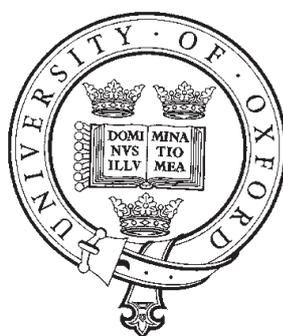


A Lexical-Functional Analysis of Swahili Relative Clauses



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The text of this thesis contains 24,997 words; this number includes 1,774 words in footnotes and figures.

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Chapter 1

Introduction

In Swahili, a Bantu language of East Africa, relative clauses are formed in a variety of ways. The two most prominent of these strategies exist in many cases side-by-side: a speaker of Swahili is free to use either one. In the first strategy, a relative pronoun is used to indicate the beginning of a relative clause. In the second, the relative clause verb itself is modified with a special relative morpheme, indicating that its clause is a relative one. In either strategy, the head of the relative clause can play almost any grammatical function in the relative clause, resulting in a wide variety of interesting constructions.

Swahili is a well-documented language, and is the national language of several countries. However, formal linguistic treatment of Swahili relative clauses is relatively sparse, considering the fascinating character of the data which is available. In particular, no substantial analysis has been produced from the perspective of Lexical Functional Grammar (LFG), a theory of syntax in which the syntactic analysis of a sentence consists of two linked structures: one representing the structural organization of the sentence, and the other representing the functional relationships between the words themselves.

In this thesis, I will provide an analysis of Swahili relative clauses, using LFG as a framework. Ultimately, my goal is to present an analysis which countenances as much of the available data as possible, and which constitutes a legitimate explanation of that data. Before discussing the analysis itself, it will be necessary to give a brief overview of the Swahili language (Chapter 2), a thorough survey of Swahili relative clause constructions (Chapter 3),

and an introduction to LFG (Chapter 4). I will bring these pieces together in order to analyze the various relative clause constructions in Chapter 5. Finally, Chapter 6 will be devoted to determining the linguistic import of my analysis, and briefly comparing it with two other analyses from different frameworks.

Chapter 2

Swahili

Swahili is a language of East Africa which has attained the status of a lingua franca there, and is used as such by over 30 million speakers in Tanzania, Kenya, Somalia, Mozambique, and other countries. In this chapter, I will provide a very brief history of the language, and outline some of its most important synchronic linguistic features. The subject of relative clauses in Swahili will be taken up in Chapter 3.

2.1 Linguistic Situation and History

Swahili (*Kiswahili* to its speakers) is a member of the well-established family of Bantu languages, a group of around 500 languages in Africa (Marten 2006). Many Bantu languages are characterized by the presence of, *inter alia*, a system of noun classes, and an expansive set of affixes designed both to enable class agreement and to convey information such as tense or even grammatical function. Swahili has these features, as will be detailed in following sections.

Historically, Swahili was used as the language of the tribes living along the coast of what is now Kenya and Tanzania, but there is no firm evidence for exactly when or how this situation arose (Polomé 1967:8). What is clear is that, with the advent of Arab traders in the region, the language began to be used in simplified form for communication between the traders and the local inhabitants. The creole that was born eventually crystallized into what we would

now recognize as the Swahili language (beginning around the 12th century AD), but not before incorporating a large number of words and phrases from Arabic (Polomé 1967:12).

Swahili speakers' position as the gatekeepers of overseas trade to the rest of Africa ensured that the language would have a long future as a lingua franca, and the language is still continuing to grow as such. However, of the tens of millions of speakers of Swahili (estimates range upwards from 30 million), less than a million speak it as a first language (Lewis 2009). This distribution of the language as primarily L2 leads to quite a bit of variation in how Swahili is actually spoken in different regions, which fact should be kept in mind when I present the data concerning relative clauses in Chapter 3.

In the following sections I will outline some of the general features of Swahili, before moving on to discuss relative clauses in particular.

2.2 Nominal Morphology

Swahili nouns drive much of the morphological complexity which characterizes the language. Each noun belongs to one of 18 noun classes, and verbs, adjectives, and even some prepositions all use special morphemes to show agreement relationships with nouns.

2.2.1 Noun Classes

The 18 noun classes are divided into that number somewhat arbitrarily, and in fact there is some overlap between classes. There are essentially two groups within the overall set: the first group (classes 1-14) consists of singular-and-plural pairs of nouns; these nouns are lexically defined to belong to only one such class-pair (e.g., class-pair 1/2, or class-pair 3/4).¹ The way nouns in Swahili belong to a class-pair is analogous to the way nouns in Spanish have lexical gender, though Swahili class and Spanish gender are not interchangeable concepts.

The second group (classes 15-18) is unique in that only one noun inherently belongs in the set (class 16 *pahali* 'place'); these classes define special semantic categories like location, and nouns are dynamically re-classified into this group when they partake in certain constructions,

¹The term 'class-pair' is my own invention, which I use to be clear that I am referring to the lexical grouping of both singular and plural classes within one semantic division.

e.g., those involving locatives.

Historically, classes 1-14 also divided up semantic space into 7 partitions (each partition represented by one class-pair). Class-pair 1/2, for example, contains nouns which refer to humans, professions, and animate creatures. Class-pair 3/4, on the other hand, is filled mostly with Swahili nouns for plants and trees. The class of a noun is typically signalled by a prefix shared with other nouns of the same class. I call the set of such prefixes the *nominal class prefixes*; the prefixes for classes 1 (*m-*) and 2 (*wa-*) can be discerned in the following examples:^{2,3}

(1) *mtu*
1.person
'a person'

(2) *watu*
2.person
'some people'

2.2.2 Class Agreement

Swahili nouns establish agreement relationships (via their class feature) with (a) modifying adjectives, (b) verbs for which the noun plays a grammatical function, and (c) some prepositions. These words show class agreement by means of two sets of class prefixes. The first, the *nominal class prefixes*, appear on open-class adjectives and on nouns themselves (in fossilized form). The second set consists of the *verbal class prefixes*, which appear in all the other environments.

Table 2.1 shows the nominal class prefixes for each class, an example of a noun from that class, and the adjective *-ema* 'good' displaying appropriate agreement for the class.

²In these words, *m-* and *wa-* are not actually separable prefixes. Rather, *mtu* is one lexical item, but shows evidence of a previous stage in Swahili's history, when class prefix (denoting some semantic class, much like classifiers do in, say, ASL (Aronoff et al. 2003)) and stem *were* more logically independent.

³In my glosses, I follow the Leipzig Glossing Rules (Bickel et al. 2008), with the following additions:

- AN: animate
- FV: final vowel of a Swahili verb
- SE: the verbal stem extension *ku-*

Class	Prefix	Noun Ex.	Gloss	Adj Ex.
1	m-	mtu	person	mwema
2	wa-	watu	people	wema
3	m-	mti	tree	mwema
4	mi-	miti	trees	myema
5	(ji-)	jiwe	stone	jema
6	ma-	mawe	stones	mema
7	ki-	kiti	chair	chema
8	vi-	viti	chairs	vyema
9	(n-)	ndizi	banana	njema
10	(n-)	ndizi	bananas	njema
11	u-	ufunguo	key	mwema
12	(n-)	funguo	keys	njema
13	u-	ugonjwa	disease	mwema
14	ma-	magonjwa	diseases	mema
15	ku-	—		kwema
16	pa-	pahali	place	pema
17	ku-	—		kwema
18	mu-	—		mwema

Table 2.1: Basic nominal class prefixes

As is apparent from the table, there is a good deal of overlap in morphological form between the different prefixes. In fact, it is only when a noun is viewed in both singular and plural forms that the class-pair to which it belongs can be unambiguously determined. There is also some interaction of phonology with the morphological operation of prefixing, as can be seen in words like *chema* ‘7.good’, where the expected form *ki-ema* has undergone palatalization.

Many of these observations also hold for the verbal class prefixes, as can be seen in Table 2.2. In this table, the prefix for each class is given, along with the agreeing form of *-a*, a word used in many cases like a preposition meaning ‘of’, and which takes the verbal class prefixes in order to agree with the head noun. Examples of these prefixes on verbs themselves will be given in the next section.

Class	Prefix	-a 'of'
1	a-	wa
2	wa-	wa
3	u-	wa
4	i-	ya
5	li-	la
6	ya-	ya
7	ki-	cha
8	vi-	vya
9	i-	ya
10	zi-	za
11	u-	wa
12	zi-	za
13	u-	wa
14	ya-	ya
15	ku-	—
16	pa-	pa
17	ku-	kwa
18	mu-	mwa

Table 2.2: Verbal class prefixes as subject and object markers

2.3 Verbal Morphology

Verbs constitute a major sub-system of Swahili morphology, and can in many cases stand alone as complete sentences. Verbs are formed via the agglutination of different morphemes, along with a stem which contributes the basic meaning. The concatenation of morphemes occurs according to variations on a set template for constructing different logical combinations of the meanings of the morphemes. Verbs can then express complicated notions, or even act as the sole linguistic representation of, for example, subjects and objects in a sentence.

2.3.1 The Verbal Template

I follow Schadeberg (1984) and Edelsten et al. (2010) in numbering the different slots of the verbal template as in Table 2.3.

One restriction on the verbal template is that not all morpheme slots may be simultane-

Slot	Morpheme Description
1	Negative Marker 1
2	Subject Marker
3	Negative Marker 2
4a	Tense Marker
4b	Tensed Relative Marker
5	Object Marker
6a	Monosyllabic verb stem extension
6b	Verbal Base
7	Final Vowel
8a	General Relative Marker
8b	Plural Imperative Marker

Table 2.3: Morphological template for Swahili verbs

ously filled. In fact, there are many constraints on which verbal morphemes may co-occur. For example, a speaker may use a morpheme as a negative marker in either slot 1 or 3, but not both. Still, despite this and other constraints, the number of possible forms corresponding to just one verbal base is extremely large. I cannot discuss each class of verbal morphemes in full detail, but I give below an overview of the kinds of morphemes which can appear in each of the slots of the verbal template.

Slot 1 The negative marker is typically *ha-*, though with animate subjects there is some irregularity (e.g., expected *ha-ni-* ‘NEG-AN.1SG’ becomes *si-*).

Slot 2 The subject marker is represented by a verbal class prefix agreeing with the subject of the sentence. The prefixes used are those in Table 2.2, with further specification for animate subjects. In Swahili, animate subjects are also marked on the verb for person and number (see Table 2.4).

Slot 3 This second negative marker slot is used only in certain constructions, like the negative subjunctive, and is always filled by the morpheme *si-*.

Slot 4a The tense marker slot can be filled by a number of morphemes which contribute some combination of tense, mood, and aspect information. Table 2.5 lists these markers, along

Person	Singular	Plural
1	ni-	tu-
2	u-	m-
3	a-	wa-

Table 2.4: Animate subject markers

with a brief description of their semantic contribution.

Morpheme	Basic meaning
-na-	Present tense
-li-	Past tense
-ku-	Past tense (negative)
-ta-	Future tense
-taka-	Future tense
-me-	Present perfect
-ja-	Present perfect (negative)
-nge-	Present conditional
-ngali-	Past conditional
-ki-	Suppositional
-sipo-	Negative suppositional
-ki-	Present/future imperfect
-ka-	Consecutive
-hu-	General

Table 2.5: Verb tense markers

Slot 4b This slot can be occupied by a relative marker; relative markers and their use will be discussed in the next chapter.

Slot 5 A verbal class prefix in this slot is a sufficient (but not necessary) condition for there being an object in the sentence. Its class features must agree with the noun representing that object. As with the subject markers, animate objects take a special set of affixes, largely similar to the subject markers but with some variation. These are listed in Table 2.6.

Slot 6a Because of the rules of accentuation in Swahili, verbs which have a monosyllabic

Person	Singular	Plural
1	ni-	tu-
2	ku-	wa-
3	m-	wa-

Table 2.6: Animate object markers

stem must often be preceded by an epenthesized syllable *ku-*, which ends up bearing the main stress of the verb. This morpheme is glossed as ‘SE’.

Slot 6b The verbal base itself occupies this slot. The verbal base is comprised of the basic stem, along with any derivational affixes (for example, the set of passive morphemes which extend the verbal base).

Slot 7 In Swahili, the ‘final vowel’ of the verbal base plays a role in indicating the use of constructions like the present negative, or the subjunctive. Depending on the historical origin of the verb (whether Bantu or Arabic), different rules moderate the behavior of the final vowel.

Slot 8a This slot is an alternate home for the relative marker, and use of it here indicates that a certain type of relative clause is being constructed (the ‘general relative’).

Slot 8b In just a few constructions, such as the imperative, Swahili verbs may end with the morpheme *-ni*, the presence of which indicates that the addressee is plural.

2.4 Basic Syntax

Beyond the level of morphology (where so much of the speaker’s meaning is first constructed), and perhaps because of the simplification that took place in Swahili’s history, Swahili syntax is relatively straightforward. In this section I will point out a few of the basic syntactic features of the language.

2.4.1 Word Order

Swahili word order, to begin with, is usually SVO. The most basic declarative construction available consists of a nominal subject and an intransitive verb:

- (3) *Juma a-na-lal-a*
 Juma AN.3SG-PRES-sleep-FV
 ‘Juma is sleeping’ (Constructed)

Swahili is also a pro-drop language, which means overt specification of the subject noun phrase is not necessary, as the grammaticality of (4) shows. It is never possible, on the other hand, to form a declarative clause without a subject marker in the verb.

- (4) *a-na-lal-a*
 AN.3SG-PRES-sleep-FV
 ‘S/he is sleeping’ (Constructed)

Objects (both OBJ and, if it exists, OBJ2) follow the main verb, which optionally exhibits an agreeing object marker:

- (5) *Juma a-li-(u)-pik-a wali*
 Juma AN.3SG-PAST-(11.OBJ)-cook-FV 11.rice
 ‘Juma cooked the rice’ (Constructed)

If both OBJ and OBJ2 are present, OBJ precedes OBJ2, and any object marker on the verb is taken to agree with OBJ:⁴

- (6) *Waziri a-me-m-p-a mwanafunzi zawadi*
 5.minister AN.3SG-PERF-AN.3SG.OBJ-give-FV 1.student 9.prize
 ‘The minister has given the student a prize’ (Mohammed 2001:60)

Word order in Swahili as I have laid it out here is deceptively simple; in reality, the combination of a robust class system and a fixed-order verbal template opens up the possibility of determining the grammatical function of words via agreement relationships, rather than

⁴In these ditransitive constructions, OBJ is usually playing the thematic role of Goal or Beneficiary (in other words, what traditional grammars would call the ‘indirect object’).

just simple word order. It is not difficult, for example, to find sentences where the subject has ‘postposed’ to a position after the verb (as we will see in the relative clause data). Still, there do seem to be canonical default orders, deviances from which tend to flag the fact that a word has a particular function in the larger discourse.

2.4.2 Phrase Structure

Without going into the detail that awaits us in the analysis of relative clauses, it is clear that Swahili is generally a head-initial language: phrases usually lead off with their most central constituent (sentences themselves being one exception, of course). Modifying adjectives (but not determiners), and various other adjuncts, follow the nominal constituents they modify:

- (7) *kikombe ki-kubwa*
 7.mug 7.big
 ‘a big mug’ (Constructed)

- (8) *kikombe ki-kubwa ch-a Juma*
 7.mug 7.big 7-of Juma
 ‘Juma’s big mug’ (Constructed)

2.4.3 Subordinate Clauses

Swahili makes use of several familiar subordination strategies, including the introduction of sentential complements following verbs of saying and the like. (Of course, Swahili also has several interesting relativization strategies, which will be explored in the rest of this project.)

Examples (9) - (11) simply illustrate several types of sentential complements: (9) utilizes the form of a verb marked as infinitive to signal subject control, (10) shows how object control requires a different strategy (use of the subjunctive), and (11) introduces a subordinate clause using a complementizer (also highlighting the fact that tense is not altered in reported speech).

- (9) *Ni-na-tak-a kw-end-a soko-ni.*
 AN.1SG-PRES-want-FV INF-go-FV 9.market-LOC
 ‘I want to go to the market.’ (Constructed)

Chapter 3

Relative Clauses in Swahili

Swahili makes use of several linguistically interesting relativization strategies. To date, little work has been done describing and analyzing these strategies from within specific theories of syntax, and most of what we have available in English is in the form of traditional grammars of the language. This chapter aims to recapitulate what is known about relative clauses in Swahili and to give a general account of the various phenomena. Given that the scope of this study did not include collecting new language data from native speakers, I will primarily be relying on what can be found in several Swahili grammars—Ashton (1987), Russell and Perrott (1996), and Mohammed (2001), as well as the substantially more targeted Keach (1980) and Edelsten (2010). A few short articles or handouts were also helpful sources of data, including Edelsten et al. (2010), Ngonyani (2010), and Zwart (1997).⁵

Because of my inability to survey Swahili speakers, all original data came through the use of the Helsinki Corpus of Swahili (HCS) (Hurskainen 2004). I relied on the HCS especially in cases where my other sources disagreed, or appeared to be making dubious claims of ungrammaticality. I have not done a full-scale corpus study with the purpose of determining the relative frequency of different constructions, but have rather operated with the intent of determining simply whether certain constructions could be found.⁶

⁵When I use examples from any of these or other sources, including the Helsinki Corpus of Swahili, I will quote the source; otherwise, I will mark the example as constructed. Furthermore, I have endeavored to normalize all glosses according to the Leipzig Glossing Rules (Bickel et al. 2008), with the additions and modifications I have used in this thesis so far (see the beginning of Chapter 2 for the list).

⁶In my searches, the active corpus was actually just a subset of all the documents available through the HCS, consisting of a number of books and newspaper articles.

As will become clear shortly, there is a real need for a systematic re-evaluation of Swahili relative clause data, based on correspondence with native speakers, and with appropriate categorizing of data according to dialect. While all my sources gave similar grammaticality judgments for basic constructions, they diverged wildly when dealing with more complicated phenomena (like subject postposing and embedded relatives, for example). In building a concrete analysis, it was obviously necessary for me to take a stand on the grammaticality of the phrases I analyzed, but in many cases it was not clear whose examples were most representative of grammatical Swahili structures, and whether and how regional or temporal differences affected their intuitions.

3.1 Relativization Strategies

Depending on how one classifies them, there are between two and five relativization strategies in Swahili. I will follow Edelsten et al. (2010) in supposing there are three basic constructions from which all examples can be formed. These are (1) *amba-* relatives, (2) ‘tensed’ verbal affix relatives, and (3) ‘untensed’ or ‘general’ verbal affix relatives. Two other constructions will also be mentioned, but these can be analyzed as one of (1) - (3).⁷

3.1.1 The ‘-o of Reference’

Before we examine the different types of relative clauses, it is important to briefly discuss the so-called ‘-o of Reference’. Many constructions in Swahili which ostensibly have some kind of ‘pointing’ or ‘referring’ effect make use of the morpheme ‘-o’, which is always bound to a verb-type class prefix (see section 2.2.2) for agreement purposes. The resulting morpheme (which will usually have changed as a result of phonological rules) must be attached to an appropriate slot, e.g., Verb Slot 4a (Edelsten et al. 2010). Table (3.1) shows how the ‘-o of Reference’ can be combined with some verbal class prefixes. The first row deserves special attention, as the animate-class singular verb prefix, typically ‘a’, when combined with the ‘-o of Reference’ becomes ‘-ye’. The other contractions preserve slightly more regularity.

⁷It is worth noting that, in this thesis, I will be dealing with restrictive relative clauses only.

Class	VCP	VCP + -o
1	a-	-ye
2	wa-	-o
3	u-	-o
4	i-	-yo
5	li-	-lo
6	ya-	-yo
7	ki-	-cho
8	vi-	-vyo
	...	

Table 3.1: Examples of binding the ‘-o of Reference’: Ashton (1987)

While a complete discussion of the various uses of the ‘-o of Reference’ is outside the scope of this thesis, it is worth noting that its incorporation is the only aspect of relative clause formation which holds across all relativization strategies. In that sense, it is tempting to think of *-o* as having some kind of topicalization function.

3.1.2 *Amba-* Relatives

In *amba-* relatives, *-o* is added to the word *amba*, which is historically related to a verb with the same form, meaning ‘say, tell’ (which meaning is now expressed by the verb *ambia*). Interestingly, the form *amba* can also be found in a number of constructions without any evidence that it is, in those cases, a verb. Chief among these is its use as what appears to be a morphologically simple complementizer in examples like (12):

Finally, the head noun may play any appropriate grammatical role in the matrix clause, as would be expected. In (17), *kitabu* ‘book’ is the object of the matrix clause, and also binds the object of the relative clause:

- (17) *Ni-na-pend-a kitabu amba-cho ni-na-ki-som-a*
 AN.1SG-PRES-like-FV 7.book amba-7 AN.1SG-PRES-7.OBJ-read-FV
 ‘I like the book which I am reading’ (Constructed)

At this stage, there is no reason to think of *amba-* as anything other than a relative pronoun with some agreement features, which behaves in many ways exactly how we would expect a relative pronoun to behave.

3.1.3 Verbal Affix Relatives I: Tensed

Perhaps a more interesting relative clause construction from a cross-linguistic point of view utilizes Slot 4b in the verbal morphology to hold the relative marker. This slot, immediately following the tense marker, is filled with a class-bound *-o*, and no additional complementizer or relative pronoun is required. For many Swahili sentences, there is no difference in grammaticality between this strategy and the *amba-* strategy (in section 3.2, I will begin to explore the differences which do arise). (18) is an *amba-* relative of the kind we have already seen, and (19) is its verbal affix analogue:

- (18) *mtu amba-ye a-li-kwend-a*
 1.person amba-AN.3SG AN.3SG-PAST-go-FV
 ‘person who went’ (Constructed)

- (19) *mtu a-li-ye-kwend-a*
 1.person AN.3SG-PAST-AN.3SG.REL-go-FV
 ‘person who went’ (Keach 1980:35)

Example (19) presents exactly the same information as (18). As we shall see, however, when we look at the data, e.g., from Keach (1980), there are some important differences between the *amba-* strategy and this verbal affix strategy, which I will sometimes follow the literature in calling the ‘tensed relative’ strategy.

3.1.4 Verbal Affix Relatives II: Untensed

Another set of verbal affix relatives exist in Swahili for constructing relative clauses in which the speaker does not wish to convey a specific tense, or wants to talk about an action which is recurring, or somehow generally the case. In this strategy (often called the ‘general relative’ strategy), the same class-bound *-o* is used as a verbal affix, but it is instead placed in the final morpheme slot on the verb. In addition, there is a constraint that no tense marker may be used in this construction. Here again is a pair of examples, this time with general relatives:

- (20) *mtu a-m-pend-a-ye Juma*
 1.person AN.3SG-AN.3SG.OBJ-like-FV-AN.3SG.REL Juma
 ‘person who likes Juma’ (Keach 1980:26)

- (21) *vitabu ni-vi-som-a-vyo*
 8.book AN.1SG-8.OBJ-read-FV-8.REL
 ‘(the) books which I (generally/usually) read’ (Keach 1980:27)

Despite the difference in verb form and meaning between these untensed ‘general’ relatives and the ‘tensed’ relatives, there is obviously a substantial overlap in strategy between the two. The use of the same verbal affix (infix in tensed relatives and suffixed in general relatives) in order to (a) mark the verb as a relative clause, and (b) ensure agreement with the head noun, does suggest that these strategies could be grouped opposite the *amba-* strategy.

3.1.5 Verbal Affix Relatives III: Copular

There is a special instance of the general relative which will not need a separate theoretical treatment, but which is worth describing briefly. In Swahili, the copular verb can be put into the general relative construction by treating the morpheme *-li-* as a copular verb stem:

- (22) *Kuta zi-li-zo kubwa ni chache*
 12.wall 12-COP-12.REL 12.big COP 12.few
 ‘Walls which are big are few’
 ‘There aren’t many big walls’ (Mohammed 2001:197)

The form of the relative clause verb in (22) exactly matches that of example (20), and we do not need to say any more about it. It is also open to a Swahili speaker, of course,

to relativize using the full verb *kuwa* ‘to be’ in situations where a specific tense is required (Mohammed 2001).

3.1.6 Compound (‘Formal’) Relatives

We will examine one final relativization strategy which, according to Keach (1980), is understood more easily by older speakers than by younger (suggesting, perhaps, that the strategy is passing out of the language). Essentially, it involves the use of both *amba-* and verbal affix strategies simultaneously:

- (23) *Wageni amba-o wa-li-o-fik-a leo wa-ta-ondok-a*
 2.guest amba-AN.3PL AN.3PL-PAST-AN.3PL.REL-arrive-FV- today AN.3PL-FUT-leave-FV
kesho
 tomorrow
 ‘The guests who arrived today will leave tomorrow’ (Edelsten 2010:19)

Keach hypothesizes that there may be an emphatic effect when using this construction, but does not provide any specific data about it. Edelsten et al. (2010) simply label this category “double marking”, and Edelsten (2010:19) merely notes that “the two strategies may be used in combination,” without discussing its stylistic features.

3.2 Constraints and Generalizations

So far we have looked only at canonical, basic examples of each of the relative strategies. In this section, I will draw out generalizations for relative clauses in general and for particular strategies by looking at their behavior in various linguistic situations. Ultimately, my goal will be to give an analysis of Swahili relative clauses that accounts for at least an important subset of this data.

3.2.1 Verb-Internal Object Marking

In all of the examples given so far where the head noun of a relative clause binds the object of that clause, the relative clause verb has included an object marker. In fact, Keach claims this object marker is obligatory in such cases. In non-relative verbs, object marking is not

always obligatory: the most succinct rule for object marking generally is that animate objects require the verbal morpheme, but non-animate objects do not. In both *amba-* and verbal affix relative strategies, object marking is obligatory even when the object is not animate.⁸ Thus (24) is grammatical, but (25) is apparently not:

(24) *kitabu ni-na-cho-ki-som-a*
 7.book AN.1SG-PRES-7.REL-7.OBJ-read-FV
 ‘book which I am reading’ (Keach 1980:36)

(25) **kitabu ni-na-cho-som-a*
 7.book AN.1SG-PRES-7.REL-read-FV
 ‘book which I am reading’ (Constructed)

Thus object marking appears as a feature of object relative clauses in general (whether as an indication of relativization or as part of a requirement that there be some kind of pronominal marking for the relativized argument in the relative clause) and we will account for it in the same way for all strategies.⁹

3.2.2 Tense and Negation

In the two relativization strategies which make use of explicit tense (the *amba-* strategy and the tensed verbal infix strategy), there is rather more asymmetrical behavior. While the *amba-* strategy can be used with any tense marked on the relative clause verb, tensed relatives cannot. Tensed relatives must use one of *-li-* ‘PAST’, *-taka-* ‘FUT’ (an allomorph of typical *-ta-* used when *-ta-* would otherwise receive primary or secondary stress), *-na-* ‘PRES’, or *-si-* ‘NEG’. (See section 2.3.1 for the full list of tense markers).

Amba- relative clause verbs, on the other hand, can use any valid tense-slot morpheme in Swahili, including e.g. *-me-* ‘PERF’ or *-ngali-* ‘PAST.COND’. Thus, while there is some overlap

⁸From Keach (1980): “When the object is relativized in the *amba-* relative, there is obligatory object agreement (OA) on the verb” (36). Also, “Just as in the *amba-* relative, the object agreement affix appears obligatorily when the object is relativized in tensed relatives” (37). For the purpose of my analysis, I am taking these statements to be correct, but there appear to be counterexamples in Keach’s own work, such as example (9b) on p. 38: ‘*kitabu ambacho nilisoma*’, where the object marking is not present in an *amba-* relative. See also example (33) below (p. 23) for more reasons to doubt Keach’s claim.

⁹The status of object markers in Swahili is by no means settled, even in non-relative contexts. For a good discussion of their use in the context of information structure, see Seidl and Dimitriadis (1997).

in the kinds of tensed propositions which may be built using both strategies, *amba-* is the only strategy without a limited mode of expression. The basic contrast is given in (26) and (27):

- (26) **yai li-me-lo-anguk-a*
 5.egg 5-PERF-5.REL-fall-FV
 ‘egg which has fallen’ (Keach 1980:36)

- (27) *yai amba-lo li-me-anguka*
 5.egg amba-5 5-PERF-fall
 ‘egg which has fallen’ (Keach 1980:35)

A similar set of facts holds with respect to negation. In general, adding negative polarity to a verb is achieved by prefixing *ha-* to the verbal class prefix, as in (28):

- (28) *Ua ha-li-ta-anguk-a*
 5.flower NEG-5-FUT-fall-FV
 ‘(The) flower will not fall.’ (Constructed)

In the *amba-* relativization strategy, no special generalization is needed; relative clause verbs can bear the negative marker just as would be expected:

- (29) *yai amba-lo ha-wa-ja-li-pik-a*
 5.egg amba-5 NEG-AN.3SG-PERF-5.OBJ-cook-FV
 ‘egg which they haven’t yet cooked’ (Keach 1980:35)

However, the use of *ha-* as a negative prefix is not allowed in the tensed relative or general relative strategies. Only one method of negation is available to these strategies, and that is use of *-si-* as a negative marker in the tense morpheme slot in the relative clause verb. This marker does preclude the use of a tense marker, and so prevents the verb from expressing any explicit tense, as in (30):

- (30) *msichana a-si-ye-pend-a* *ku-som-a*
 1.girl AN.3SG-NEG-AN.3SG.REL-like-FV INF-read-FV
 ‘a girl who does not like to read’
 ‘a girl who didn’t like to read’
 ‘a girl who will not like to read’ (Mohammed 2001:187)

Thus, if a speaker wishes to be more explicit in using different combinations of tense and negation, she will need to use a relative clause with *amba-*.

3.2.3 Word Order: *amba-* Relatives

Given that *amba-* is a separate word from the relative clause verb, we might expect to see constraints on what sorts of constituents can intervene between *amba-* and the head noun, as well as between *amba-* and the relative clause verb. Likewise, we might expect there to be potential differences (in such allowed word orders) between the *amba-* strategy and the verbal affix strategies.

One basic generalization is that *amba-* may be separated from the head noun only by arguments and adjuncts of that noun, for example, a genitive (such as in *kitabu cha mtoto* ‘child’s book’) or an adjective phrase (such as in *kitabu kizuri* ‘good book’). Thus (31) - (33) are permissible:

(31) *kitabu amba-cho ni-li-ki-som-a*
 7.book amba-7 AN.1SG-PAST-7.OBJ-read-FV
 ‘book which I read’ (Constructed)

(32) *kitabu ch-a mtoto amba-cho ni-li-ki-som-a*
 7.book 7.SG-of 1.child amba-7 AN.1SG-PAST-7.OBJ-read-FV
 ‘child’s book which I read’ (Keach 1980:112)

(33) *sauti nzuri z-a ndege amba-zo watu wa-li-zoe-a*
 10.voice 10.good 10-of 10.bird amba-10 2.person AN.3PL-PAST-be.accustomed-FV
ku-zi-siki-a
 INF-10.OBJ-hear-FV
 ‘the pleasant voices of (the) birds which the people grew accustomed to hearing’¹⁰
 (Found in HCS)

However, *amba-* must appear in initial position within the relative clause. (34) is therefore not permissible:

¹⁰(33) is interesting because it is not ambiguous, even though both *sauti* and *ndege* belong to class-pair 9/10. Since *ndege* ‘birds’ refers to an animate group, it cannot agree with class-10 *ambazo* (instead, the animate plural *ambao* would be required).

- (34) **mtu jana amba-ye a-li-ye-kwend-a*
 1.person yesterday amba-AN.3SG AN.3SG-PAST-AN.3SG.REL-go-FV
 ‘person yesterday who went’ (Keach 1980:66)

(34)’s ungrammaticality has nothing to do with the adverbial nature of the constituent, but rather its place in the syntactic structure. A phrase like (35) is just fine, given that the adverb is inside the NP, modifying an adjective likewise inside the NP:

- (35) *shule chache tu amba-zo zi-me-fund-ish-a sanaa*
 10.school 10.few only amba-10 10-PERF-learn-CAUS-FV 9.art
 ‘just a few schools which have taught art’ (Found in HCS)

We might also examine what happens on the other side of *amba-*, within the relative clause itself. According to Mohammed (2001), it is the case that adverbs may not intervene between *amba-* and the relative clause verb:

- (36) **mtu amba-ye jana a-li-fik-a ni mwalimu*
 1.person amba-AN.3SG yesterday AN.3SG-PAST-arrive-FV COP 1.teacher
 ‘The person who yesterday arrived is a teacher’ (Mohammed 2001:186)

Example (37) (with *jana* after the verb *alifika*) is the grammatical sentence which conveys the intended meaning.

- (37) *mtu amba-ye a-li-fik-a jana ni mwalimu*
 1.person amba-AN.3SG AN.3SG-PAST-arrive-FV yesterday COP 1.teacher
 ‘The person who arrived yesterday is a teacher’ (Constructed)

Corpus data, however, call Mohammed’s generalization into question. Take, for example, (38):

- (38) *chama ki-kuu ch-a wafanyakazi amba-cho jana ki-li-anda-a mgomo*
 7.party 7-major 7-of 2.worker amba-7 yesterday 7-PAST-prepare-FV 3.strike
m-kuu
 3.major
 ‘the workers’ union which yesterday prepared a major strike’ (Found in HCS)

According to my initial observations, ‘*amba-+ jana*’ occurs at a frequency on roughly the same order as that of the ‘grammatical’ construction, and thus it does not appear to be ungrammatical for all speakers.

A noun phrase may intervene between *amba-* and the relative clause verb if it is the subject of the relative clause verb.

- (39) *mtu amba-ye mimi ni-li-mw-on-a*
 1.person amba-AN.3SG 1SG.PRO AN.1SG-PAST-AN.3SG.OBJ-see-FV
 ‘person whom I saw’ (Constructed)

Interestingly, an overt subject in the relative clause is grammatical even if that subject is identified with the head noun. In this case, it must be a resumptive pronoun, like *yeye* ‘3SG.PRO’:

- (40) *mtu_i amba-ye yeye_i/*Juma_i a-li-kwend-a*
 1.person amba-AN.3SG 3SG.PRO AN.3SG-PAST-go-FV
 ‘person who (she/*Juma) went’ (Keach 1980:97)

In (40), we see the first obvious instance of resumption, a feature which will appear in a number of relative constructions.

3.2.4 Word Order: Tensed Relatives

The situation with the tensed relative with respect to word order is largely similar to what we find with *amba-*. However, the relative clause verb (with the verbal infix relative marker) does not need to immediately follow the head noun, in the same way that *amba-* did need to immediately follow the head noun phrase.¹¹ Several kinds of constituents can intervene, including adverbs of time or manner, as in (41):

- (41) *mtu jana a-li-ye-kwend-a*
 1.person yesterday AN.3SG-PAST-AN.3SG.REL-go-FV
 ‘person who went yesterday’ (Keach 1980:66)

¹¹This will be explained in my analysis on the assumption that *amba-* resides to the immediate left of the relative clause, in Spec-CP.

This is a phenomenon called subject postposing (Keach 1980:152). Subject postposing is also possible in *amba-* relatives, according to several authors (Keach (1980), Edelsten (2010), Edelsten et al. (2010)). In (46), *mama* ‘mother’ shows up in a post-verbal position:

- (46) *chakula amba-cho a-li-ki-pik-a mama*
 7.food amba-7 AN.3SG-PAST-7.OBJ-cook-FV 1.mother
 ‘food which mother cooked’ (Edelsten et al. 2010:6)

On the surface, there is thus a discrepancy between the word orders available to *amba-* and verbal affix relatives: in *amba-* relatives, subject postposing is optional; in tensed relatives, it is obligatory. In contradiction to this claim of difference, researchers have argued that subject postposing is not in fact obligatory for tensed relatives, and that phrases like (45) are in fact grammatical. Edelsten et al. (2010:6) cites (47) as an example:

- (47) *chakula mama a-li-cho-ki-pik-a*
 7.food 1.mother AN.3SG-PAST-7.REL-7.OBJ-cook-FV
 ‘food which mother cooked’

Edelsten agrees, saying that (47) is not ungrammatical but “dispreferred” or “colloquial”. Ultimately, I will follow the more recent work, which treats subject postposing as an optional feature in all cases, but within which there is a range of preference. In fact, subject postposing is possible in non-relative clauses as well (perhaps conditioned by discourse features):

- (48) *Wa-na-wa-pend-a watoto watu w-a Kenya.*
 AN.3PL-PRES-AN.3PL.OBJ-love-FV 2.child 2.person 2-of 9.Kenya
 ‘The people of Kenya love children.’ (Deen 2006:227)

When both subject and object share verb agreement features, an interesting ambiguity can arise as a result of subject postposing. A phrase like (49) has two readings:

- (49) *mtu a-li-ye-m-pend-a Juma*
 1.person AN.3SG-PAST-AN.3SG.REL-AN.3SG.OBJ-like-FV Juma
 ‘the person who liked Juma’
 ‘the person who Juma liked’ (Keach 1980:211)

In other words, we have two options: either (1) *mtu* binds the subject of the relative clause verb, and therefore *Juma* is the object of the relative clause verb and is already in its canonical position, or (2) *mtu* binds the object of the relative clause verb, and *Juma*, the subject of that verb, has obligatorily postposed.

Even though *amba-* relatives can optionally participate in subject postposing, it is claimed that they avoid this kind of ambiguity, as (50) and (51) illustrate:

- (50) *mtu amba-ye a-li-m-pend-a Juma*
 1.person amba-AN.3SG AN.3SG-PAST-AN.3SG.OBJ-like-FV Juma
 Only: ‘the person who liked Juma’ (Keach 1980:211)

- (51) *mtu amba-ye Juma a-li-m-pend-a*
 1.person amba-AN.3SG Juma AN.3SG-PAST-AN.3SG.OBJ-like-FV
 Only: ‘the person whom Juma liked’ (Keach 1980:212)

3.2.6 Relatives with Passive Verbs

Further differences between the *amba-* and tensed relatives can be found in passive constructions. In a typical passive sentence, the object (often the semantic theme) is promoted to syntactic subject position, and the semantic agent is demoted to oblique status or left out entirely. In *amba-* relatives, the head noun can be either the subject or the semantic agent which has been relegated to an agentive oblique. Examples (52) and (53) show each of these possibilities:

- (52) *chakula amba-cho ki-li-pik-w-a na mvulana*
 7.food amba-7 7-PAST-cook-PASS-FV by 1.boy
 ‘the food which was cooked by the boy’ (Keach 1980:105)

- (53) *mvulana amba-ye chakula ki-li-pik-w-a na-ye*
 1.boy amba-AN.3SG 7.food 7-PAST-cook-PASS-FV by-3SG.PRO
 ‘the boy the food was cooked by’ (Keach 1980:105)

It is important to note that in the case where the head noun binds the demoted semantic agent, the preposition *na* cannot stand on its own, so a cliticized form of the personal pronoun

is added with the appropriate agreement features.¹² Furthermore, I assume that the cliticized pronoun in (53) is a resumptive pronoun, since it is also possible to use a lexical form:¹³

- (54) *mvulana amba-ye chakula ki-li-pik-w-a na yeye*
 1.boy amba-AN.3SG 7.food 7-PAST-cook-PASS-FV by 3SG.PRO
 ‘the boy the food was cooked by (him)’ (Keach 1980:105)

In the verbal affix relative strategy, the analogue of (52) is grammatical:

- (55) *chakula ki-li-cho-pik-w-a na mvulana*
 7.food 7-PAST-7.REL-cook-PASS-FV by 1.boy
 ‘the food which was cooked by the boy’ (Keach 1980:106)

Surprisingly, Keach claims that we cannot relativize on the oblique, in the way that we could in (53)! (56) is ungrammatical:

- (56) **mvulana chakula ki-li-ye-pik-w-a naye*
 1.boy 7.food 7-PAST-AN.3SG.REL-cook-PASS-FV by-3SG.PRO
 ‘the boy the food was cooked by’ (Keach 1980:106)

What accounts for this difference? Unfortunately, we cannot claim that the difference is one of resumption, since if we relativize on an oblique argument within a COMP, we can find resumptive pronouns easily enough:

- (57) *mvulana ni-li-ye-da-i chakula ki-li-pik-w-a na-ye*
 1.boy 1SG-PAST-AN.3SG.REL-claim-FV 7.food 7-PAST-cook-PASS-FV by-3SG.PRO
 ‘the boy I claimed the food was cooked by’ (Keach 1980:107)

Nor does the pronoun which resumes an infix relative morpheme necessarily have to belong to a subordinate clause; we can also find it in an adjunct of the relative clause verb:

- (58) *vitu a-li-vyo-ku-j-a na-vyo*
 8.thing AN.3SG-PAST-8.REL-SE-come-FV with-8.PRO
 ‘things which he came with’ (Keach 1980:147)

¹²Preposition stranding is not allowed generally in Swahili.

¹³We might also see a connection between (53), where the oblique is relativized on, and other sentences where the object is relativized on, in which sentences there is obligatory object marking on the relative clause verb. I will argue (in section 5.2) that in both cases the marking which appears is actually a resumptive pronoun whose presence highlights relativization on its function within the clause.

Thus the ungrammaticality of (56) does not appear to have anything to do with the grammatical functions of *mvulana* ‘boy’ or *chakula* ‘food’, but rather their position within the phrasal structure. One obvious structural explanation has to do with subject postposing; if postposing is indeed obligatory or strongly preferred in verbal affix relatives, (56) would be ruled out on that basis alone. Within this understanding, the postposed version (59) should be acceptable:

- (59) *?mvulana ki-li-ye-pik-w-a chakula naye*
 1.boy 7-PAST-AN.3SG.REL-cook-PASS-FV 7.food by-3SG.PRO
 ‘the boy the food was cooked by’ (Constructed)

I did not find any instances of this kind of sentence, and so claims of grammaticality must remain tentative. However, the analysis I will present in this thesis does accept (59); see section 5.8 for further discussion.

3.2.7 Relatives with Applicative Verbs

Swahili verbs can bear certain morphemes which indicate that the verb will take an extra argument, often a semantic beneficiary of the action. These applicative morphemes typically show up as vowels epenthesized immediately after the verbal base. (60) is an example of an applicative construction. Since the ‘extra’ semantic participant appears as an argument in an immediately post-verbal position, I consider it to play the grammatical role of OBJ.¹⁴ The semantic theme is then OBJ2:

- (60) *Ni-li-wa-som-e-a watoto kitabu*
 1SG-PAST-AN.3PL.OBJ-read-APPL-FV 2.child 7.book
 ‘I read a book for the children.’ (Constructed)

A relative clause may be based on either argument (OBJ in (61) and OBJ2 in (62)):

¹⁴It is also the case that any object marking which appears on the verb agrees with this argument, which I take to be strong evidence that it should be classified as OBJ. This analysis is in line with the equivalent statement about indirect objects in English sentences like “John gave Bill the ball”, where ‘Bill’ is the ‘indirect object’, with the grammatical function of OBJ.

- (61) *rafiki amba-ye wavulana wa-ta-m-nunu-li-a pombe*
 9.friend amba-AN.3SG 2.boy AN.3PL-FUT-AN.3SG.OBJ-buy-APPL-FV 9.beer
 ‘a friend who the boys will buy beer for’ (Edelsten et al. 2010:4)
- (62) *pombe amba-yo wavulana wa-ta-m-nunu-li-a rafiki*
 9.friend amba-9 2.boy AN.3PL-FUT-AN.3SG.OBJ-buy-APPL-FV 9.friend
 ‘beer which the boys will buy for a friend’ (Constructed)

None of my sources discussed the tensed relative versions of (61) and (62), and I take it that they are acceptable (despite whatever subject postposing issues may arise). There is a difference, however, in the treatment of these constructions in the passive. Passive applicatives can be formed in one of two ways: by promoting either the theme or the benefactive to SUBJ. When it is the theme which is thus promoted, the grammaticality distribution mirrors precisely that which we saw in the previous section: relativization on the benefactive argument (i.e., OBJ) requires a resumptive pronoun in the *amba-* strategy, and is considered ungrammatical in the tensed relative strategy (unless embedded in e.g. COMP). The following three examples illustrate the point:

- (63) *watoto ambao chakula kilipikiwa wao na mvulana*
 2.child amba-AN.3PL 7.food 7-PAST-cook-APPL-PASS-FV 3PL.PRO by 1.boy
 ‘children for whom the food was cooked by the boy’ (Keach 1980:109)
- (64) **watoto chakula kilipikiwa wao na mvulana*
 2.child 7.food 7-PAST-AN.3PL.REL-cook-APPL-PASS-FV 3PL.PRO by 1.boy
 ‘children the food was cooked for by the boy’ (Keach 1980:110)
- (65) *watoto niliodai kwamba chakula kilipikiwa*
 2.child 1SG-PAST-AN.3PL.REL-claim COMP 7.food 7-PAST-cook-APPL-PASS-FV
wao na mvulana
 3PL.PRO by 1.boy
 ‘children who I claimed the food was cooked for by the boy’ (Keach 1980:110)

The verbal affix relative in (64) forms an ungrammatical construction with the resumptive pronoun, but not when the pronoun is shuttled through COMP. Given that we see here the same pattern as in non-applicative passive verbs, my analysis will treat these cases in the same way (by reference to subject postposing).¹⁵

¹⁵Interestingly, in none of these cases is object marking found on the passive (and applicative) verb, despite

3.2.8 Embedded Relatives

One of the most interesting differences between *amba-* relatives and verbal affix relatives is whether they allow other relative clauses to appear within them (what Keach calls ‘rels-in-rels’). Keach that *amba-* relatives are less restrictive in this regard, and “have one more embedding than their tensed counterparts” (Keach 1980:70). Example (66) illustrates the kind of embedding permitted by *amba-*:

- (66) *mtu amba-ye ni-li-wa-on-a watoto amba-o*
 1.person amba-AN.3SG 1SG-PAST-AN.3PL.OBJ-see-FV 2.child amba-AN.3PL
a-na-wa-pend-a
 AN.3SG-PRES-AN.3PL.OBJ-like-FV
 ‘person who I saw the children who he likes’ (Keach 1980:71)

In this case, the head noun *mtu* binds the subject of the most deeply-embedded verb *anawapenda*. Keach’s statement about levels of available embedding in the *amba-* strategy implies that we could not have a third embedded relative clause, but she gives no examples of the ungrammaticality of such a construction. Regardless, even this single level of embedding is not possible with the verbal affix strategy, and thus (67) is ungrammatical:

- (67) **mtu ni-li-ye-wa-on-a watoto*
 1.person 1SG-PAST-AN.3SG.REL-AN.3PL.OBJ-see-FV 2.child
a-na-o-wa-pend-a
 AN.3SG-PRES-AN.3PL.REL-AN.3PL.OBJ-like-FV
 ‘person who I saw the children who he likes’ (Keach 1980:71)

Interestingly, we cannot have embedding with the verbal affix relatives even if the inner relative clause is of the *amba-* type, as seen in (68):

- (68) **zawadi ni-li-zo-wa-on-a watoto amba-o*
 10.gift 1SG-PAST-10.REL-AN.3PL.OBJ-see-FV 2.child amba-AN.3PL
u-li-wa-p-a
 2SG-PAST-AN.3PL.OBJ-give-FV
 ‘gifts which I saw the children who you gave them to’ (Keach 1980:73)

the relativization on OBJ. About this fact Keach has only to say that “...an NP will occur post-verbally but will not govern an OA [object agreement marker] since object agreement is impossible in all passives” (Keach 1980:108). While it is not within the scope of this work to provide a full explanation for this situation, it is important to note that, agreement or no agreement on the verb itself, the resumptive pronoun *wao* ‘3PL.PRO’ is present, indicating the relativized grammatical function.

The opposite is true for *amba-* relatives; a relative clause within another relative clause of the *amba-* type may be either an *amba-* relative or a verbal affix relative. Example (66) is an example of the former and (69) of the latter:

- (69) *vitabu amba-vyo ni-li-mw-on-a mtoto*
 8.book amba-8 1SG-PAST-AN.3SG-see-FV 1.child
a-li-ye-vi-som-a
 AN.3SG-PAST-AN.3SG.REL-8.OBJ-read-FV
 ‘books which I saw the child who read them’ (Keach 1980:73)

Edelsten (2010:38) takes issue with Keach’s claim, and suggests that verbal affix relatives can also take part in what he calls “nested” relative strategies. He presents (70) as evidence:

- (70) *mtu a-na-ye-wa-pend-a watoto*
 1.person AN.3SG-PRES-AN.3SG.REL-AN.3PL.OBJ-like-FV 2.child
ni-li-o-wa-on-a
 1SG-PAST-AN.3PL.REL-AN.3PL.OBJ-see-FV
 ‘the person who likes the children whom I saw’

I do not believe (70) is a strong counterexample to Keach’s claim, at least in the sense that, in Keach’s examples, the head noun binds an argument of the innermost clause. In (67), *mtu* ‘person’ is the relativized SUBJ of *anaowapenda* ‘(which) he likes (them)’, but is not an argument of the higher verb *niliyewaona*. In Edelsten’s example, the head noun plays no role whatsoever in the embedded relative clause. Thus, while he is right that relative clauses may be *chained*, I see no reason to discard Keach’s observation about *embedding* (if I may make the distinction with this terminology), which may be an insight about functional constraints on the relative strategies.

3.2.9 Relatives and COMP

As made apparent in a few examples so far, the head nouns for relative clauses can bind arguments within sentential complements. There does not appear to be any difference between *amba-* and other relative strategies as regards this feature, and thus two simple examples will suffice. First, for *amba-*:

- (71) *watu amba-o ni-li-da-i kwamba wa-li-kw-end-a*
 2.person amba-AN.3PL.REL 1SG-PAST-claim-FV COMP AN.3PL-PAST-SE-go-FV
 ‘the people who I claimed they left’ (Constructed)

The corresponding tensed relative example is as expected:

- (72) *watu ni-li-o-da-i kwamba wa-li-kw-end-a*
 2.person 1SG-PAST-AN.3PL.REL-claim-FV COMP AN.3PL-PAST-SE-go-FV
 ‘the people who I claimed they left’ (Keach 1980:69)

While Keach (1980) does not examine this type of construction, arguments can also be bound within verbal complements (often taken to be XCOMP arguments of the main verb), as in (73), where *ambaye* binds the object of the verbal complement *kumwondoa*:

- (73) (*mtu*) *ambaye Marekani i-na-tak-a ku-mw-ondo-a*
 (1.person) amba-AN.3SG.REL 9.America 9-PRES-want-FV INF-AN.3SG.OBJ-remove-FV
madaraka=ni
 9.government=LOC
 ‘(the person) who America wants to remove from the government’ (Found in HCS)

Again, in this case there do not appear to be significant differences between *amba-* and tensed relatives, since examples of the latter can also be found:¹⁶

- (74) *msichana a-na-ye-tak-a ku-mw-o-a*
 1.girl AN.3SG-PRES-AN.3SG.REL-want-FV INF-AN.3SG.OBJ-marry-FV
 ‘the girl who he wants to marry’ (Edelsten et al. 2010:8)

3.2.10 Headless Relatives

The so-called ‘general’ or ‘tenseless’ relative strategy, wherein the relative particle is a verbal suffix, has not received individual attention in the preceding sections. There is, however, one construction which uses only this type of relative, analogous to the types of headless relatives found in English proverbs like ‘Those who can, do; those who can’t, teach!’ In

¹⁶Note that the relative marker in these verbal affix relatives is found on the matrix verb of the relative clause, not on the verb whose argument is being relativized on.

Swahili, aphorisms or general statements of obligation are also one important function of this construction, as we see in Ashton (1987):

- (75) *Li-andik-w-a-lo* *ha-li-fut-ik-i*
 5-write-PASS-FV-5.REL NEG-5-wipe.off-STAT-FV
 ‘That which is written cannot be blotted out.’ (Ashton 1987:114)

In (75), the elliptical subject is class 5, presumably implying the intended referent is *nenö*, a class 5 word meaning ‘word’. Perhaps because of the timeless nature of the proverb’s meaning, neither the *amba-* nor the verbal infix (‘tensed’) relatives appear in this stylistic frame.

As we will see in the next section, the tensed relatives do partake in certain restricted headless constructions. None of my sources, however, give examples of headless *amba-* relatives, and I take it that these are ruled out.¹⁷

3.2.11 Time, Place, and Manner Relatives

Another interesting feature of Swahili vis-à-vis relative clauses is how the language treats cases where the topic is related to time, manner, or place. In these cases, as with headless relatives, the head noun is elliptical and must be understood from context. A special relative particle with a temporal, locative, or adverbial value is used instead. Example (76) shows how temporal *-po-* is used:

- (76) *Ni-li-ku-w-a* *ni-me-lal-a* *a-li-po-ku-j-a*
 1SG-PAST-SE-be-FV 1SG-PERF-sleep-FV AN.3SG-PAST-TEMP.REL-SE-come-FV
nyumba-ni
 9.home-LOC
 ‘I was asleep when he came home.’ (Mohammed 2001:192)

A similar strategy is used with relatives of place: in this case, each of the three locative classes (16, 17, and 18) forms a separate relative particle (as expected, by combining with

¹⁷From (Edelsten 2010:32): “With the relative morpheme [verbal affix] strategy, a relativised subject or object may be substituted by an incorporated pronoun i.e. the so-called ‘headless relative’, but with the relative pronoun [*amba-*] strategy, this is not possible.”

-o) with the semantic value of that class (i.e., place-definite, place-indefinite/place-to-which, and place-inside). The next three examples show how each functions:

(77) *ni-na-po-ka-a*
1SG-PRES-16.REL-stay-FV
'(the [definite] place) where I am staying' (Mohammed 2001:194)

(78) *ni-na-ko-end-a*
1SG-PRES-17.REL-go-FV
'(the place) where I am going' (Mohammed 2001:194)

(79) *ni-na-mo-ish-i*
1SG-PRES-18.REL-live-FV
'(the place) where I live in' (Mohammed 2001:194)

It appears in these cases that some noun referring to place could quite grammatically be used as an overt head, but the elliptical constructions are very common. The same seems to be true as regards relatives of manner: the noun- and verb-prefix for class 8, *vi-*, can be used to refer to the manner in which something is being done:¹⁸

(80) *Si-elew-i* *a-na-vyo-fany-a*
NEG.1SG-understand-FV AN.3SG-PRES-8.REL-do-FV
'I don't understand how she does (it).' (Mohammed 2001:192)

As with the aphoristic relatives, *amba-* cannot be used to form this type of headless relative clause.

3.2.12 Other Constructions

Unfortunately, there are more Swahili relative clause constructions than a paper with the scope of this one can hope to treat fully. In this section I will give brief examples of three such constructions which I believe can be accommodated by the analysis I will present in Chapter 5, but which I will not have the space to discuss there.

¹⁸As noted by Swahili grammarians, class-pair 7/8 has a semantic connection to manner; the class 7 prefix *ki-* can be prefixed to nouns in order to adverbially denote the type of behavior usually associated with that noun, as in *ki-toto* '7-child', which can mean, *inter alia*, 'in a childish way'.

Focus Firstly, there is a general construction in Swahili syntax which Keach calls “Focus”, wherein the logical SUBJ and OBJ of a sentence not only switch position, but also effect a different agreement pattern on the verb itself. (81) is an example of such a sentence:

- (81) *Vyakula vi-li-ku-l-a watoto*
 8.food 8.OBJ-PAST-SE-eat-FV 2.child
 ‘Children ate the food.’ (Keach 1980:98)

(81) shows the logical object’s marker in the subject marker’s position, and no morpheme in the object marker slot, despite the presence of an animate entity in a post-verbal position. This is, in essence, an entirely unique construction, with different constraints. Interestingly, relative clauses can be formed with this construction as well. Relativization on the logical object (now in subject position) is straightforward in both *amba-* and tensed relative cases. Relativization on the logical subject, however, is possible only in the *amba-* strategy, through use of a resumptive pronoun:

- (82) *watoto amba-o vyakula vi-li-ku-l-a wao*
 2.child amba-AN.3PL 8.food 8.OBJ-PAST-SE-eat-FV 3PL.PRO
 ‘the children who (they) ate the food’

Comparisons The head noun phrases of relative clauses can also bind the object of a comparison, as in (83):

- (83) *mwanafunzi amba-ye Ndeule ni m-refu kuliko yeye*
 1.student amba-AN.3SG Ndeule COP 1-tall than 3SG.PRO
 ‘the student who Ndeule is taller than (him)’ (Edelsten 2010:21)

According to the pattern which should by now be familiar, this is not possible with the analogous copular relative:

- (84) **mwanafunzi Ndeule a-li-ye m-refu kuliko yeye*
 1.student Ndeule AN.3SG-COP-AN.3SG.REL 1-tall than 3SG.PRO
 ‘the student who Ndeule is taller than (him)’ (Edelsten 2010:22)

Possessives Finally, relative clauses can interact with an idiosyncratic set of possessive constructions. In these constructions, the relation of the head noun to some possession of hers is of primary importance, and the relativized information about that possession takes a less prominent position. The following four examples constitute evidence, I think, that we are indeed dealing with something in addition to pure relativization:

(85) *shangazi amba-ye shamba l-ake ni-li-li-lim-a*
 9.aunt amba-AN.3SG 5.farm 5-POSS.3SG 1SG-PAST-5.OBJ-cultivate-FV
 ‘the aunt whose field I dug’ (Edelsten 2010:21)

(86) *shangazi shamba l-ake amba-lo ni-li-li-lim-a*
 9.aunt 5.farm 5-POSS.3SG amba-5 1SG-PAST-5.OBJ-cultivate-FV
 ‘the aunt whose field I dug’ (Edelsten et al. 2010:5)

(87) *shangazi shamba l-ake ni-li-lo-li-lim-a*
 9.aunt 5.farm 5-POSS.3SG 1SG-PAST-5.REL-5.OBJ-cultivate-FV
 ‘the aunt whose field I dug’ (Edelsten 2010:21)

(88) *shangazi amba-ye shamba l-ake ni-li-lo-li-lim-a*
 9.aunt amba-AN.3SG 5.farm 5-POSS.3SG 1SG-PAST-5.REL-5.OBJ-cultivate-FV
 ‘the aunt whose field which I dug’ (Edelsten 2010:21)

A few features of these examples (listed by Edelsten (2010) and Edelsten et al. (2010) simply as examples of relative clauses) deserve attention:

- *amba-* does not always immediately follow the head noun phrase (e.g., as in (86)).
- The relative morphology on the relative clause verb does not always agree with the head noun phrase (cf. (87), where *-lo-* ‘5.REL’ agrees with *shamba* ‘5.farm’, not *shangazi* ‘9.aunt’).
- When both *amba-* and the verbal affix relative are used, as in (88), they do not agree.

While I will not be able to give a complete analysis of such constructions, I will assume that they are not all examples of relative clauses *per se*. Instead, some appear to be relative noun phrases which have within them a relative clause. On this view, in (88),

the head noun *shangazi* ‘9.aunt’ is related in some way to *shamba lake* ‘5.farm 5-POSS’, which in turn is the head of a relative clause *nililolilima* ‘which I dug (it)’.

Clearly, the “facts” as they concern Swahili relative clauses are not easy to reconcile, and this is therefore an area which deserves more attention, not least in the gathering of more “facts”. In Chapter 5 I will present an analysis which aims at explaining what I have discussed so far; first, let us turn to a brief description of the syntactic framework of Lexical Functional Grammar, within which the analysis will be formulated.

Chapter 4

Lexical Functional Grammar

Lexical Functional Grammar (LFG) is a theory of syntax which began its development in the 1970s. It arose out of the collaboration of Joan Bresnan and Ron Kaplan, as a counterpoint to the prevailing Chomskyan views of grammar (which saw the variation in the syntactic phenomena of the world's languages as the result of transformations of more basic, underlying structures presumed to be more or less the same cross-linguistically). One such Chomskyan view (that of Chomsky and Lasnik (1977)) is in fact the framework for Camillia Barrett Keach's work on Swahili relative clauses (Keach 1980), whose data I used frequently in the last chapter.

This chapter presents a basic introduction to LFG, in preparation for the development of my own LFG-based analysis of Swahili relative clauses. For a fuller description of the theory, see (for example) Dalrymple (2001).

4.1 Theoretical Motivation

While LFG need not be understood solely as a reaction to earlier views, it is helpful to say something about the assumptions LFG was designed to reject.

4.1.1 Background: Transformational Grammar

Within the whole paradigm of generative grammar (Chomsky 1965), of which both LFG and transformational theories are a part, a central role is given to phrase structure rules. These rules can recursively generate an infinite number of ‘sentences’, organized according to the constituent structures created as a result of the generation process. The resulting structures are usually visualized as tree diagrams.

From a strictly theoretical perspective, the success of a particular analysis (e.g., a set of phrase structure rules) for a given language is judged by how close it comes to generating all and only the valid sentences of that language. It is obvious, in this case, that the analyses for different languages will be wildly divergent (and not just in the case of ‘lexical entry’ rules—those defining the words which appear as leaves of the tree)! Irish, for example, is a verb-initial language, which means that even at the highest levels of phrase structure, its analysis must differ from that of English.

Of course, linguists in the broadly Chomskyan tradition would like to see more than random variation in the syntax of the world’s languages. Transformational approaches achieve this uniformity by positing a deeper level of syntactic structure which *is* more or less the same for different languages. Where languages differ, this is the result of ‘movement’ operations, which take ‘deep’ structures and transform them into the surface structures which actually match the order of words found in a sentence.

4.1.2 The Lexical-Functional Approach

From the perspective of LFG, the transformation of one tree into another is an unintuitive way of pursuing the project of analyzing aspects of grammar cross-linguistically. Rather than assuming a deep constituent structure and a surface constituent structure constructed from that deep structure by variously-defined ‘movement’ rules, LFG proposes a *parallel* system. This architecture does countenance multiple related structures, but these are assumed to exist simultaneously, describing different aspects of the syntax of a sentence, rather than different steps in some derivational sequence.

One of the immediate benefits of this perspective is that it frees the theory from the

awkward burden of specifying one set of constituent structures as privileged by virtue of their ‘underlying’ nature. LFG does posit constituent structures, visualized as the familiar tree diagrams, but the phrase structure rules which account for these trees are free to vary from one language to another, in order to transparently show the organizing principles for a particular language. The constituent structures thus described are called ‘c-structures’.

The other main structure of LFG is not a tree at all, but a feature-value matrix which represents the functional information conveyed by the syntax of a sentence. From the perspective of LFG, it is in such ‘f-structures’ where more cross-linguistic generalizations are found; the main purpose of the c-structures is to describe the constituent structure of a language, not the interactions of the functional aspects of a sentence.

Of course, the c- and f-structures are not simply abstract representations floating unconnected in space: LFG provides, as a core part of the theory, a function ϕ which allows f-structures to be automatically generated from functional annotations on c-structure nodes, together with the functional contribution of lexical items. In this regard, LFG is unapologetically *lexical*: the lexicon is assumed to be a highly structured system, such that each lexical item partaking in a syntactic construction brings with it a wealth of functional information.

LFG takes seriously the long history of functional descriptions in syntactic analysis, which Dalrymple (2001:8) points out is thousands of years old.¹⁹ Abstract grammatical functions like subject and object are given first-class status as canonical elements of f-structures, where the relationships between predicates and arguments are explicitly listed.

It should come as no surprise that the static nature of LFG’s c-structures, along with the simple dictionary-like nature of its f-structures, results in a straightforward description of the mathematical and computational properties of the theory. Early work by Kaplan and Bresnan (Kaplan and Bresnan (1982b), for example) led to the eventual implementation of LFG as a computational syntax framework in the form of XLE (Crouch et al. 2007), which underlies my analysis of Swahili relative clauses.

In the remainder of this chapter, I will outline the core features of LFG, in order to flesh out the framework I will be assuming when I present my analysis in the next chapter.

¹⁹Dalrymple gives the example of Apollonius Dyscolus, who in the second century A.D. analyzed the relation of nouns and verbs in a way which prefigured a later understanding of subject and object.

4.2 Functional Structure

The f-structures of LFG are mathematically defined as functions from attributes to values, and can be instantiated in a number of simple data structures (for example, a hash table). They are most commonly depicted as in (89) (adapted from Dalrymple (2001:30)):

$$(89) \quad \left[\begin{array}{ll} \text{ATTR_1} & \text{VALUE_1} \\ \text{ATTR_2} & \text{VALUE_2} \end{array} \right]$$

Feature values can themselves be smaller f-structures, which allows the creation of more complex representations, as in (90):

$$(90) \quad \left[\begin{array}{ll} \text{ATTR_1} & \text{VALUE_1} \\ \text{ATTR_2} & \left[\begin{array}{ll} \text{ATTR_3} & \text{VALUE_3} \\ \text{ATTR_4} & \text{VALUE_4} \end{array} \right] \\ \text{ATTR_5} & \left\{ \begin{array}{l} \left[\begin{array}{ll} \text{ATTR_6} & \text{VALUE_6} \\ \text{ATTR_7} & \text{VALUE_7} \end{array} \right] \\ \left[\begin{array}{ll} \text{ATTR_8} & \text{VALUE_8} \end{array} \right] \end{array} \right\} \end{array} \right]$$

(90) also illustrates the possibility of collecting f-structures into sets. In this example, the value of the feature `ATTR_5` is not one f-structure but rather the collection of two (this set is still a singular object, maintaining the mathematical requirement that f-structures be functions). Importantly, f-structure values can be shared; when two features have the same f-structure as their value, the convention I will follow to denote this is that of drawing a line which depicts the link, as in (91):

$$(91) \quad \left[\begin{array}{ll} \text{ATTR_1} & \text{VALUE_1} \\ \text{ATTR_2} & \left[\begin{array}{ll} \text{ATTR_3} & \text{VALUE_3} \\ \text{ATTR_4} & \text{VALUE_4} \end{array} \right] \\ \text{ATTR_5} & \text{---} \end{array} \right]$$


F-structures are built around the idea of grammatical functions, abstract syntactic categories used to characterize relationships between different elements of a sentence. These grammatical functions, familiar from traditional grammarians' notions of, e.g., subject and

object, are assumed to constitute a universal set, and do not vary from language to language. Dalrymple (2001:8) lists them as I have displayed in Table 4.1.

LFG Abbreviation	Grammatical Function
SUBJ	Subject
OBJ	Object
OBJ _θ	Object (indexed by thematic role)
COMP	Closed sentential complement
XCOMP	Open sentential complement
OBL _θ	Oblique (indexed by thematic role)
ADJ	Adjunct
XADJ	External (open) adjunct

Table 4.1: Grammatical functions in LFG

Central to the incorporation of grammatical functions as primitive elements of LFG theory is the concept of predication. Grammatical functions are ultimately meaningless outside of a context of predication, i.e., a speaker using words to say something. In LFG, the PRED feature is used to flag the semantic content associated with a particular f-structure. The values of PRED are therefore called ‘semantic forms’ and put inside single quotes. The f-structure associated with the lexical entry for the verb *sleep*, for example, might be (92):

(92) [PRED ‘SLEEP<SUBJ>’]

PREDS play an extremely important role, in that they define the grammatical functions which are required to appear in an f-structure in order for it to be considered valid. The existence of such subcategorization requirements, generally speaking, is a familiar cross-linguistic phenomenon. The English sentence in (93), for example, is ungrammatical because it has too few arguments (it is missing an OBL_{goal}); (94), on the other hand, has too many.

(93) **John put the ball.*

(94) **Mary yawned the book.*

Requirements like these are enforced in LFG by the wellformedness conditions on f-structures: *Completeness*, *Coherence*, and *Consistency*. Completeness declares any structure

ill-formed if it fails to contain a grammatical function which is mentioned (‘governed’) in the value of the PRED feature of the f-structure. Governed relations are made explicit in the semantic form of the PRED feature, as we saw in ‘SLEEP<SUBJ>’, where the grammatical function within the angled brackets represents the subcategorization frame of the verb *sleep*. A transitive verb like *hit* would also have to mention OBJ: ‘HIT<SUBJ,OBJ>’. The ditransitive verb *put* in (93) needs three arguments, SUBJ, OBJ, and OBL_{goal}. The f-structure for the ungrammatical (93) would then look something like (93-fstruct):²⁰

$$(93\text{-fstruct}) \quad \left[\begin{array}{l} \text{PRED} \quad \text{‘PUT<SUBJ,OBJ,OBL}_{goal}\text{’} \\ \text{SUBJ} \quad \left[\text{PRED} \quad \text{‘JOHN’} \right] \\ \text{OBJ} \quad \left[\text{PRED} \quad \text{‘BALL’} \right] \\ \text{TENSE} \quad \text{past} \end{array} \right]$$

Completeness declares (93-fstruct) to be an invalid f-structure, since OBL_{goal} is mentioned in the PRED feature, but no such feature is found elsewhere in the f-structure.

While Completeness takes care of ungrammatical examples like (93), Coherence handles cases where the problem is precisely the inverse (as in (94)). Essentially, Coherence rules out any f-structure which specifies values for grammatical functions which are not governed by the PRED. Such an f-structure is what would be generated for (94):

$$(94\text{-fstruct}) \quad \left[\begin{array}{l} \text{PRED} \quad \text{‘YAWN<SUBJ>’} \\ \text{SUBJ} \quad \left[\text{PRED} \quad \text{‘MARY’} \right] \\ \text{OBJ} \quad \left[\text{PRED} \quad \text{‘BOOK’} \right] \\ \text{TENSE} \quad \text{past} \end{array} \right]$$

In this case, the OBJ feature is present without being mentioned in the value of PRED; thus, Coherence will declare this f-structure ill-formed.²¹

The last condition, Consistency, is also (and perhaps more straightforwardly) known as the Uniqueness Condition, and simply stipulates that every feature of a given f-structure

²⁰The f-structures presented in this section are intentionally simplified in terms of the features used to express syntactic information. For example, no mention is made of the fact that *ball* is definite.

²¹Technically, the wellformedness conditions need to be stated more carefully. In particular, it is very important to make a distinction between governable and non-governable grammatical functions. Some grammatical functions (like ADJ) are not governable, and may not be listed as such in any PRED. For this reason, they are not subject to the constraints under discussion. Thus the f-structure below for the sentence *Mary yawned quietly* is not invalid, since *quietly* is taken to be a member of the non-governed ADJUNCT set:

must have one and only one value. The point of this requirement is to rule out grammatical contradictions. An example adapted from Dalrymple (2001:39) is the f-structure for the ungrammatical sentence in (95):

(95) **The boys yawns*

(95-fstruct)
$$\left[\begin{array}{l} \text{PRED} \quad \text{'YAWN<SUBJ>'} \\ \text{SUBJ} \quad \left[\begin{array}{l} \text{PRED} \quad \text{'BOYS'} \\ \text{NUM} \quad \text{sg/pl} \end{array} \right] \\ \text{TENSE} \quad \text{pres} \end{array} \right]$$

In this example, we assume that the plural *-s* of *boys* contributes plural number to the SUBJ f-structure, whereas the 3rd-person singular *-s* of *yawns* declares that its SUBJ must have singular number. Thus the NUM feature of SUBJ ends up having two values, 'sg' and 'pl'; it is this situation which the Uniqueness Condition declares invalid. In the end, all three wellformedness conditions together provide a powerful (and mathematically elegant) explanation of the grammaticality judgments we see in many linguistic phenomena.²²

4.3 Constituent Structure and ϕ

The primary motivation for the hierarchical, tree-based representation of syntactic structures is the evidence of the linguistic reality of constituency. Given that both LFG and transformational theories agree broadly about the reality of syntactic constituents, I will not offer a defense of them here.²³ Instead, I will simply define a constituent as a contiguous set of words in a sentence which in some sense acts as a unit.

(94-new)
$$\left[\begin{array}{l} \text{PRED} \quad \text{'YAWN<SUBJ>'} \\ \text{SUBJ} \quad \left[\text{PRED} \quad \text{'MARY'} \right] \\ \text{ADJ} \quad \left\{ \left[\text{PRED} \quad \text{'QUIETLY'} \right] \right\} \\ \text{TENSE} \quad \text{past} \end{array} \right]$$

²²In this section, I have intentionally kept my explication of the conditions informal; for a fuller and more precise discussion, see Kaplan and Bresnan (1982a).

²³Dalrymple (2001:45ff) devotes a section to this task, and notes sets of criteria which have been proposed for determining constituency.

Individual words themselves, along with the sentence as a whole, trivially satisfy this definition, and so it is more interesting to examine phrase-level constituents. Imagine, for example, the sentence in (96):

(96) *John likes the red book.*

According to well-known constituency tests (some of which are listed in Dalrymple (2001:48)), *the red book* is a constituent. It can, for example, be replaced by the pronoun *it*, as in *John likes it*, or moved as a unit to a focus position, e.g. as in *The red book, that's the one John likes!* The group *the red*, on the other hand, is not a constituent: although contiguous, it cannot be easily disentangled from the noun *book*, and this is borne out in various tests.

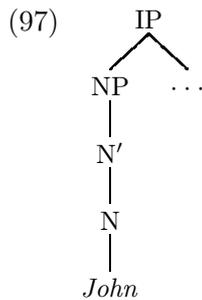
Tree diagrams provide an intuitive way of visualizing the decomposition of a sentence into its constituent parts, especially since there can be groups of constituents which themselves act as a constituent (*likes the red book* is a constituent in (96), as we can see in the sentence *John likes the red book, and Mary does too*—here the whole verb phrase is replaced by *does* in the second clause).

LFG's c-structures, and linguists' syntax trees in general, provide more than information about constituency: they also categorize constituents. Words themselves belong to lexical categories (the familiar 'parts of speech' from traditional grammars, i.e., noun (N), verb (V), adjective (A), etc...) which project phrases found at intermediate levels of structure. Here 'projection' simply means that, if we find an item in a certain lexical category (say N), we expect it to be part of a phrase of the same category (so NP). The item which projects is called the head. *John* in (97) is therefore not just a noun, but often the head of a noun phrase as well.²⁴

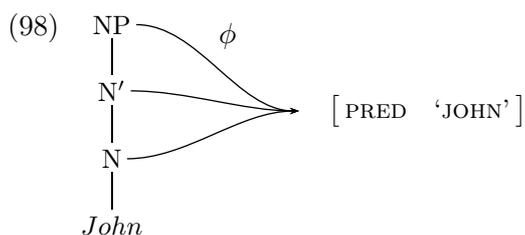
C-structures are organized basically according to the principles of X-bar theory (Jackendoff 1977), which defines the ways in which phrases may be projected from lexical or functional heads. Within-phrase structure is created by use of the bar-level categories (like N'); these

²⁴Lexical categories do not figure alone in the construction of trees. So-called 'functional categories' (unrelated to LFG's notion of 'functional') also exist; these are categories whose members may have idiosyncratic properties in different languages, but whose primary function remains the same. The 'IP' in (97) (I is short for Inflection) is a phrase built from such a category; in English, I is instantiated by auxiliary verbs, whose part of speech is not I, but whose structural behavior requires an analysis where they project as Is, not Vs.

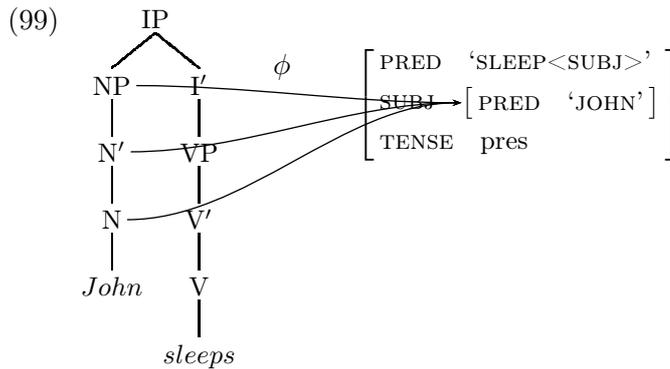
may be recursively chained to allow a huge variety of possible configurations within the rigid confines of X-bar theory. In this paper, X-bar theory is assumed as a convention, but not much hangs on it in terms of my analyses; thus, I will forego a more detailed discussion of its properties.



So much for constituent structure. In LFG, c-structures are important, not least as a foundation for the proper construction of f-structures. It is therefore crucial to understand how a mapping is instantiated between the two. The correspondence is effected by a function ϕ (Dalrymple 2001:70) which relates c-structure nodes to f-structures. ϕ 's functional nature ensures each node is related to one and only one f-structure, though many nodes might be related to the same f-structure, and indeed there might be f-structures to which no c-structure node is related. In (98), for example, all the nodes in the simple noun phrase correspond to the same f-structure.



The next example shows ϕ relating the same elements of the *John*-NP to an embedded f-structure (the value of SUBJ) in the simple sentence *John sleeps*:



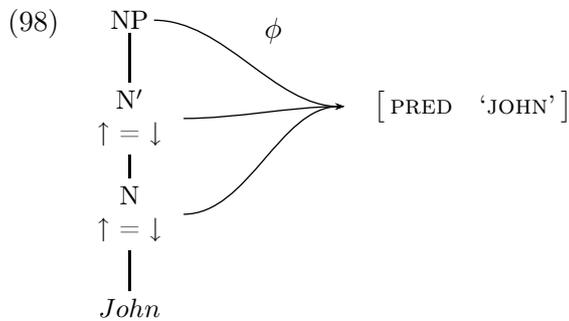
It remains to explore exactly how ϕ knows to relate each node to the appropriate f-structure. In the next section, I will discuss how the words themselves contribute functional structure; for now, let us assume that *John* automatically contributes the f-structure [PRED 'JOHN']. What we need to explain is (a) how all of the nodes in the NP are related to that structure, and (b) how it comes about that that structure is correctly assigned to the value of SUBJ.

This is achieved by annotating each node of the tree with functional information. LFG makes available two helpful abbreviations for reference to the values of ϕ from within the tree. The DOWN symbol \downarrow is shorthand for the value of ϕ when it is applied to the current node in the tree. Thus, in the context of (for example) the IP node in the previous example, \downarrow means 'the f-structure related to the IP node by ϕ '. The UP symbol \uparrow is similar: it refers to the value of ϕ for the *mother* node of the current node. In the above example, \uparrow in the context of the N node would refer to the f-structure related to the *N'* node.

\uparrow and \downarrow alone do not constitute functional annotations on nodes. In order to be useful, something must actually be said of them. One extremely simple annotation is in (100):

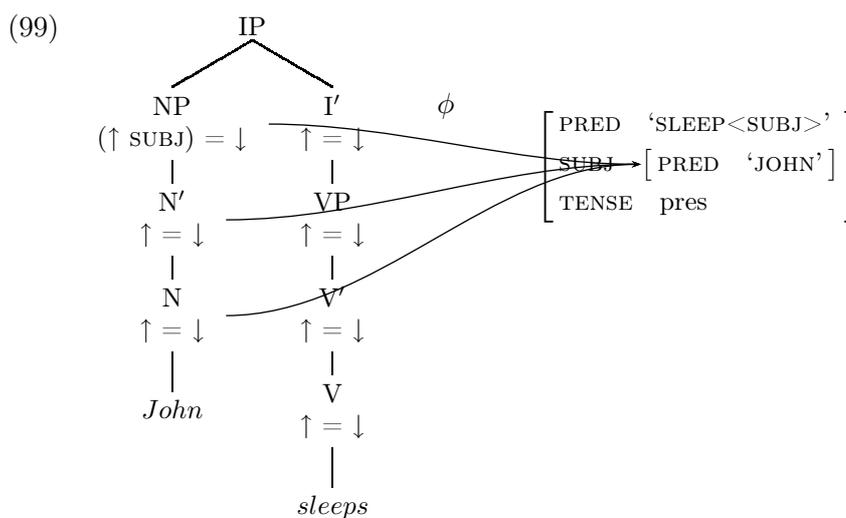
(100) $\uparrow = \downarrow$

When applied to a given node, it simply states that the f-structure corresponding to that node is the same as the f-structure corresponding to the node's mother. This is the only annotation that would be needed to build the f-structure shown in (98), reproduced with annotations below:



In this example, the annotations ensure that every node of the tree is related to the f-structure originally contributed by *John*. With the concept of annotation in hand, it is easy to see how functional information can be passed up from words (highlighting again LFG’s focus on the contributions of the lexicon) to the highest levels of the tree.

In many cases, the configurational structure of a sentence itself provides functional information. In English, for example, it is the fact that *John* appears before the verb which makes it clear that *John* fulfills the grammatical function of SUBJ. This is accounted for by functional annotations on c-structure nodes. In the following reproduction of (99), the annotation $(\uparrow \text{SUBJ}) = \downarrow$ makes the requisite claim, namely that the NP should be related to the f-structure which is defined by $(\uparrow \text{SUBJ})$:



$(\uparrow \text{SUBJ})$ is a ‘functional path description’, a string which specifies some f-structure. In

this case, it is the f-structure which is the value of the SUBJ attribute of \uparrow , i.e., the SUBJ attribute of the f-structure associated with the IP.

Using these functional annotations on c-structure nodes, it is possible to give a rich account of the interaction of functional information and configurational information, and how each plays a role in taking the initial functional contribution of lexical items and producing a linguistically insightful syntactic representation of a sentence. As I have laid them out, however, the annotations are tied too specifically to individual trees; our understanding of English subjects requires an analysis which can be formulated for sentences other than *John sleeps*. For this reason, the annotations are usually included in an analysis as part of the phrase structure rules proposed for a language, in order to make the generalization clear.

Dalrymple (2001:92ff) gives a thorough introduction to the motivations behind using phrase structure rules to describe the patterns of constituent structure in a language; it is a tradition which goes back to the earliest days of generative linguistics. I will not enter into a detailed discussion of the logic of rule expansions here, but simply point out how their form is altered in LFG in order to allow for functional annotations. The rule which describes the behavior of English subjects, for example, is as follows:

$$(101) \text{ IP} \longrightarrow \begin{array}{cc} \text{NP} & \text{I}' \\ (\uparrow \text{SUBJ}) = \downarrow & \uparrow = \downarrow \end{array}$$

(101) says that an IP has as its first child an NP, followed by I'. The functional annotations are included immediately below the element representing the nodes in the trees which will be generated using this rule. Together with other constituent structure rules, and the functional contributions of the words which act as leaves of the c-structure trees, well-formed sentences like *John sleeps* can be generated, and f-structures produced which clearly represent the functional organization of the sentences. In order to put all these pieces together formally, it remains to give an overview of the LFG lexicon, since it plays such an important part in building the f-structures of LFG.

4.4 Lexical Entries

The LFG lexicon for a language consists, on a formal level, of a set of 3-tuples, each with the following information:

1. **Word form:** this is the form of a word as it actually appears in a c-structure tree, *not* the ‘dictionary form’ of the word, or its stem, or some other underspecified representation of it. It is common within LFG to assume the Lexical Integrity Principle (see Bresnan and Mchombo (1995) for a discussion of evidence for the principle), which basically states that morphological operations are invisible to syntax. Thus, a language with highly agglutinated forms (like Swahili), will have in its abstract lexicon a list of fully-specified forms, with all morphemes attached; the morphemes themselves will not figure in the lexicon. Of course, it is important to note that this does not limit the organization of the lexicon, or state that morphological operations cannot be used to generate the lexicon. It simply means that LFG as a syntactic theory says nothing about the way that the morphology of a particular language must function; in particular, it does not claim that morphological operations are basically syntactic operations.
2. **Lexical category:** this is the ‘part of speech’ of the word form (e.g., N, A, V, etc...), which restricts the set of c-structure nodes where the lexical item can be inserted.
3. **Functional annotations:** these constitute the functional contribution of a given lexical entry, and generally utilize \uparrow and \downarrow in order to construct or refer to f-structures.²⁵

The lexical entry for the word *John*, for example, is given in (102):

$$(102) \quad \textit{John} \quad N \quad (\uparrow \text{ PRED}) = \text{‘JOHN’}$$

(102) says that the PRED of *John*’s mother node’s f-structure (in this case, the lexical category N) should be ‘JOHN’. Adding relevant functional information to lexical entries is straightforward. (103) shows a few such additions, as well as the lexical entry for *sleeps*,

²⁵In fact, lexical entries are formally equivalent to annotated phrase structure rules, where the words are terminal expansions from their lexical category.

which now refers to the features NUM and PERS, since the *-s* at the end of the verb introduces a requirement on those attributes of its SUBJ.

- (103) *John* N (↑ PRED) = ‘JOHN’
 (↑ PERS) = 3
 (↑ NUM) = sg
- sleeps* V (↑ PRED) = ‘SLEEP<SUBJ>’
 (↑ TENSE) = pres
 (↑ SUBJ PERS) = 3
 (↑ SUBJ NUM) = sg

These entries, together with the c-structure in (99), will produce the following f-structure:

- (104)
$$\left[\begin{array}{l} \text{PRED} \quad \text{‘SLEEP<SUBJ>’} \\ \text{SUBJ} \quad \left[\begin{array}{l} \text{PRED} \quad \text{‘JOHN’} \\ \text{PERS} \quad 3 \\ \text{NUM} \quad \text{sg} \end{array} \right] \\ \text{TENSE} \quad \text{pres} \end{array} \right]$$

Importantly, if *John* had been specified with a different person or number (e.g., as the lexical entry for *people* would be), the Uniqueness Condition would have prevented any f-structure from being produced, since there would be a conflict in the NUM feature for the main f-structure’s SUBJ.

Lexical entries like those in (103), together with annotated phrase structure rules, constitute a syntactic analysis of a language from the perspective of LFG. C-structures and f-structures are produced when a string of words is generated (or parsed) from the rules, and the annotations are used to create a map from the constituent structure to the functional structure. The goal of an analysis in the spirit of LFG, then, is to be able to parse all and only valid sentences with the phrase structure rules, with the additional requirement that, for each parse, the f-structure or f-structures produced are indeed those which faithfully represent the functional information in the sentence. In the following chapter, I will define a fragment of just this kind of analysis for Swahili, focusing on those rules and annotations which bear on the topic of relative clauses.

Chapter 5

Analyzing Swahili Relatives in LFG

In this chapter I will outline an LFG analysis of Swahili relative clauses. While complete coverage of all the facts which impinge in any way upon Swahili relative clauses is of course beyond the scope of this discussion, I will claim at least to have said something about the phenomena presented in Chapter 3. It is also worth noting that the various LFG rules, templates, and structures I present were actually constructed and generated within the Xerox Linguistic Environment (XLE) (Crouch et al. 2007), a framework for developing and computationally experimenting with LFG grammars.

Before examining Swahili relative clauses specifically, I chose to build a basic model of the language in XLE, in order to provide an environment in which to test my later analyses. All of the rules and lexical entries included are taken from those that actually power my implementation, and the structures given are those that resulted from parsing the corresponding sentences in XLE.²⁶

In what follows I will give a basic introduction to my LFG grammar of Swahili, and then discuss each of the types of relative clause. Finally, I will examine how the multiple projection architecture of LFG encourages different levels of analysis for different linguistic claims about Swahili relative clauses. In cases where both *amba-* and verbal affix strategies are possible, my argument will be that the f-structures for such examples will be the same. In other words,

²⁶I will not always show all of the details present in my actual implementation, since some may be irrelevant to the point under examination, and it will be valuable to isolate only the pertinent features of a rule or lexical entry.

at the functional level, the level most appropriate for semantic analysis and translation, there is no important difference between the two strategies. Of course, we also observed in Chapter 3 that there are important syntactic differences, and we will explore the ramifications of those differences as well.

5.1 Basic Phrase Structure Rules

The basic set of c-structure rules which will be used in the examples I will give is as follows (with descriptions following each rule):

$$(105) \text{ IP} \longrightarrow \left(\begin{array}{c} \text{NP} \\ (\uparrow \text{SUBJ}) = \downarrow \end{array} \right) \text{ VP} \quad \uparrow = \downarrow$$

An IP begins with a possible noun phrase subject, followed by the verb phrase.

$$(106) \text{ NP} \longrightarrow \text{N}' \quad \uparrow = \downarrow$$

NP goes to N'

$$(107) \text{ N}' \longrightarrow \left\{ \begin{array}{c} \text{N}' \quad \text{NAdj} \\ \uparrow = \downarrow \quad \uparrow = \downarrow \end{array} \right\}$$

A noun phrase consists of a noun and an optional series of adjuncts attached via recursion at the bar level (see the next definition for the list).

$$(108) \text{ NAdj} \equiv \left\{ \begin{array}{c} \text{AP} \quad \text{PP} \quad \text{CP} \\ \downarrow \in (\uparrow \text{ADJ}) \quad \downarrow \in (\uparrow \text{ADJ}) \quad \downarrow \in (\uparrow \text{ADJ}) \\ (\downarrow \text{CLASS}) = (\uparrow \text{CLASS}) \quad @\text{PREP-AGR} \quad @\text{CP-FEAT} \\ (\downarrow \text{ANIM}) = (\downarrow \text{ANIM}) \end{array} \right\}$$

Nouns can have adjective, preposition, and CP adjuncts (CP is the category used for relative clauses). These all appear in the ADJ set of the NP, and have various functional restrictions, primarily for agreement purposes. The templates @PREP-AGR and @CP-FEAT are used to encapsulate these restrictions; only @CP-FEAT is relevant for this analysis, and its definition is shown below.

$$(109) @\text{CP-FEAT} \equiv \begin{array}{l} (\downarrow \text{CLAUSE-TYPE}) =_c \text{rel} \\ @\text{NOFE}((\uparrow \text{CLASS}), (\downarrow \text{TOPIC CLASS})) \\ @\text{NOFE}((\uparrow \text{NUM}), (\downarrow \text{TOPIC NUM})) \\ @\text{NOFE}((\uparrow \text{ANIM}), (\downarrow \text{TOPIC ANIM})) \\ @\text{NOFE}((\uparrow \text{SEM}), (\downarrow \text{TOPIC SEM})) \end{array}$$

These annotations on CP adjuncts of nouns make explicit that such CPs need to be relative clauses, and enforce agreement between the head noun and the relative pronoun (which is taken to be the TOPIC of the relative clause).²⁷

$$(110) \text{ VP} \longrightarrow \begin{array}{c} \text{V}' \\ \uparrow = \downarrow \end{array}$$

VP goes just to V'.

$$(111) \text{ V}' \longrightarrow \left\{ \begin{array}{c|c} \text{V}' & \text{VAdj} \\ \uparrow = \downarrow & \uparrow = \downarrow \end{array} \middle| \begin{array}{c|c} \text{V} & \text{VArg*} \\ \uparrow = \downarrow & \end{array} \right\}$$

Verbs can be followed by an adjunct at the bar level, or an optional series of arguments defined in VArg below.

$$(112) \text{ VAdj} \equiv \left\{ \begin{array}{c|c|c} \text{AdvP} & \text{PP} & \text{NP} \\ \downarrow \in (\uparrow \text{ADJ}) & \downarrow \in (\uparrow \text{ADJ}) & \downarrow \in (\uparrow \text{ADJ}) \\ & & (\downarrow \text{SEM}) \end{array} \right\}$$

Verbs can have adverbs and prepositional phrases as adjuncts. Certain nouns which bear a special semantic value (locative nouns, for example), can also be used adverbially and thus count as verbal adjuncts.

$$(113) \text{ VArg} \equiv \left\{ \begin{array}{c|c|c|c|c} \text{NP} & \text{CP} & \text{VP} & \text{PP} & \text{NP} \\ (\uparrow \{\text{OBJ} \mid \text{SUBJ}\}) = \downarrow & (\uparrow \text{COMP}) = \downarrow & (\uparrow \text{XCOMP}) = \downarrow & (\uparrow \text{OBL}) = \downarrow & (\uparrow \text{OBL}) = \downarrow \\ & & & & (\downarrow \text{SEM}) \end{array} \right\}$$

Verbs can take a variety of arguments, including (for some verbs) items from the OBL_θ family of grammatical functions, and sentential and verbal complements. Initial provision is also made for subject postposing by allowing a post-verbal NP to be SUBJ.

Leaving out for now the rules for AP, AdvP, and PP, we simply need to examine the simple CP rules, as they are particularly important for relative clauses:

$$(114) \text{ CP} \longrightarrow \begin{array}{c} \left(\text{NP} \right) \\ \uparrow = \downarrow \end{array} \quad \begin{array}{c} \text{C}' \\ \uparrow = \downarrow \end{array}$$

CPs begin with an optional NP in the specifier (containing a relative pronoun amba-), then C'.

²⁷I assume @NOFE is an LFG template (short for “none or force equal”) which checks the first argument and, if it exists, checks to make sure whether it matches the second argument. If the second argument does not exist, it creates it with the value of the first argument. Otherwise, if the first argument does not exist, nothing happens.

$$(115) \ C' \longrightarrow \left(\begin{array}{c} C \\ \uparrow = \downarrow \end{array} \right) \text{ IP} \quad \uparrow = \downarrow$$

Clauses can also contain an optional complementizer, and always have an embedded IP.

Of course, the rules as I have laid them out are intended to be a first draft, and we will see how they need to be modified in order to account for the various relative clause phenomena. I hope that this minimal grammar can be taken as a relatively uncontroversial explication of a bare set of syntactic constraints.

5.2 A Resumptive Introduction

Given the proliferation of what appear to be resumptive pronouns in many of the examples in Chapter 3, it is important to be explicit about their role in this analysis. In some cases it is not clear whether verbal morphemes in relative clauses should count as resumptive pronouns or agreement morphology, e.g. as they would in a gap strategy. Object markers, for example, can be analyzed in general as either incorporated pronouns (which in the framework of LFG would contribute a PRED ‘PRO’ to their f-structure) or as agreement morphemes (in which case their PRED-less f-structures can simply be unified with that of an overt object, or optionally contribute a PRED just in case there is no overt object).²⁸

In other relative clause examples there are, however, entirely clear cases of resumption, wherein a stand-alone relative pronoun is used. Recall, for example, (54):

$$(54) \textit{mvulana} \ \textit{amba-ye} \ \ \ \ \ \textit{chakula} \ \textit{ki-li-pik-w-a} \ \ \ \ \ \textit{na} \ \ *(yeye)$$

1.boy amba-AN.3SG 7.food 7-PAST-cook-PASS-FV by 3SG.PRO

‘the boy the food was cooked by (him)’ (Keach 1980:105)

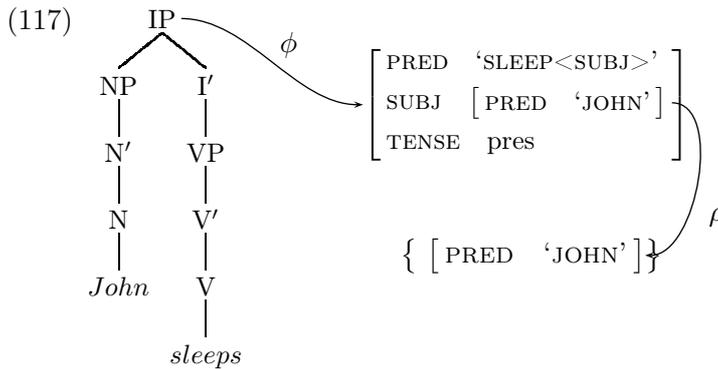
²⁸Bresnan and Mchombo (1987) provides a thoughtful discussion of grammatical vs. anaphoric agreement in Bantu, which may bear on the facts presented here. They provide evidence that, in Chichewa, subject agreement is grammatical, whereas object agreement is anaphoric; object markers would then be incorporated pronouns used as anaphors to an overt object (or to a relative clause TOPIC). However, the situation in Swahili is not necessarily the same (cf. (Augustin and Augustin 2007:7), who claims object markers are well on their way to becoming purely agreement morphemes). Still, I take it as an important point that relativized objects are always marked (if possible) on the relative clause verb, which is entirely reminiscent of the other pronominal elements that show up obligatorily where one might expect a gap in the relative clause. Thus, in this analysis, I have chosen to treat object markers as incorporated pronouns, making them resumptive in relative clauses.

In this and other such examples, *yeye* ‘PRO’ must be anaphorically (and not grammatically) related to *ambaye*, if, as I also claim, *amba-* is pronominal itself. On the other hand, there are clear cases of gapping in Swahili as well, for example when relativizing on OBJ2 or locative adjuncts:

- (116) *kitabu a-li-cho-wa-som-e-a mwalimu wanafunzi*
 7.book AN.3SG-PAST-7.REL-AN.3PL.OBJ-read-APPL-FV 1.teacher 2.student
 ‘the book which the teacher read to the students’ (Edelsten et al. 2010:3)

In (116), *kitabu* binds the OBJ2 of the relative clause, but (apart from the relative morpheme itself) there is nothing in the clause to indicate that OBJ2 even exists! According to Asudeh (2004:104), it is common for resumptive pronoun strategies to be in this kind of complementary distribution with gap strategies. In fact, the cliticized pronominal elements and pronominal morphemes in Swahili relative clauses exhibit, *prima facie*, the key characteristics Asudeh claims belong to resumptive pronouns. In fact, apart from the subject marker, I argue that all pronominal elements are *actually* pronominal, and exist in anaphoric relationships with the nouns they resume.

So much for the linguistic defense; how are resumptive pronouns to be handled theoretically? In LFG, it is important both that (a) no two PREDs are contributed for one f-structure and that (b) no f-structure with a PRED is floating around unattached. Thus some mechanism is needed for modeling the process of resumption. In my analysis I follow Falk (2002), who proposes that we countenance a ‘referential structure’ (‘r-structure’), linked to f-structure by a projection ρ . The r-structure of a phrase or sentence is essentially a set of nominal f-structures which have been declared (lexically, perhaps) to be referential. This set is available for reference, via appropriate annotations, from any f-structure. The relation between c-, f-, and r-structures can be depicted as follows:



In this diagram, it is made explicit that the f-structure for *John* has been contributed to the set of f-structures which constitute the r-structure, via the projection ρ . What has not been explicitly mentioned is that this entire set is available to *any* f-structure for reference. For this situation to obtain, it is necessary to make a change to any c-structure annotation which is not simply $\uparrow = \downarrow$. In other words, assume that the annotation on the NP node in the above example was originally $(\uparrow \text{SUBJ}) = \downarrow$. To properly build up the r-structure for a sentence, the new annotation needs to be:

$$(118) \quad (\uparrow \text{SUBJ}) = \downarrow \\ \uparrow_{\rho} = \downarrow_{\rho}$$

(118) says that, even though \downarrow is the SUBJ of \uparrow , their r-structure is the same. This ensures that the same r-structure set will be accessible via \uparrow_{ρ} from any f-structure. In the rest of this paper, I will assume that such annotations are present in all the appropriate places.

Of course, something needs to be said about how the r-structure is built up to begin with. Essentially, the lexical entry for any referring entity needs to contribute itself to the r-structure set. This is done via the addition of the annotation $\uparrow \in \uparrow_{\rho}$, i.e., the declaration that the f-structure representing the referring entity is a member of the r-structure set.

The mechanism for handling resumptive pronouns, then, is to give such pronouns a disjunctive definition in the lexicon: either (a) they contribute a PRED 'PRO', or (b) they are equal to some member of the r-structure which plays an appropriate discourse function (DF). (B) essentially encodes the fact that resumptive pronouns must resume something which has already been contributed to the list of referential items in a discourse, and which is the kind

of thing which can grammatically be resumed.²⁹ This statement can be defined formally as an LFG template, @RES-PRO:

$$(119) \text{ @RES-PRO} \equiv \left\{ \begin{array}{l} (\uparrow \text{ PRED}) = \text{'PRO'} \\ \uparrow = (\uparrow_{\rho} \in) \\ (\{\text{TOPIC} \mid \text{OBJ}\} \uparrow) \end{array} \right\}$$

In other words, if a pronoun with f-structure f is not able to contribute its own PRED because of some constraint, then it will be considered resumptive if the following conditions are met:

1. There is some f-structure g in the r-structure set which f may be identified with (i.e., which may unify with f according to the basic conditions of LFG). Note that $\uparrow = (\uparrow_{\rho} \in)$ imposes a requirement only; it does not actually contribute \uparrow to the set \uparrow_{ρ} . This mirrors the requirement on resumptive pronouns that their anaphor must already be present in discourse.
2. g is either the TOPIC or OBJ of its mother f-structure. This reflects the intuition that resumption only happens in certain linguistic environments, for example in relative clauses which introduce the TOPIC feature.

With these formal tools in hand, we are ready to engage in a rigorous discussion of the examples presented so far, and examine the details of a resumptive pronoun-based analysis.

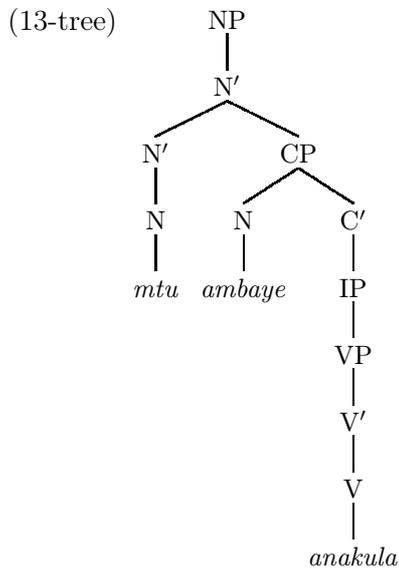
5.3 Analyzing the Basic Cases

Since in LFG much of the syntactic information used in parsing a sentence comes from the lexical entries for the words in that sentence, I will move directly to the analysis of a basic *amba-* phrase:

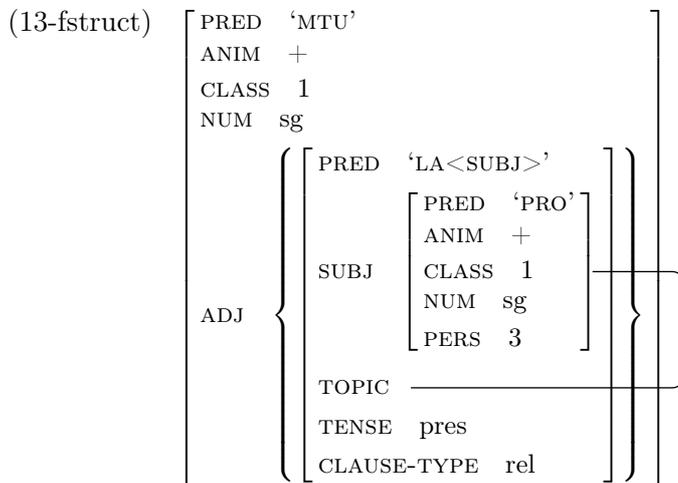
$$(13) \begin{array}{lll} mtu & amba-ye & a-na-ku-l-a \\ 1.\text{person} & \text{amba-AN.3SG} & \text{AN.3SG-PRES-SE-eat-FV} \\ \text{'(a) person who is eating'} & & \end{array} \quad (\text{Mohammed 2001:181})$$

²⁹In this thesis, DF is the disjunction $\{\text{TOPIC} \mid \text{OBJ}\}$, since I am claiming that resumptive pronouns must resume either a relative pronoun or, in the case of an object marker, an overt object.

The phrase structure rules we listed allow for just one tree to be parsed from this phrase:³¹



Combining the c-structure annotations in (105) - (115), the lexical entries in (13-lex), and the tree in (13-tree), we produce the following f-structure:



This structure is, I take it, exactly the right analysis. In particular, the annotations on the CP rule listed in @CP-FEAT ensure that *mtu* agrees with *ambaye*, and unifies all class, number, person, and animacy information. Thus if any of *mtu*, *ambaye*, or *anakula* had not

³¹In this tree, I have included a chain of single expansions from C' to V. For the sake of space in future trees, I will often omit chains of non-branching nodes, in which case the omission will be signified by three vertical dots.

agreed, no valid f-structure would have been generated, and the phrase would be deemed ungrammatical.

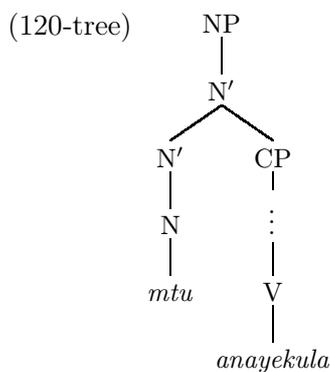
Keeping the c-structure rules as they are, we can give an analysis of the same phrase in the tensed relative strategy:

- (120) *mtu a-na-ye-ku-l-a*
 1.person AN.3SG-PRES-AN.3SG.REL-SE-eat-FV
 ‘(a) person who is eating’ (Constructed)

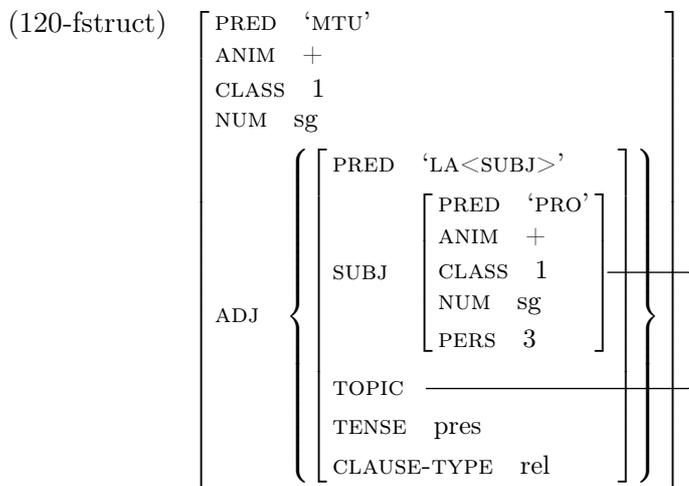
The lexical entries for this phrase are largely similar, except the information provided by *ambaye* and *anakula* in the last example is now found in the entry for just the verb *anayekula*:

- (120-lex) *mtu* N (↑ PRED) = ‘MTU’
 (↑ CLASS) = 1
 (↑ NUM) = sg
 (↑ ANIM) = +
 ↑ ∈ ↑_ρ
- anayekula* V (↑ PRED) = ‘LA<SUBJ>’
 ((↑ SUBJ PRED) = ‘PRO’)
 (↑ SUBJ ANIM) = +
 (↑ SUBJ NUM) = sg
 (↑ SUBJ PERS) = 3
 (↑ TENSE) = pres
 (↑ TOPIC PRED) = ‘PRO’
 (↑ TOPIC) = (↑ SUBJ)
 (↑ TOPIC ANIM) = +
 (↑ TOPIC NUM) = sg
 (↑ CLAUSE-TYPE) = rel

The c-structure is even more simple:



And the f-structure is, for this example, exactly the same as (13-fstruct):



Although (120) is an example of a tensed verbal affix relative, we could have used virtually identical structures to construct an analysis for an ‘untensed’ version of the phrase, say (121):

- (121) *mtu a-ku-l-a-ye*
 1.person AN.3SG-PRES-AN.3SG.REL-SE-eat-FV
 ‘(a) person who eats’ (Constructed)

The lexical entries, c- and f-structures for (121) would be the same as for (120), except the lexical entry for *akulaye* would have no TENSE feature. In general, the untensed relative strategy in (121) will not receive separate treatment in this chapter, and instead I will focus on the differences between *amba-* relatives and tensed relatives.

5.3.1 Aside: Lexical Templates

Since it can become unnecessarily tedious both to list and to read certain features (like CLASS, PERS, or NUM) in the lexical entries, I will introduce a set of parameterized templates which will enable that information to be collapsed. The basic template for the agreement features will be @ANCP:

- (122) @ANCP(*D*, *A*, *N*, *C*, *P*) ≡
 @SET-IF-VAL(*A*, *D*, ANIM)
 @SET-IF-VAL(*N*, *D*, NUM)
 @SET-IF-VAL(*C*, *D*, CLASS)
 @SET-IF-VAL(*P*, *D*, PERS)

$$(123) \text{ @SET-IF-VAL}(V, D, F) \equiv \left\{ \begin{array}{l} V = _ \\ (D \ F) = V \end{array} \right\}$$

Together, (122) and (123) allow us to specify animacy, number, class, and person information for arbitrary designations (such as \uparrow , or $(\uparrow \text{ SUBJ})$). The @SET-IF-VAL template provides a way to avoid specifying one or more features in the template call, as often it will be desirable to make no claims at all about the value of one of the features.³²

Although it is not necessary for the examples seen so far, I will assume that we have also redefined @RES-PRO as follows, in order to allow one-line definitions for resumptive pronouns:

$$(124) \text{ @RES-PRO}(D, A, N, C, P) \equiv \left\{ \begin{array}{l} (D \text{ PRED}) = \text{'PRO'} \\ D = (\uparrow_\rho \in) \\ (\{\text{TOPIC} \mid \text{OBJ}\} \ D) \end{array} \right\}$$

$$\text{ @ANCP}(D, A, N, C, P)$$

Finally, it is helpful to introduce a template to encapsulate the annotations introduced by relative clause lexical items (i.e., by *amba-* and verbs with relative markers):

$$(125) \text{ @REL-FEAT}(A, N, C, P) \equiv \begin{array}{l} (\uparrow \text{ TOPIC PRED}) = \text{'PRO'} \\ \text{ @ANCP}((\uparrow \text{ TOPIC}), A, N, C, P) \\ (\uparrow \text{ TOPIC}) = (\uparrow \text{ SUBJ}) \\ (\uparrow \text{ CLAUSE-TYPE}) = \text{rel} \end{array}$$

In order to demonstrate the use of these templates, (120-lex) is reproduced below with the template notation:

$$(120\text{-lex}) \quad \begin{array}{ll} \textit{mtu} & \text{N} \\ \textit{anayekula} & \text{V} \end{array} \quad \begin{array}{l} (\uparrow \text{ PRED}) = \text{'MTU'} \\ \text{ @ANCP}(\uparrow, +, \text{sg}, 1, _) \\ \uparrow \in \uparrow_\rho \\ (\uparrow \text{ PRED}) = \text{'LA<SUBJ>'} \\ ((\uparrow \text{ SUBJ PRED}) = \text{'PRO'}) \\ \text{ @ANCP}((\uparrow \text{ SUBJ}), +, \text{sg}, _, 3) \\ (\uparrow \text{ TENSE}) = \text{pres} \\ \text{ @REL-FEAT}(+, \text{sg}, _, _) \end{array}$$

³²Passing in the value ‘_’ for one of the parameters of @ANCP will therefore have the effect of *not* setting the corresponding feature to anything.

5.4 Obligatory Object Marking

In section 3.2.1, I discussed a putative constraint on cases where the head noun of a relative clause binds the object of that clause. In such cases, object marking was obligatory, regardless of the animacy of the head noun. In this section I will show how I treat this generalization via resumption: the relative clause TOPIC must play a grammatical role in the relative clause, and this identification is made through the resumption of the pronominal object marker. Recall, for example, (24) and (25), repeated here for convenience:

(24) *kitabu ni-na-cho-ki-som-a*
 7.book AN.1SG-PRES-7.REL-7.OBJ-read-FV
 ‘book which I am reading’ (Keach 1980:36)

(25) **kitabu ni-na-cho-som-a*
 7.book AN.1SG-PRES-7.REL-read-FV
 ‘book which I am reading’ (Constructed)

In my implementation of Swahili grammar, the lexical entry for *ninachokisoma* in (24) is as follows:

(24-lex) *ninachokisoma* V (↑ PRED) = ‘SOMA<SUBJ,OBJ>’
 ((↑ SUBJ PRED) = ‘PRO’)
 @ANCP((↑ SUBJ), +, sg, _, 1)
 @RES-PRO((↑ OBJ), -, sg, 7, _)
 (↑ TENSE) = pres
 @REL-FEAT(-, sg, 7, _)

The various morphemes sitting in the appropriate verb slots contribute a wealth of information, but most relevant are *-cho-* and *-ki-*:

- *-cho-* (the relative marker) gives information about the TOPIC of whichever clause the verb is in, and moreover declares that we are in a relative clause, with the appropriate annotations pulled in through the @REL-FEAT template.
- *-ki-* (the object marker) contributes an object pronoun which may (and in this case does) end up being resumptive, according to the disjunctive definition for resumptive pronouns given in 5.2.

How then do we add to our analysis the constraint that verbs relativizing on objects must show the object-marking morpheme, in other words that *-ki-* in this example is obligatory? The answer lies in modifying the @REL-FEAT template to support resumption:

$$(125\text{-new}) \text{ @REL-FEAT}(A, N, C, P) \equiv \begin{array}{l} \vdots \\ (\text{GF } (\uparrow \text{ TOPIC})) \\ (\uparrow \text{ TOPIC}) \in \uparrow_{\rho} \\ ((\uparrow \text{ TOPIC}) = (\uparrow \text{ SUBJ})) \end{array}$$

First, the line $(\text{GF } (\uparrow \text{ TOPIC}))$ is added. This is an existential constraint which requires $(\uparrow \text{ TOPIC})$ to be a grammatical function GF (defined, perhaps, as $\{\text{SUBJ} \mid \text{OBJ}\}$), and it amounts to saying that a relative clause must relativize on *something*; we are just not committed in this template to what exactly it is. Next, TOPIC’s f-structure is added as a member of the r-structure, to enable its resumption. Finally, we make the identification with $(\uparrow \text{ SUBJ})$ optional—TOPIC can now play other roles via resumption, but this optional path specification must be retained in order for the gap strategy to work.

With these modifications in place, we can observe that the incorporated pronouns in *ninachokisoma* do all the work: @REL-FEAT does not tell TOPIC that it should be OBJ, but relies for the identification on the link in the r-structure. Thus *-cho-* (the relative morpheme) and *-ki-* (the incorporated object pronoun) mutually constrain each other. If *-ki-* is anything other than a resumptive pronoun, or if *-cho-* does not contribute to r-structure, the phrase will fail to be grammatical. This in fact is what accounts for the ungrammaticality of (25) above, since the lexical entry for the verb *ninachosoma* in that example would lack the @RES-PRO declaration that comes with the absent morpheme *-ki-*.

5.5 Tense and Negation Constraints

As we saw in section 3.2.2, one difference between the *amba-* and verbal affix strategies is the number of tenses available for the relative clause verb. While there is no restriction for *amba-* relatives, tensed relatives can use only *-na-* ‘PRES’, *-li-* ‘PAST’, *-taka-* ‘FUT’, and *-si-* ‘NEG’.

Interestingly, from a synchronic perspective this constraint seems to be driven by phonology, rather than syntax. In Swahili verbs, the morphemes up to and including the relative

marker form a phonological word which receives secondary stress. This phonological word receives its stress, according to the standard rules of Swahili accentuation (i.e., penult receives stress). (126) and (127) show examples of this stress pattern:

(126) ,*a-li-'kw-end-a*
AN.3SG-PAST-SE-go-FV
'(s)he went'

(127) ,*a-ta-'kw-end-a*
AN.3SG-FUT-SE-go-FV
'(s)he is going'

When the relative marker is added after the tense marker, it shifts the tense marker into the penult of the phonological word, thus causing it to receive secondary stress. In Swahili, some morphemes are not allowed to receive stress, whether primary or secondary, and this in fact is why not every tense marker is available for use in the verbal affix relatives. Evidence of this is shown in *-taka-* 'FUT', a version of *-ta-* which *can* receive stress. Thus, while (128) is not permitted, (129) is.

(128) **a-,ta-ye-'kw-end-a*
AN.3SG-FUT-AN.3SG.REL-SE-go-FV
'(s)he who will go'

(129) *a-ta,ka-ye-'kw-end-a*
AN.3SG-FUT-AN.3SG.REL-SE-go-FV
'(s)he who will go'

In the spirit of this analysis, I deal with the ungrammaticality of cases like (128) in my morphological analyzer, rather than in the LFG grammar. In this case, facts about stress are encoded directly in the morphology (via the alternation between *-ta-* and *-taka-*), and so, following the Lexical Integrity Principle, we can assume the logic which governs this alternation has already taken place by the time the verb is added to the lexicon. I assume, in other words, that the morphological rules which build up valid Swahili verbs simply do not generate phonologically undesirable forms, and thus the syntax is relieved of the burden of having to do something about them.³³

³³Of course, I have not offered an explanation for the phenomenon in general, and it may best be formulated

5.6 Word Order: Basic Analysis

Many of the basic facts about word order in relative clauses fall out automatically from the c-structure rules for non-relative clauses as I have given them. Take, for example, the restriction that *amba-* must immediately follow its head noun phrase. This, in my analysis, is a consequence merely of the ordering of noun adjuncts and arguments: AP and PP are nominal adjuncts which precede CP. Given that *amba-*, if it appears, must be the leftmost element of CP, it will always be the case that *amba-* immediately follows the head noun along with any of its other adjuncts. Any other kind of intervening material will result in a failure to find a valid parse tree.

Likewise, the slightly more relaxed situation with the tensed relatives (e.g., as in (42)) is automatically explained by the fact that, in tensed relative constructions, nothing is in the specifier of CP, and we can therefore find all sorts of material intervening between the head noun phrase and the relative clause verb—essentially, whatever is allowed to appear before the relative clause verb in its IP.

In sections 3.2.3 and 3.2.4, I engaged in an extended discussion about where adverbs like *jana* ‘yesterday’ can appear in *amba-* and verbal affix relatives. I argued that, despite suggestions in Mohammed (2001) to the contrary, adverbs could be found between *amba-* and a relative clause verb, as well as after the verb. If this is indeed the case, it makes the analysis of these facts quite simple: adverbs can appear sententially (at the beginning of IP, for example), or anywhere else allowed by the phrase structure rules. Thus no modification of my analysis is required to accommodate any of the adverb-focused examples given in Chapter 3.

5.7 Word Order: Subject Postposing

One word order issue demands more detailed attention, and that is subject postposing, wherein we do find an arguably clear difference between *amba-* and tensed relatives. First, we need to note (as I detailed in section 3.2.5) that, in tensed relatives, an overt subject

diachronically in any case. All I claim is that syntax is not the right linguistic stratum for an analysis of these facts.

within the relative clause is ungrammatical if the subject is the grammatical function being relativized on, as in (43) (in contrast to the grammaticality of the *amba-* version in (40)):

- (43) **mtu yeye a-li-ye-kw-end-a*
 1.person 3SG.PRO AN.3SG-PAST-AN.3SG.REL-SE-go-FV
 ‘person who went’ (Keach 1980:97)

- (40) *mtu amba-ye yeye a-li-kw-end-a*
 1.person amba-AN.3SG 3SG.PRO AN.3SG-SE-PAST-go-FV
 ‘person who went’ (Keach 1980:97)

(40) is already predicted by my analysis, on the assumption that *yeye* ‘PRO’ uses the @RES-PRO template in its lexical definition; it is then an example of a resumptive pronoun. (43) is not thus explained, however. Its ungrammaticality, I believe, is due to the presence of a non-postposed subject (whose coreference with the adjacent head noun *mtu* may or may not be independently dispreferred). This difference between *amba-* and tensed relatives arises in cases of relativization on the object. In the *amba-* strategy, an overt subject is allowed in general:

- (130) *kitabu amba-cho Juma a-li-ki-som-a*
 7.book amba-7 Juma AN.3SG-PAST-7.OBJ-read-FV
 ‘book Juma read’ (Constructed)

In the verbal affix strategy, an overt subject obligatory (or preferentially) postpones to a position immediately following the verb, as in (45):

- (45) *kitabu a-li-cho-ki-som-a Juma*
 7.book AN.3SG-PAST-7.OBJ-7.REL-read-FV Juma
 ‘book Juma read’ (Keach 1980:211)

How do we account for this difference? I take it that, since we are dealing with a configurational phenomenon (like subject/auxiliary inversion in English, for example), the best explanation will make reference to c-structural facts. Fortunately, these are precisely the facts which describe the primary difference between *amba-* and verbal affix relatives: the former make use of a relative pronoun in the specifier position of CP, whereas the latter do not.

relatives and COMP in section 5.10, but the main observation here is that subject postposing is not triggered when TOPIC is not one of the arguments of the relative clause verb.

Assuming my statement of the generalization is correct, how can it be expressed within the current analysis? A simple solution would be to modify the IP rule once again, allowing Spec-IP subjects even when SPEC-CP is ‘–’, but only under the condition that TOPIC is not targeting any argument of the relative clause verb itself. Of course, such a solution is not a linguistic explanation. I see the real source of the alternation as having to do with the weight of the different arguments; on any account, a sentential complement is a ‘heavier’ argument than a bare noun. Placing *Asha* in (42) after a heavy CP could make the resulting construction awkward and therefore dispreferred, despite a more general preference for postposing.³⁵

5.8 Passive Relatives

To account for the various data regarding passivization in relative clauses, we will have occasion to modify the analysis in some ways. The basic cases, however, do not require such modification. First, consider the two passive sentences (133) and (134):

(133) *chakula ki-li-pik-w-a*
 7.food 7-PAST-cook-PASS-FV
 ‘the food was cooked’ (Constructed)

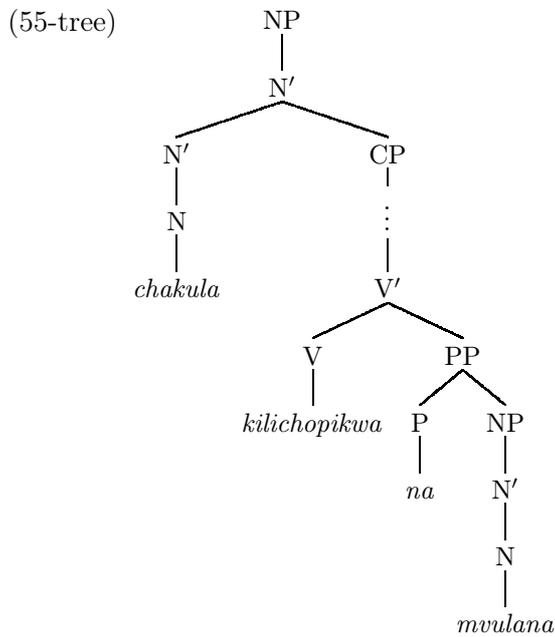
(134) *chakula ki-li-pik-w-a na mvulana*
 7.food 7-PAST-cook-PASS-FV by 1.boy
 ‘the food was cooked by the boy’ (Constructed)

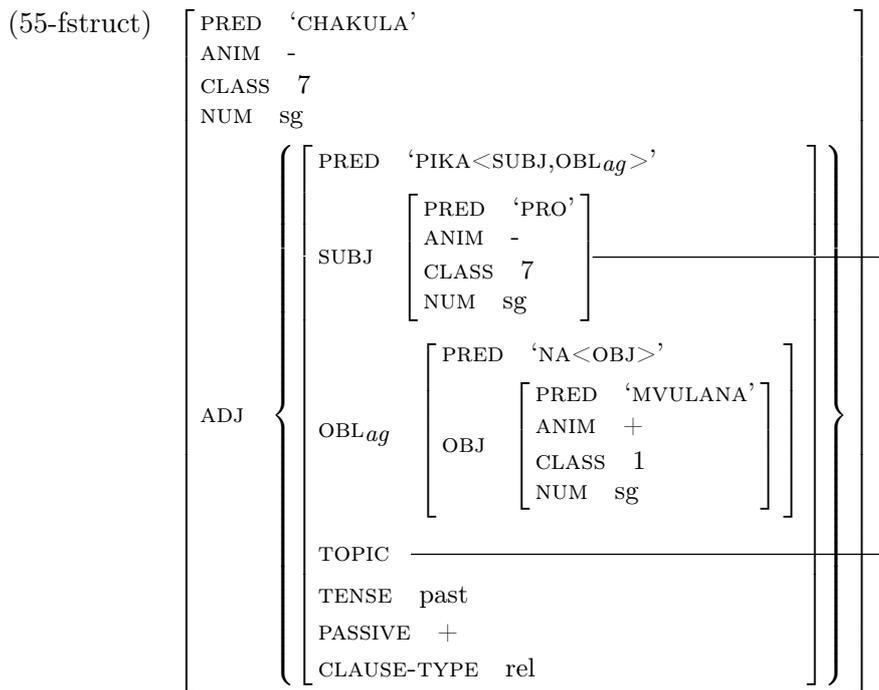
Passive verbs like *-pikwa* are morphologically quite interesting, in that there are a number of rules regarding the use of the passive morpheme *-w-*. From the point of view of my syntactic analysis, I am assuming that full verbs like *kilipikwa* come ‘ready-made’ with all morpho-syntactic contributions, and thus *-pikwa* is a verb which has already undergone a valency-reducing passivization operation. I leave to one side a discussion of how best to

³⁵In my computational implementation of the analysis, and in accord with data from e.g. Edelsten (2010), I have chosen to handle subject postposition, and the facts regarding constituent weight, in an optimality-theoretic fashion. Unfortunately, detailing precisely how I incorporated such considerations is beyond the scope of this thesis.

- (55-lex) *chakula* N (\uparrow PRED) = 'CHAKULA'
 @ANCP(\uparrow , -, sg, 7, _)
 $\uparrow \in \uparrow_\rho$
- kilichopikwa* V (\uparrow PRED) = 'PIKA<SUBJ,OBL_{ag}>'
 (\uparrow PASSIVE) = +
 ((\uparrow SUBJ PRED) = 'PRO')
 @ANCP((\uparrow SUBJ), -, sg, 7, _)
 @REL-FEAT(-, sg, 7, _)
 (\uparrow TENSE) = past
- na* P (\uparrow PRED) = 'NA<OBJ>'
- mvulana* N (\uparrow PRED) = 'MVULANA'
 @ANCP(\uparrow , +, sg, 1, _)
 $\uparrow \in \uparrow_\rho$

One of the annotations for PP arguments of verbs was (\uparrow OBL) = \downarrow . If we assume here that OBL is really a disjunction, referring to the whole family of OBL functions (including the relevant OBL_{ag}), then the c-structure rules already allow us to build an analysis for the phrase:





According to the data laid out in section 3.2.6, the example above could be rephrased using *amba-* in exactly the way we would expect, and so I omit a complete analysis of it here.

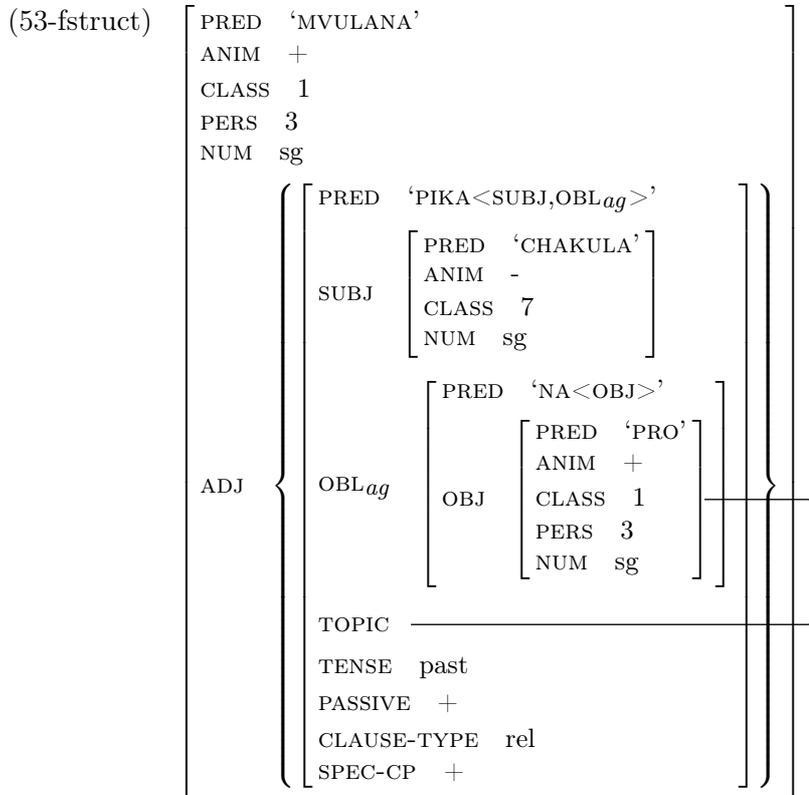
Given that we have introduced verbs which take OBL_{ag} arguments, we can ask whether it is open to either *amba-* or tensed relatives to relativize on the demoted agent, located in the f-structure as the OBJ of the PP OBL_{ag}. Example (53) proves it is possible to do so with *amba-*:

- (53) *mvulana amba-ye chakula ki-li-pik-w-a na-ye*
 1.boy amba-AN.3SG 7.food 7-PAST-cook-PASS-FV by-3SG.PRO
 ‘the boy the food was cooked by’ (Keach 1980:105)

Naye is a word which consists of the Swahili preposition *na* ‘by, with’ as well as a cliticized pronoun (of the same form as the relative marker with which we are familiar). I take it that this incorporated pronoun is resumptive (since in this example we could also have the non-incorporated pronoun, e.g., *na yeye* ‘by PRO’).

The possibility of relativization on the object of OBL_{ag} is already countenanced by the way resumption is handled: *ambaye* (which has contributed itself to the r-structure) needs to play some grammatical role, and *-ye* in *naye* is an OBJ which needs (as a resumptive pronoun)

And the OBL_{ag} -relativized f-structure:



The same phrase cannot be constructed using the tensed relative strategy, as (56) attempts to do:

- (56) **mvulana chakula ki-li-ye-pik-w-a naye*
 1.boy 7.food 7-PAST-AN.3SG.REL-cook-PASS-FV by-3SG.PRO
 ‘the boy the food was cooked by’ (Keach 1980:106)

That it is possible to relativize on OBL_{ag} OBJ in the *amba*- strategy but not, apparently, in the tensed relative strategy can be explained by the current analysis of subject postposing. I was not able to verify (in 3.2.6) whether a postposed version is grammatical, but that is the outcome predicted on this analysis. I will therefore assume the grammaticality of (59) until more data is gathered:³⁸

³⁸If it turns out that (59) is ungrammatical, one explanation could be that in passive constructions, relativization on the oblique agent together with subject postposing creates a situation where the (typically) animate head noun is followed immediately by the subject marker of a (typically) inanimate promoted theme. It is possible that this juxtaposition would bring about the illusion of a class/animacy disagreement, and encourage speakers to find different strategies for communicating the idea.

- (59) *mvulana ki-li-ye-pik-w-a chakula naye*
 1.boy 7-PAST-AN.3SG.REL-cook-PASS-FV 7.food by-3SG.PRO
 ‘the boy the food was cooked by’ (Constructed)

The possibility of relativization on OBL_{ag} OBJ is not at all in question if it is in a COMP of the relative verb:

- (57) *mvulana ni-li-ye-dai (kwamba) chakula ki-li-pik-w-a*
 1.boy 1SG-PAST-AN.3SG.REL-claim (COMP) 7.food 7-PAST-cook-PASS-FV
na-ye
 by-3SG.PRO
 ‘the boy I claimed the food was cooked by’ (Keach 1980:107)

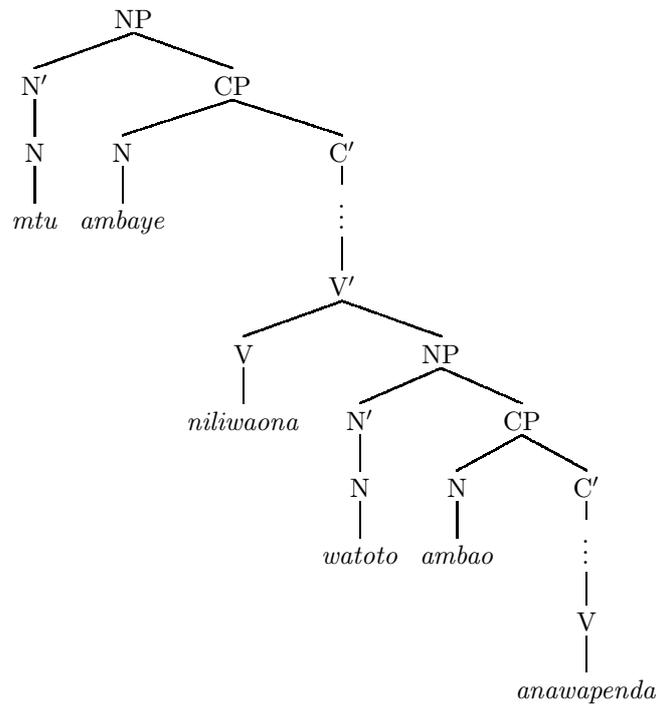
(57) is already explained via resumption; assuming the relative verb and the COMP verb share the same r-structure, the relative TOPIC will have no trouble finding the resumptive OBJ in the deeper f-structure.

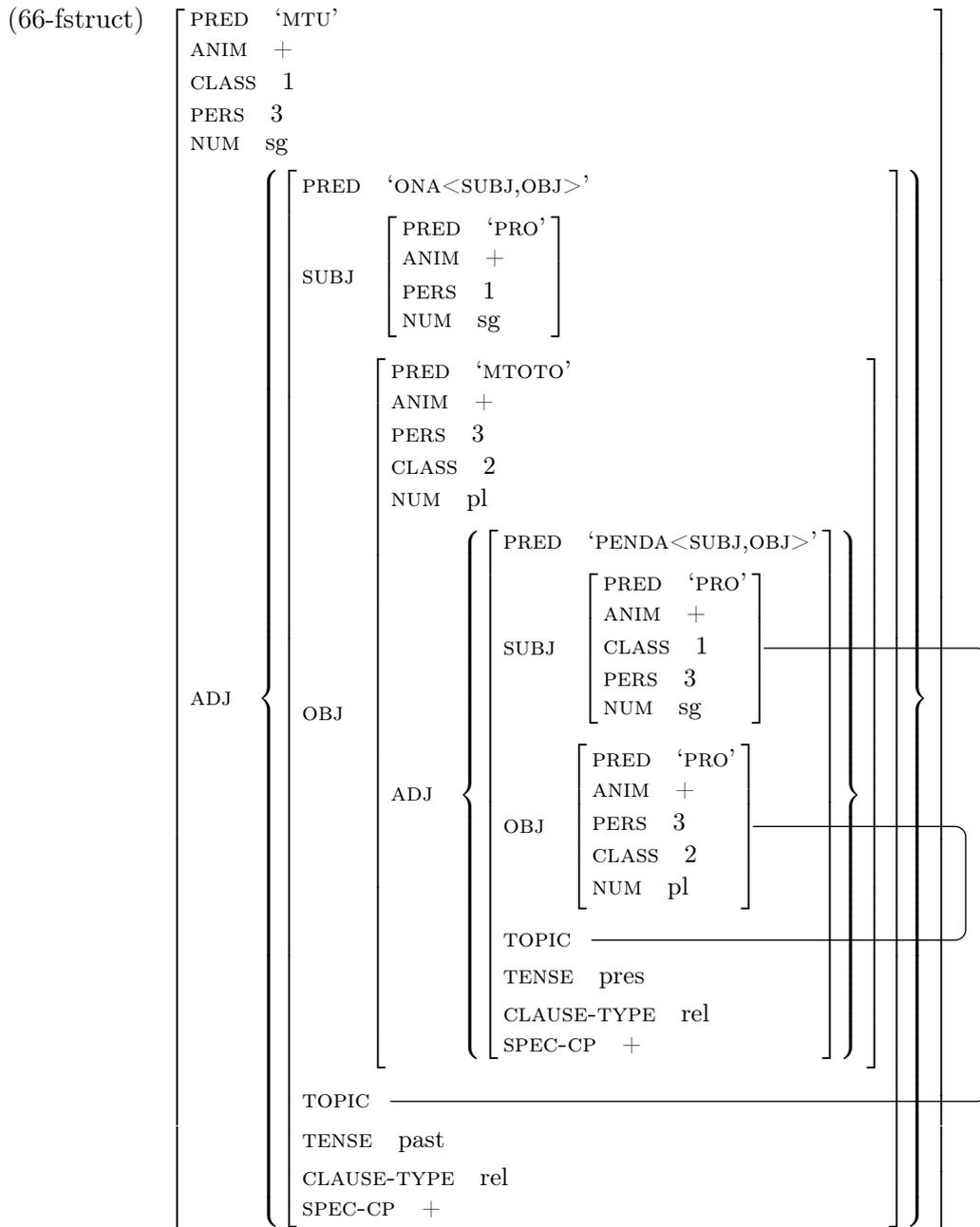
Ultimately, what drives the difference between *amba-* and tensed relatives in these passivized examples is again subject postposition, itself a result of the difference in SPEC-CP. It cannot be an explanation of the foregoing data that one of the distinctive features of the verbal affix relative strategy is that it simply does not employ resumption. Resumption can be found at the end of a functional path within the relative clause itself, as in (58):

- (58) *vitu a-li-vyo-ku-j-a na-vyo*
 8.thing AN.3SG-PAST-8.REL-SE-come-FV with-8.PRO
 ‘things which she came with’ (Keach 1980:147)

In this example, *navyo* is not an argument of the verb, since *kuja* ‘come’ is an intransitive verb; instead, it is a PP adjunct. This is no challenge for the resumption analysis, which produces the following f-structure:

(66-tree)





Keach claims that a tensed relative version of (66) is ungrammatical (cf. (67) on p. 32). This is not accounted for on my analysis, which does not currently make a distinction in either (a) the kinds of resumptive pronouns which may occur in different relative strategies or (b) the functional paths of gap relatives of various strategies. If Keach’s claims are eventually supported by a broader variety of examples (i.e., not just relativization on the subject of an embedded clause), it would be necessary to treat resumption differently in my analysis, some-

how differentiating either the scope of the r-structure or the available resumption positions for *amba-* vs. tensed relatives. Since the data, as it stands, is not entirely unambiguous (and we have seen that Edelsten (2010), for example, outrightly denies Keach’s claims of difference), I will treat examples like (67) (the verbal affix analogue of (66)) as provisionally acceptable.

5.10 Relatives and COMP

We saw in section 3.2.9 how both *amba-* and verbal affix relatives could be built by relativizing on a grammatical function in a sentential or verbal complement of the relative clause. Take, for example, (72) and (136) (the *amba-* cases are exactly parallel):

- (72) *watu ni-li-o-da-i kwamba wa-li-kw-end-a*
 2.person 1SG-PAST-AN.3PL.REL-claim-FV COMP AN.3PL-PAST-SE-go-FV
 ‘the people who I claimed (they) left’ (Keach 1980:69)

- (136) *msichana a-na-ye-tak-a ku-soma*
 1.girl AN.3SG-PRES-AN.3SG.REL-want-FV INF-AN.3SG.OBJ-marry-FV
 ‘the girl who wants to study’ (Constructed)

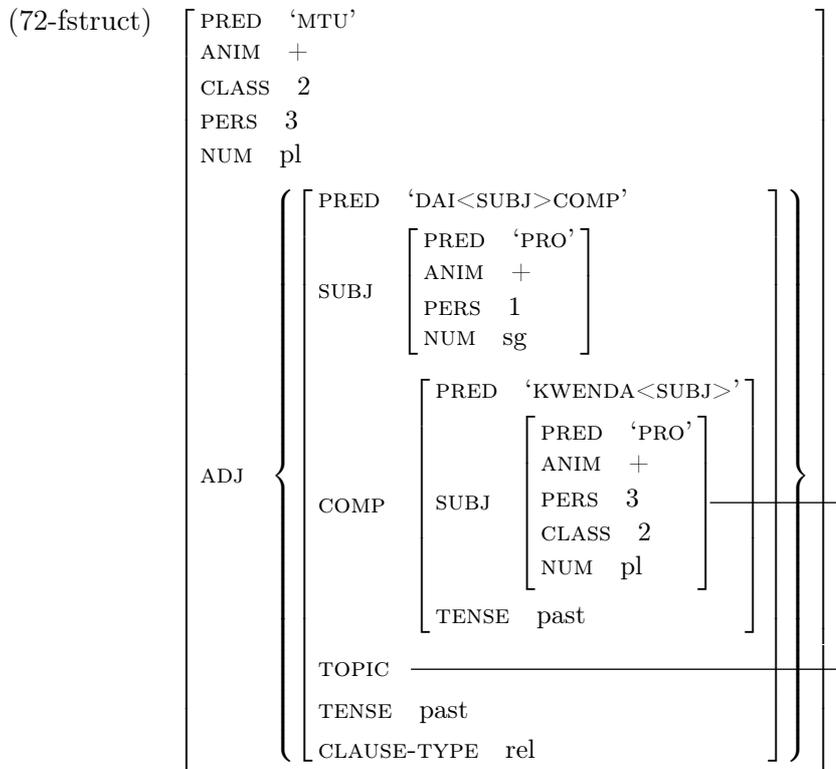
What allows such examples is, as in the previous section, an adjustment to the functional path of TOPIC. While COMP and XCOMP are not grammatical functions TOPIC can be identified with, they need to be added to RELPATH in order to allow TOPIC to be identified with, e.g., a (gapped) subject of COMP:

- (137) $\text{RELPATH} \equiv \left\{ \begin{array}{c} \text{GF} \\ \text{ADJ} \in \\ (\leftarrow \text{CLAUSE-TYPE}) =_c \text{rel} \end{array} \left| \begin{array}{c} \text{COMP} \\ \text{XCOMP} \end{array} \right\}^* \text{SUBJ}$

Since RELPATH is defined with the Kleene star *, and since the relative morpheme is included in the matrix verb of the relative clause (enabling a straightforward path description), TOPIC will find its target even through multiple embedded COMPS, e.g., as in (138):

- (138) *watu ni-li-o-da-i kwamba Juma a-li-sem-a*
 2.person 1SG-PAST-AN.3PL.REL-claim-FV COMP Juma AN.3SG-PAST-say-FV
kwamba wa-li-kw-end-a
 COMP AN.3PL-PAST-SE-go-FV
 ‘the people who I claimed that Juma said they left’ (Constructed)

For this section, I will simply present the f-structure produced by the updated analysis for (72):



5.11 Applicative Relatives

Most of the examples of applicative relatives and passive applicative relatives discussed in section 3.2.7 fall out precisely as predicted on the basis of the analysis as it stands. In cases where a resumptive pronoun is present, no special modifications are required for applicatives. In passive applicatives, relativization on OBJ is not permitted in the verbal affix strategy; I account for this situation in the same way as for normal passive relatives, i.e., by reference to subject postposing constraints.

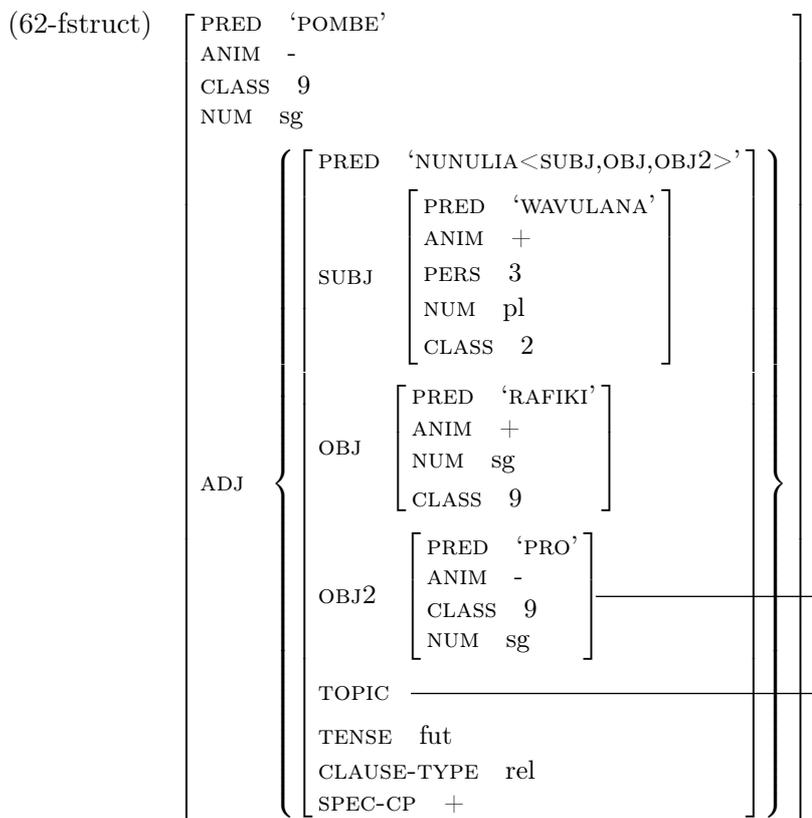
One change is required to fully account for applicative relatives, in cases of relativization on OBJ2. An example of this kind of relative was given in (62):

- (62) *pombe amba-yo wavulana wa-ta-m-nunu-li-a rafiki*
 9.beer amba-9 2.boy AN.3PL-FUT-AN.3SG.OBJ-buy-APPL-FV 9.friend
 'beer which the boys will buy for a friend' (Constructed)

Interestingly, no pronoun is found within the relative clause to mark the grammatical function of the extracted *pombe*, whether resumptive or not. Thus we have motivation for an addition to the grammatical functions handled by a gap strategy, and this needs to be reflected in RELPATH:

(137-new) RELPATH \equiv ... {SUBJ | OBJ2}

The new RELPATH enables the relative clause TOPIC to play the role of relativized OBJ2 without the presence of a resumptive pronoun. The f-structure which results for (62) is precisely as expected:



5.12 Headless Relatives

Headless relative constructions pose some interesting challenges, initially at least because the c-structure rules need to be modified to allow noun phrases without nouns in the c-structure. This modification takes place in the N' rule, where a new disjunct is added:

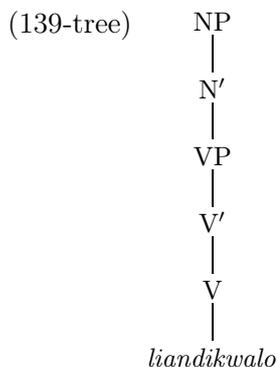
$$(107\text{-new}) \quad N' \longrightarrow \left\{ \begin{array}{c|c|c} N' & N\text{Adj} & N \\ \uparrow = \downarrow & & \uparrow = \downarrow \\ \hline & & \text{VP} \\ & & \downarrow \in (\uparrow \text{ADJ}) \\ & & (\uparrow \text{PRED}) = \text{'PRO'} \\ & & @\text{CP-FEAT} \end{array} \right\}$$

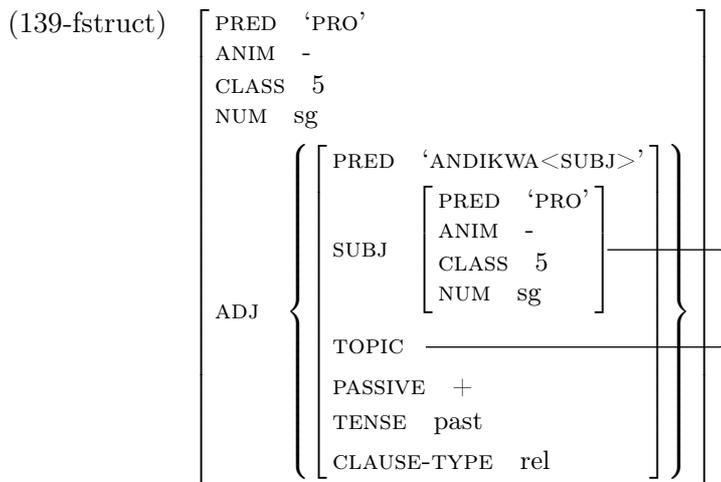
(107-new) says that a noun phrase can consist of a relative-clause VP with a special PRED contribution. Note that here I am taking the relativization to happen within an internal verb phrase, not within a CP. This move is essential—if we were to hypothesize that the appropriate category is CP, then the noun would have a child IP with another noun possibly appearing in the Spec position of that IP: a ‘headless’ relative with an overt subject indistinguishable from a head! Claiming that headless relative clauses are built from VP also explains why there can be no headless *amba-* constructions. *amba-* always appears in Spec-CP, and in this analysis, there is no CP at all in headless constructions. Of course, the linguistic intuitions behind relative clauses (e.g., that the relative information should appear in the ADJ set) are still captured via the annotations on VP in the rule.

The only other step in forming headless clauses is to contribute this necessary PRED for the nominal object being implicitly referred to by the relative clause verb; this is done in the second annotation. (139), based on (75) in section 3.2.10, is a good example of a headless relative clause:

- (139) *li-andik-w-a-lo*
 5-write-PASS-FV-5.REL
 ‘that which is written’ (Ashton 1987:114)

Leaving aside the lexical entry, the c- and f-structures for example (75) can now be laid out:





5.13 Time, Place, and Manner Relatives

There is another class of headless relative clauses, discussed above in section 3.2.11. This class consists of cases where some expression of time, place, or manner is the elliptical head of the relative clause, as in (77):

- (77) *ni-na-po-ka-a*
 1SG-PRES-16.REL-stay-FV
 ‘(the [definite] place) where I am staying’ (Mohammed 2001:194)

In Swahili, class 16 marking is typically associated with a definite locative semantics, and we could rewrite (77) with an overt class 16 head:

- (140) *pa-le ni-na-po-ka-a*
 16.DIST 1SG-PRES-16.REL-stay-FV
 ‘over there where I am staying’ (Constructed)

How are we to represent these types of examples, regardless of the presence of an overt head? It is clear, first of all, that we are dealing with a gap in the relative clause, not a resumptive pronoun, since the verb *ninapokaa* in both examples has no overt arguments or adjuncts. The solution will therefore involve modifying the annotation in @REL-FEAT which lists the grammatical functions which may be targeted by TOPIC in a gap situation.

A unique challenge is posed by these nominal adjuncts, however, since they are not sub-categorized arguments. In my analysis, I have chosen to treat nominal elements which have special adverbial semantic contributions as existing in the ADJ set of a clause, with a required SEM feature describing how that element modifies the clause (cf. the VAdj rule on p. 56). The path specification for the relativized adjunct is then simply (ADJ \in): ‘some (non-deterministically chosen) member of ADJ.’

Unfortunately, adding this expression to the list of grammatical functions will do no good, because the annotation (\uparrow TOPIC) = (\uparrow ADJ \in) merely expresses a requirement on (\uparrow TOPIC); it does not actually construct any f-structure in (\uparrow ADJ). We therefore have to create a new RELPATH terminating in ADJ, and update @REL-FEAT to express the possibility of TOPIC adding itself as one of its elements:

$$(141) \text{ RELPATHADJ} \equiv \left\{ \begin{array}{l} \text{GF} \quad \text{ADJ} \in \\ (\leftarrow \text{CLAUSE-TYPE}) =_c \text{rel} \mid \text{COMP} \mid \text{XCOMP} \end{array} \right\}^* \text{ADJ}$$

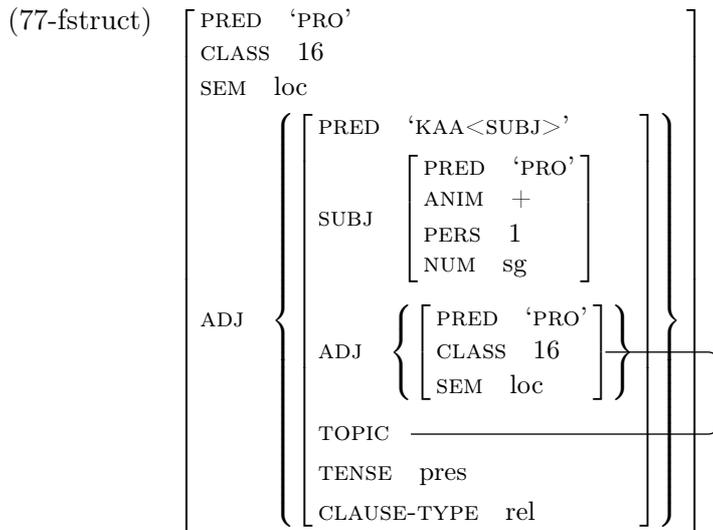
$$(125\text{-new}) \text{ @REL-FEAT}(A, N, C, P) \equiv \begin{array}{l} \vdots \\ \{(\uparrow \text{TOPIC}) = (\uparrow \text{RELPATH}) \mid \\ (\uparrow \text{TOPIC}) \in (\uparrow \text{RELPATHADJ})\} \end{array}$$

We are now in a position to give a full analysis of (77), a headless relative where the grammatical function of TOPIC is a member of the ADJ set of the verb:

$$(77\text{-lex}) \quad \textit{ninapokaa} \quad \text{V} \quad \begin{array}{l} (\uparrow \text{PRED}) = \textit{‘KAA < SUBJ >’} \\ ((\uparrow \text{SUBJ PRED}) = \textit{‘PRO’}) \\ \text{@ANCP}((\uparrow \text{SUBJ}), +, \textit{sg}, 1, 1) \\ \text{@REL-FEAT}(-, _, 16, _) \\ (\uparrow \text{TOPIC SEM}) = \textit{loc} \\ (\uparrow \text{TENSE}) = \textit{pres} \end{array}$$

The line (\uparrow TOPIC SEM) = loc ensures that the locative contribution of *-po-* is sufficient to trigger the appropriate disjunct in @REL-FEAT, thus producing the following structures:

$$(77\text{-tree}) \quad \begin{array}{c} \text{NP} \\ | \\ \vdots \\ | \\ \text{V} \\ | \\ \textit{ninapokaa} \end{array}$$



I take it that (77-fstruct) is precisely what we want: a PRED ‘PRO’ is contributed in the outer f-structure, and the features from the relative clause TOPIC are unified (including, importantly, the SEM feature, which enables us to say that the entire phrase is locative). Finally, the TOPIC of the relative clause is equated with a locative adjunct of that clause, which in precisely the desired behavior.

Several complications have been hidden from view, however. For example, the class 16 relative marker *-po-* need not have a definite locative semantic value; it can also denote a temporal value. There is thus certain amount of ambiguity or vagueness in the language itself—in these headless constructions it must be determined from context whether a temporal or locative interpretation is intended.

5.14 Other Constructions

As should be apparent, Swahili relative clauses constitute a complicated set of facts, difficult to model concisely and elegantly. In my view, the analysis I have constructed not only accounts for but gives an insightful linguistic explanation of a remarkable amount of the data presented in Chapter 3. At the end of that chapter, I called attention to a variety of constructions which I am not going to discuss specifically in this paper; however, I think it is clear that, in at least several cases (possessive or comparative relatives, for example), the mechanism of resumption provides a natural analysis of the judgments I collected during my

research. In the next chapter, I will discuss the linguistic consequences of my analysis as I have presented it.

Chapter 6

Evaluating the Analysis

Evaluating a syntactic analysis of any linguistic construction is not a straightforward process. It is sometimes difficult to define good criteria for an analysis to begin with, not least because even foundational theoretical entities like SUBJ and OBJ are not naively and directly observable. Linguistic argumentation comes at the end of a long chain of assumptions, about which different frameworks and different researchers may plausibly disagree.

Even validity—the property an analysis has when it produces all grammatical constructions and fails to produce all ungrammatical ones—is not the final guide to the merits of an analysis. A perfectly valid analysis may well raise the suspicion that it is a cleverly jury-rigged affair, out of touch with linguistic reality. Ideally, validity is grounded in the features of the analysis which make clear and succinct linguistic claims. In this chapter, I will discuss what, precisely, the claims are which my analysis makes, and explain what I take to be their real linguistic motivation.

6.1 Linguistic Claims

Taking all the data from Chapter 3 into account, the broadest generalizations which can be made about Swahili relative clauses are:

1. Every relative clause has some kind of relative marker (either *amba-*, the verbal morpheme *-o*, or both).

2. Relativization is possible on a large number of grammatical functions in both *amba-* and verbal affix strategies.
3. Some kind of marking of relativized grammatical function is obligatory in all cases except where that function is one of:
 - (a) SUBJ (even the relativized SUBJ of a ‘Focus’ sentence)
 - (b) member of ADJ (with (\uparrow SEM)) (e.g., locative adjuncts)
 - (c) OBJ2
4. Head nouns of relative clauses can bind nominal functions in embedded contexts, through COMP, XCOMP, and even other relative clauses (at least in the *amba-* case).
5. *amba-* and verbal affix strategies can be used interchangeably in constructing relative clauses, except:
 - (a) Verbal affix relatives have a more restricted tense distribution.
 - (b) Verbal affix relatives are ungrammatical in certain constructions (e.g., relativization on the OBL_{ag} OBJ of a passive verb)—but not when the relativized GFs are found in a lower clause (for example, in COMP).
6. Verbal affix relatives come with a strong preference for subject postposition.

In the next few sections, I will outline whether and how the claims my analysis makes amount to explanations of the foregoing facts.

6.1.1 Relative Pronouns

On my analysis, *amba-* and the relative morphemes are relative pronouns, that is, from the perspective of LFG they contribute a PRED ‘PRO’, and belong to an r-structure. This choice is (I think) a very natural one, but it has consequences for the entire system. The fact that they are pronominal predisposes the analysis heavily towards countenancing resumptive pronouns. In a phrase like (40), for example, the claim that *ambaye* introduces a PRED ‘PRO’ forces *yeye* to be interpreted resumptively.

- (40) *mtu amba-ye yeye a-li-kwend-a*
 1.person amba-AN.3SG 3SG.PRO AN.3SG-PAST-go-FV
 ‘person who (she) went’ (Keach 1980:97)

I might have chosen a different analysis for (40), for example one wherein *amba-* is some kind of complementizer which introduces TOPIC and certain agreement features, but does not contribute a nominal predicate on its own. Indeed, (40) alone does not offer any features which can be used to differentiate these approaches. Consider, however, (62):

- (62) *pombe amba-yo wavulana wa-ta-m-nunu-li-a rafiki* _____
 9.friend amba-9 2.boy AN.3PL-FUT-AN.3SG.OBJ-buy-APPL-FV 9.friend (OBJ2)
 ‘beer which the boys will buy for a friend’ (Constructed)

There is a gap in this relative clause, showing the absence of relativized *pombe* ‘beer’. Here, *ambayo* is the only word which can reasonably contribute the f-structure required for the verb to find an OBJ2 argument. Our options now appear more constrained: *amba-* seems like it *must* be a relative pronoun in at least this case. Furthermore, there do not appear to be cases that clearly rule out *amba-*’s pronominal nature; for that reason, I have decided that the simplest analysis involves always treating the relative markers (*amba-* and the relative morphemes) as pronouns.

6.1.2 Spec-CP

The primary *prima facie* difference between the *amba-* and verbal affix relative strategies is configurational, not functional: *amba-* relatives have a pronoun in Spec-CP, whereas tensed relatives incorporate the relative pronoun into the verb itself. In the analysis I have presented, this difference explains a number of the observed facts. The essential linguistic claim I make is that the presence of a pronoun in Spec-CP triggers the choice of a different IP lower in the clause.

In one IP, there are no special rules or preferences as to the position of the subject in the clause. The default position of the subject here is the normal Spec-IP. In the other IP, the Spec position is dispreferred, allowing a nominal subject to surface only in certain cases.

I chose to model this analysis by use of the structural feature SPEC-CP, whose value is ‘+’ when Spec-CP is filled (i.e., in *amba-* relatives). The name of the feature and its value are of course arbitrary, as is the choice to encode the difference in f-structure. I could alternately have chosen to create a cascade of different c-structure rules (e.g., IP and IPSpec, VP and VPSpec, etc...) in order to track the structural difference. The *purpose* of the feature, however, is not arbitrary: it is designed to model the claim that it is precisely the difference in configuration between *amba-* and tensed relatives which accounts for subject postposing, and thereby a host of other differences.

I have not explained, however, *why* a difference in Spec-CP should lead to different preferences for subject inversion. One hypothesis is suggested by Edelsten (2010:50), who points to the fact that, in tensed relatives, identification of the relative clause is postponed until a time when some elements (an overt subject, or bits of verbal morphology) may have been parsed as though not heading or belonging to a relative clause. In this case it would be reasonable to predict a general preference for constructions where the relative marker’s host (either *amba-* or the relative clause verb) appears as early as possible in the relative clause. *amba-* relatives satisfy this preference trivially and inevitably, since *amba-* is in Spec-CP; for tensed relatives, the situation is more complicated, since whatever is allowed before the verb in IP (but most typically, an overt subject) could theoretically appear before the relative verb.

If this parsing-centric explanation is correct, it is not surprising that other considerations might overrule those which recommend postposing; for example, it may be *more* preferential to avoid placing the subject of a relative clause after a heavy sentential complement than it is to avoid parsing a subject before the relative clause verb. And this, in fact, is what we find in the data. The encoding of facts about Spec-CP in the analysis is therefore not a deceptively *ad hoc* way to account for differences between the two relative strategies; rather it reflects what I take to be an insightful explanation: the presence of *amba-* in Spec-CP is the differentiating factor (since it initiates a parsing environment where relativization has already been flagged).

This difference, captured in my analysis through the SPEC-CP feature, has ramifications for the grammaticality of large classes of examples. We saw in previous chapters that tensed

relatives cannot be constructed when relativizing on the OBL_{ag} OBJ of a passive verb. The subject postposing rule explains the (putative) ungrammaticality of the examples Keach listed; I did not, however, come across any claims in any of my sources about the grammaticality of such examples *with* subject postposing, like (59):

- (59) *?mvulana ki-li-ye-pik-w-a chakula naye*
 1.boy 7-PAST-AN.3SG.REL-cook-PASS-FV 7.food by-3SG.PRO
 ‘the boy the food was cooked by’ (Constructed)

Since the status of this example is not determined, I will not say any more about it. If it is grammatical, no more needs to be said anyway, since the analysis currently supports it; otherwise, an explanation will have to be sought after gathering more data about the behavior of subject postposing in passive verbs in general.

6.1.3 TOPIC and Grammatical Function

Besides the analysis-internal `CLAUSE-TYPE` feature, relative clauses contain a `TOPIC` feature intended to track the relativized grammatical function. I take it that this use of `TOPIC` is not linguistically controversial; the essential insight is that relative clauses relativize on *something*, and that thing is the local topic of the relative clause.

My analysis requires that `TOPIC` be identified with some grammatical function at some level of embedding in the relative clause’s f-structure. This is tantamount to saying that `TOPIC` cannot be external to the relative clause, and more importantly it cannot add an argument to the clause which was not present in the non-relativized version; again, I take this to be a commonplace of relative clauses cross-linguistically.

That `TOPIC` is thusly identified is ensured, on my analysis, by two complementary strategies: a gap strategy and a resumptive pronoun strategy. In the gap strategy, there is no nominal element, whether lexical or incorporated into a verb or preposition, in the place where one would expect to see the argument corresponding to the relativized grammatical function. Instead, the relative pronoun itself plays this role via `TOPIC`, which has targeted the appropriate GF through the `RELPATH` specification.

In the resumptive pronoun strategy, TOPIC (the functional equivalent of the relative pronoun) is not explicitly linked to any grammatical function at all. Instead, TOPIC relies on a resumptive pronoun within the relative clause to be identified with it through the r-structure expressions in the resumptive pronoun's lexical entry. This strategy works because, for the relative clause's f-structure to be considered valid, (a) the resumptive pronoun needs to find an appropriate anaphor in r-structure, and (b) TOPIC must be so found by some pronoun in order for it to play an appropriate grammatical role in the relative clause.

One consequence of this analysis is that, in the resumptive pronoun strategy, there are no path constraints whatsoever in terms of which resumptive pronouns may be anaphorically related to TOPIC. This results in an elegant picture wherein pronouns can resume any appropriate element of the r-structure, at any distance. Many of the facts about Swahili relative clauses are therefore automatically explained under the assumption that the pronominal elements seen in various places (as object markers, or incorporated pronouns of *na-*, for example) are resumptive pronouns.

The resumptive analysis is not the only logically coherent one, however. It is entirely possible to extract a disjunctive functional path specification which would allow TOPIC to be identified explicitly with any of the (what would now be considered to be) 'topic markers'. Two problems present themselves, if we take this view:

1. Either all incorporated pronouns, or the relative pronouns themselves, must be seen as referentially empty (i.e., they do not contribute a PRED 'PRO'). This must be the case in order for TOPIC and the f-structure for the appropriate grammatical function to successfully unify. But, in many (non-relative) examples, the incorporated pronouns (e.g., the one in *na-ye* 'with-PRO') do function as real pronominal objects.
2. It is not merely incorporated pronouns which show up as topical grammatical functions in relative clauses: full pronouns like *yeye* 'PRO' do as well. On this story, we would be forced to claim that either *amba-* or *yeye* is not a pronoun, again in order for their f-structures to unify in examples like (40).

Because it seems safest linguistically not to deny noun-hood to either *amba-* or the in-

corporated pronouns found in many relative constructions, I have opted for the resumption analysis. Not only does it make sense of the words as they actually appear (i.e., with cliticized pronouns), it eliminates the need to define a functional path for TOPIC in many of the most complicated relative clause constructions.

6.1.4 Difficulties and Issues Raised

It would be disingenuous to claim that the analysis presented in this paper offers the best explanation for every fact about Swahili relative clauses which has surfaced in the course of the discussion. The fact that tensed relatives seem to be more constrained in their usage in the passive than *amba-* relatives, for example, is a result which has not bubbled up from the foundational elements of my analysis. I have been forced, for the time being, to simply assume some unspecified interaction with subject postposing. Word order considerations may or may not even be the right place to start in looking for an explanation; perhaps the functional nature of Swahili passive verbs would be a more fruitful point of departure.

Likewise, my analysis does not provide a natural explanation of (a) ‘double-marking’ (i.e., the formal or compound relative), or (b) differences in the use of embedded relatives. With regard to double marking, I am forced currently to assume that the relative morpheme on the relative clause verb is itself resumptive on *amba-*, without any independent linguistic motivations.

With regard to embedded relatives: if Keach is right that a tensed relative TOPIC cannot target a grammatical function of an embedded relative clause, the validity of my analysis is challenged. Where could we look for an explanation? The only real difference in my analysis lies in the structural SPEC-CP feature, but this does not play into the logic of TOPIC and resumption. There does not seem to be any way to prevent a verbal affix relative TOPIC from being resumed by a pronoun in a deeply-embedded relative clause.

We could decide to recruit SPEC-CP to drive this difference as well, perhaps by disallowing CP adjuncts of nouns from appearing in SPEC-CP = – clauses. But this would not count as an explanation; rather, it is a description of the facts which models them precisely, but without additional insight. The problem is again the lack of a large quantity of suitably specific data.

The explanation of subject postposing has already shown that what some linguists assume is a matter of grammaticality vs. ungrammaticality may in fact be a matter of competing constraints, some of which may not even be syntactic.

Finally, I want to point out that the use of a gap strategy in cases of relativization on SUBJ was not the only sensible option. In fact, there may be good cross-linguistic reasons to consider whether relativization on SUBJ uses resumption as well; according to Keenan and Comrie (1977), it would be odd to find SUBJ and OBJ2 grouped together in a relativization strategy. If it is important to maintain the integrity of K&C's accessibility hierarchy, relativization on SUBJ could be removed from the gap strategy and treated resumptively. Swahili subject markers would then be considered to have three roles: (1) contributing a PRED 'PRO' when there is no overt subject, (2) marking agreement when there is an overt subject, and (3) resuming a relative pronoun in cases of relativization on SUBJ.

6.2 Other Approaches

Work on Swahili relative clauses has not generated a particularly extensive bibliography, but several analyses of this very interesting set of constructions have been produced. The classic statement is Keach (1980), a transformational exploration from which much of the data in this paper is drawn. A more recent entrant is Edelsten (2010), which examines Swahili and Chindamba relative clauses from the perspective of dynamic syntax. To my knowledge, no work has been done on giving a formal analysis of Swahili relative clauses in LFG. In this section, I will set out some of the features of the other analyses on offer, in order to highlight a few important differences between them and the one presented here.

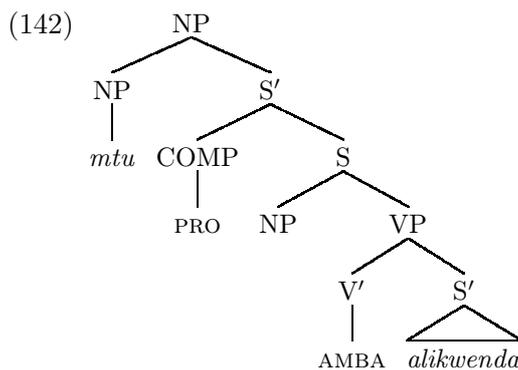
6.2.1 Keach (1980)

Keach (1980) presents a movement-based approach to Swahili relatives, built on the framework set out in Chomsky and Lasnik (1977). In her analysis, the relative pronoun is an 'inaudible' pronoun she calls PRO (distinguished from 'audible' PRONOUNS like *yeye*). This PRO, if cliticized, becomes the familiar *-o* in Swahili, visible on *amba-*, relative affix verbs, and prepositions like *na* 'with/by'. If PRO does not find itself in a structure of the appropriate

form, it is simply deleted in the course of the derivation. Otherwise, it can participate in the interpretation conditions on a given relative clause which validate the formation of that clause.

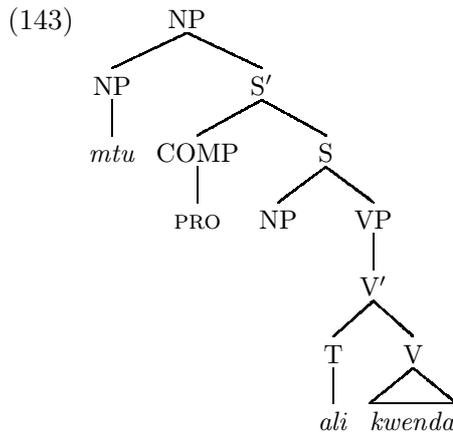
An essential point for Keach is that PRO must cliticize appropriately for any relative clause to be formed, and this in turn requires that it be generated in positions where the cliticization movement is possible (according to a special clitic rule). In order to ensure this, Keach goes to great lengths to argue that *amba-* is neither a relative pronoun nor a complementizer, but rather a verb. *Amba-*, as a verb, produces another S to host the relative clause verb. The structures for *amba-* and tensed relatives are then substantially more different from each other than on my own analysis.

The base tree for an *amba-* example looks like (142) (Keach 1980:70):



And for the analogous tensed example (Keach 1980:70):³⁹

³⁹This tree makes apparent a feature of transformational analyses of Swahili in general, namely the treatment of different parts of the verb as being generated in different syntactic nodes. From the perspective of LFG, this is a conflation of morphology and syntax, and moreover of functional information (e.g. tense) and constituent structure.



One of the main differences between the different relative strategies, on Keach’s view, is movement. She claims that movement occurs in tensed relatives, and not in *amba-* relatives. In *amba-* relatives, the relative pronoun PRO is base-generated in COMP, and attaches downward to *amba-* via the clitic rule. It is then simply interpreted with an empty node (a gap) in the relative S. Tensed relatives, on the other hand, generate PRO in its position within the relative clause; it then moves upward to COMP, where it can successfully cliticize onto TENSE (T).

Keach’s analysis is far too detailed to treat adequately in this thesis; I simply want to point out here that inordinately much seems to hang on her view that *amba-* is a verb. Despite *amba-*’s history as a verb, it is not obvious that it should be so considered in synchronic Swahili. Additionally, in order for her analysis to work, Keach must “stipulate that *amba-* is semantically null” (Keach 1980:68). The benefits of treating *amba-* as a verb moreover seem primarily theory-internal: they allow the simplification of a clitic rule, and cause certain structures in the two relative strategies to become superficially similar. I am not sure what, if anything, this really says about Swahili.

Still, Keach’s claim that the two strategies are differentiated by movement is interesting and potentially insightful; from the perspective of my own analysis, this amounts to suggesting that, on one hand, *amba-* exists in anaphoric agreement with resumptive pronouns, but on the other hand, tensed relative pronouns are related grammatically to topical markers within the clause. I did not pursue this possibility in order to account for what look like obvious cases of resumption even in tensed relatives, but there may well be more to glean from Keach’s observations.

6.2.2 Edelsten (2010)

In his MA thesis, Edelsten provides a number of helpful examples of Swahili relative clause constructions not found elsewhere. His primary motivation is to give an analysis (within the framework of Dynamic Syntax (Cann et al. 2005)) of relatives in both Swahili and Chindamba (a related Bantu language). Edelsten takes issue on a number of occasions with Keach’s data, concluding that, “contrary to expectations, the syntactic environments available to each of the strategies are remarkably similar” (Edelsten 2010:35).

Linguistically, Edelsten argues a line which I take to be congenial to my own analysis, namely that *amba-* is a relative pronoun, and that relativization also involves the use of resumptive pronouns.⁴⁰ However, in terms of word order, he mentions a few basic constraints but argues that word order within relative clauses is “basically free”. In essence, he relaxes many of the constraints and distinctions Keach took seriously, some of which I did not discard in my own analysis, for example subject postposing.

Edelsten’s analysis (he considers only relativization on subjects and objects from a formal perspective) is presented as the derivation of a semantic structure representing the parse of the relative clause. Words and morphemes are parsed from left to right, and contribute to the semantic structure in various ways. The relative pronoun, whether it is parsed in *amba-* or a relative verb, will institute a link between the head noun and the relative clause, and also open up a node representing the requirement of a resumptive pronoun. As parsing continues, new elements are potential matches for this node, based on e.g. class information. The parse will complete successfully only if all nodes can be appropriately merged.

Edelsten did not consider more complicated relative clause examples, and in any case the representations of Dynamic Syntax are somewhat different than those of LFG, but there is arguably a lot of agreement between Edelsten’s take on the facts and the analysis presented in this paper. Without examining parses of more classes of relative clauses in his analysis, it is difficult to know how much overlap there really is, or what deeper claims Edelsten is making about Swahili. At any rate, the primary insight provided by his analysis is in how the

⁴⁰In fact, he argues that Swahili relatives constitute a new category in the Cann et al. (2005) classification of relative clauses: “TYPE 4: relative pronoun + resumptive pronoun” (Edelsten 2010:32).

concept of incremental parsing has an effect on the ease of understanding different relative constructions. Parsing is a real linguistic phenomenon, and so Edelsten's analysis is a natural model of those facts which are conditioned by parsing considerations.

6.3 A Cautionary Tale: Explanan{dum|s}

In order to develop and validate my analysis of Swahili relative clauses, I developed a model of Swahili grammar in the Xerox Linguistic Environment (XLE) (Crouch et al. 2007). There are a number of compelling reasons for a syntactician to develop theories with computational models, including the following:

1. Conceptual precision is enforced. Vague and ambiguous notions are not easily expressed in the language of computational grammars.
2. Validity is easily testable; the tedious process of checking analyses by hand is replaced by the tedious process of designing a working model of a natural language.
3. Interaction effects are not easily ignored. Sub-systems are always active, even when not in the view of the grammar developer, and so surprising interactions between different components are less likely to remain hidden.

However, it can be dangerous to confuse the goal of building a model of a certain syntactic construction with the goal of giving a good linguistic analysis of the same construction. Any set of facts has a trivially valid 'analysis' which consists of the simple recapitulation of those same facts. For an analysis to count as an insightful explanation of a linguistic phenomenon, it must make a non-superficial (and ideally intuitive) connection between the facts, with reference to more basic or more well-understood linguistic entities.

It is precisely in this project of finding good explanations that computational models can lead an analysis astray. Lacking the psychological experience of a surprising and elegant connection, a computational model can only help in determining validity. There is no guarantee that this validity is in any way meaningful; it is possible, for example, to give any number of different analyses for Swahili relative clauses which resemble the one I have offered in this

paper in terms of validity, but which offer no real explanation. For example, using the expressive power of LFG's f-structures, we could simply encode the differences between the relative strategies in the analysis itself, say with annotations like $(\uparrow \text{REL-TYPE}) = \text{amba}$.

It is in fact very difficult not to fall into this trap, and so I have endeavored to motivate every feature of the analysis with a claim about Swahili itself. When the SPEC-CP feature has the value '+', for example, this is merely functional shorthand for *amba*'s being in Spec-CP, which itself is a basic configurational fact of the clause. All logic in the analysis which makes use of SPEC-CP, then, claims to be grounded in this structural organization. It is not impossible to build *ad hoc* explanations using SPEC-CP, but at least it is clear in my analysis where I would be doing so.

Chapter 7

Conclusion

Relative clauses constitute a major source of linguistically interesting constructions in Swahili, whose depths have not been fully plumbed. If the research done in the course of writing this thesis is any indication, more work in this area will emerge in the future. For now, I have provided an analysis of a number of relative constructions in LFG, supported by a computational grammar developed in XLE. The analysis as presented is of course provisional in some areas, for example in its treatment of subject postposing in passivized verbal affix relatives.

Linguistically, my analysis assumes a preponderance of similarities, not differences, between *amba-* and tensed relatives. Both are treated as involving relative pronouns, and as utilizing both gap and resumptive pronoun strategies for determining the grammatical function of TOPIC in the relative clause. I claimed that the differences which *do* exist arise from the basic structural configuration of the two strategies (*amba-* relatives have a relative pronoun in Spec-CP, and verbal affix relatives do not); these constructions naturally lead to a difference in distribution of relative clause strategies, especially when taking into account some various other considerations, like constituent weight or parsing complexity.

It is always open to anyone to question whether this analysis constitutes a good or insightful explanation of the facts within view. I argue, however, that the entities to which my analysis makes reference (resumptive pronouns, TOPIC, functional paths, etc...) are those which come along with a basic understanding of linguistics, or the framework of LFG in par-

ticular, and thus that the analysis does constitute an explanation—at least until more data is gathered and the provisional features of the analysis can be more adequately evaluated.

LFG was invaluable as the framework of choice for this project, and it proved a natural system for modeling the various features of the analysis. The intuitive coherence of meaning between *amba*- relatives and their tensed counterparts is exhibited beautifully in the identity of their f-structures, for example. Likewise, the use of r-structure and the ρ projection to moderate pronoun resumption is a surprisingly literal and obvious mechanism for tracking discourse referents, which allows for an elegant solution to the problem of finding the right grammatical function for a relative clause TOPIC. Regardless of framework, what matters at the end of the day is what my analysis says about Swahili and related languages. I hope, in that regard, to have contributed to the growing interest in Swahili relative clauses.

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