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Cyclic movement and chain resolution in Swahili relative clauses

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Abstract. Swahili relative clauses have three different constructions, characterized by different linear positions of a relative marker. The relative marker follows C, T and the verbal complex in each case. While some previous analyses propose construction-specific operations such as T to C or V to C movement in amba-less relatives, this study shows that the distribution of the relative marker can in fact be derived from a set of independently motivated assumptions without substantial ad-hoc proposals. I argue that the relative marker is an operator that undergoes cyclic Ā movement to Spec,CP, and its various linear position results from Landau (2006)'s chain resolution algorithm conditioned by a disyllabic minimality requirement of words in Swahili (Park 1997; Scott 2015).

Keywords. cyclic Ā movement; movement chain resolution; lower phase conjecture; relative marker in Bantu; Swahili relative clauses; minimality requirement on words; Bantu languages

1. Introduction. Swahili is known to have three different strategies to form relative clauses, as shown in the followings examples taken from Ngonyani (2006).[1]

(1) a. vi-tabu [$_{CP}$ amba-**vyo** Juma a-li-nunu-a] ni ghali.
8-book amba-**8.REL** Juma 1.SM-PST-buy-IND be expensive
The books Juma bought are expensive.

b. vi-tabu [$_{CP}$ a-li-**vyo**-nunu-a Juma] ni ghali.
8-book 1.SM-PST-**8.REL**-buy-IND Juma be expensive
The books Juma bought are expensive.

c. vi-tabu [$_{CP}$ a-nunu-a-**vyo** Juma] ni ghali.
8-book 1.SM-buy-IND-**8.REL** Juma be expensive
The books Juma buys are expensive.

These can be categorized into two broad types: *amba-relatives* and *amba-less relatives*. In amba-relatives (1a), an overt complementizer *amba* is present, and a relative marker (REL) specified with a noun class follows *amba*. In amba-less relatives, REL either follows the tense marker (1b) or attaches to the end of the verb (1c). These are often referred to as tense vs. tense-less amba-less relatives. Note that if a tense-less amba-less relative involves negation, REL follows the negation marker:

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[1] Abbreviations in this paper: x.REL=class x relative marker; (x)/(1/2).(SG/PL).SM/OM=class x/(first/second person)(singular/plural) subject/object marker; PST=past tense; IND=indicative; NEG=negation; PROG=progressive; APPL=applicative. For abbreviations in examples cited from other works, refer to works cited.

(2) vi-tabu a-si-**vyo**-nunu-a
8-book 1.SM-NEG-**8.REL**-buy-IND
Books she doesn't buy

An empirical puzzle comes with the position of REL in amba-less relatives. It is not apparent what categorical status of REL is, and its various linear position is unexpected given either of the two obvious analytical possibilities: No matter whether it is a relative C or a relative operator, it should be structurally higher than all other elements in a relative clause, and therefore it is expected to linearly surface on the edge of the relative clause. Therefore, two intertwined questions are: what is the categorical statue of the relative marker and what are the morphosyntactic structure and mechanisms that give rise to its puzzling distribution? This study aims to answer these two questions.

Some previous derivational analyses on Swahili relative clauses have different answers to these questions. For example, some argue that REL is a relative C, and its surface position is the result of T to C or V to C movement specific to Swahili amba-less relatives (Demuth & Harford 1999; Henderson 2004; Ngonyani 2006 among others). Buell (2002) argues that REL heads a projection under T, and a number of remnant movements are proposed in order to derive the right morpheme order and constituency. Meadows (2023) argues that different relative constructions have different sizes, and in the two kinds of amba-less relatives, which have a size of only TP or VoiceP, T or Voice, respectively, bears the feature responsible for relativization, which is then realized as REL suffixed to these heads. This study alternatively argues that the puzzling distribution of the relative marker in fact follows from some universally attested structure and properties of relative clauses and the **movement chain resolution algorithm** (Landau 2006) which is shown to be sensitive to specific PF requirements in particular languages, assuming a copy theory of movement (Chomsky 1995, 2000, 2001).

An overview of my arguments is the following. I propose that the relative marker is the relative operator that undergoes Ā-movement to Spec,CP which makes cyclic stops on intermediate phase edges (Chomsky 2000). Crucially, I advocate the Lower Phase Conjecture (LPC) by Deal (2016) that the sister projection of C/Fin in relative clauses is a phase, and therefore the Ā-movement of the operator leaves a copy on this lower phase edge. Therefore, the underlying syntax of Swahili amba-relatives, for example, is schematically shown below in (3).

(3) [$_{NP}$ vitabu] [$_{CP}$ Op_i/vyo [$_{C}$ amba] [$_{TP}$ ~~Op_i~~ T a-li-nunu-a ~~Op_i~~]]
books that he bought

Following the insight from Scott (2021), I argue that the distribution of REL (i.e. relative operator) in different relative constructions is due to spelling out different movement copies in different positions by Landau's chain resolution algorithm. I will show that this choice is made in observance of a **phonological minimality** (PM) requirement of Swahili prosodic words (Park 1995; Scott 2015). This analysis shows how a couple of unrelated theoretical mechanisms can interact with language specific properties and produce intricate patterns that we see in Swahili relative clauses.

This paper is organized as follows. §2 introduces LPC, the chain resolution algorithm and the phonological minimality in Swahili, which are essential pieces of my analysis. In §3, I demon-

strate how different relative constructions are derived. §4 shows a prediction made by my analysis. §5 discusses issues with the subject-verb order in amba-less relatives and §6 concludes.

2. Theoretical premises.

2.1. LOWER PHASE CONJECTURE. The idea that there is an additional lower phase in relative clauses is proposed by Deal (2016), motivated by a phoenomenon in Nez Perce that a relative pronoun in relative clauses can optionally be pronounced either to the left or to the right of an overt C.

(4) Nez Perce (from Deal 2016:438)
samx̂ (**ko-nya**) kex (**ko-nya**) *pro*$_{subj}$ 'a-sayqi-ca
shirt.NOM (RP-ACC) C (RP-ACC) PRO.1SG AGR-like-TAM
the shirt that I like

Deal argues that this variable position of a relative pronoun suggests that there are Ā-movement copies on both Spec,CP and Spec,TP. She subsequently proposes that this is because TP is a phase in relative clauses, which is formalized as the Lower Phase Conjecture (LPC):

(5) *Lower Phase Conjecture* (LPC)
The TP sister of relative C/Fin is a phase[2].
(Deal 2016:453)

The theoretical mechanism responsible for this can be traced back to Chomsky (2008), in which he argues that some features on T are inherited from C. In relative clauses, T is argued to inherit an Ā-feature from C, and the consequence is that any Ā-movement crossing TP to Spec,CP would leave a copy on Spec,TP.

(6) $[_{CP}\ \overset{\text{movement}}{\overbrace{RP_i\ C_{[\bar{A}]}\ [_{TP}\ RP_i}}\ \overset{\text{movement}}{\overbrace{T_{[\bar{A}]}\ ...RP_i}}...]]$

Although it is not easy to find independent diagnostics for a TP phase in relative clauses in a language, Deal shows that with this assumption, the old puzzling *that*-trace effects in English can be derived (Deal 2016:448-450). Therefore, it can be considered as a possible universal property of relative clauses awaiting more cross-linguistic supports, which I argue that Swahili provides. Additionally, for reasons that will be evident later, I propose the following generalization of LPC:

(7) Lower Phase Conjecture (Generalized)
The XP sister of relative C/Fin is a phase.

This proposal claims that T inherits an Ā-feature only by virtue of being the sister of a relative C/Fin. That is to say, if T is absent, then whatever XP sister of C/Fin it is should be able to inherit the Ā-feature.

[2] Fin is the lowest projection in an articulated left periphery (Rizzi 1997).

2.2. MOVEMENT CHAIN RESOLUTION ALGORITHM. Under the view of a copy theory of movement, syntactic movement is achieved by creating copies of the moved object and merge it to any intermediate and the terminal positions (Chomsky 1995, 2000, 2001). It has been assumed that the decision of which copy to pronounce is made at the PF module, and different theories of such mechanism have been proposed (Nunes 1995, 2004; Landau 2006). In this work, I follow Landau (2006)'s chain reduction algorithm. He argues that the following must be true for copy deletion at PF: It must obey some economy principle to delete any unnecessary copies, otherwise all chain copies would never fail to be pronounced; It must ensure that at least one copy is pronounced such that the phonological materials are recoverable; It must respect other PF requirements. The last point is where cross-linguistic intricate patterns arise. There are examples showing that some PF-requirements **preclude** the pronunciation of some copy, quoting Landau (2006):

(8) *For example, according to Franks (1998, 1999), second-position clitics in Serbo-Croatian move successively to C^o, and are normally spelled out in that position. However, if the highest copy cannot cliticize to a prosodic word to its left (e.g., when it follows an intonational boundary of an appositive), the next highest copy will be pronounced. According to Bobaljik (2002), V and T must be string-adjacent for morphological merger to take place; if Object Shift targets a position between V and T, the higher copy of the object must be deleted at PF to guarantee successful V-T merger.*

On the other hand, there are examples where PF-requirements **necessitate** the pronunciation of copies in particular positions (Landau 2006; Yuan to appear; Van Urk 2018). Therefore, Landau formalizes his chain reduction algorithm in the following terms attempting to capture all above-mentioned properties:

(9) a. *P-recoverability*:
In a chain $<X_1, \ldots X_i, \ldots X_n>$, where some X_k is associated with phonetic content, X_k must be pronounced.

b. *X is associated with phonetic content* iff:
i. X has phonetic content, or
ii. X is in a position specified with some phonological requirement

(10) *Economy of Pronunciation*:
Delete all chain copies at PF up to P-recoverability.

This formalization covers cases where there are multiple copies pronounced because they are all demanded by PF-requirements. He demonstrates how it accounts for the fact that a verb is pronounced twice in Hebrew VP-topicalization (Landau 2006:32): The higher copy is pronounced to satisfy the prosodic requirement of Top^o, and the lower copy of the verb on T is pronounced such that inflectional affixes can be hosted. The copy in the base-generated position is deleted due to economy (10).

However, there is some lack of clarity in this formalization. It is unclear what determines whether a copy X_k has phonetic content or not in (9b-i). This point of unclarity makes it difficult to predict the outcome of the following logically possible scenario. If in a movement chain $<X_1$,

X_2, X_3>, all copies are neither demanded nor excluded by any PF-requirement, but at least one has to be pronounced, which one would end up "having phonetic content"? Intuitively, it should be the highest copy, as it is very commonly seen that the highest copy in a movement chain is pronounced. For example, it is always the case in English relative clauses:

(11) a. The book [which$_i$ John said [~~which$_i$~~ Mary likes ~~which$_i$~~]]

b. *The book [~~which$_i$~~ John said [which$_i$ Mary likes ~~which$_i$~~]]

But it is unclear what requirement demands the pronunciation of the highest copy in (11) above[3], while cross-linguistically, we do see that some languages prefer a faithful spell-out of the highest copy with everything else being equal. For example, Van Urk (2018) argues that in Dinka Bor, if a movement chain has copies on *v*P edges, then those copies only undergo partial deletion and are pronounced as pronouns, due to the V2 property of *v*.

(12) Dinka Bor (from Van Urk 2018:8)

Yè	**kɔ̂ɔc-kò**	[$_{CP}$	yíi̤	Bôl	[$_{vP}$	***(ké)**	luêeel	[$_{CP}$	è̤	cíi̤	Áyèn
be.3SG	**people-which**		be.OV	Bol.GEN		**3PL**	say.NF		C	PRF.OV	Ayen.GEN

[$_{vP}$ ***(ké)** tî̤iŋ]]]]?
3PL see.NF

Which people does Bol say Ayan has seen?

Note that in this case, any of these copies could have been fully pronounced, since as long as there is *something* being pronounced at each required position and a fully faithful version is pronounced once, P-recoverability is satisfied. However, it is always the highest copy that undergoes full spell-out in Dinka Bor. Therefore (11) and (12) together suggest that for some languages, there is a requirement to faithfully pronounce the highest movement copy. I propose the following formalization of such a requirement (c.f. PHC in Deal 2016):

(13) *Pronounce the highest available copy* (PHAC)
In a movement chain, <X_1, . . . X_i, . . . X_n>, where X_j is structurally the highest copy among the ones not excluded by PF-requirements, X_j must be faithfully pronounced.

PHAC is in fact parameterized, as it is not an requirement in some other languages (Van Urk 2018; Yuan to appear). Later I will show that Swahili is among the languages that enforce PHAC.

2.3. PHONOLOGICAL MINIMALITY IN SWAHILI. It has already been argued by Scott (2021) that movement chain resolution in Swahili relative clauses is sensitive to a disyllabic phonological minimality requirement (PM) for words in Swahili (Park 1995, 1997; Scott 2015). My analysis is based on her insight that a copy can't be deleted if such deletion would result in a violation to PM. In this section, I introduce such requirement in Swahili.

Park (1995, 1997) and Scott (2015) provide numerous examples demonstrating a disyllabic minimality requirement of words in Swahili. *ku*-insertion is one of compelling examples showing

[3] Note that in a raising-to-subject construction ([John$_i$ seemed ~~John$_i$~~ to be noticed ~~John$_i$~~]), the pronunciation of the subject is thought to be enforced by the requirement to spell out anything in an EPP position (Landau 2006). The pronunciation of the relative operator chain in this case is harder to be explained in this way since a subordinated spec,CP isn't an EPP position.

such a requirement. Whenever monosyllabic verb stems appear in their bear form, a meaningless morpheme *ku* is required. Otherwise *ku*-insertion is not allowed when it is not required. Compare (14) with (15).

(14) a. ni-li-[i-la] m-buzi
1SG.SM-PST-4.OM-eat 4-goat
I ate the goat.

b. *(ku)-la!
*(ku)-eat!
eat!

(15) a. ni-li-[ki-soma] kitabu
1SG.SM-PST-7.OM-read book
I read the book.

b. (*ku)-soma!
(*ku)-read!
read!

Other examples from Park (1995, 1997) include various intricate patterns about reduplication. Scott (2015) provides examples of vowel lengthening in Swahili loanwords arguing for a bi-moraic minimality requirement. Under either account, monosyllabic words with one mora are not allowed in this language. Moreover, Scott (2021) provides compelling examples showing that when the complement of a preposition is Ā-extracted, whether the use of a resumptive pronoun (homophonous with REL) is obligatory only depends on whether the preposition is monosyllabic, as we can see from the contrast between (16) and (17) below[4].

(16) (from Scott 2021:819)
ni-li-vi-nunu-a vi-kombe amba-vyo u-li-safiri **na-*(vyo)**.
1SG.SM-PST-8-buy-IND 8-cup amba-8.REL 2SG.sm-PST-travel with-*(8.REL)
I bought the cups that you traveled with.

(17) (from Scott 2021:820)

a. a-me-waka pingamizi katika kazi y-ake.
1-PERF-put conditions on 9.work 9-POSS
She put conditions on her work.

b. Kazi amba-yo a-li-weka pingamizi **(*katika/*katika-yo)** i-na-endelea.
9.work AMBA-9 1-PST-put conditions (*on/*on-9.REL) 9-PRS-continue
The work that she/he put conditions on.

Examples above demonstrate that a word is Swahili can't be monosyllabic, but the notion of a *word* is not clearly defined so far, and in fact we do see monosyllabic orthographic words in Swahili such as some prepositions and copulas. I follow Pietraszko (2018a)'s assumption for Ndebele that complex heads are mapped to prosodic words (PWord), a category in the Prosodic Hierarchy (Selkirk 1984 among others), which is subject to the minimality requirement. Furthermore, the ban against monosyllabic preposition stranding (16) and monosyllabic pronouns (Park 1997:80) indicate that maximal projections can't be monosyllabic either. These two facts are responsible for the distribution of REL in Swahili relatives, and what the status of simplex heads are in the prosodic structure and why they can be monosyllabic are thus irrelevant.

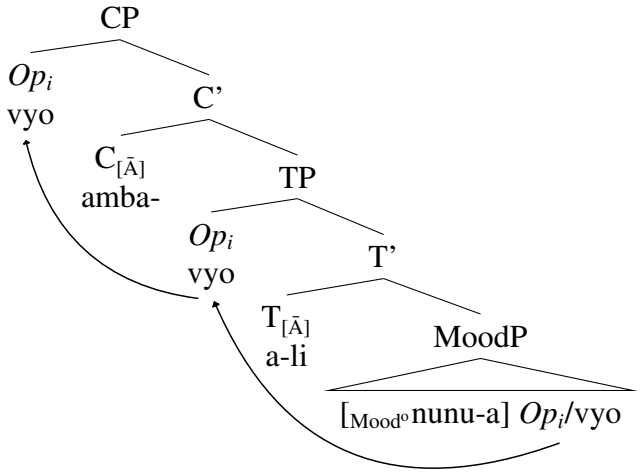
[4] It was not addressed by Scott (2021) why the preposition must be dropped entirely if it is not monosyllabic, and whether we can also drop a monosyllabic preposition to avoid a PM violation.

3. Deriving Swahili relative clauses. Having introduced relevant facts and theoretical premises, I demonstrate how they together derive the distribution of relative marker in Swahili relative clauses. First, I argue that the relative marker is in fact a relative pronoun, akin to "which" in English, given its homophony to actual pronominal elements in Swahili (Keach 1980; Henderson 2006; Scott 2021). Under most theories of relative clauses, relative pronoun is or is a part of the phrasal element that undergoes Ā-movement to Spec,CP of the relative clause[5]. For the sake of simplicity, I represent it as an operator (*Op*) in my derivations[6](c.f. Liu 2023). According to LPC, Ā-movement of the operator leaves copies on both Spec,CP and Spec,XP of whatever XP it is that inherits an Ā-feature from the CP layer of relative clauses, and the chain resolution algorithm spells out different copies in different cases, yielding different linear positions of the relative marker. Next, I demonstrate this process for each case. I demonstrate with relative clauses without an overt subject, and I address the issue with the subject in §5.

3.1. AMBA-RELATIVES. The output from syntax for amba-relatives is the following, where T inherits an Ā feature from C that makes it probe for *Op* and raise it to Spec,TP. Therefore there are three copies of *Op* in the structure[7].

(18) a. vi-tabu [$_{CP}$ amba-vyo a-li-nunu-a]
8-book amba-8.REL 1.SM-PST-buy-IND
the books which she bought

b.



The operator on Spec,CP apparently incorporates into C, yielding the surface form *amba-vyo*, and the same goes to other copies in the specifier of other heads. This incorporation can be

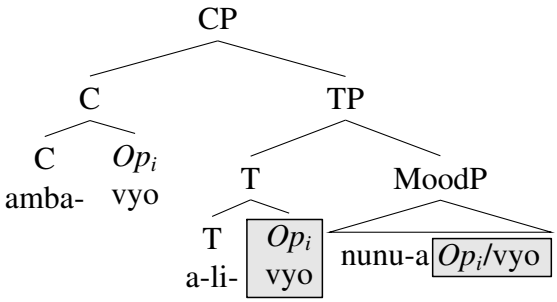
[5] For a review of different versions of relative clauses and their treatments of the relative pronoun, see references in Salzmann (2019)

[6] My analysis is trivially compatible with other versions of relative clause analysis with different categorical assumptions for the relative pronoun. In both raising and matching analysis, the relative pronoun is analyzed as a relative determiner of the NP that undergoes raising/deletion-under-matching. In either case, a chain resolution mechanism needs to be applied to decide which copies of the relative pronoun to pronounce.

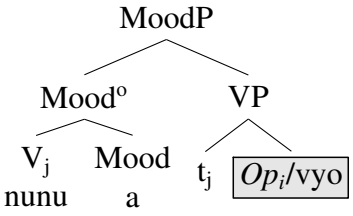
[7] I follow some previous authors and assume that the suffix morpheme cluster of the verb, including the verb itself, is formed via successive head raising from V to *Mood* through all intermediate functional projections (Carstens 2005; Ngonyani 2006). Therefore, the verb and the final vowel and any verbal extensions in between (voice, applicative etc.) are spelled out together as the complex Mood^o that heads MoodP. I also assume that the subject marker doesn't head a separate projection, instead it spells out the φ-probe on T (Pietraszko 2018b among others).

modeled by a post-syntactic m-merger operation (Matushansky 2006; Harizanov 2014 among others) that rebrackets a head with its specifier. M-merger applies to all copies in all specifier positions, yielding the following post-syntactic structure in (19).

(19) m-merger applied to (18b)



(20)



The chain resolution algorithm then applies to the Op_i chain in (19). We can see that among these three copies, the lowest one in the base position can't be pronounced. As we can see in the articulated structure of MoodP in (20) above, this copy is the only phonological material in VP. Given that maximal projections can't be monosyllabic as established in §2.3, pronouncing this copy would cause a PM violation. Therefore this copy should be deleted. On the other hand. Since the top two copies in (19) are already incorporated into C and T, they can be pronounced in those positions without any minimality violation. In this case, however, only pronouncing the intermediate copy is never possible:

(21) *vi-tabu amba a-li-vyo-nunu-a
8-book C 1.SM-PST-8.REL-buy-IND
Intended: the books which she bought.

This suggests that Swahili enforces PHAC (13) which forces the highest available copy to be pronounced, and the second highest copy in this case is deleted due to economy (10).

Interestingly, in some older varieties of Swahili, it is possible to pronounce both copies of *Op* in (19) (Keach 1980; Edelsten 2010; Lipps 2011), as shown below in (22). It is possible that in these varieties copy deletion is bled by m-merger[8]. Nevertheless, this piece of diachronic data provides support for there being multiple copies of *Op* in Swahili relative clauses.

(22) (from Edelsten 2010:19)
Wageni amba-**o** wa-li-**o**-fik-a leo wa-ta-ondok-a kesho.
2.guest amba-**2.REL** 2.SM-PST-**2.REL**-arrive-IND today 2.SM-FUT-leave-IND tomorrow
The guests who arrived today will leave tomorrow

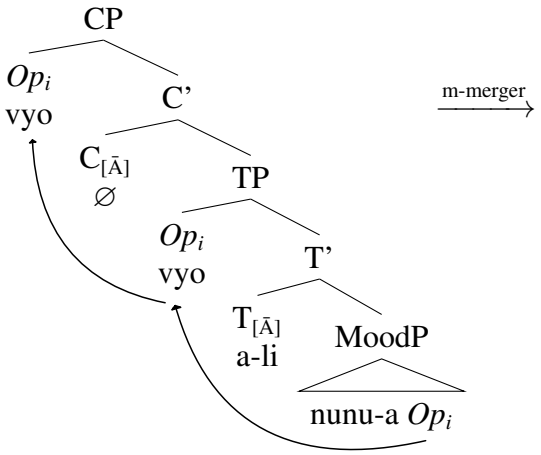
[8] For other cases of morphological operation bleeding copy deletion, see Yuan (to appear).

3.2. AMBA-LESS RELATIVES. For amba-less relatives, I argue that a CP layer still exists even though C in this case is not associated with overt phonological material. I provide evidence for the existence of a CP layer in §5. What crucially stay the same in amba-less relative are that the first XP under the CP layer also inherits an Ā-feature from C/Fin, and cyclic Ā-movement of the operator also leaves copies on both Spec,CP and Spec,XP, where XP in this case can be TP, MoodP and NegP.

3.2.1. TENSED AMBA-LESS RELATIVES. For cases like (23) where a TP is projected, the morphosyntactic derivation is shown below in (24).

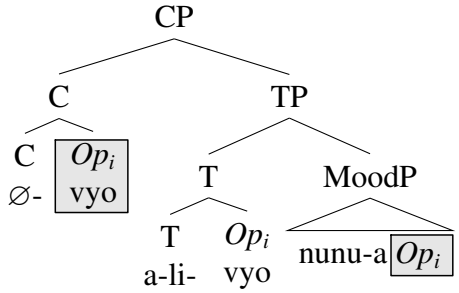
(23) vi-tabu [$_{CP}$ a-li-vyo-nunu-a]
8-book 1.SM-PST-8.REL-buy-IND
The book that he bought.

(24) a.



m-merger

b.



Chain resolution algorithm then applies to (24b). Since in this case pronouncing the highest/lowest copy would cause a PM violation, the second highest copy is pronounced.

3.2.2. TENSE-LESS AMBA-LESS RELATIVES. In some other cases of amba-less relatives, a TP doesn't seem to be projected. These are the ones associated with a characterizing reading (see references in Boneh 2019). In these expressions, no specific temporally anchored event is involved, and tense morphology is also absent. Relevant cases are shown below in (25).

(25) a. vi-tabu a-nunu-a-**vyo**
8-book 1.SM-buy-IND-**8.REL**
Books she buys

b. vi-tabu a-si-**vyo**-nunu-a
8-book 1.SM-NEG-**8.REL**-buy-IND
Books she doesn't buy

Another argument for the nonexistence of a TP in type-2 amba-less relatives is the following. Assuming Pietraszko (2018b)'s theory of subject marking in Bantu languages, φ-probe for the subject (realized as the subject marker) that can show up in various places is introduced by V and percolates to the highest head that checks its [uV] against V. Given this account, it is obvious that T, if present, always checks with a V in Swahili and possesses a φ-probe that is eventually

realized as the subject marker. If a TP layer exists in (25a) and T is associated with morphological content (a valued φ), then after the copy of *Op* on Spec,TP incorporates into T, the following ungrammatical string in (26) is wrongfully predicted to be grammatical. Therefore, T must be absent in this case and φ is in fact spelt out on Mood^{o} in (25a).

(26) a. vitabu [$_{CP}$ t_i [$_{C}$ ~~∅-*OP*$_i$~~] [$_{TP}$ t_i [$_{T}$a-*Op*$_i$/vyo] [$_{MoodP}$ [$_{Mood^o}$ nunu-a] ...~~Op$_i$~~...]]

b. *vi-tabu a-vyo-nunu-a
8-book 1.SM-8.REL-buy-IND
Intended: Books she buys

Therefore, MoodP and NegP are the highest projection under the CP layer in (25a) and (25b) respectively. Consequently, Mood/Neg inherits the Ā-feature and the cyclic movement of *Op* leaves a copy on Spec,MoodP/NegP in these cases. M-merger and chain resolution algorithm then apply and produce the correct outputs for (25a) and (25b) as shown below in (27).

(27) a. vitabu [$_{CP}$ t_i [$_{C}$ ~~∅-*OP*$_i$~~] [$_{MoodP}$ t_i [$_{Mood^o}$ nunu-a-*Op*$_i$/vyo] ...~~*Op*$_i$~~...]]
movement, movement; m-merger, m-merger

b. vitabu [$_{CP}$ t_i [$_{C}$ ~~∅-*OP*$_i$~~] [$_{NegP}$ t_i [$_{Neg}$ a-si-*Op*$_i$/vyo] [$_{MoodP}$ [$_{Mood^o}$ nunu-a] ...~~*Op*$_i$~~...]]]
movement, movement; m-merger, m-merger

4. Prediction. This analysis makes an interesting cross-linguistic prediction that if a relative pronoun couldn't be spelt out in isolation on the edge of a relative clause due to minimality requirement, a copy in a lower position has to be pronounced if it can get phonological support there. There are confirmatory examples of this prediction in other Bantu languages. In Luganda and iKalanga, which have a documented disyllabic minimality requirement (Hyman & Katamba 2005; Kadenge & Mathangwane 2017), it is reported that the relative pronoun is also realized on T:

(28) a. Luganda(from Letsholo 2009:133)
emikeeka [$_{RC}$ abawala **gye**-ba-a-luka]
4.mat 2.girl **4.REL**-2.SM-past-plait
The mats that the girls plaited

b. iKalanga(from Letsholo 2009:133)
ngumba [$_{RC}$ Ludo **ya**-a-ka-baka]
9.house 1.Ludo **9.REL**-1.SM-past-build
The house that Ludo built

5. The subject in relative clauses. In §3, I demonstrate derivations of Swahili relative clauses without an overt subject, and I address the issue with the subject in this section. Note that in amba-less relatives, the subject in the relative clause is often post-verbal. Relevant examples are repeated below in (29).

(29) a. vi-tabu [$_{CP}$ a-li-vyo-nunu-a **Juma**] ni ghali.
8-book [$_{CP}$ 1.SM-PST-8.REL-buy-IND **Juma**] be expensive
The books Juma bought are expensive.

b. vi-tabu [$_{CP}$ a-nunu-a-vyo **Juma**] ni ghali.
8-book [$_{CP}$ 1.SM-buy-IND-8.REL **Juma**] be expensive
The books Juma buys are expensive.

Many previous works describe this VS order as obligatory and propose derivational analyses for amba-less relatives that entail this order (Buell 2002; Ngonyani 2006; Meadows 2023 among others). However, it is noted in other works that the subject is in fact not obligatorily post-verbal in all amba-less relative clauses (Zwart 1998; Edelsten 2010; Lipps 2011 among others). Judgements from my consultant confirm the latter. First, Edelsten (2010) reports that the following sentence in (30), where the subject is preverbal in an amba-less relative clause, is judged not ungrammatical, but ”dispreferred” and ”colloquial” (Lipps 2011:27).

(30) (from Edelsten 2010:6)
chakula mama a-li-cho-ki-pik-a
7.food 1.mother 1.SM-PST-7.REL-7.OM-cook-IND
food which mother cooked

Furthermore, from my consultant's judgements, it seems that as an amba-less relative clause gets more complicated, a pre-verbal subject becomes more accepted. In the following examples of amba-less relative clauses, a pre-verbal subject is judged as good as a post-verbal in-situ subject.

(31) a. vi-tabu [$_{CP}$ (Juma)$_{p1}$ a-li-vyo-wa-nunu-li-a (Juma)$_{p2}$ wa-toto]
8-book (Juma)$_{p1}$ 1.SM-PST-8.REL-2.OM-buy-APPL-IND (Juma)$_{p2}$ 2-child]
The book that Juma bought for kids
(A subject at p1 is as good as a subject at p2 (p1 = p2))

b. biskuti [$_{CP}$ (Baraka)$_{p1}$ a-li-yo-sem-a (Baraka)$_{p2}$ kwamba Juma
4.cookie (Baraka)$_{p1}$ 1.SM-PST-4.REL-say-IND (Baraka)$_{p2}$ that Juma
a-li-i-l-a]
1.SM-PST-4.OM-eat-IND
The cookie which Baraka said that Juma ate
(p1 = p2)

These facts above suggest that the structure and mechanisms responsible for the morphology of amba-less relatives don't entail a post-verbal subject, but questions remain as to where is the subject located in these structures and why the order preference changes with the size of the clause. Next, I speculate a connection between the subject behavior and the information structure within Swahili relative clauses, and propose a tentative account for different subject positions that is compatible with my main proposal. I leave in-depth investigation of this matter to future research.

An important observation is that the subject in amba-relatives can be focused, but the subject in amba-less relatives is always anti-focus, regardless of its position. This can be shown by the fact that the subject in amba-relatives can be a wh-word, while it can't in amba-less relatives:

(32) *Context: Speaker A: "I want the cookie which Baraka said that Juma ate"; Speaker B: "who?"; Speaker A: "excuse me?"; Speaker B:"the cookie which* **who** *said that Juma ate?"*

a. Biskuti amba-yo **(nani)** a-li-sem-a **?(nani)** kwamba Juma
4.cookie amba-4.REL **(who)** 1.SM-PST-say-IND **?(who)** that Juma
a-li-i-l-a?
1.SM-PST-4.OM-eat-IND
the cookie which who said that Juma ate?

b. *Biskuti **nani** a-li-yo-sem-a kwamba Juma a-li-i-l-a?
4.cookie **who** 1.SM-PST-4.REL-say-IND that Juma 1.SM-PST-4.OM-eat-IND
the cookie which who said that Juma ate?

c. *Biskuti a-li-yo-sem-a **nani** kwamba Juma a-li-i-l-a?
4.cookie 1.SM-PST-4.REL-say-IND **who** that Juma 1.SM-PST-4.OM-eat-IND
the cookie which who said that Juma ate?

I tentatively propose that this is because the entire TP is always focalized in amba-less relative clauses, therefore an in-situ subject within this TP (as in (32c)) can't be further in focus. On the other hand, a preverbal subject in amba-less relative clauses (as in (32b)) is presumably in a peripheral position (c.f. Pietraszko 2021) while the TP is focused in-situ. This possibility is also suggested by examples (as in (33)) where the entire TP seems to raise above the subject, to a peripheral focus position under my account[9]. In this case, the fact that the subject is left behind suggests that it has already moved out of TP to a peripheral position (c.f. Kayne & Pollock 2001; Lahousse 2006 on French VS)

(33) vi-tabu a-li-vyo-wa-nunu-li-a watoto **Juma**
8-book 1.SM-PST-8.REL-2.OM-buy-APPL-IND 2-child **Juma**
books which Juma bought for kids

Therefore, amba-less relatives with a preverbal subject ((31) with subjects in p1) has the structure in (34a) below, and the ones with a subject following the entire TP (33) has the structure in (34b). If the subject is in-situ ((31) with subjects in p2), it is unclear whether the TP is focused in-situ or ex-situ.

(34) a. $[_{CP}\ [_{FP}$ **Subj** $[_{F}]$ ... $[_{TP_{[+Foc]}}\ t_{Subj}$ T-*Op*-V-Mood^{o} XP]]]
b. $[_{CP}\ [_{FocP}\ [_{TP}\ t_{Subj}$ T-*Op*-V-Mood^{o} XP] $[_{Foc}][_{FP}$ **Subj** $[_{F}]$ ... $t_{TP}]]]$

Moreover, the following fact in (35) suggests that TPs that are too heavy can't be focused ex-situ.

[9] A similar example is used by Ngonyani (2006) to argue that MoodP is raised to the left periphery, across a subject on Spec,TP.

(35) *biskuti [$_{CP}$ [$_{TP}$a-li-yo-sem-a t_i kwamba Juma a-li-i-l-a] [$_{Foc}$]
cookie 1.SM-PST-4.REL-say-IND that Juma 1.SM-PST-4.OM-eat-IND
Baraka$_i$]
Baraka
the cookie which Baraka said that Juma ate

Putting things together, it is possible to explain the subject-verb order phenomena in amba-less relatives as the following. When TP is small (as in (29)), an in-situ focus of TP is dispreferred. Therefore, no matter whether the subject is in-situ, a VS order is preferred. When TP gets bigger, an in-situ focus of TP becomes more preferred, and the optionality of SVO/VSO in (31) comes from the optionality of an in-situ subject in Swahili[10]. For cases like (31a) and (33) where SVO, VSO and VOS are all acceptable, it is because an in-situ and ex-situ focus of TP are equally acceptable, in addition to the optionality of an in-situ subject.

Last but not least, recall that in §3.2, the existence of a silent CP layer in amba-less relatives needs support. I argue that cases like (33) are strong evidence that a silent CP layer exist in this case, because things can move to the left-periphery. Otherwise it is hard to explain why the subject follows the verb and object in (33). Therefore, these cases are challenging to a reduced structure account of amba-less relatives by Meadows (2023).

6. Conclusion. This study explains the puzzling distribution of the relative marker in different Swahili relative constructions. I argue that the relative marker is in fact a relative operator that undergoes $\bar{A}$ movement to Spec,CP, and its various linear position is a result of spelling out different copies at different structural positions. According to a slightly generalized version of the Lower Phase Conjecture by Deal (2016), there is a movement copy not only on Spec,CP, but also on Spec,XP where XP is the highest projection under a relative CP layer. Furthermore, I argue that such copy spell-out process can be modeled by Landau (2006)'s chain resolution algorithm which states that copy spell-out respects economy and language specific requirements at PF. I show that relevant PF requirements in Swahili are the disyllabic minimality requirement on words (Park 1997; Scott 2015) and a cross-linguistically attested (but not universal) requirement that the highest available copy in a movement chain must be faithfully pronounced, which I formalized as Pronounce the Highest Available Copy (PHAC). I also show that a post-verbal subject in amba-less relatives is in fact not obligatory, and I provide a tentative account for relevant facts based on the information structure in amba-less relative clauses.

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[10] In main clauses, an in-situ subject is judged to be interchangeable with a preverbal subject by my consultant.

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