
 FOC what DEM INTENS PRED love-3SG
gdzèr ná
 child DEM
á màgà bà ḡán kàa
 3SG do FOC DEF NEG
 ‘Whatever the girl wants, that’s what is going to be done, isn’t it so?’

The ventive extension *w* has the root form before the focus marker *bà*:

(48) à **ǰú** bà s-t-wà
 3SG finish:VENT FOC DEF-DEF-DEF
 ‘it ended like that’

*à/á **ǰùwà** bà s-t-wà
 3SG finish:VENT:PB FOC DEF-DEF-DEF
 ‘it ended/ends like that’

4.2.7 Root forms of nominalized verbs before the predicate

Verbless clauses with nominal and adjectival predicates have the structure Nominal subject-Predicate, hence their order is quite different from that of verbal clauses. The subjects of such clauses, whether nominal or pronominal, have the root form:

(49a) **mùksá** sùppléyè
 woman butter
 ‘The woman is butter.’ [i.e., she melts easily, a saying] *mùksé* ‘woman’

(49b) **tàrdádá** **mámá** **ántàrgdzá** **tàrǰílé**
tàr **dádá** **mámá** **ántàr** **gdz-á-tàr** **ǰílé**
 3PL father mother CONJ child-GEN-3PL male
 ‘They are the father, the mother, and their son.’ (*tare*: 3PL)

The root form of the noun in the subject function is justified by the fact that in verbless equational clauses the subject precedes the predicate. The root + *a* form or the sentence-final form of the noun would indicate topicalization of the subject.

4.2.8 Root form before another clause in the same sentence

Lexical items and grammatical markers have the root form before a paratactic or a complement clause. The root ending ensures that the clause that follows is interpreted as a sequential clause or as a complement of the preceding clause rather than as another sentence in the narrative. The sentence-final form of lexical items would indicate that what follows is another clause in a narrative or discourse. Thus, the root form and sentence-final form distinguish between a clause boundary within the same sentence and a sentential boundary:

(50) **mávà** **cátànà** **hárbò** **kífyé**
má **vácíyà** **tè-nà** **háre** **bwà** **kífyé**
 HYP time DEF-DEM day two three
 ‘After some time, two or three days,’

tátsàtá **dúǰàbè**
tá **tsà** **tá** **d-úw** **ǰàbè**
 3PL get up 3PL go-VENT again
 ‘they get up, they go there again.’

The verb has the root form when it precedes the hypothetical marker *má*, which is at the beginning of the complement clause (the first reduplicant ends in *à*, the form all first reduplicants take before pronouns other than the first-person pronoun):

- (51) *mákí dàrá dè má tándá vágdzà gyálè*
má-kí dà-r-á-dè má tá ndávà
 HYP-? go-3PL-GO-go HYP 3PL ask
ágdzà gyálè
 young girl
 ‘When they arrive, they ask for the girl.’

4.2.9 Root form of the head of a relative clause before the subject of the clause

The head of a relative clause has the root form to indicate that the ensuing clause is the comment on the head. The root form before the relative clause is consistent with the ending preceding embedded clauses within the same sentence. The relative clause is in contrast with the comment on topic, where the topicalized element has the root + *a*:

- (52) *nàrwàndzè tà sà-nétàr nà*
 story 3PL come-3SG:3PL DEM
 ‘the story they brought’ (*nàrwàndzà* ‘story’)

- (53) *ágdzà-r-zálá kìnìúmlùwàyàrwàyà*
ágdzàr zálá kìnì úml wàyà-r-wàyà
 child male C.FOC other want-3PL-want
bákà dàbàryàrà
bákà dàbàrì-á-rà
 NEG.EX means-GEN-3SG
 ‘Boys, there are some who want [to marry], but they have no means.’ (*úmlè* ‘other’; sentence-final form)

4.2.10 Root form before a conjunction

Lexical items preceding a conjunction occur in the root form, as a conjunction is an allowed follow-up of any preceding clause. The noun *žílé* ‘man’ (citation form) has the root form before a conjunction:

- (54) *tá pwám̀bà ɣánnà gə̀bákìrà žíłmtú*
tá pwà á-m mbá ɣánnà gə̀ bák
 3PL pour PRED-IN home DEF TO NEG.EX
ìr-á žíl mtú
 head-GEN man or
 ‘They [the girls] loaf around the house because of the absence of a man,’

áɣkwè žíłmtú wàyàrkàbéetàrèè
áɣkwè žíl mtú wàyà-r kà bà ítàrèè
 exist man or love-3PL NEG FOC 3PL
 ‘or else, there is a man, but they [the girls] don’t like [him].’

4.2.11 Root form before the negative marker

Lexical items and grammatical morphemes have the root form before the negative marker. The reason for the root form is that the negative marker negates the preceding predication and is therefore a natural follow-up. The following example illustrates the use of the root form of the verb *ɣyìyà* ‘extract’:

- (55a) *ká ɣyì mtù ká ɣyì kà hè*
 2SG extract OR 2SG extract NEG Q
 ‘are you extracting or you are not extracting’

Compare the affirmative clause, where the verb ends in the vowel *a*:

- (55b) *á ɣyà šúŋgù*
 3SG extract money
 ‘he extracts money’

4.2.12 Auxiliaries before main verbs

Auxiliaries that precede main verbs have the root form. The main verb is the only possible follow-up after the auxiliaries:

- (56) *á dǎ žàgàdá gdzrè*
 3SG FUT escape child
 ‘the child will run away’

4.2.13 Root forms before determiners

Determiners follow the noun in Wandala. Hence, the root form of the noun before a determiner indicates a natural follow-up. Verbs end in the root form before a determiner whose scope is the whole clause:

- (57) *áppàkúmdǎnàní wàtsǎmàgàrǎnkǎ itǎrníyà*
áppàkǎ mdǎ nǎ ní wàtsǎ
 wait:IMP people DEM INTENS FUT
màgà-rǎ-n-kǎ-itǎr
 make-3PL-3SG-NEG-3SG
sǎkátà gdzǎnàní kǎvá tǎrtǎvǎnǎ
níyà sǎ kátà gdzǎ-nǎ ní kǎ
 desire come ask child:GEN-2SG INTENS 2SG
vǎ-tǎr-tǎ-vǎ nǎ
 give-3PL-T-give DEM
 ‘Wait then until those who have no desire to come to ask for your child, it is to those people that you will give her.’

- (58) *álvàŋánnà nóyéšíná wá*
álvà ŋánnà nó yé ší ná wá
 matter DEF PRES 1SG tell DEM COM
á dābà yìyékní yètápántàp káràrà cìkwángùdī
á dābà ìyá kní yè tàpá-n-tàp kár-á-rà
 because 1SG C.FOC 1SG taste-3SG-taste fire-GEN-3SG
cìkwángùdī
 a little bit
 ‘The reason I am telling you, is because I myself tasted its fire a little bit.’

4.2.14 Summary of the functions subsumed by the root form

Circumstances in which only the root form is used:

- Spatial specifiers and prepositions that obligatorily precede the noun in locative predication
- Auxiliaries, including the future tense marker *dá* and sequential marker *dà*, both of which immediately precede the verb
- All lexical categories before the disjunction *mtù* or the hypothetical marker *má*
- Inherently transitive or transitivized verbs before their objects in the perfective and perfect aspects
- Nouns before adjectives and determiners
- All lexical categories before complement clauses
- Verbs before adverbs of manner (but not before other adverbs)
- All lexical and grammatical categories before a sequential or an embedded clause
- Nouns before a conjunction

In all of these cases, the root form is followed by an element that is not unexpected for given the lexical and grammatical properties of the category that occurs in the root form.

5. Functions coded by the root + *a* form

The general function of the root + *a* form is to indicate that what follows should be interpreted after all other root forms used in the preceding material have been interpreted. Most often, the element that follows the root + *a* form is not the expected, natural follow-up of the lexical category and subcategory to which the form *a* is added.

5.1 Subject pronouns that precede the predicate

Subject pronouns that precede the verb always have the root + *a* form. In the present tense, the pronoun has high tone. In the past tense, the pronoun has low tone. One may claim that in the order Subject pronoun-Verb there is no motivation to indicate that the verb is not the expected follow-up of the subject pronoun. That, however, may not necessarily be so. Subject pronouns occur in clause-initial position in some aspects and in post-verbal position in other aspects. If the default form is taken to be the form in which subject pronouns follow the verb, then the position before the verb is not the expected one. In a related Central Chadic language, Hdi, subject pronouns are suffixed to verbs in all aspects (Frajzyngier with Shay 2002). Hence, the subject pronoun

preceding the verb may reflect a variant of the default form, potentially related to topicalization (topicalization in Wandala requires the root + *a* form, as shown later in this section):

- (59) *tá kkə̀ʒà tá kkə̀ʒà tá kkə̀ʒà mbàtè tà bə̀ɣyì*
tá kkə̀ʒà tá kkə̀ʒà tá kkə̀ʒà
 3PL count 3PL count 3PL count
 ‘They count, they count, they count,’

mbàté tà bə̀ɣyì bà jírè lisáfyà
 indeed 3PL find FOC true number (Ar.)
šilyà zàrvà pállə̀ báakà
šilyà zàrvà pállə̀ báakà
 sand sesame one NEG.EX
 ‘and they found that indeed it is true that one of their sesame seeds is missing.’

- (60) *sèyádətàttàyà yéssánsə̀ sábiná*
sèi yá də̀ tàttàyà yá s-á-n-sə̀-sè
 then 1SG FUT search 1SG come-GO-3SG-S-come
á b-inà
 3SG say-3SG
 ‘‘I will search, I will get it out, and bring it back,’’ he said.’

- (61) *kàdúhùm tù*
kà dúw hw mtù
 2SG go:VENT outside or
 ‘Did you go anywhere?’

Question words that end in the vowel *e* in sentence-final position end in the vowel *a* when they precede the verb:

- (62) *wàrà žàgàdè*
wàrà á žàgàdè
 who:PB 3SG run
 ‘who is running?’

5.2 Topicalized noun phrases

Topicalized noun phrases end in the root + *a* form regardless of what morpheme occurs at the end of the noun phrase. The clause-initial position of the noun phrase is not expected, hence what follows it cannot be expected either. Here is an example with the definite marker in root + *a* form at the end of the noun phrase:

- (63) *yó əlv wándəl ηánnà à fyàrà málrùwà* [error]
yó əlv wándəl ηánnà à f-y-àr-à
 well speech Wandala DEF 3SG put-1SG-ON-PB
mál-rùwà
 older brother-1SG
 ‘This Wandala speech is imposed on me by my older brother.’

Compare the definite marker in the root form before the contrastive focus marker:

- (64) *mábámhùdáyéw yánnè kìnì*
má bà á-m hùd-á yáw yánnè kìnì
 HYP FOC PRED-IN belly-GEN water DEF C.FOC
 ‘Even if it is in this water!’

Here is an example of topicalization of the object, *àgdz-á-rwà* ‘my child’. The evidence that this is topicalized is provided by the use of the root + *a* form of the noun:

- (65) *yà màgá nyàsàw má*
yà màgá nyà sàw má
 1SG make preparation come:VENT HYP
àgdzàrwà àptsàr kágkágì ánvàdyá
àgdz-á-rwà à ptsà-rà kágkágì
 child-GEN-1SG 3SG return-ON:PB fever
án vādīyá
 ASSC night
 ‘When I was making my preparations to come, the fever returned to my child at night.’ (the object role of the noun is coded by the causative-like extension *r* ‘on’).

5.3 Root + *a* before the nominal subject

All morphemes, whether lexical or grammatical, end in the vowel *a* before a nominal subject. As shown later in the present section, this is a result of a further grammaticalization of the root + *a* form. Here is an example of the root + *a* form of a verb:

- (66) *yòw má bàní áksàráksà gdzàrwá*
yòw má bàní áksà-rá-ksà gdzàr wá
 well, HYP since take-ON-take child COM
 ‘Well, since the child has accepted,’

The source extension *s* + *a*, plus high tone (the complex being glossed as GO for ‘goal’), indicates that the ensuing noun is the subject:

- (67) *séy bàná zènání àndàsámàmèná*
séy bà názá ná ní à ndà-sá
 except FOC what DEM INTENS 3SG say-S:GO
màmè ná
 mother DEM
 ‘Except what the mother says.’ [i.e., what the mother says goes]

The verb followed by the pronominal subject of the same clause has the root + *a* form:

- (68) *máki dà-r-á-dà tàrà mùksè žílé*
 HYP go-3PL-GO-go-PB 3PL womanman
 ‘Before they arrived, the woman, the man . . .’

The complementizer *nts` + a* precedes the nominal subject:

- (69a) *à bá ntsà náli gè fáadi à žálà*
 3SG tell COMP Nali TO Faadi 3SG go
 ‘Nali told Faadi to go’

The complementizer *nts* has the root form when followed by the verb of the complement clause:

- (69b) *à bà-ná ntsà žálà*
 3SG tell-3SG COMP depart
 ‘he told her to go’

The question word *wè* (sentence-final form) ‘what’ has the root + *a* form before the subject:

- (70) *kái kándángwà kónà*
kái ká ndá-n gè wà kà únà
 no 2SG say-3SG TO what 2SG DEM
 ‘Hey, why do you say this?’

Recall that in pre-pausal position, the question word *w* has the form *wè*. This fact provides the evidence that the morpheme-final vowel *a* is a grammatical marker:

- (71) *mándà súwèe kìnì ègdzárwá ážìpžyè kážàbè*
má á ndà-sú wèe kìnì ègdz-á-r wá
 HYP 3SG say-S what C.FOC child-GEN-3SG COM
á žì-p-žyè ká žàbè
 3SG accept-APPL-accept NEG again
 ‘whatever he says, his child should accept, shouldn’t she?’ [the vowel lengthening in *wèe* is in anticipation of a pause]

Additional evidence that the ending *a* is a grammatical marker rather than part of the underlying form of the verb is provided by the fact that verbs that end in the vowel *e* in isolation have the ending *a* when followed by the subject:

- (72) *èstùwá žóžà nàrwàndzàžánnà*
èstù wá žóžà nàr-wà-ndzà žánnà
 like that COM finish:PB language-mouth-past DEF
 ‘Like that finished this story.’

Compare the sentence-final form of the verb ending in *e*:

- (73) *àstùwá* *ǰóǰè*
àstù wá ǰóǰè
 like that COM finish
 ‘It finished like that.’

Here is another verb ending in the vowel *e* in sentence-final position and in the vowel *a* before the subject:

- (74a) *à ǰàgàdà ǰàkàtá tàrè*
 3SG ran fellow 3PL
 ‘their buddy ran away’ (elicited)

Compare the same verb in the sentence-final position:

- (75b) *mákáfár ndzàdàbákà ágdzrè dá ǰàgàdè*
má ká fá-r ndzàdà bá-kà ágdzrè dá ǰàgàdè
 HYP 2SG put-ON force say-2SG child FUT escape
 ‘If you apply force, the child will run away.’

One could claim that the presence of a nominal subject after an intransitive verb is fully expected. The basis for such a claim would be an assumption that every clause must have a subject, and a nominal one to boot. No theory makes such a claim and there is no empirical basis for such a claim. There are, however, claims that nominal arguments represent new elements in discourse (Hopper and Thompson 1984). The root + *a* form may have its origin in the presence of a new element in discourse.

An affirmative existential verb before a single argument has the root + *a* form. Recall that the negative existential verb occurs in the root form before the single argument. The single argument of the affirmative existential verb is treated like new, unexpected information. The single argument of the negative existential verb is treated as an expected element. The negation of the existence of something in discourse follows a previous affirmation of the existence of an element. Nominal arguments of affirmative existential clauses in natural discourse occur in interrogative clauses, where they are per force new elements in discourse, something a listener does not expect:

- (76a) *áǰkwà dùksǎkà màgànákà*
áǰkwà dùksǎ kà màgà-ná kà
 exist thing 2SG do-3SG 2SG
 ‘Was there anything you did?’

Further support for the claim that the noun phrase that follows the affirmative verb of existence in Wandala is a new element is provided by the fact this verb has been grammaticalized as a means to code indefiniteness:

- (77a) *áǰkwá gdzà dóolè [pause] à dǎkàtàngyáalè*
áǰkwá gdzà dáwalè à dǎ kàtá gyáalè
 exist young boy 3SG SEQ want girl
 ‘A certain boy wanted to marry a girl.’

- (77b) *áɲkwà gdzrè yèdákàtà tàyyèvá bàstùwá*
áɲkwà gdzrè yè dákàtà tà yyè-vá bàstùwá
 there exist child 1SG go want 3PLrefuse-APPL like that
 ‘A child [girl] whom I went to ask for, I was refused like that.’

5.5. Adjectives before nouns

Adjectives preceding the noun have the root + *a* form. Recall that in the default Noun-Adjective configuration, the noun has the root form. The explanation for the root + *a* form of the adjective is that Adjective-Noun is not the expected configuration, and what follows the adjective is unexpected as well:

- (78a) *ágdzà šóyá làrúusà*
ágdzà šóy-á làrúusà
 small story-GEN marriage
 ‘a short story of a marriage’

- (78b) *cùkwá šóyì ɲánnà*
 small story DEF
 ‘this is a small story’

5.6 Root + *a* before question particle *hè*

The root + *a* form occurs before the question marker *hè*:

- (79) *kàḷ-á-n-vá-kàḷà hè zàdà ɲánnà*
 break-GO-3SG-APPL-break Q stick DEF
 ‘did he break this stick?’

The presence of the root + *a* form here is explained by the very nature of the coding of polar questions. Polar questions in Wandala are marked by the clause-final particle. The polar question has the form Proposition-Question marker. The question marker is not an expected component of the proposition.

5.7 Root and root + *a* forms and grammatical relations

The root and the root + *a* distinction has been grammaticalized for environments where any lexical or grammatical category can be followed by a noun phrase and where the grammatical relation of this noun phrase needs to be indicated. Question words or the negative marker precede nominal arguments. The root form of the question word or of the negative marker indicates that the ensuing noun is the object. The root + *a* form of the question word or the negative marker indicates that the ensuing noun is the subject. The evidence that the vowel *a* on the question word is a grammatical marker rather than a part of the underlying form of the question word is provided by the fact that the citation forms of the question words end in the vowel *e*. The object function of the noun following the question word is coded by the root ending on the question word.

The question word about a human participant is *wàrè* ‘who’ (sentence-final form):

- (80) *kà pàká wàrè*
 2SG wait who
 ‘who are you waiting for?’ (elicited)

The question word has the root form before the object:

- (81) *á bàdà-ná wàr kèllù*
 3SG flatter-3SG who Kellu
 ‘who flatters Kellu?’

The question word has the root form before the contrastive focus marker *kínì*:

- (82) *màḡármá wàr kìnà kyádámbatàrè*
màḡár má wàr kìn à kyà
 now HYP who C.FOC 3SG scatter
á dóm mb-á-tàrè
 PRED go:IN home-GEN-3PL
mátàḡàrsátàḡàr [error and attempt at correction] *górò*
má tḡà-r-sá-tḡà górò
 HYP distribute-3PL-S-distribute cola nut
 ‘Now, everybody goes home, having partaken of the cola nuts.’

The question word has the root + *a* form before the subject:

- (83) *á bàdà wàrà Nàbbà/žíl-nà*
 3SG flatter who:PB Nabba/man-DEM
 ‘who does Nabba/this man flatter?’
- (84) *wàtskàpàkàwàrà kányàné*
wàts kà pàká wàrà kà án ḡánè
 FUT 2SG wait:GO who:PB 2SG ASSC 3SG
 ‘Who are you going to wait for, with respect to her [marriage]?’

The question word about the place is *mè* (sentence-final form):

- (85a) *á bàdà-trá mè*
 3SG flatter-3PL:PRED where
 ‘where does he flatter them?’

A question word about place has the form *mà* to indicate that the ensuing noun is the subject:

- (85b) *á bàdà-n á mà kèllù*
 3SG flatter-3SG PRED where:PB Kellu
 ‘where does Kellu flatter him?’

The object role of the noun following the question word is coded by the root form of the question word:

- (85c) *á bàdà-n á mà kèllù*
 3SG flatter-3SG PRED where Kellu
 ‘where does he flatter Kellu?’

Here are examples of the root versus the root + *a* alternation with the question word *wè* ‘what’ preceded by the preposition *g* ‘to’ resulting in the meaning corresponding to ‘why’. The object pronouns on the verb are in the root form before the preposition (the sentence-final position (the forms *-tár* and *-trá* are free variants):

- (86a) *á bàdà-tár g-wè*
 3SG flatter-3PL TO-what
 ‘why does he flatter them?’

The root + *a* form of the question word indicates that the ensuing noun is the subject:

- (86b) *á bàdà-trá g-w-à kèllù*
 3SG flatter-3PL TO-what-PB Kellu
 ‘why does Kellu flatter them?’

The root form of the preposition *g* plus the question word *w*, resulting in the form *gù*, indicates that the ensuing noun is the object:

- (87) *á bàdá-n gù kèllù*
 3SG flatter-3SG TO:what Kellu
 ‘why does he flatter Kellu?’

The root form of the negative marker (plus epenthetic vowel if necessary) indicates that the ensuing noun is the object:

- (88) *yó màrà ávántákà sàwàrí šágrà gègdzrè*
yó màrà á v-à-n-tá k sàwàrí
 well mother 3SG give-3SG-T NEG advice (F)
šágrà gè gdzrè
 good TO child
 ‘Yes, the mother does not give good advice to her child.’

The root + *a* form of the negative marker *kà* indicates that the ensuing noun is the subject:

- (89) *mádám tàtárkínì áwàmikàšyáwà*
má dá-m tàt-à-r kìnì á w-à-mì kà
 1INCL go-IN place-Q C.FOC 3SG bite-1INCL NEG:PB
šyáwà
 fear
 ‘Wherever we would go, the fear will not bite us.’

5.8 Summary of the environments in which the *root + a* form is used

- (1) Subject pronouns that precede the verb always have the vowel *a*.
- (2) Grammatical morphemes + *a* indicate that the ensuing noun is the subject.
- (2) Adjectives preceding nouns have the root + *a* form.
- (3) Verbs before interrogative particle *hè* have the root + *a* form unless it is overridden by the ventive extension.
- (4) Topicalized noun phrases end in the root + *a* form.

6. Grammaticalization of the root and root + *a* forms

Grammaticalization of the root form as an algorithm indicating how to interpret constituents within a phrase involved the use of phonological reduction as indicate phrase-internal position. Such a reduction is a likely (but not necessarily an automatic) outcome of reductions that take place within the phrase. The general motivation for this grammaticalization is the frequency of the occurrence of a form within its phrase (cf. Bybee 2007 on the importance of frequency of use in language structure and grammaticalization). The role of frequency in phonological reduction has been known for a long time. The likely explanation for the frequency effect is that frequency leads to predictability of the occurrence of a form in a given environment. Predictability allows the use of a reduced signal to convey the message. The use of the reduced form in turn becomes a linguistic sign in itself, which can be used to code a function.

Given the facts that no word in Wandala can end in a consonant in sentence-final position; that all kinds of lexical categories can end in the vowel *a* in that position; that the vowel *e* in many cases represents an erstwhile grammatical morpheme; and that the vowel *a* occurs in all situations in clause- or sentence-final position where the vowel *e* does not occur, we may conclude that the vowel *a* in clause- and sentence-final position represents an epenthetic vowel. To assume that the vowel *a* is an underlying vowel of various lexical categories would imply that the great majority of morphemes in the open and closed classes have the same underlying segment in the same position in the morpheme. That would imply that morphemes can have underlying segments that do not contribute to the differentiation among morphemes. Such a presence across different classes of morphemes would violate the fundamental nature of underlying segments. This consideration thus reinforces the conclusion that such segments are epenthetic in clause- and sentence-final position.

Given the fact that the root + *a* form in clause-internal position is identical with the clause- and sentence-final form of lexical items belonging to different lexical categories, it is reasonable to consider whether the identity of the two forms is accidental. The proposed grammaticalization sequence indicates that this similarity is not accidental. Through the frequency of its occurrence, the clause- and sentence-final epenthetic *a* has become a marker of clause- and sentence boundary. It is by virtue of marking the phrasal boundary that the form *a* came to be a marker of the less-than-expected follow-up in clause-internal position. Thus, clause-internal lexical or grammatical morphemes ending in the vowel *a* are products of the addition of a grammatical morpheme *a*, which has as its grammaticalization source the marker of clausal and sentential boundary, which in turn has as its origin the epenthetic vowel *a*.

This grammaticalization runs against theories of grammaticalization that assume some cognitive/semantic motivation in the choice of sources of grammaticalization (the

oldest approach to grammaticalization, which started with Wilhelm von Humboldt and continues in contemporary works by Samuels 1972, Lehmann 2002, and numerous publications by Heine, e.g. Heine et al. 1991). The change from the epenthetic vowel to a marker of syntactic boundary to a marker of grammatical relations is not semantically motivated. The proposed grammaticalization also runs against the general unidirectionality hypothesis, which claims that grammaticalization starts with more concrete meaning and results in a more abstract meaning (Kuryłowicz 1965, and Heine and Kuteva 2002 (Introduction)), in that various localized readings resulting from the deployment of the two forms are more concrete than the general function of the two forms. Moreover, the grammaticalization of the subject and object distinction through the root versus root + *a* forms of the content question and negative markers represents a direction from more abstract (coding a type of boundary) to more concrete (coding grammatical relations).

7. Consonant mutation in Celtic as an instance of parsing morphology

Celtic languages display an extensive system of consonant mutation, whereby an initial phoneme of a word changes to another phoneme. Different languages display different types of mutations. Irish displays two types: lenition, which has spirantizing effects, and ‘eclipsis’, which combines voicing and nasalization. Welsh is said to have three mutations: Soft, which results in voicing and spirantization, Spirant, and Nasal (Fife and King 1998: 478; capitalization is theirs). The formal properties of consonant mutation, viz. which consonant becomes which, have been well studied and are not controversial. It is also generally accepted that the consonant mutation is a historical product of consonantal changes triggered by the final segments of the preceding word. In contemporary languages, consonant mutation has become an independent coding means in the sense that in exactly the same environment a mutation may but does not have to occur (Frajzyngier and Shay 2003). The question about the conditions under which the consonant mutation takes place or, alternatively, about the function of consonant mutations remains an open question. The usual discussion of consonant mutations consists of listing various environments where the mutations take place.

A common characteristic of mutations is that they occur on different lexical categories, e.g. on nouns, verbs, adjectives, numerals. This characteristic is non-categorical in that it is not linked to any specific lexical or grammatical category. Consonant mutation in Celtic languages is also non-categorical in functional terms, in that it is involved in the coding of a number of unrelated functions. Fife and King 1998: 478 list: gender, case, objecthood, negation, person/number, relativization, subordination, tense/mood and word classes. Like the distinction between the root and root + *a* forms in Wandala, consonant mutation in Celtic languages is involved in the coding of a large number of grammatical distinctions. A third characteristic of consonant mutation is that it is an independent coding means, i.e. consonant mutation is not triggered by any other element in the utterance. Press 1986: 38 states: ‘In many cases the mutations may seem to have no special morphosyntactic significance, - though their presence or absence may reflect a pause or the subordination of one sub-group to another.’ He provides the evidence that the mutation is not triggered by any other component by demonstrating that the same word in the same syntactic environment may undergo the mutation or not:

(90a) *war toenn an ti*
 on-PRP roof-NF DART house
 ‘on the roof of the house’

or:

(90b) *war doenn an ti*
 on-PRP roof-NF DART house
 ‘on the roof of the house’

The second phrase, according to Press, represents ‘a single unit, with greater prominence of *war*’. Press also cites Kervella 1947/1976, where the same noun after the same preposition can undergo mutation or not:

(91a) *war vor*
 on-PRP sea-NM
 ‘at sea’ (AVP)

and

(91b) *war morioù ar c’hresteiz*
 on-PRP sea-NMPL DART south-NM
 ‘on southern sea’

In the proposed analysis, the absence of consonant mutation in the second example ensures that the relationships within the phrase *morioù ar c’hresteiz* will be interpreted first, and only then will the relationship between this phrase and the preposition *war* ‘one’ be computed. The role of consonant mutation and its absence is parallel to the use of the marker *n* before pronouns in prepositional phrases in some Slavic languages. The marker *n* triggers interpretation of the structure as part of one phrase. The absence of the marker *n* indicates that the pronoun that follows the preposition first has to be interpreted in connection with the material that follows the pronoun; only then can the phrase with the pronoun be interpreted in connection with the preposition:

(92) *ot n-ego*
 from n-3SG:M:GEN
 ‘from him’

ot jego materi
 from 3SG:M:GEN mother
 ‘from his mother’ (Russian)

Possessive pronouns that precede nouns in Welsh differ with respect to the type of mutation that follows them. Similarly, different prepositions are characterized by different types of mutations (Awbery 1976: 26ff). Data from Welsh ‘subject raising’ constructions provide an interesting piece of evidence that the function of consonant mutation is to indicate phrase-internal connection:

- (93) *Dymunai Wyn i Ifor **ddarlen** llyfr*
 wanted Wyn for Ifor reading (a) book
 ‘Wyn wanted Ifor to read a book’ (Awbery 1976: 37)

The bolded item *ddarlen* ‘read’ represents a mutated form of the verb *darlen* ‘read’. The mutated form indicates that *Ifor ddarlen llyfr* is one phrase, a complement of the preposition *i*. Whatever is the historical origin of consonant mutation, its synchronic function is to indicate the internal structure of the utterance.

8. Parsing morphology and the locus of marking

Bloomfield’s 1933 distinction between endocentric and exocentric constructions has been incorporated in one way or another in a number of linguistic theories. An endocentric construction is a construction that behaves like one of its constituents and an exocentric construction is a construction that does not belong to the class of any of its constituents, (Bloomfield 1933:194ff). Some components of the notion of endocentric construction have been widely incorporated in a number of linguistic theories: Minimalist program (Chomsky 1995), lexical functional grammar (Bresnan 2001: 110ff). A somewhat diluted notion of endocentric construction serves as the basis of the distinction between the head and dependent. Although the notion of ‘head’ itself is controversial (Corbett et al. 1993), the distinction between the head and dependent gave rise to the fundamental typological distinction between the head-marking and dependent-marking proposed by Nichols in 1986 and more recently applied to a large number of languages in Nichols and Bickel 2005. In those studies, languages are classified as head-marking, as dependent-marking, as both head- and dependent-marking, and as neither head- nor dependent-marking. The interest of parsing morphology, as illustrated in Wandala, is that it occurs in both endocentric and exocentric constructions. Consider the formation of content questions or negative predications in Wandala, where the form of the question word or of the negative particle indicates whether the ensuing noun is the subject or object. The question word is neither the head of the construction nor its dependent. Similarly, the negative particle is neither the head nor a dependent part of the construction with the ensuing noun. Nevertheless, the language has a robust system of morphological coding. Hence, the distinction between head-marking and dependent-marking has no heuristic value for such morphology. The four types of marking resulting from the distinction between head- and dependent-marking do not exhaust the possibilities of morphological marking in languages. Such a typology needs to be enriched by the types of marking that occur in exocentric constructions. The data presented in this study indicate that such a typology may involve a distinction between languages that mark the first element in an exocentric construction (Wandala) and languages that mark the second element in an exocentric construction (Celtic languages). But it is entirely possible that other types would need to be postulated, e.g. languages that mark both the first and second element.

9. Conclusions and implications

The present work demonstrates the existence of a type of morphology that has not been previously described. Consequently, it describes a type of language architecture that has not been recognized so far.

The key difference between categorial and parsing morphology is that in the former, the function of a morpheme or a morphological process is consistent regardless of the environment. In categorial item and arrangement morphology, a given morpheme can occur only with a given lexical category. A morphological process can apply across categories. It either changes the meaning of a form to which the process applies or it indicates a specific relationship with another element in the utterance. In the parsing morphology, the morpheme or a process may occur across different lexical categories and across different types of grammatical morphemes, whether bound or free. Parsing morphemes or processes do not change the meaning of words, nor do they indicate any specific relationship with another element of the utterance. Parsing morphology provides the algorithm for the parsing of an utterance into constituents. The functional semantic interpretations in parsing morphology include, but are not limited to, the domains of grammatical and semantic relations between the predicate and noun phrases; relations between the noun phrases; complementation; topicalization; conjoined noun phrases and clauses; and modality.

The study also presents a hypothesis regarding the grammaticalization of such a system of coding. Parsing morphological marking did not develop because the sources of the markers carried semantic features useful for the contemporary functions but rather because the phonological forms came to be associated with phrase-internal or phrase-final positions.

The existence of parsing morphology has several implications for linguistic theory. The first one is factual: It demonstrates the existence of a coding means that has not been recognized so far. The other implication of parsing morphology is that it demonstrates the existence of grammatical marking that lies outside of the head-dependent relations and head-dependent marking.

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List of abbreviations

I have retained abbreviations from the sources cited in order to avoid potential misrepresentation of authors' intentions. As a result, identical categories may have different glosses depending on the source of the example.

1	First-person
2	Second-person
3	Third-person
AFF	Affected
APPL	Applicative
AR	Arabic
AVP	Adverbial phrase
ASSC	Associative
C.FOC	Contrastive focus
COM	Comment marker
COMP	Complementizer
CONJ	Conjunction
DART	Definite article
DAT	Dative
DEF	Definite
DEM	Demonstrative
DEST	Destinative
EP	Epenthetic
EX	Existential
EXCL	Exclusive
F	Fula (Fulfulde)
FOC	Focus marker
FUT	Future
GEN	Genitive
GO	Goal
H	Hausa
HL	Human locative
HYP	Hypothetical
IMP	Imperative
IN	Inner space
INCL	Inclusive
INTENS	Intensifier
K	Kanuri
L.A.	Locative anaphor
M	Masculine
N	Noun, nasal consonant
NF	Feminine noun
NM	Masculine noun
NEG	Negative
NOM	Nominalizer
ON	Extension 'on'
ONOM	Onomatopoeic
OPT	Optative
OUT	Extension 'out'
PAST	Past

PREP Preposition
PRP Preposition

¹ For a few older and recent textbooks limited to categorial morphology as described above, see Matthews 1974, Haspelmath 2002, Spencer and Zwicky 1998, Booij 2005, Aronoff and Fudeman 2005, Lieber 2010. The list is by no means exhaustive.