Chapter 1

Derivational timing of auxiliary insertion in Swahili relative clauses

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1 Introduction

This work explores the consequences of derivational timing of T-to-C movement in Swahili relative clauses with respect to Late Insertion accounts of overflow auxiliary patterns. The Late Insertion approach suggests that an overflow auxiliary is inserted late to pick up stranded inflectional features (Bjorkman 2011). However, recent work from Pietraszko (2023) suggests an alternative approach to representing Swahili overflow auxiliaries, called *cyclic selection*. Pietraszko (2023) argues that cyclic selection has an empirical advantage to capturing the surface order of the auxiliary verb *kuwa* in Swahili relative clauses (RCs), with respect to C-agreement morphology. In this work, we argue that it is possible to save the Late Insertion approach when it comes to Swahili RCs, when coupled with a PF theory of head movement (e.g. the morphological selection features proposed in Harizanov & Gribanova 2018). This alternative proposal requires T-to-C movement in Swahili relative clauses (RCs) to be post-syntactic and occur after Insertion (Vocabulary Insertion; Embick & Marantz 2008).

Swahili RCs pose a particular challenge to insertion-based accounts of

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overflow auxiliaries (Pietraszko 2023). Systematic T-to-C head movement occurs in Swahili tensed RCs, but to the exclusion of auxiliaries: the Aux appears to get stranded in T, seemingly not participating in the head-movement chain at all. Since insertion approaches interpret auxiliaries as a last resort strategy in the morphology to host unvalued features, these accounts predict that auxiliary insertion should follow all syntactic operations, and therefore be inserted into the moved position, not the base-generated position. The purpose of this paper is to demonstrate that, despite these concerns, an insertion approach can still succeed in accounting for the Swahili RC data, when coupled with the hypothesis that head movement in Swahili RCs could in fact be post-syntactic. Any analysis of Swahili RCs requires ensuring that 1) the overflow auxiliary is not part of the head movement chain, and that 2) the overflow auxiliary is added to the structure prior to whichever head movement mechanism is utilized. Exploring PF theories of head movement gives us an avenue for ordering auxiliary insertion before head movement *within* the post-syntactic module.

2 Overflow auxiliaries

Bjorkman (2011)'s dissertation on cross-linguistic auxiliary distribution differentiates between two patterns of auxiliaries: the additive pattern and the overflow pattern. In the additive pattern, there is a one-to-one mapping between inflectional categories and auxiliary verbs, such as the English examples (1–3).

(1) a. She **has** worked. perfect *have*
b. She **had** worked.
c. She will **have** worked.

(2) a. She **is** working. progressive *be*
b. She **was** working.
c. She will **be** working.

(3) She will **have been** working. perfect *have* + progressive *be*

In these examples above, there is an auxiliary *be* that reliably corresponds progressive inflection (1), and an auxiliary *have* that reliably corresponds to perfective inflection (2). Both auxiliaries show up together, when both inflections are expressed (3).

The overflow pattern differs from the additive pattern with respect to mapping of inflectional categories to auxiliary verbs. Unlike the one-to-one mapping of a particular auxiliary form associated with a unique inflection, overflow patterns utilize only one auxiliary verb, that has a default form. This auxiliary is also only needed in certain combinations of inflectional categories (4-5).

(4) Swahili progressive aspects

a. ni -∅ -na -soma.
1SG -**PRES** -PROG -read.
'I am reading.'

b. ni **-li** **-kuwa** ni -na -soma
1SG -**PST** -**AUX** 1SG -PROG -read
'I was reading.'

c. ni **-ta** **-kuwa** ni -na -soma
1SG -**FUT** -**AUX** 1SG -PROG -read
'I will be reading.'

(5) Swahili perfective aspects

a. ni -∅ **-me** -soma
1SG -PRES -**PERF** -read
'I have read.'

b. ni **-li** **-kuwa** ni **-me** -soma
1SG -**PST** -**AUX** 1SG -**PERF** -read
'I had read.'

c. ni **-ta** **-kuwa** ni **-me** -soma
1SG -**FUT** -**AUX** 1SG -**PERF** -read
'I will have read.'

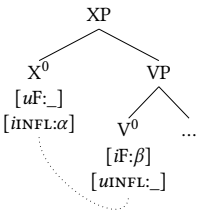
The auxiliary *kuwa* appears only when past or future tense co-occurs with the progressive (4b, 4c), or perfective (5b, 5c). When the sentence is in present tense, the auxiliary does not appear at all for either the progressive or perfective (4a, 5a). Bjorkman (2011) calls this observed paradigm "the overflow pattern", to capture the generalization that inflectional morphemes unable to be expressed on the main verb "spillover" onto a default auxiliary form. In the above cases, the present tense in Swahili is treated as unmarked or unspecified and therefore does not have a corresponding morpheme, preventing any spillover issues. This differs from past and future tenses, which are realized with overt morphemes.

3 Insertion analysis

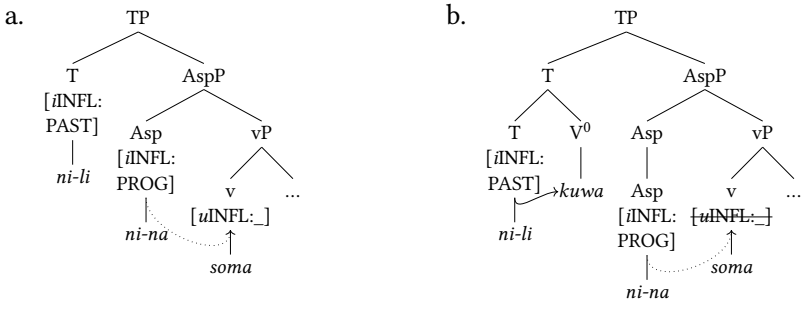
Since the overflow paradigm demonstrates insertion of auxiliaries only when both tense (under the assumption that present tense in Swahili is unspecified and invisible) and another inflectional feature are present, Bjorkman (2011) argues for an analysis of the pattern where auxiliary is inserted late to "save" a stranded inflectional feature, in cases where functional heads on the clausal spine host inflectional features that are unable to be valued by a Probe. The account utilizes the operation Reverse Agree (Bjorkman 2011; Bjorkman & Zeijlstra 2019), which differs from the traditional characterization of Agree in the Minimalist Program (Chomsky 1995) in directionality. In traditional Agree, probes must have unvalued features, but in Reverse Agree, the probe hosts a valued interpretable feature, e.g. [*i*INFL:PST] or [*i*INFL:FUT]. The probe searches for a goal that contains an unvalued feature [*u*INFL:_].

In this system, T and Asp heads are all considered to be INFL heads with interpretable features, while V^0 is assumed to contain an unvalued inflectional feature. The probe with the valued feature on the INFL head looks down into its c-command domain to search for a goal with an unvalued INFL feature. This process is depicted in (6).

(6) Reverse Agree (Bjorkman 2011)



(7) Stranded past tense INFL (a) triggers Auxiliary insertion (b)



If an inflectional head cannot agree with a V^0 head, because of other intervening inflectional heads, then its INFL feature is "stranded" and unable to be valued. In this circumstance, an extra V is then inserted post-syntactically to host it, as shown in (7) above. Bjorkman (2011) asserts that Swahili present tense is unspecified (lacking features), and therefore does not count as an intervening head. If only specified inflectional heads can act as interveners, and unspecified heads cannot, then auxiliary insertion is only triggered when two specified inflectional heads occur in the same structure.

In this analysis, auxiliary insertion is derivationally timed later than the building of the structure: Merge first creates a structure without an auxiliary, but one may later be inserted in a post-syntactic component.

4 An alternative: cyclic selection

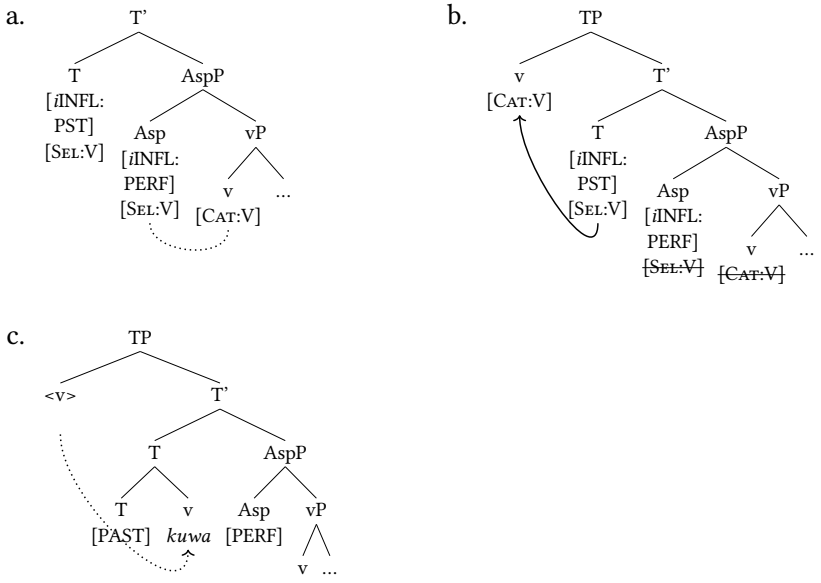
Pietraszko (2023) provides an alternative account of the overflow pattern, in which she puts forth the claim that auxiliaries are externally Merged into specifier positions, rather than inserted. Her motivations for doing so are related to theory; being able to derive auxiliary behavior using only the Minimalist toolbox avoids having to define "stranded inflection", or having to posit a formal Insertion operation. To account for both auxiliary patterns, Pietraszko (2023) proposes a syntactic operation called *cyclic selection*, which utilizes the selectional V-features of Cowper (2010). This is different from traditional views of c-selection: Pietraszko asserts a difference between 'Sel-Merge', which is what cyclic selection accomplishes, and 'HoP' (Hierarchy of Projections) Merge, which refers to a fixed universal ordering of functional projections along the clausal spine.

Cyclic selection works as follows: a probe looks into its c-command domain to establish a relation with an accessible goal. If it cannot find a suitable goal, then it is allowed to "select" and externally Merge a satisfactory goal into its specifier. In the overflow auxiliary cases, an inflectional head looks to satisfy a [Sel:V] feature; if it can find no acceptable goal with the feature [Cat:V] in its c-command domain, as the main verb may have already valued a lower inflectional head, then it will Merge an auxiliary with [Cat:V] into its specifier. The auxiliary is then post-syntactically adjoined to the inflectional head via m-merger (Matushansky 2006). An example of this derivation is given in (8) below.

Cyclic selection can be characterized as the External Merge counterpart of M-merger; the M-merger operation accomplishes Internal Merge of a head,

whereas cyclic selection accomplishes External Merge of a head. To derive the overflow pattern, Pietraszko (2023)'s system depends on the same understanding of feature under-specification that Bjorkman (2011) and other Insertion approaches use: overflow auxiliary languages are assumed to have an unmarked present tense, which in the cyclic selection approach translates to a T with present tense lacking a [Sel:V] feature. In additive auxiliary languages, past, present, and future T all have a [Sel:V] feature.

(8) [Sel:V] Agrees with [Cat:V] (a); [Sel:V] Merges AUX in Specifier (b); *M-merger* of AUX to T in PF (c)



Pietraszko's analysis functionally derives the same pattern as the Last Resort account discussed in §3. The motivation for preferring one analysis over the other lies in theoretical choice point: on one hand, an insertion approach has strength in its ability to capture the characterization of auxiliary patterns as a "last resort" phenomenon, as auxiliary insertion is a post-syntactic operation rather than one that occurs in syntax proper. On the other hand, Pietraszko (2023)'s analysis still manages to capture this as well, simply cast in a different light as auxiliary Merge as a means to value a [Sel:V] feature, rather than an [*u*INFL:_] feature. Benefits of the cyclic selection account come from being able to derive the paradigm using just the familiar Minimalist operations of Merge

and Agree, removing the need to resort to separate mechanisms to accomplish Aux-insertion. In doing so, however, a new understanding of c-selection using Selectional features (Cowper 2010) is added into the system, in addition to the commitment that the phenomenon of insertion itself is parasitic on the presence of these selectional features.

5 Swahili RCs: an empirical problem for Late Insertion

Pietraszko (2023) observes that the Late Insertion account of the overflow pattern makes the wrong prediction for the surface ordering of morphemes in Swahili relative clauses (RCs), giving *cyclic selection* an empirical edge. Swahili RCs can be formed with or without an overtly pronounced complementizer. Regardless of whether it is overt, C will agree with the relative head. See an example RC with an overt complementizer in (9), and one without in (10). The morphological content assumed to diagnose the location of the C head is boxed.

(9) kitabu [$_{CP}$ **amba**-cho a-li-ki-soma]
7book [$_{CP}$ COMP-C7 1SG-PST-7o-read]
'The book that he read'

(10) *kitabu [$_{CP}$ **a-li-**cho -ki-soma]
7book [$_{CP}$ 1SG-PST-C7- 7o-read]
Intended: 'The book (that) he read'

When there is no overt complementizer (10), T-to-C movement is obligatory. With no *amba*, it is ungrammatical to leave T low, represented by the past tense with subject agreement *a-li* in (11), and also ungrammatical to do full roll-up movement of V-to-T-to-C (12).

(11) *kitabu [$_{CP}$ cho **a-li**-ki-soma]
7book [$_{CP}$ -C7 3SG-PST-7o-read]
Intended: 'The book (that) he read'

(12) *kitabu [$_{CP}$ a-li-ki-soma-cho]
7book [$_{CP}$ 3SG-PST-7o-read-C7]
Intended: 'The book (that) he read'

Recall from §3 that Insertion accounts assume auxiliaries to be inserted directly into T. As this is characterized in Bjorkman (2011) as Late Insertion, adding

the auxiliary into the structure is expected to happen post-syntactically, therefore *after* syntactic head movement has occurred. If this were true, we would expect to see the auxiliary surface high, in the location where T is after head movement, as part of a complex head with C. This is not the case, however. In (13), the grammatical surface ordering of morphemes shows *kuwa* following C, rather than preceding C. If *kuwa* was part of the T-C complex head formed by head movement, we would expect it to linearly precede the morpheme *-cho*.

(13) a. kitabu [$_{CP}$ ni-li-[-cho]-**kuwa** ni-na-soma]
7book [$_{CP}$ 1SG-PST-C7-**AUX** 1SG-PROG-read]
'The book (that) I was reading'

b. *kitabu [$_{CP}$ ni-li-**kuwa**-[cho] ni-na-soma]
7book [$_{CP}$ 1SG-PST-**AUX**-C7 1SG-PROG-read]
Intended: 'The book (that) I was reading'

The Late Insertion account incorrectly predicts the ungrammatical surface order in (13b), but cyclic selection can successfully rule out (13b) and derive (13a). An auxiliary Merged into the specifier of T is off the chain of head movement along the clausal spine, and so T-to-C movement will pass over the auxiliary in the specifier position, successfully stranding the auxiliary low and deriving the observed surface order.

6 A question of derivational timing

There is some debate in the literature about how to characterize head movement (Chomsky 2001; Matushansky 2006; Roberts 2010, etc). One large discussion considers whether head movement is best represented as a syntactic operation (e.g. utilizing M-Merger, Matushansky 2006), or whether there are avenues for treating head movement as post-syntactic (e.g. Harizanov & Gribanova 2018).

The choice of head movement characterization plays a crucial role in understanding the (lack of) participation that auxiliaries in Swahili RCs take in the roll-up T-to-C movement. Regardless of framework, a successful derivation of Swahili RCs requires that the addition of the auxiliary occurs *prior* to head movement. This is because the overflow pattern informs us that auxiliary insertion is conditioned by T. In RCs, since *kuwa* stays low in the structure, in order for T and the auxiliary to be in a local enough relationship at some point in the derivation to trigger insertion of *kuwa*, this process must occur before T has moved.

As long as there is a way to ensure that: 1) the auxiliary is added to the structure before head movement; and 2) does not participate in head movement, Swahili RC surface order can be generated. In Pietraszko (2023), this is accomplished with the following steps: selection features Merge the overflow auxiliary immediately into the structure, as requested by the stranded tense feature. M-Merger is ordered after syntactic head movement, effectively leaving the auxiliary *kuwa* behind in a specifier position. In §7, we explore whether treating T-to-C head movement in Swahili as a post-syntactic operation, utilizing the morphological selection features of Harizanov & Gribanova (2018), can work together with a Late Insertion characterization of the overflow auxiliary pattern to correctly derive the surface order of morphemes in Swahili RCs, at least as well as the account in Pietraszko (2023) can. We require the following pieces: first, post-syntactic head movement still follows Aux insertion, ensuring that auxiliary *kuwa* is added to the structure in the critical location, local to T. Second, Aux insertion must 'tuck in' (in a similar vein to Richards 1998; 1999) to the stranded INFL in T, such that the Aux is still sufficiently off the chain of movement. The strength of our analysis, then, is to preserve Last Resort approaches to overflow auxiliaries as a potential theoretical alternative that still has equivalent empirical coverage to a cyclic selection approach.

7 Swahili T-to-C as post-syntactic amalgamation

Harizanov & Gribanova (2018) argue that the syntactic phenomena traditionally classified as instances of head movement actually break down into two empirically distinct classes: syntactic head movement (such as Aux inversion in English polar questions) and post-syntactic amalgamation (such as V-to-T movement in French). Under a traditional view of head movement as some sort of upward displacement (e.g. Baker 1985), subject to locality, we expect a head that has undergone head movement to be a proper subpart of some head adjunction structure (i.e. a complex head). This has not been shown to hold consistently cross-linguistically (e.g. Abels 2003; Brody 2000).

In their paper, Harizanov & Gribanova (2018) motivate a split between head displacement and morphological word-formation. The prior refers to movement of entire heads from a lower syntactic position to a higher one (such as movement of a T head up to C to invert word order in polar question formation in English), while the latter is characterized by strictly local "roll-up" head movement phenomena that form morpho-syntactically complex words (such as

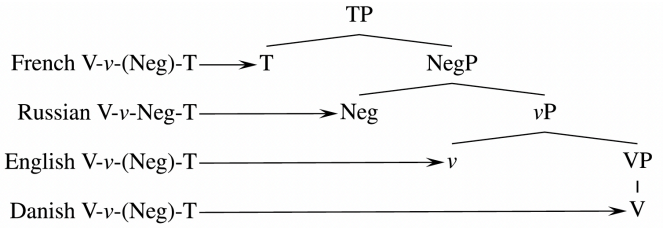


Figure 1: Different loci of complex head pronunciations across languages (from Harizanov & Gribanova 2018)

V-to-T movement in French). They call this second type of movement *morphological amalgamation*, and argue that it must occur in PF as either 'lowering' or 'raising' (depending on the language) of inflectional heads to the preferred location for pronunciation of the morphologically complex verbal head. Their cut dissociates pronunciation in a higher position and morphological unification, which are assumed to go together in traditional approaches to head movement. In other words, there can be instances of pronunciation of a head in a higher position without morpheme unification, and there can be morpheme unification without pronunciation of a head in a higher position. Surveying a multitude of different languages, Harizanov & Gribanova (2018) provide a helpful visualization of different languages that choose to pronounce the amalgamated string of functional morphemes at different sites along the clausal spine (Figure 1).

Given these inconsistencies, Harizanov & Gribanova (2018) propose two different classes of head movements, which are predicted to differ along the empirical dimensions listed in Table 1.

The cross-linguistic difference suggests that morphological amalgamation is logically independent from genuine syntactic movement. For example, in Dan-

Table 1: Properties of syntactic head movement and postsyntactic amalgamation (from Harizanov & Gribanova 2018)

	Postsyntactic amalgamation	Syntactic head movement
Produces head-adjunction structures (which map to words)	Yes	No
Driven by morphological properties of heads	Yes	No
Obeys the Head Movement Constraint	Yes	No
Obeys constraints on phrasal movement	No	Yes
Potential for interpretive effects	No	Yes

ish (Figure 1) the V-v-(Neg)-T complex is pronounced in V, but carries information of higher functional heads like v, Neg and T. The fact that the complex is pronounced in V indicates there has been no upward head movement. And yet, since V-v-(Neg)-T complex hosts the information of higher functional heads, there must be some other way in which higher morpho-syntactic features are passed down to the V position. For Harizanov & Gribanova (2018), this operation is morphological amalgamation, realized as PF-lowering. The approach is formalized by the introduction of [M] features, which are binary morphological selection features that can be specified with either a [+] or [−] value. The presence of the feature dictates that the head will need to amalgamate post-syntactically, and the [+/−] will determine the direction: a [+M] feature on a head H will trigger PF-raising of H to adjoin with next head above H, while a [−M] feature on H will trigger PF-lowering of H to the next head below H. The latter type of feature allows us to derive instances where pronunciation of inflectional heads occurs lower than its syntactic place of interpretation. If a head has no [M] feature, then there will be no change of its position at PF.

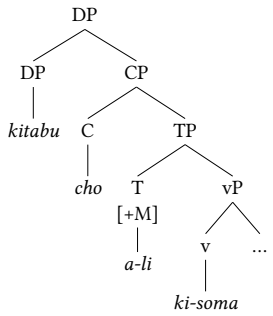
Amalgamation results in the creation of a head-adjunction structure, such that the moved head adjoins to the target head. Upon amalgamation, the M feature of the moved head becomes inactive, and, since the operation is post-syntactic, no copy of the head is left behind. If the target head also has its own [M] feature, then upon amalgamation this feature is projected up to the node directly dominating the target head and the now adjoined head, so that it will trigger amalgamation of the entire complex head with the next head up (or down).

Analyzing T-to-C movement in Swahili RCs as post-syntactic morphological amalgamation gives us the opportunity to resurrect a Late Insertion account of overflow auxiliaries. The head movement observed in Swahili RCs fits the profile of post-syntactic amalgamation defined by Harizanov & Gribanova (2018): it produces head adjunction structures, is driven by morphological properties of heads (such as being a bound vs. free morpheme), appears to be strictly local, and lacks interpretative effects.

Given that morphological amalgamation allows for both raising or lowering of heads, we can consider two possibilities within the Harizanov & Gribanova framework: option 1 would assume T has a [+M] feature that triggers its amalgamation with C, while option 2 would assume C has a [−M] feature that triggers its amalgamation with T. Option 1 is schematized in (14) below, and Option 2 is schematized in (15).

(14) Option 1: Raising of T to C in PF

a.



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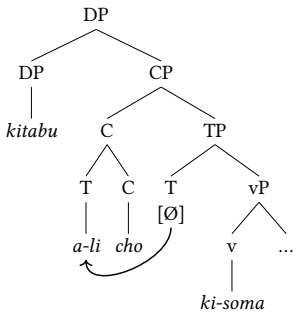
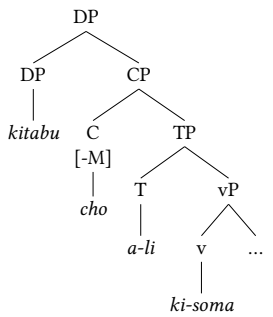


(15) Option 2: Lowering of C to T in PF

a.



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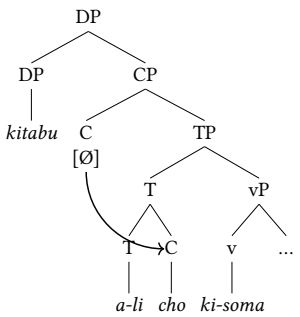
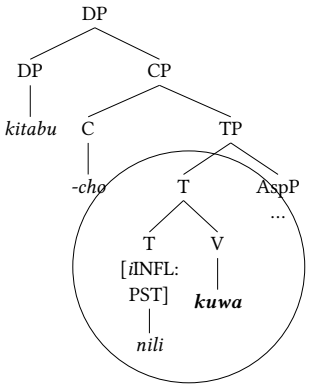


When it comes to auxiliary insertion, any account of the overflow auxiliaries needs to ensure that the auxiliary *kuwa* is not directly inserted into T, regardless of the choice of head movement operation type or timing of the derivation. This is because, in order to ensure that the auxiliary does not 'roll up' as part of the head movement chain, it must be sufficiently off the chain of head movement. Treating auxiliary insertion as the external merge of an auxilary as an adjunct to T would force us to commit to allowing excorporation— that is, sub-extraction out of a complex head structure, which is typically understood to be disallowed (Baker 1988; see discussions in Chomsky 2001; Matushansky 2006; Roberts 2010). If we assume a typical adjunction structure for complex head formation, then in both cases (14) and (15), insertion of *kuwa* directly into T, as in Bjorkman (2011), will create a complex head structure like that depicted in (16). If we posit a [+M] feature on T, we will ultimately have the [+M] feature on the entire complex head, as in (17), which predicts that the entire head complex, *kuwa* included, move up to morphologically amalgamate with C. This is the wrong pre-

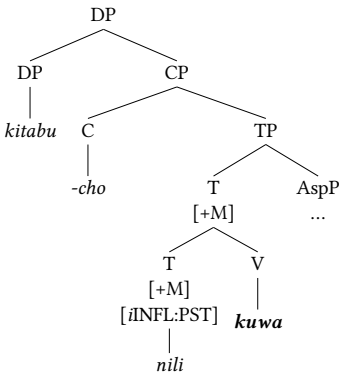
diction, as the data informs us that we would want to be able to have only T, to the exclusion of the adjoined V, raise up to C.

(16) Complex head formed by auxiliary insertion



(17) Illicit derivation: *kuwa* participates in amalgamation of T to C

a.



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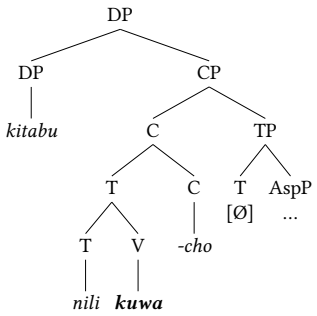
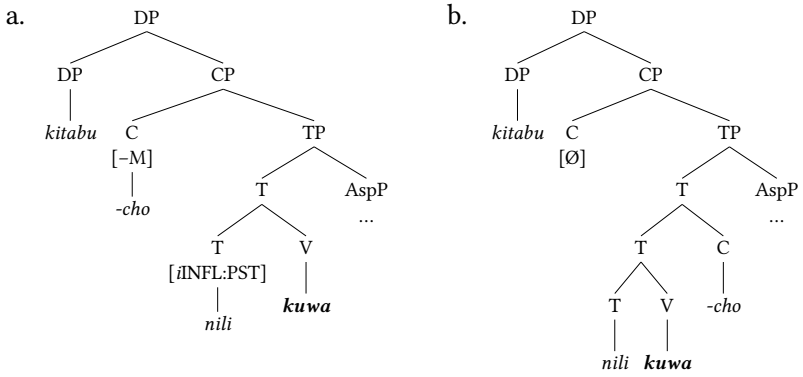


The same issue would arise if we assume standard head adjunction in combination with a lowering [−M] feature. If C has the [−M] feature, it will be instructed to combine with the next lowest head in PF, which would be the complex head structure shown in (18), which consists of both T and the inserted auxiliary V. This still results in the incorrect surface linear order.

This issue only holds in so far as we are committed to PF head movement operations obeying the ban on excorporation. While controversial, it could be possible to explore whether excorporation is tolerated if it is driven by a PF operation. This suggestion would, however, depart from the characterization of mor-

phological amalgamation by Harizanov & Gribanova (2018), which they consider to be an operation that successfully derives the ban on excorporation.

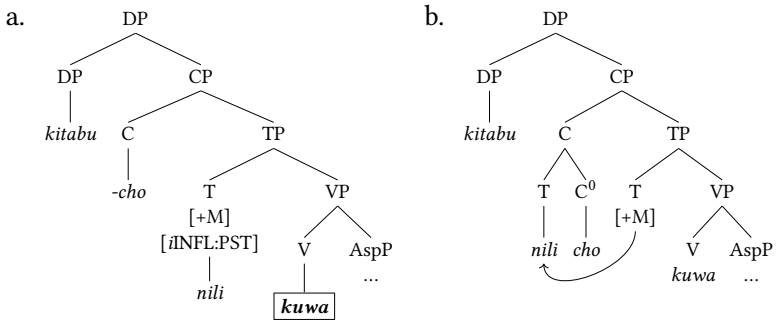
(18) Illicit derivation: *-cho* amalgamates with T, which contains both T and V



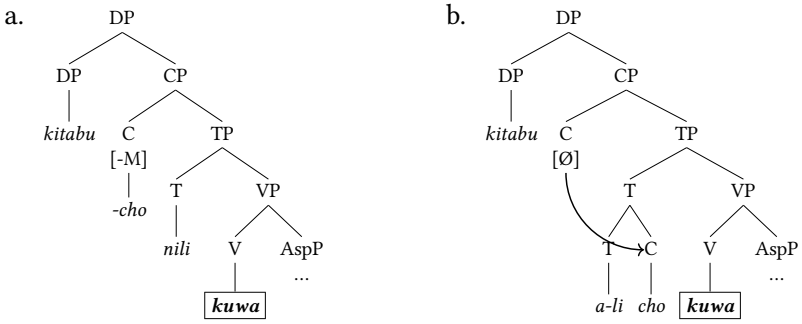
To side step the excorporation issue, one could instead assume an alternative where the Aux insertion operation adds *kuwa* directly below T, in V (e.g. 19). In essence, this would assume that Late Insertion has *kuwa* 'tuck in' to the structure (in a similar vein to tuck in movement in Richards 1998; 1999). If the auxiliary is added below T, then either PF-raising (19) or PF-lowering (20) will successfully generate the correct surface order.

Even under this alternative analysis it is still crucial for auxiliary insertion to precede head movement, as the presence of the T in its base position is what licenses the insertion of the aux underneath it. Once T has amalgamated upward, there would be no way for the T to trigger auxiliary insertion in the correct location indicated by the data pattern.

(19) Possible derivation: Aux inserts below T, [+M] feature on T.



(20) Possible derivation: Aux inserts below T, [–M] feature on C.



More should be said about how exactly the insertion of the auxiliary below T is licensed, given that we are working with the assumption that both Auxiliary Insertion and head movement in this account are post-syntactic. Bjorkman (2011)'s analysis of overflow auxiliaries characterizes auxiliary insertion as a Last Resort approach, where the auxiliary is *only* inserted post-syntactically into the structure if a certain condition (the stranded inflectional feature) necessitates it. While this is immediately an issue for understanding Swahili RC constructions under a syntactic account of head movement, which would necessitate a derivational ordering of head movement before auxiliary insertion, considering PF morphological amalgamation as an alternative opens up the hypothesis space to modularity within PF operations as well. In other words, not only would we derivationally expect syntactic operations to precede PF operations, but this proposal implicitly assumes that there must be an ordering of operations within the PF module as well, namely Last Resort phenomena preceding linearization.

One avenue for theoretically grounding this proposal could be found in the Serial model of Distributed Morphology (DM; Halle & Marantz 1993) laid out in Arregi & Nevins (2012). This work proposes a serial model of post-syntactic operations, sequenced in a particular order (see Figure 2). The application of any operation creates a new representation which can be subject to further operations. Relevant to our work, we note that auxiliary insertion in Basque is argued by Arregi & Nevins (2012) to be an operation that takes place in the module called Morphological Concord, which *precedes* Linearization. Adopting this framework for understanding the Swahili RC paradigm, then, would require that auxiliary insertion is not done by the same mechanism as Vocabulary Insertion (the module where terminal nodes are exponed), as is assumed in Bjorkman (2011).

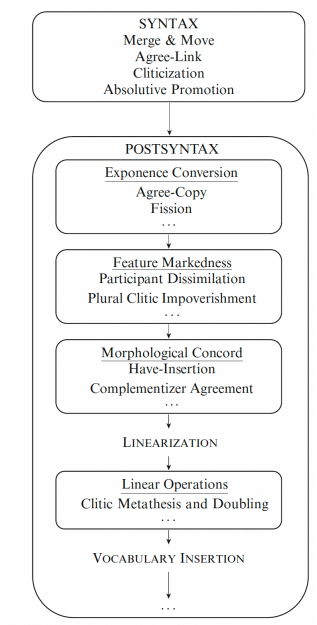


Figure 2: The Structure of Spell-out presented in Arregi & Nevins (2012)

8 Conclusion

To briefly summarize: the main goal of our project here has been to explore whether there is any way by which the Late Insertion analysis of Swahili overflow auxiliaries is still empirically adequate, in the face of a data pattern found in Swahili RCs that poses a significant challenge. Pietraszko (2023) argues that cyclic selection is empirically superior to a Late Insertion approach to overflow auxiliaries, since Late Insertion is unable to derive Swahili RCs. While our alternative proposal presented here leaves much unanswered, we hope to have demonstrated that a Late Insertion approach can still find a way to account for Swahili RCs, although of course the mechanical commitments it takes still beg the question of conceptual adequacy. Theory-neutrally, any analysis of Swahili RCs requires some way of ensuring that 1) the overflow auxiliary is not a part of the head movement chain, and 2) that the overflow auxiliary is inserted *prior* to whatever head movement mechanism is utilized.

We'd also like to explicitly note that our account of Swahili RCs is not an argument against the analysis proposed by Pietraszko (2023). We simply wish to make the point that exploring the different interactions of current theories

of head movement with different types of insertion operations, especially with the growing body of work that is pushing innovative and nuanced theories of what PF is and what types of operations it could contain, gives us room to envision different alternatives and explore different possibilities. This work does not endeavor to oppose cyclic selection, and in fact, it might even be appealing to utilize cyclic selection in tandem with the head movement operation proposed in Harizanov & Gribanova (2018), as a way to successfully get the auxiliary off the chain of head movement, without needing to posit a PF operation that must alter syntactic structure by tucking in an auxiliary. The exploration presented here minimally demonstrates the necessity of a modular grammar, although there could be many possible realizations of this. We leave the choice point for how to best combine these insights for future work.

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