

Relative clauses and CP nominalization in Ndebele

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Abstract

This paper confronts two surface asymmetries between complement clauses and relative clauses in Ndebele: i) complement clauses show nominal properties which are not obviously detectable in relative clauses and ii) the two types of embedded clauses employ different sets of subject agreement markers. I argue that these asymmetries are apparent: both clause types are nominalized (CPs dominated by a DP-shell), and the irregular subject agreement paradigm in relative clauses is derived by the DP-shell hypothesis and regular phonological rules. The proposal that all embedded clauses in Ndebele project a DP shell derives a number of syntactic and morphophonological peculiarities of relative clauses, as well as noun complement clauses.

Keywords. Clause nominalization, relative clauses, syntax, morphophonology, Bantu, Ndebele.

1 Introduction

Relative clauses in Ndebele (Bantu, Zimbabwe) differ from other embedded clauses in two observable ways. First, embedded complement clauses show nominal properties (evidenced e.g. by the fact that the complementizer has phi-features). Relative clauses, on the other hand, lack left-peripheral markers such as a complementizer or relative pronouns, and there is no obvious indication of their nominal status. The second difference concerns the morphology of subject agreement prefixes. Verbs in relative clauses are marked with a special form of subject agreement prefix, called the *relative agreement* or *relative concord* (Doke, 1954) in the Bantu literature. As an example, compare the non-relative clause in (1)¹ with the subject agreement prefix *si-* and the relative clause in (2) with the relative agreement *esi-*. Although the two agreement paradigms show some morphological similarity, neither paradigm appears transparently derived from the other, as we see by comparing, for instance, class 7 prefixes ((1) and (2)) with class 1 prefixes ((3) and (4)).

(1)	<u>subject agreement</u>	(2)	<u>relative agreement</u>
	i- si- lwane si -yagijima.		i- si- lwane esi -gijimayo
	7aug- 7- lion 7s-run		7aug- 7- lion 7rel-run
	‘The lion is running.’		‘the lion that is running’

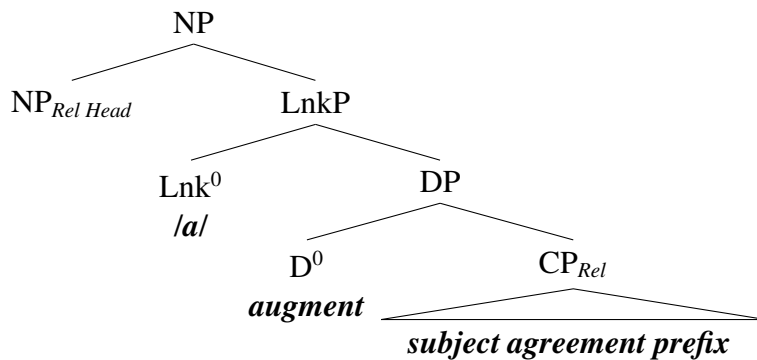
¹ Abbreviations: 1 (etc) = class 1 nominal prefix, 1aug = class 1 augment vowel, 1S (etc) = class 1 subject agreement prefix, 1sg.S (etc) = 1st person singular subject agreement prefix, 1o (etc) = class 1 object agreement prefix, 1sg.o (etc) = 1st person singular object agreement prefix, 1rel = class 1 relative agreement prefix, CAUS = causative, COMP = complementizer, COP = copula, DEM = demonstrative, DSJ = disjoint, FUT = future, LNK = linker, LOC = locative, NEG = negation, OBL = oblique, POSS = possessive, PST = past, PSV = passive, SP = subject (agreement) prefix, REL = relative, TAM = tense/aspect/mood.

- | | | | |
|-----|--------------------------------|-----|-------------------------------|
| (3) | <u>subject agreement</u> | (4) | <u>relative agreement</u> |
| | u- m- fana u -yagijima. | | u- m- fana o -gijimayo |
| | 1aug- 1- boy 1s-run | | 1aug- 1- boy 1rel-run |
| | ‘The boy is running.’ | | ‘the boy who is running’ |

In this paper, I examine these two asymmetries between relative and complement clauses and argue that they are apparent: i) like complement clauses, relative clauses are nominalized, and ii) the morphological variation in agreement prefixes is not an idiosyncrasy (or allomorphy), but follows from clause nominalization and regular phonological rules.

I propose that relative clauses, like other types of embedded clauses in Ndebele, obligatorily project a DP-shell. In other words, relative clauses are adnominals of the category D. Based on independent evidence from possessive constructions, I propose that DP-adnominals are introduced by a functional head – a *linker*, as shown in (5).

- (5) The syntax of relativization in Ndebele



The complexity and apparent idiosyncrasy of relative agreement prefixes is, I argue, a consequence of a well-motivated syntactic fact, namely that embedded clauses, including relative clauses, project a DP-shell in Ndebele. I propose that the morphological composition of the relative agreement prefix follows from the structure in (5). As shown in (6), the relative agreement prefix is trimorphemic: it consists of the regular subject prefix preceded by an exponent of D^0 (the so called augment vowel) and the linker *a*. The surface form of agreement prefixes is determined by regular rules of vowel hiatus resolution.

- (6) Relative agreement prefix: the linker **a-** + D^0 (augment vowel) + T^0 (subj-agreement)

The next section presents evidence that complement clauses in Ndebele project a DP-shell. Section 3 develops an analysis of relative clauses, arguing that, like complement clauses, relative clauses are nominalized and involve a linking structure, similar to that found in possessives. Section 4 provides evidence from morphophonology of relative agreements in Ndebele. The full paradigm of relative prefixes is derived from the linking structure and simple, independently motivated vowel coalescence rules. I demonstrate that the typically assumed decomposition of relative prefixes into the relative complementizer and a regular agreement prefix requires stipulations which can be avoided entirely if we posit an augment vowel (D^0) as part of the relative agreement prefix. Section 5 shows that the DP-shell proposal additionally explains an asymmetry between verb- and noun-complement clauses: the latter, but not the former, require a linking structure. Finally, I present

evidence from coordination that all three types of embedded clauses are DPs.

2 DP shell in complement clauses

In this section, I present evidence that the external syntax of verb-complement clauses in Ndebele is nominal. The nominal nature of embedded clauses is evidenced both by their syntactic behavior and their morphology.

The most commonly used complementizer in complement clauses is *ukuthi*. It is used to introduce both indicative and subjunctive complement clauses. In the example below, it heads the indicative clausal complement of ‘think’ (7).²

- (7) Ngicabanga **ukuthi** u-ya-m-thanda.
 think.1sg COMP 1s-DSJ-1o-like
 ‘I think that she likes him.’

One piece of evidence for the nominal nature of clauses (familiar from work on Zulu, a closely related language) is the fact that clausal complements control object agreement. Consider the parallel between the nominal object of class 15 *ukudla* ‘food’ in (8-a) and the clausal complement in (8-b). Both trigger the appearance of a class 15 object marker *ku-*.

- (8) a. Ngi- * (ya)- **ku**-funa ukudla
 1sg.S- DSJ- 15o-want 15food
 I want food.
 b. Ngi- * (ya)- **ku**-funa ukuthi uZodwa a- pheke
 1sg.S- DSJ- 15o-want 15COMP 1Zodwa 1s- cook
 I want Zodwa to cook.

A well-known feature of object marking in related Bantu languages is the obligatoriness of movement, or dislocation (Baker, 2003; Carstens, 2005). The fact that the object in (8-a) is dislocated is reflected by the form of the selecting predicate, the so called *disjoint form*, marked by the prefix *ya* in the present tense. As we see in (8-b), object marking of a clausal complement requires the disjoint form, as well. Thus, object marking of clausal complements obeys the same dislocation requirement observed with nominal objects.

Another piece of evidence for clause nominalization comes from the morphosyntactic properties of clausal objects. Etymologically, the complementizer *ukuthi* is a nominalization of the verb ‘say’. As shown in (9), it is composed of the verb stem *thi*, and the nominal prefix of class 15 *uku*. Importantly, the nominal prefix is itself complex: it consists of the class prefix *ku-* and the so called augment vowel *u-*. The augment vowel, also known as the pre-prefix, is found on nominal elements in many Bantu languages (Katamba, 2003). DPs in Ndebele typically require the augment, in addition to a noun class prefix (10).

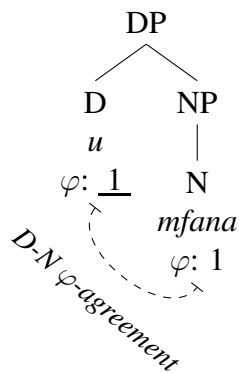
- (9) u- ku- thi
 15aug- 15- say
 ‘saying/to say’

² Other types of complementizers exist (e.g. *ukuze*, *sengathi*), though they are lexically selected by certain embedding predicates and occur only with the subjunctive mood. Indicative clauses only allow *ukuthi*. It remains to be seen if the nominal properties we observe with *ukuthi*-clauses are found with the other complementizers.

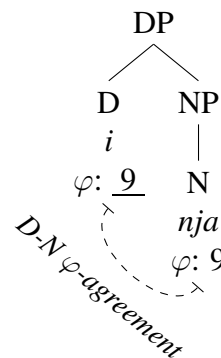
	noun class	augment	class prefix	root	translation
	class 1	u-	m-	fana	‘boy’
	class 2	a-	ba-	fana	‘boys’
	class 5	i-	∅-	luba	‘flower’
	class 6	a-	ma-	luba	‘flowers’
(10)	class 7	i-	si-	lwane	‘lion’
	class 8	i-	zi-	lwane	‘lions’
	class 9	i-	∅-	nja	‘dog’
	class 10	i-	zi-	nja	‘dogs’
	class 11	u-	lu-	tho	‘thing’
	class 15	u-	ku-	dla	‘food’

The view that the augment vowel is a property of the nominal category seems uncontroversial. It is evident not only from its distribution but also semantics – the presence of an augment typically co-occurs with definiteness, referentiality and specificity. The lack of an augment, on the other hand, often corresponds to the interpretation of Negative Polarity Items, or narrow scope indefinites (Progovac, 1993; Carstens & Mletshe, 2015). For this reason, the augment in Bantu has been treated as a type of determiner (Ziervogel, 1967; von Staden, 1973; Giusti, 1997; de Dreu, 2008; Visser, 2008; Taraldsen, 2010; Buell & de Dreu, 2013). I will follow this standard treatment and assume that the augment is an exponent of D^0 which covaries with the noun class of the nominal root.³ As shown in (11), φ -features on D^0 are valued by agreement with the noun. The D-head is then spelled out as the augment vowel of the relevant class.

(11) a. *umfana* ‘the/a boy’



b. *inja* ‘the/a dog’



The nominal etymology of the complementizer *ukuthi* certainly does not entail nominal syntax of embedded clauses in the present day Ndebele. It is possible – likely, in fact – that the nominalization of the verb ‘say’ was grammaticalized as a syntactic primitive of the category C. There is, however, syntactic evidence that the complementizer is not monomorphemic. At the very least, it should be decomposed into the augment vowel *u-* and the complementizer root *kuthi*. I discuss this evidence below.

³ Halpert (2012) proposes that the augment in Zulu is a realization of K^0 , rather than D^0 , and there is convincing evidence the presence of the augment vowel correlates with structural case licensing. The discussion to follow is entirely independent of this choice. What matters is that the augment realizes some head in the nominal extended projection, be it K^0 or D^0 . For clearer exposition, I will therefore assume that the augment is an exponent of D^0 .

The augment vowel on nouns can sometimes be omitted. The distribution of augmentless nominals is determined by syntactic and semantic factors. In Ndebele, augmentless nouns seem to have the same distribution as in Zulu: they must occur in scope of negation and be in a post-verbal argument position (Halpert, 2012).⁴ Consider the contrast in (12), where the augment on the direct object can be dropped in the negative sentence (12-b), but not in the affirmative one (12-a).

- (12) a. Ngi-funa [DP *(i)-sinkwa.] *augment drop
 1sg.S-want 7aug-7bread
 ‘I want bread.’
- b. A-ngi-funi [DP (i)-sinkwa.] augment drop ✓
 NEG-1sg.S-want 7aug-7bread
 ‘I don’t want (any) bread.’

The presence of an augment in the negative sentence seems optional, but it corresponds to a semantic difference. In particular, the augment forces an interpretation of the noun as a definite or a specific indefinite (i.e. out of the scope of negation). In the absence of an augment, the object in (12-b) must be interpreted as a narrow scope indefinite. This semantic contrast is compatible with the hypothesis that the augment is a type of determiner. That is to say, there are two types of D^0 in Ndebele: the augment vowel and a null morpheme. Their distribution roughly corresponds to what we expect from the definite/indefinite dichotomy.

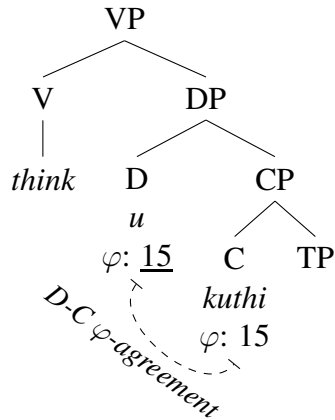
The initial vowel of the complementizer *u-kuthi* can be dropped, as well. More importantly, an augmentless complementizer appears exactly in those configurations which license augmentless nominals. In (13-a), the matrix clause is affirmative, and the complementizer must have an augment (cf. (12-a)). When the matrix verb is negated, however, its clausal object may be augmentless – the complementizer may surface as *kuthi*, i.e. without the augment vowel (13-b).

- (13) a. Ngi-funa [DP *(u)-kuthi uSipho a-pheke].
 1sg.S-want aug-15COMP 1Sipho 1S-cook
 ‘I want Sipho to cook.’
- b. A-ngi-funi [DP (u)-kuthi uSipho a-pheke].
 NEG-1sg.S-want aug-15COMP 1Sipho 1S-cook
 ‘I don’t want Sipho to cook (I don’t want that *at all*)’.

While with nominal objects the presence of an augment corresponds to a particular interpretation of the DP, it is difficult to detect a semantic difference between augmentless and augmented clausal objects. One common judgement is that the augmentless variant of (13-b) is emphatic, and translated with the modifier *at all*.⁵ Nonetheless, the morphosyntactic parallel between (12) and (13) is striking, and it shows that the complementizer *ukuthi* is not monomorphemic. Rather, it has an active augment, whose distribution is regulated by the same licensing conditions as those for nominal objects. Given these facts, I propose that verb complement clauses, as those in (13), project a DP-shell (14).

⁴ This characterization is simplified. For details about licensing augmentless nominals in Zulu see Halpert (2012).

⁵ Another interesting semantic effect of augmentless complementizers can be observed with clausal complements of (negated) factive verbs. When the complement clause lacks an augment, the factivity presupposition is lost.

(14) The syntax of verb complement clauses:

As with nominal objects, the augment is an exponent of D^0 , which agrees with the class of its complement. In the case of nominal objects, the class features are inherent to the NP complement of D. When the complement of D is a CP, as in (14), the augment agrees with the features of the complementizer root *kuthi*, namely class 15. In other words, the form of the augment is determined by agreement with the head of its complement, be it an NP or a CP. Whether D^0 selects for an NP or a CP, it can have the null allomorph, as long as it appears in a licensing configuration.

The third way in which clausal complements behave like DPs is their freedom to occur as objects of prepositions. The pair of sentences in (15) illustrates this with the prepositions *nga* ‘about’, where the preposition attaches directly to the following object and coalesces with the augment vowel. The translations remind us that English clauses contrast with DPs in this respect.

(15) Clauses as objects of prepositions

- a. Si-khuluma *nga-* [_{DP} **u**-muntu omdala.] (> *ngo*-muntu)
 1pl.s-talk about- aug-1person old
 ‘We are talking about an old person’.
- b. Si-khuluma *nga-* [_{DP} **u**-kuthi abantu babambane.] (> *ngo*-kuthi)
 1pl.s-talk about- aug-15COMP people be.united
 ‘We are talking about *(the fact) that people are united’.

The fourth parallel we observe concerns oblique case marking. In addition to prepositions, which select full DPs (headed by an augment vowel), Ndebele exhibits oblique morphology that *replaces* the augment (augment-replacing prefixes (Halpert, 2012)). I adopt Halpert’s proposal that these prefixes are oblique case markers. As an example, consider the prefix *yi-* in (16), which introduces the demoted subject in a passive sentence. Crucially, the oblique prefix appears with a nominal and a clausal subject alike.

(16) Oblique case prefix:

- a. Umama u-dan-is-w-e **yi-lokho.**
 1mother 1S-worry-CAUS-PSV-PST OBL-this
 ‘Mother was worried by this.’

- b. Ngi-dan-is-w-e **yi-kuthi** u-sukile.
 1sg.S-worry-CAUS-PSV-PST OBL-15COMP 2sg.S-left
 ‘I was worried by *(the fact) that you left’

The fact that the prefix *yi-* replaces the initial vowel on the complementizer strongly suggests that this initial vowel is an independent morpheme, and one which can be replaced by oblique prefixes, namely the augment.

Some of the nominal properties of clausal complements discussed above have been observed in Zulu. Halpert (2012) notes that CPs in Zulu behave like nominal arguments in that they control object agreement and can be objects of prepositions. These facts, however, do not lead Halpert to analyze Zulu embedded clauses as DPs, unlike the proposal made here for Ndebele. An argument for retaining a category difference between clausal and nominal arguments (CP vs DP) in Zulu is that clauses in this language cannot surface as preverbal subjects (17). In Halpert’s analysis, this is a consequence of the inability of CPs to satisfy the EPP feature on T – a problem which does not arise for DP arguments.

- (17) * **Ukuthi** w-a-thatha umhlala phansi **kw-a-ngi-mangaza** Zulu, Halpert (2016)
 17COMP 1s-PST-take 1sit down 17s-PST-1sg.o-surprise
 ‘That he retired surprised me.’

The DP-shell analysis of Ndebele clauses predicts that sentential subjects should be allowed. The sentences in (18) show that Zulu and Ndebele indeed differ in this respect.

- (18) a. **Ukuthi** umama wakhe u-dla imbeba **ku-ya-ngi-mangalisa.** Ndebele
 15COMP 1mother 1your 1S-eat mice 15S-DSJ-1sg.o-surprise
 ‘That your mother eats mice surprises me’
- b. **Ukuthi** izitha zi-za-buya **ku-bal-iw-e** e-roof-ini.
 15COMP 10enemies 10S-FUT-come 15S-write-PSV-PST LOC-roof-LOC
 ‘That enemies were coming was written on the roof.’

A fact that appears to correlate with this contrast between Zulu and Ndebele is the unavailability of augmentless complementizers in Zulu (Claire Halpert, pc). The possibility of augment drop in Ndebele clauses is an important argument for the DP-shell analysis: it shows that the clausal periphery contains a true augment, i.e. an exponent of D. Thus, Zulu clauses lack two important DP properties: an active augment and the ability to satisfy EPP.

A possible source of this variation is grammaticalization of the complementizer in Zulu as C, together with the augment. In Ndebele, on the other hand, the augment on *ukuthi* appears to have been analyzed as the head of a DP-shell. It remains to be seen what other properties of clauses in the two languages correlate with the asymmetries observed here. I leave this question for future investigation, though I will briefly discuss another plausible correlation in section 5.

3 The linking structure of relative clauses

The previous section provided ample evidence that complement clauses in Ndebele project a DP shell. The question arises whether other types of embedded clauses share this property. The claim put forth in this paper is that the nominal layer is found not only in verb-complement clauses, but

that it is a property of Ndebele embedded clauses in general. In this section, I argue for a DP-shell in relative clauses – constructions which, unlike complement clauses, lack straightforward morphological manifestation of a nominal periphery.

3.1 The connection between possessive and relative syntax

Nominal properties are not as easily testable in relative clauses as in complement clauses. Given their distinct status as noun modifiers, relative clauses are not expected to ever appear as objects of prepositions, with oblique case markers or to be targeted for movement to a sentential subject position. The morphology of a relative periphery is also not transparently nominal: there is no obvious complementizer or an augment vowel that would reveal a DP layer, like in complement clauses. Relativization is only marked by a special form of the subject agreement prefix inside the relative clause, e.g. *o-* for class 1 subjects (19).

- (19) *umfana o- gijimayo* (< *a- u- gijimayo*)
 1boy 1rel- run REL- 1S- run
 ‘the boy who is running’

The relative agreement prefix is, however, typically viewed as bimorphemic. As indicated by the decomposition of (19), it consists of the relative marker *a-* and the regular subject agreement prefix, here *u-*, for class 1, which coalesce into the surface form *o-*. We will return to the morphology of relative agreements in section 3.3. The binary decomposition suffices for our immediate purposes, namely to observe one syntactic parallel between relative clauses and DPs.

It has been previously noted that the Ndebele relative marker *a-*, and its cognate in Zulu, appears outside of relative clauses and is often referred to as the general associative marker. It is used, for instance, in possessives (introducing the possessor DP) and in complex NPs with nominal modifiers (e.g. "a house of stone") (Sabelo, 1990). Compare the relative clause in (19), where the marker *a-* combines with a verb, with the possessive construction in (20), where the marker *a-* combines with a possessor DP. Note that, in both cases, the same coalescence ($a+u \rightarrow o$) takes place.

- (20) *i-moto y- o- mfana* (< *i- a- u- mfana*)
 9-car 9- 1POSS- boy 9- POSS- 1- boy
 ‘the boy’s car’

Thus, relative clauses do show at least one property of DPs – they are introduced by the same marker as possessor DPs. The analysis developed in the next subsection builds on this parallel between possessive and relative marking, proposing that both constructions involve a functional element, *the linker*, introducing a DP. Note that there is one difference between the possessive in (19) and relative clause in (20): in the possessive construction, the marker *a-* is preceded by an agreement prefix (which co-varies with the NP preceding it); in the relative clause, there is no agreement prefix on the linker. I return to this asymmetry in the next subsection.

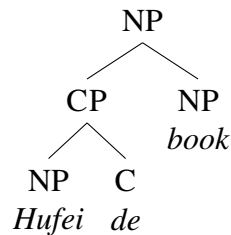
The connection between possessive and relative marking has been previously observed in other languages. A well known example is Chinese, where the linker *de* is used both to introduce possessors (21-a) and as a relative marker (21-b).

- (21) a. Hufei de shu (Cheng 2006, ex. (29))
 Hufei LNK book

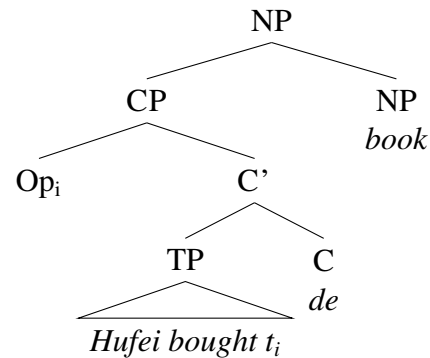
- b. Hufei mai de shu
 Hufei buy LNK book
 ‘the book that Hufei bought’

According to Cheng (1986), the marker *de* is a complementizer which may select either a clausal or a nominal complement. Selection of a clause gives rise to relativization (22-b). If *de* selects a DP, the result is a possessive construction (22-a).

- (22) a. *de* in possessives



- b. *de* in relativization



(from Cheng (2006))

Cheng (2006) makes the observation that many Bantu languages employ possessive morphology in the formation of relative clauses (the *Possessive-Strategy of Relativization*). In this respect, Cheng makes an explicit connection between Chinese and Shona – both languages use the same marker to introduce possessors and relative clauses. Consider the parallel between Shona possessives and relative clauses in (23), where the possessive marker *a* is prefixed on a noun (the possessor) or on a verb (introducing a relative clause), much like in the Ndebele examples discussed above.

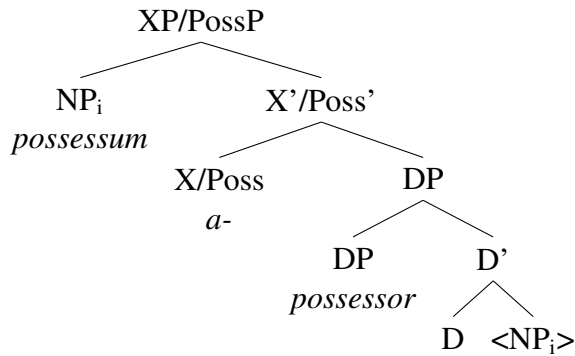
- (23) a. varwi v- a- mambo
 2warrior 2- LNK- king
 ‘the warriors of the king’

(Shona, Cheng (2006))

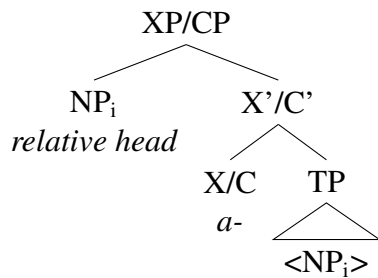
- b. ndimi dz- a- va- no-taura
 10language 10- LNK- 2S- TAM-speak
 ‘the languages which they speak’

Given the striking parallel in (23), Cheng proposes that the two constructions involve a similar structure, like their equivalents in Chinese. Just like the Chinese *de*, the Shona possessive marker/linker *a* can optionally select for a nominal or clausal complement. The syntax proposed by Cheng for Shona possessives and relative clauses is given in (24) below.

- (24) a.
- Shona possessives
- (Cheng, 2006)



- b.
- Shona relative clauses

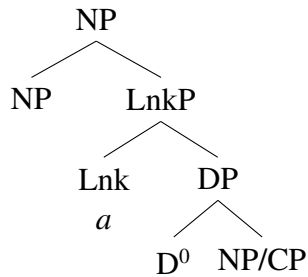


It is worth noting that the so-called linkers have a broader distribution if we look at a variety of languages, and have received different treatments. Linkers may appear inside a vP associating two arguments – a phenomenon found in other Bantu languages, for instance in Kinande (Baker & Collins, 2006; Schneider-Zioga, 2015a, b).⁶ Other constructions which have been analyzed as involving linkers include copular clauses and broadly understood adnominal phrases, e.g. attributive adjectives, possessives, but also relative clauses and noun complement clauses (Den Dikken & Singhapreecha, 2004; Den Dikken, 2006). Whether what we call "linkers" in all these construction refers to the same syntactic object is not obvious and it is not my goal to propose a syntax of the linker that will apply to all those constructions. Instead, I focus on the constructions where the Ndebele linker is used, which fall in the second set of environments, namely NP modification.

3.2 Ndebele relative clauses as linking structures

Adapting Cheng's analysis, I argue that the morphological affinity of relative and possessive marking reflects a syntactic uniformity. I argue, however, that the structures of relatives and possessives in Ndebele are more uniform than Cheng's (24). First, the marker *a-* does not vary as to its category (Poss vs C), but rather it is uniformly a nominal linker: the exponent of Lnk^0 . And second, there is no optionality in the category of its complement: as shown in (25), both in relative clauses and in possessives the linker selects a DP: a possessor or a nominalized relative clause.

⁶ As Schneider-Zioga (2015b) shows, the linker in Kinande is actually not limited to arguments, but may also introduce certain adverbs.

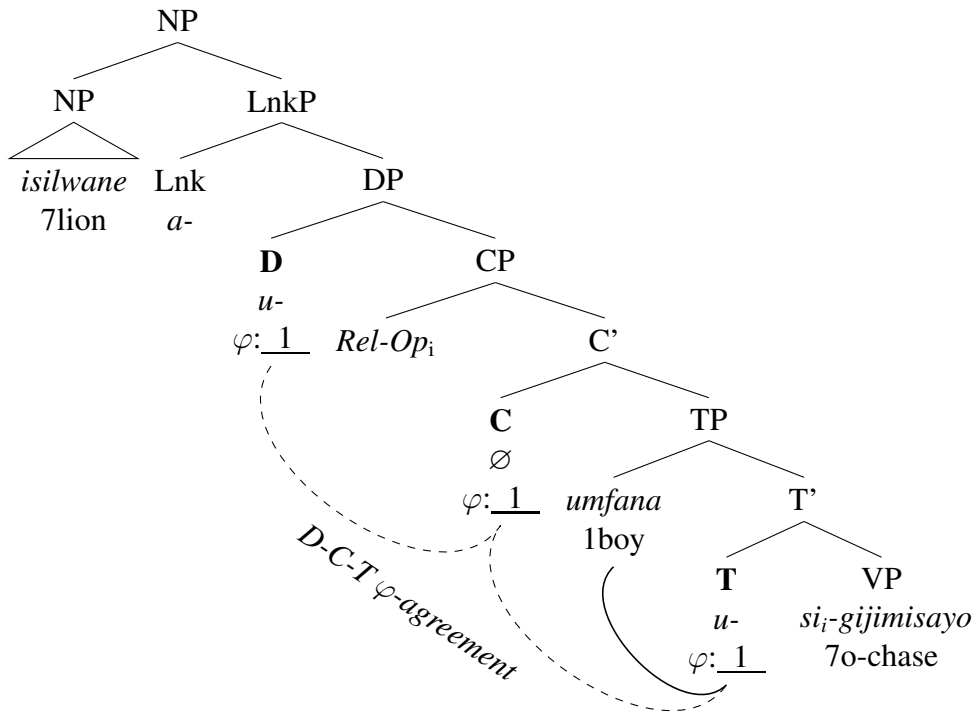
(25) The syntax of the linker in Ndebele:

The linking structure in (25) is the structure of both possessive constructions and relative clauses in Ndebele, and it is the syntax of NP modification in this language. The linker is there to facilitate noun modification by another nominal constituent. The difference between relatives and possessives boils down to the internal structure of the DP-complement of the linker. In the case of possessives, D selects for a noun phrase expressing the possessor. In a relative construction, the DP is a nominal shell obligatorily projected on top of the relative CP. Note that this analysis of relative clauses derives the so called Possessive Strategy of Relativization: possessive marking is found in Ndebele relative clauses because of their striking structural affinity with possessors: both are adnominal phrases of category D, and so they must both be introduced by the linker.

To see the details of relative clause derivation, consider the object relatives in (26). Note that the morphological decomposition of the verbs in (26) is now more detailed to reflect the proposed structure of relativization in (27). In particular, a relative agreement prefix is composed of three morphemes: the linker, an augment vowel (exponent of the D head of the DP shell), and a regular subject agreement prefix. Morphophonological evidence for this decomposition will be presented in the next section.

- (26) a. i-si-lwane u-m-fana [a]- u- u- si- gijimisayo. (> o-sigijimsayo)
 7aug-7-lion 1aug-1-boy LNK- 1aug- 1s- 7o- chase.REL
 ‘the lion that the boy is chasing’
- b. i-si-lwane a-ba-fana [a]- a- ba- si- gijimisayo. (> aba-sigijimsayo)
 7aug-7-lion 2aug-2-boy LNK- 2aug- 2s- 7o- chase.REL
 ‘the lion that the boys are chasing’

Note that none of the morphemes which make up the complex relative agreement prefix (*o* in (26-a) and *aba-* in (26-b)) covaries with the relative head, which is of class 7 in both examples in (26). Lack of agreement with the relative head is a well-known property of relative clauses in Ndebele and other Nguni languages (including e.g. Zulu, Xhosa and Swati); rather, we observe agreement only with the relative-clause internal subject (Zeller, 2004; Henderson, 2006, 2007). I propose that this covariation with the RC-internal subject is a consequence of the DP-shell augment agreeing with the RC-internal T⁰. This is demonstrated in (27) for the example (26-a). The RC-internal subject controls φ -agreement on T. Subsequently, the relative C is merged and projects a DP shell.

(27) Syntax of relativization (the structure of (26-a))

A D head selecting a relative clause behaves the same way as a D selecting an NP or a non-relative CP. That is, it has a φ -probe which agrees with the head of its complement. The relative C is null, and its φ -features are determined by T, with which C agrees.⁷ Recall from section 2 that, in complement clauses, D⁰ agrees with an overt C, which has φ -features (class 15). The difference between relative clauses and complement clauses is that the former do not have an overt complementizer that could control features on the higher D. As a result, D obtains the class features of the next head down, i.e. T, and consequently always covaries with the RC-internal subject. Since the augment vowel is an integral part of the relative agreement prefix, its phonology contributes to deriving the surface forms of relative prefixes. We will see in the next section that this morphological decomposition allows a straightforward derivation of the relative prefix paradigm.

Following Zeller (2004), I assume that relative clauses in Nguni languages are formed with an empty operator. In the object relative clause in (26-a), the operator binds a variable inside the relative clause resumed by an object marker. This assumption is, however, not crucial to the present discussion and, as far as I can see, other analyses of relative clause syntax, such as raising or matching and deletion, are in principle compatible with the claims made here. Finally, note that although the linker and the augment vowel spell out heads dominating the subject of the relative clause, they end up prefixed on the verb, following the subject. In the next subsection, dealing with the morphology of relative agreements, I propose that this is a result of post-syntactic lowering of these heads to T.

The DP-shell analysis of relative clauses has the following two advantages: i) it affords a uniform treatment of relative and complement clauses (both are DPs), and ii) it captures the connection

⁷ See Henderson (2013) for an analysis of relative clauses in related Bantu languages where anti-agreement effects are derived by T-C agreement in these constructions.

between possessive and relative clause marking (i.e. the Possessive Strategy of relativization). In section 4, we will see converging morphophonological evidence for a DP layer in relative clauses. Before that, however, I discuss in the next subsection the morphology of relative agreement prefixes, building on their syntax proposed in this section.

3.3 The morphology of relative agreement prefixes

The analysis proposed above leaves us with two morphosyntactic puzzles. The first puzzle concerns the unexpected surface position of the relative clause-internal subject: it precedes the linker. And second, we observed an asymmetry between possessives and relatives with respect to agreement on the linker. In this subsection, I discuss these two questions in turn.

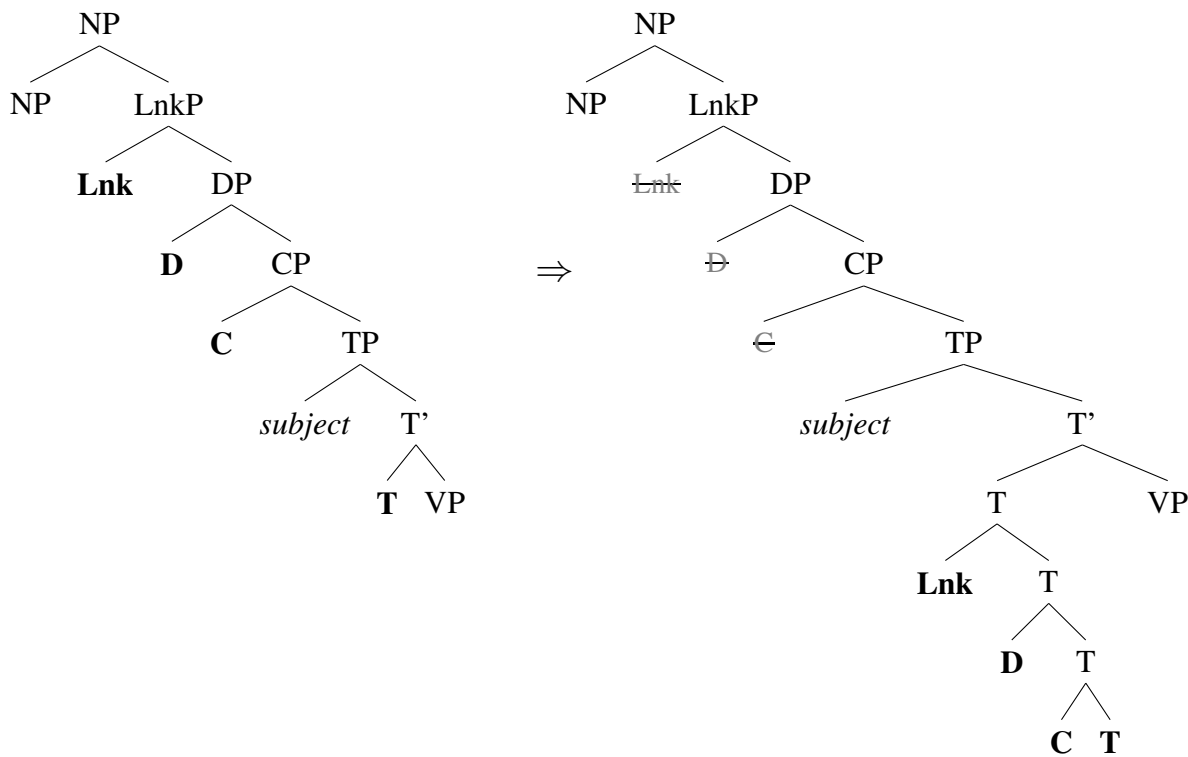
Given the linking structure of relative clauses, we predict relative-clause internal subjects to be linearized to the right of the linker and the D^0 it selects, i.e. the augment (28). We have seen, however, that this is not the case: both the linker and the augment are prefixed on the verb, and thus follow the subject (29).⁸

(28) $[_{NP} [_{NP} \text{Rel-head}] [_{LnkP} \text{linker} [_{DP} \text{augment} [_{CP} \emptyset [_{TP} \text{subject} [_{T^0} \dots]]]]]]]]$

(29) i-si-lwane *u-m-fana* a- u- u- si- gjimisayo. (repeated from (26-a))
 7aug-7-lion 1aug-1-boy LNK- 1aug- 1s- 7o- chase.REL
 ‘the lion that the boy is chasing’

I propose that the apparent high position of relative-clause internal subjects is the result of affix lowering (Embick & Noyer, 2001): the augment and the linker post-syntactically lower to T. I assume that lowering proceeds cyclically, in a bottom-up fashion, and targets all heads between T^0 and Lnk^0 . Lowering displaces a head onto the next head down. The first instance of lowering, i.e. C-to-T lowering, results in a complex C-T head in T, and renders T the closest head to D. Thus, subsequent lowering operations are D-to-T and Lnk-to-T. This derivation, shown in (30), is responsible for creating a complex prefix on the verb – the relative agreement prefix – comprising exponents of four heads (Lnk, D, C and T). The phonological rules deriving surface forms of relative prefixes are discussed in detail in the next section.

⁸ Ndebele is not one of the Bantu languages which exhibit T-to-C movement in relative clauses (Demuth & Harford, 1999). In those languages, relative clauses have the VSO order. Ndebele relative clauses are always SVO, like matrix clauses.

(30) Postsyntactic derivation of relative prefixes

It is worth noting that the apparent high position of subjects in Ndebele relative clauses is not a problem particular to the proposed analysis of relative clauses as involving a linking structure. It is a puzzle for any analysis in which the relative prefix contains left-peripheral morphology. Under the standard analysis of relative clauses in Zulu and other closely related languages, the relative marker *a-* is a complementizer. Assuming that subjects are in Spec,TP, they are equally unexpected to precede the relative marker as they are in the present approach, where the marker *a-* is analyzed as a linker – under either analysis, we need an account of how the subject ends up preceding the relative complementizer. Henderson (2007) offers an analysis of similar facts in Zulu relative clauses, arguing that the puzzling word order is due to a high, dislocated position of the RC-internal subject. Building on previous observations that preverbal subjects in Bantu have properties of topics (Letsholo, 2002), Henderson assumes that agreeing subjects are in Spec,TopP, rather than in Spec,TP (31). The relative complementizer follows the subject because it is an exponent of Fin^0 – a head below Top^0 (Rizzi, 1997).

(31) [_{ForceP} Rel-NP [_{TopP} *subject* [_{FinP} COMP_{rel} ‘*a-*’ [TP ...]]]]

The proposal in (31) derives the apparent high position of the subject by actually locating the RC-internal subject high in the periphery, rather than by lowering the marker *a* across a non-dislocated subject. There is evidence that the dislocation analysis is untenable for Ndebele. While preverbal subjects in root clauses do behave like topics, RC-internal subjects do not. First, Ndebele relative clauses do not allow left-peripheral topics in general. And second, unlike matrix subjects, RC-internal subjects can be in narrow focus.⁹ This asymmetry between root clauses and relative

⁹ A similar asymmetry between main and certain embedded clauses can be found in Kinande (Schneider-Zioga, 2000, 2007).

clauses can be exemplified with the distribution of interrogative pronouns, which, by assumption, are incompatible with a topic position. In matrix clauses, *wh*-subject are not allowed preverbally (32-a) – a restriction which supports the hypothesis that a preverbal subject in a main clause is a topic. In relative clauses, however, preverbal *wh*-subjects are allowed (32-b), indicating that the subject is not dislocated. Crucially, the *wh*-subject still precedes the relative marker *a*-.

- (32) a. **Ubani* u- pheké inyama?
 1who 1s- cook.PST 9meat
 ('Who cooked the meat?')
- b. U- dlé inyama [*rel-clause ubani a- a- yi- phékileyo?*]
 2sg.S- eat.PST 9meat 1who REL- 1s- 9o- cook.PST.REL
 'Who is such that you ate the meat that they cooked?'

Non-topicality of RC-internal subjects is further evidenced by the distribution of subjects associated with the focus particle *kuphela* 'only': matrix subjects cannot appear with the focus particle (33-a), while RC-internal subjects can (33-b).

- (33) a. **Umama kuphela* u- pheké inyama.
 1mother only 1s- cook.PST 9meat
 ('Only mom cooks meat.')
- b. Leyo y-inyama [*rel-clause umama kuphela a- a- yi- phékileyo.*]
 9DEM COP-9meat 1mother only REL- 1s- 9o- cook.PST.REL
 'This is the meat that only mom cooks.'

We, thus, conclude that, unlike matrix subjects, RC-internal subjects are not dislocated. These facts are accounted for by the lowering analysis proposed here, where the linearization of the subject to the left of the relative marker is not the result of subject dislocation, but of lowering of left-peripheral morphology onto the verb.

The second morphological puzzle we observed was the asymmetry between possessives and relative clauses with respect to linker agreement: the linker covaries with the preceding NP in possessives, but not in relative clauses. The facts are repeated below in (34).

- (34) a. i-moto i- [a]- u- mfana (> y-omfana) *linker agreement*
 9-car 9- LNK- 1- boy
 'the boy's car'
- b. u-mfana [a]- u-u-gijimayo. (> ogijimayo) *no linker agreement*
 1aug-1boy LNK- 1aug-1s-run.REL
 'the boy who is running'

Recall from previous discussion that this asymmetry is not found in Shona, where the linker agrees with the preceding NP in both possessives and relative clauses (35).

- (35) a. varwi v- [a]- mambo *Shona, (Cheng, 2006)*
 2warrior 2- LNK- king
 'the warriors of the king'

- b. ndimi dz- a- va- no- taura
 10language 10- LNK- 2s- TNS-speak
 ‘the languages which they speak’

Thus, although both languages employ the same morphological marking possessives and relatives, the parallelism is not perfect due to the lack of linker agreement in Ndebele relatives (36).

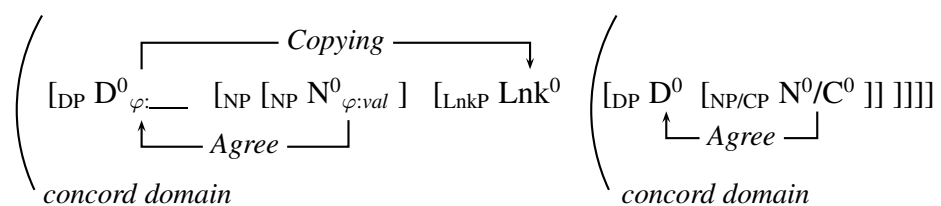
- (36) Linker agreement variation (Ndebele and Shona)

	Ndebele	Shona
Possessives	<i>Lnk agreement</i>	<i>Lnk agreement</i>
Relative clauses	<i>no Lnk agreement</i>	<i>Lnk agreement</i>

For all I can tell, this agreement asymmetry between Shona and Ndebele does not correlate with any syntactic asymmetry – both languages uniformly employ the associative marker/linker to introduce possessors and relative clauses. It is therefore plausible that the lack of linker agreement in (34-b) is not a syntactic fact, but a morphological one, an instance of impoverishment (Bonet, 1991; Noyer, 1992; Halle & Marantz, 1999; Halle, 1997; Harley & Noyer, 1999; Arregi & Nevins, 2012). I suggest that the linker always agrees with the preceding NP, be it a possessum or a relative head, in both languages, but φ -features on the linker are deleted in Ndebele relative clauses.

I treat the φ -feature covariation between the linker and the NP it adjoins to as an instance of DP-internal concord, whereby modifiers and other adnominal elements express the φ -features of the nominal head within the same nominal projection. I assume, following Norris (2014), that the highest head in the nominal projection, i.e. D^0 ,¹⁰ probes its c-command domain for valued number and gender (= class) features. Simplifying, we can say that this Agree operation results in N^0 controlling class agreement on D^0 , as shown in (37). This Agree relation is, according to Norris, the first, syntactic step towards the output of concord. The features collected in D^0 are postsyntactically copied onto lower heads, resulting in the expression of nominal features on adnominal elements, such as numerals, demonstratives and modifiers. Importantly, feature copying is restricted to the DP-domain: features can be transmitted down within a single DP, but never past a DP-boundary. Linker agreement in Ndebele behaves as predicted from the analysis of Lnk^0 as the head of a modifier: it covaries with the noun it modifies, and never with the DP it selects (37).

- (37) DP-internal concord in Ndebele modification structures:



In Ndebele, but not in Shona, the nominal features copied on the linker are removed by an impoverishment rule in the context of T (i.e. in the same complex head as T) (38). As proposed before,

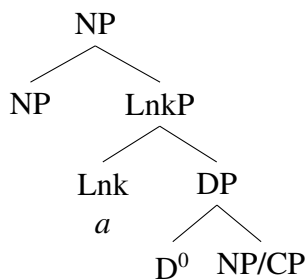
¹⁰To be precise, Norris (2014) takes the domain of nominal concord to be a KP, not a DP, assuming that the highest head in the nominal extended projection is K, not D. Since nothing in my analysis hinges on the K/D choice, I will continue to assume D as the highest nominal projection.

Lnk⁰ lowers onto T in relative clauses, but not in possessives (where the DP selects a possessor NP, not a relative CP), and so φ is not deleted on the linker in possessive constructions.

- (38) Ndebele φ -impoverishment on Lnk⁰:
- Structural description: $[[\text{Lnk } \varphi], \text{T}]_{\text{complex head}}$
 - Structural change: $[\text{Lnk } \varphi] \rightarrow [\text{Lnk}]$

To sum up, I proposed an analysis of Ndebele relative clauses which involves a linking structure. The basic syntax of the Ndebele linker, repeated in (39), is found in both possessives and relative clauses. The linking structure is the structure of modification in Ndebele where the modifying constituent is a DP (a possessor or a nominalized relative clause).

- (39) The basic syntax of the linker in Ndebele:



We further conclude that a DP-shell is not only a property of complement clauses (as discussed in section 2), but also of relative clauses: both types of embedded clauses project a DP-shell.

4 Evidence from phonology: deriving relative agreements

According to the proposal developed in the previous section, relative clauses in Ndebele are nominal. It has been previously observed for other Bantu languages that relative clauses show nominal properties. In addition to a diachronic connection between relative markers and demonstratives (Doke, 1954; Hendrikse, 1975; Poulos, 1982, 1999; Mischke, 1998; Demuth & Harford, 1999; Visser, 2002; Zeller, 2004), nominal properties have been noted in the context of so-called anti-agreement effects in Bantu (which affect the morphology of subject agreement in subject relatives). It has been observed that anti-agreement prefixes resemble nominal morphology (Cheng, 2006; Diercks, 2010; Henderson, 2013). Nominal properties of Ndebele relative clauses have so far been evidenced by the parallel between relative clauses and possessives, and implemented as a DP-shell. In this section, I present converging morphophonological evidence for a nominal layer in Ndebele relative clauses. In particular, we will see that the presence of an augment vowel (D⁰) as part of the relative agreement prefix allows us to derive the surface forms of those prefixes from regular phonological rules. In the first subsection, I present the details of vowel coalescence which gives rise to the morphologically complex relative agreement prefixes, supporting the syntactic and morphological analysis of relative clauses. In subsection 4.2, I discuss further advantages of the proposed account over an existing alternative.

4.1 Trimorphemic structure and hiatus resolution

The term *relative agreement* or *relative concord* was used in Doke (1954) to refer to subject agreement prefixes in Zulu which appear in relative clauses. This terminology reflects the fact that relative agreements in Zulu (and related languages including Ndebele) were initially treated as monomorphemic, replacing subject prefixes in relative clauses (Doke, 1954; Mischke, 1998; Poulos, 1999; Mawadza, 2009; Poulos & Msimang, 1998). Indeed, they appear in the same position as subject agreement prefixes: they attach to the left of a tense marker and, together with the verb, follow a preverbal subject (by assumption, located in Spec,TP) (40).

- (40) a. Inja **i-** za- gijimisa umangoye.
 9dog 9s- FUT- chase 1cat
 ‘The dog will chase a cat.’
- b. Lowo ng- umangoye [*relative clause* inja **e-** za- m- gijimisa.]
 1DEM COP- 1cat 9dog 9rel- FUT- 1o- chase
 ‘This is the cat that the dog will chase.’

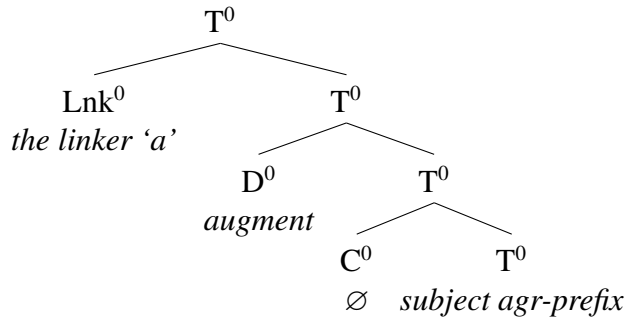
The relative and non-relative paradigms of subject agreement prefixes are given in (41) below. As we can see, there is not straightforward morphological relationship between the two paradigms. In some classes, the relative subject prefix consists of the regular subject prefix preceded by an additional mid vowel (e.g. classes 7 and 17). In other classes, there is not extra segmental material in the relative prefix; rather, the relative prefix remains the same (class 6) or it changes to a mid vowel (e.g. classes 1 and 9).

- (41) Two paradigms of subject agreement prefixes

noun class	1	2	5	6	7	8	9	17
<i>regular agr prefix</i>	u-	ba-	li-	a-	si-	zi-	i-	uku-
<i>relative agr prefix</i>	o-	aba-	eli-	a-	esi-	ezi-	e-	oku-

Nonetheless, relative prefixes do not seem entirely idiosyncratic: some of their properties are clearly related to the properties of regular agreement prefixes. For instance, all classes which add an extra vowel to form a relative prefix are those whose regular form is CV (classes 2, 5, 7, 8 and 17 in (41)). Onsetless subject prefixes remain onsetless in the relative paradigm (classes 1, 6 and 9). Moreover, the mid vowels found in relative prefixes share their backness/frontness feature with the vowel of the regular prefix. Treating the two paradigms as two sets of monomorphemic prefixes renders these generalizations accidental. Below, I argue that there are no accidental similarities between the two paradigms.

According to the syntactic analysis of relative clauses developed in the previous section, a relative agreement prefix is not monomorphemic. Rather, it is composed of three overt morphemes within a single complex head: the linker *a*, an augment vowel and a subject agreement prefix (42).

(42) The components of a relative agreement prefix:

The trimorphemic decomposition allows a straightforward derivation of the relative prefix paradigm by using regular phonological rules of hiatus resolution, called vowel coalescence rules (43).

(43) Vowel coalescence rules in Ndebele (adapted from Sibanda (2004)):

- a. $a + u \rightarrow o$
- b. $a + i \rightarrow e$
- c. $V_{\alpha} + V_{\alpha} \rightarrow V_{\alpha}$ ¹¹

The rules in (43) are employed in various instances of hiatus resolution in Ndebele (but also in closely related languages, such as Zulu or Swati). As an example, consider the nominal conjunction *la*, which attaches to the left of the second conjunct DP. Since the initial segment of a DP in Ndebele is a vowel (the augment), concatenation of *la* creates a vowel hiatus. As we see in (44), the hiatus is resolved by the coalescence rules above.

- (44) a. i-nja **la** u-mangoye (>inja **lomangoye**) $a + u \rightarrow o$
 9aug-9dog & 1aug-1cat
 ‘a dog and a cat’
- b. u-mangoye **la** i-nja (>umangoye **lenja**) $a + i \rightarrow e$
 1aug-1cat & 9aug-9dog
 ‘a cat and a dog’
- c. a-bafana **la** a-mankazana (> abafana **lamankazana**) $a + a \rightarrow a$
 2aug-2boy & 6aug-6girl
 ‘boys and girls’

Given the DP-shell proposal for relative clauses in Ndebele, the linker *a* is always in a hiatus – it is immediately followed by an augment vowel. Unless that vowel is identical to the linker (i.e. /a/), the linker and the augment coalesce into a mid vowel, as shown in (45).

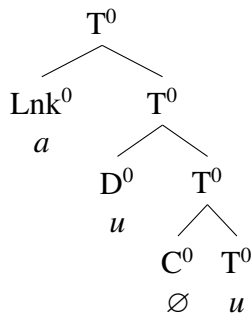
¹¹This last rule was formulated only for the vowel /a/ in Sibanda (2004): $a + a \rightarrow a$. No rules were given for other sequences of identical vowels. I assume that not only /a/, but all vowels undergo the same type coalescence.

(45) Vowel-coalescence derivation of relative agr. prefixes from a trimorphemic structure

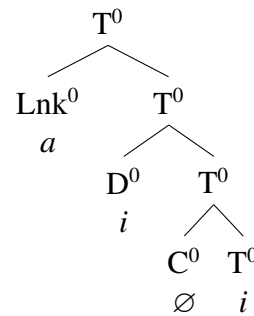
noun class	<i>linker</i>	+	<i>augment</i>	+	<i>subject prefix</i>	\Rightarrow	<i>relative prefix</i>
class 1	a-		u-		u-		o-
class 2	a-		a-		ba-		aba-
class 5	a-		i-		li-		eli-
class 6	a-		a-		a-		a-
class 7	a-		i-		si-		esi-
class 8	a-		i-		zi-		ezi-
class 9	a-		i-		i-		e-
class 17	a-		u-		ku-		oku-

For classes whose subject prefix is CV, relative prefixes follow straightforwardly: a C-initial subject prefix is preceded by two vowels in a hiatus. The hiatus is resolved by the regular coalescence rules in (43). With onsetless subject prefixes there are two instances of vowel hiatus as all three components of the relative agreement prefix are vowels. I assume that the order of application of hiatus resolution rules is determined by the hierarchical position of the relevant morphemes within the complex head. Assuming cyclic spellout (in a bottom-up fashion), the first hiatus to be resolved is the lower one: between the subject agreement prefix and the augment vowel. Since in all relevant noun classes the two morphemes are identical (see (45)), the vowels simply coalesce into a singleton vowel of the same quality, as shown in (46) and (47) for classes 1 and 9. The next step is coalescence with the linker *a*, where the familiar height-neutralization applies.

(46) Class 1 relative prefix:
 $a + (u+u) \rightarrow a+u \rightarrow o$



(47) Class 9 relative prefix:
 $a + (i+i) \rightarrow a+i \rightarrow e$



In the next subsection, I consider an alternative derivation of relative prefixes – one which assumes a bimorphemic structure. It is shown that the bimorphemic analysis requires stipulations about phonological rules involved, and makes incorrect predictions.

4.2 A bimorphemic account of relative prefixes: Vowel Raising analysis (Khumalo, 1992)

It has been recognized that relative agreement prefixes are not simply allomorphs of subject agreement prefixes, and their monomorphemic analysis is nowadays widely rejected. Instead, it is typically assumed that they conflate two morphemes: the relative complementizer *a* and a regular subject agreement prefix (Khumalo, 1992; Demuth & Harford, 1999; Zeller, 2004, 2006; Henderson, 2007, among others), as shown in (48).

(48) *Relative agreement prefix* = relative COMP "a-" + subject agreement prefix

Under this view, a subject agreement prefix in relative clauses has the same form as in non-relative clauses. The reason its surface form is altered is that the complementizer *a* attaches to its left and undergoes a phonological alternation. The alternation is, however, somewhat peculiar. It resembles vowel coalescence rules discussed above, but has other properties, as well.

Combining the bimorphemic analysis in (48) with regular coalescence rule does not yield the relative paradigm. Assuming the bimorphemic structure, vowel coalescence rules derive only some of the relative prefixes: the ones whose subject prefix is a vowel (classes 1, 6 and 9 in (49)), and the class 2 prefix. However, coalescence rules do not correctly derive relative prefixes for other noun classes whose subject prefix has an onset (CV subject prefixes).

(49) Vowel-coalescence derivation of relative agr. prefixes from a bimorphemic structure

noun class	<i>rel-comp</i>	+	<i>subject prefix</i>	⇒	<i>relative prefix</i>
class 1	a-		u-		o-
class 2	a-		ba-		aba-
class 5	a-		li-		*ali- (correct: eli-)
class 6	a-		a-		a-
class 7	a-		si-		*asi- (correct: esi-)
class 8	a-		zi-		*azi- (correct: ezi-)
class 9	a-		i-		e-
class 17	a-		ku-		*aku- (correct: oku-)

The predicted forms for CV-classes do not involve height-neutralization because there is no hiatus between the complementizer and the subject prefix. Given no hiatus, the complementizer is expected to retain its original form, namely /a/. Nonetheless, the initial vowel of the relative prefix is a mid vowel.

The analysis proposed in the previous section avoids that problem by revising the underlying morphological composition of the relative prefixes: they are trimorphemic, not bimorphemic. The widely adopted view is, however, that the bimorphemic structure is correct, and that the inadequacy is related to the phonological rules that determine the surface form of relative prefixes. This is the so-called Vowel Raising analysis proposed by Khumalo (1992) for Zulu, where the relative agreement paradigm is identical to the one found in Ndebele. According to this analysis, the relative marker *a* undergoes raising to a mid vowel when the following subject agreement prefix *contains* a high vowel. Consider, for instance, class 7 prefix in (49); there, the relative marker *a* undergoes raising to *e* because the following subject prefix *si* contains a high vowel.

The Vowel Raising analysis has the following parts: i) it assumes a bimorphemic structure of relative agreement prefixes (50-a), ii) it employs a rule which alters the relative marker *a* (50-b) and iii) a rule which deletes a subject agreement prefix, if that prefix is a vowel and is preceded by the relative marker (50-c).

(50) The Vowel Raising analysis (Khumalo, 1992)

- Bimorphemic structure of the relative prefix: $a_{REL} + S(\text{subject}) P(\text{refix})$
- Vowel Raising: $a_{REL} \rightarrow V_{[mid, \alpha back]} / _ (C)V_{[high, \alpha back]}$
- V-Subject Prefix Deletion: $V_{SP} \rightarrow \emptyset / REL _$

Note that, in addition to raising, the marker *a* assimilates in backness and roundness: it is raised to a round back mid vowel (*o*) or an unrounded front mid vowel (*e*), depending on the conditioning environment. Since Vowel Raising applies to the relative markers attached to both V and CV subject agreement prefixes, the rule must encode an optional C in the conditioning environment. This first rule is enough to derive relative agreements of CV classes. This is shown in (51) for classes 2, 5 and 17.

(51) Vowel Raising derivation of relative prefixes

class	input (REL-SP)	Vowel Raising	V Subject Prefix Deletion	surface form
2	a-ba	N/A	N/A	aba
5	a-li	e-li	N/A	eli
17	a-ku	o-ku	N/A	oku
6	a-a	N/A	a	a
9	a-i	e-i	e	e
1	a-u	o-u	o	o

For classes whose regular agreement prefix is a vowel, the application of Vowel Raising is not enough since it gives rise to two vowels in a hiatus. Khumalo proposes that the second vowel, i.e. the subject agreement prefix, is deleted in this morphophonological context. The deletion rule (50-c) applies to classes 6, 9 and 1 in (51). Note that the two rules apply in a counterbleeding order: deletion of the subject prefix must apply after Vowel Raising because it constitutes the environment for Vowel Raising.

The analysis advocated in this paper has both theoretical and empirical advantages over the Vowel Raising account. First, vowel raising and backness assimilation are not found across intervening consonants in other morphosyntactic contexts in Ndebele. This can be seen, for instance, in negative forms. The negative prefix *a* is attached to the left of an inflected verb, just like the relative marker. As we see in (52), the negative prefix does not undergo raising (or backness assimilation).

(52) No vowel raising in the negative prefix *a*:

- a. a- li- pheki > *alipheki* (**elipheki*) (cf. class 5 in (51))
 NEG- 2pl.S- cook
 ‘You are not cooking’
- b. a- ku- la-manzi > *akulamanzi* (**okulamanzi*) (cf. class 17 in (51))
 NEG- 17S- COP-water
 ‘There is no water’

The negation marker in (52) is in the same morphophonological context as the relative marker in (51): it has the same form (*a*) and it is immediately followed by a subject agreement prefix. Nonetheless, it does not undergo any alternation. Thus, Vowel Raising is a rule which applies only in the formation of relative agreement prefixes. Vowel coalescence rules, on the other hand, are regular rules of hiatus resolution, as exemplified with the conjunction *la* in (44).

Second, Vowel Raising is not sufficient. As discussed above, deletion of the subject prefix must apply whenever the prefix has no onset (classes 6, 9 and 1 in (51)). Just like Vowel Raising, the

deletion rule is specific to relative agreement prefixes. In other contexts, the same phonological environment does not trigger deletion of the subject prefix. Consider the derivation of a class 9 relative prefix in (51), where the hiatus *e-i* is resolved by deleting the second vowel. Typically, this type of hiatus is resolved by deleting the *first*, not the second vowel. In fact, the vowel /*e*/ is deleted whenever it is followed by another vowel, as shown by the rule in (53-a) from Sibanda (2004). /*e*/-deletion, like coalescence rules, is a general strategy of hiatus resolution, applied in different environments. As an example, consider the aspectual marker *se-* ‘now’, which combines with an inflected verb (53-b). The marker *se* is concatenated on a verb whose first segment is an onsetless subject prefix: the vowel *i*. As we see, the general /*e*/-deletion applies, retaining the second vowel, i.e. /*i*/, in the surface form.

- (53) Regular rule of *e*-deletion (Sibanda, 2004)
- a. $e \rightarrow \emptyset / \text{ ___ } V$
- b. *i- se- i- pheka* \Rightarrow *isipheka* (**isepheka*) (cf. class 9 in (51))
 9s- SE- 9s- cook
 ‘she is now cooking’

Since the derivation of class 9 relative prefix involves deletion of the second, not the first, vowel, the rule in (50-c) remains a stipulation about relative prefixes. In the trimorphemic account proposed here, no deletion rule is necessary. Assuming cyclic application of phonological rules, the three vowels undergo predicted coalescence (54).

- (54) Derivation of class 9 relative prefix: the trimorphemic account

$$[a \quad [i \quad [i \quad]]] \rightarrow [a \quad [i \quad]] \rightarrow e$$

Lnk Aug SP

Thus, the trimorphemic analysis proposed in this paper has a theoretical advantage over the Vowel Raising analysis – it does not rely on context specific rules to derive the relative agreement paradigm. Rather, the correct forms follow from regular rules of vowel hiatus resolution.

The third argument against the vowel raising analysis is empirical. In addition to coalescence rules and /*e*/-deletion, there is a third strategy of hiatus resolution in Ndebele: gliding (Sibanda, 2004). Gliding applies to high vowels followed by non-high vowels (55).

- (55) Gliding
- a. $u \rightarrow w / \text{ ___ } V_{[-high]}$
- b. $i \rightarrow j / \text{ ___ } V_{[-high]}$

The instance of gliding relevant here is in non-relative forms: between a subject prefix and the past tense prefix *a-*. If the subject prefix is a high vowel, it becomes a glide (56).

- (56) a. *umfana u- a- bala* > *wabala* b. *inkazana i- a- bala* > *yabala*
 1boy 1s- PST- read 9girl 9s- PST- read
 ‘the boy read’ ‘the girl read’

The forms in (56) start with a hiatus which is resolved by gliding. Crucially, gliding turns two adjacent vowels into one C-initial syllable (here: *wa* and *ya*). This result is crucial in making

predictions about relative forms of the past tense. When the forms in (56) appear in a relative clause, they are preceded by the relative marker *a*, as shown in (57).

(57) Relative forms of (56):

- a. umfana **a** wa-bala > *owabala* (*awabala)
 1boy REL- 1S.PST- read
 ‘the boy who read’
- b. inkazana **a** ya-bala > *eyabala* (*ayabala)
 9girl REL 9S.PST- read
 ‘the girl who read’

According to the Vowel Raising analysis, the relative marker in (57) is not expected to undergo raising because the triggering environment is absent: there is no high vowel in the following syllable. Therefore, the predicted forms are *awabala* and *ayabala*, respectively. As we see in (57), this is a wrong prediction of the Vowel Raising analysis. The relative marker does undergo raising.

Admittedly, this argument against the Vowel Raising analysis is based on the assumption that gliding in (57) applies first, i.e. before the rules forming relative prefixes. This order of application follows from the assumption I make in this paper, namely that phonological rules apply cyclically in a bottom-up fashion. One could argue, however, that the order of rule application is different. Note that gliding is a regular phonological rule, while the two rules proposed by Khumalo (1992) are very specific, as discussed above. In the framework of Distributed Morphology (adopted here, though not in Khumalo) phonological rules which make reference to specific morphosyntactic features apply before regular phonological rules and are called *readjustment rules*. Thus, if we treat Khumalo’s Vowel Raising and Subject Prefix Deletion as readjustment rules, the formation of the relative prefix would take place before gliding. (58) attempts a derivation of the forms (57) with this rule ordering, i.e. where gliding is suspended until after the application of Vowel Raising and SP-Deletion.

(58) Relative prefix derivation in the past tense: gliding applies at the end

	Input (C _{Rel} -SP-T)	Readjustment Rules		Regular phonology rules (gliding)
		Vowel Raising	V _{SP} Deletion	
class 1	a-u-a	o-u-a	o-a	N/A (not an environment for gliding)
class 9	a-i-a	e-i-a	e-a	N/A (not an environment for gliding)

Ordering rules in this way does not yield the attested forms. This is due to the role that subject agreement prefixes (*u* and *i*) play in the derivation. On the one hand, they are necessary to trigger Vowel Raising, and suspending gliding of those prefixes (into *w* and *j*) allows the desired application of Vowel Raising (which alters the relative marker to *o* and *e*). On the other hand, Vowel Raising is immediately followed by deletion of those subject prefixes. The deletion rule, as a context-specific rule, must apply before gliding, but that means the environment for gliding is deleted – there are no high vowels in the output of readjustment rules. In other words, the problem with past tense forms for the Vowel Raising analysis is the following: the order of application in (58) removes the environment for gliding, while cyclic application these rules removes the environment for Vowel Raising (as discussed below (57)). Thus, neither order can derive the fact that both gliding and

raising take place in these forms.¹²

The past tense relative forms follow from the analysis proposed here with no further amendments. Since the underlying structure of the relative prefix is trimorphemic, in the past tense we have a sequence of four vowels: in addition to the usual three morphemes (the linker, augment and subject prefix), there is a past tense prefix *a* (59). Like in other forms, the derivation of relative prefixes results from cyclic application of regular hiatus resolution rules: here, gliding and vowel coalescence.

(59) Relative prefix in the past tense: the trimorphemic account

- a. class 1: [a [u [u [a]]]] → [a [u [wa]]] → [a [uwa]] → owa
 Lnk Aug SP T
- b. class 9: [a [i [i [a]]]] → [a [i [ya]]] → [a [iya]] → eya
 Lnk Aug SP T

The Vowel Raising analysis of relative prefixes was meant to account for height alternation of the relative marker *a-* in contexts where regular hiatus resolution rules do not apply, that is when the marker is followed by a C-initial subject marker. I have argued in this section that this analysis is both unexplanatory and empirically inadequate. I argued that the problem with CV classes is not a phonological one. Rather, it stems from the assumption that the relative prefix is bimorphemic. I rejected that assumption and proposed that the relative prefix contains an augment vowel (D^0) immediately following the marker *a*, analyzed here as a linker taking a DP complement. This single morphological change removes both the theoretical and empirical problems of the Vowel Raising analysis. Thus, the morphophonology of relative agreement prefixes strongly supports the syntactic analysis of relative clauses as projecting a DP-shell, a property they share with verb complement clauses. The next section brings into the picture a third type of embedded clause, noun-complement clauses, providing a final piece of evidence for DP-shell in Ndebele embedded clauses.

5 Further syntactic correlates of the DP shell hypothesis

This section discusses a third type of embedded clause – the so called noun complement clause, which has properties of verb complement clauses (it has an overt complementizer) and of relative clauses (it is a noun-attached clause). In subsection 5.1, I show that noun-complement clauses are better understood assuming the DP-shell hypothesis for Ndebele embedded clauses. Section 5.2 looks at all three types of embedded clauses and provides a final piece of evidence for their DP status: all three types of embedded clauses are coordinated like DPs.

5.1 Consequences of the DP-shell hypothesis for clausal complementation

We have seen in section 2 a list of properties of verb complement clauses which show that their external syntax is nominal. The morphological and syntactic behavior of the initial vowel of the complementizer *u-kuthi* strongly suggests that the initial vowel is an active augment and that em-

¹²There is one more logically possible order of application: Vowel Raising > Gliding > SP Deletion. While it would derive the correct forms, this order is entirely unprincipled – it obeys neither cyclicity (it ignores hierarchical structure) nor modularity (it interleaves readjustment rules with regular phonology).

bedded clauses are dominated by a DP layer. We will see in this section that the DP-shell analysis helps us understand an asymmetry between noun- and verb-complement clauses. The asymmetry is simple: verbs can take clausal complements but nouns cannot (60).

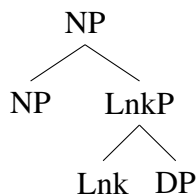
- (60) a. Ngi-zwe [DP u-kuthi u-ya-m-thanda.]
 1sg.S-hear.PST 15aug-15COMP 1s-TAM-1o-like
 ‘I heard that she likes him’
- b. *indaba [DP u-kuthi u-ya-m-thanda]
 9news 15aug-15COMP 1s-TAM-1o-like
 (‘the news that she likes him’.)

Interestingly, noun-complement clauses are possible if they are introduced by a linker (61). Note that the linker covaries with the noun class of the head noun.

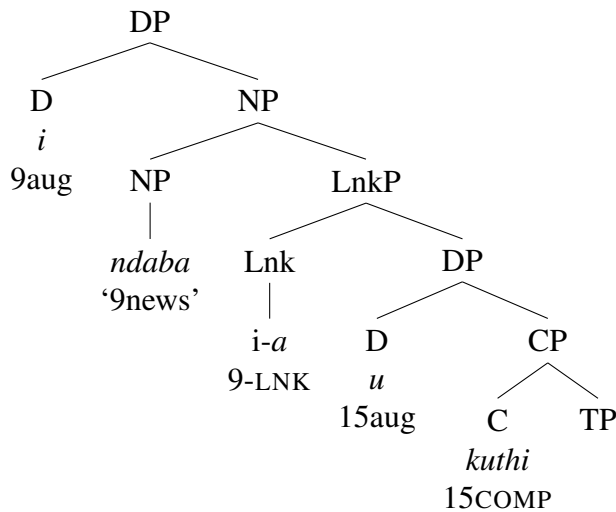
- (61) a. indaba i- [a]- [DP u-kuthi u-ya-m-thanda.] (> indaba yokuthi ...)
 9news 9- LNK- 15aug-15COMP 1s-TAM-1o-like
 ‘the news that she likes him.’
- b. isizatho s- [a]- [DP u-kuthi u-sukile.] (> isizatho sokuthi ...)
 11reason 11- LNK- 15aug-15COMP 1s-left
 ‘the reason why she left’

Under the hypothesis that complement clauses are DPs, as indicated in (60), the ungrammaticality of (60-b) could be analyzed as resulting from a general ban on DP complements to nouns. However, it is far from obvious that what we call noun-complement clauses are in fact complements, and have instead been argued to act as modifiers of the head noun (Stowell, 1981; Moulton, 2009). Additionally, it has been argued that noun complement clauses in Zulu (which strikingly resemble those in Ndebele) are adjuncts (Halpert, 2012). Adopting the adjunction view, we should rephrase the description of (60-b): it shows that nouns cannot have DP modifiers. This observation brings us back to relative clauses and the proposal that adnominals of category D in Ndebele involve a linking structure, repeated in (62).

- (62) The syntax of NP-modification in Ndebele



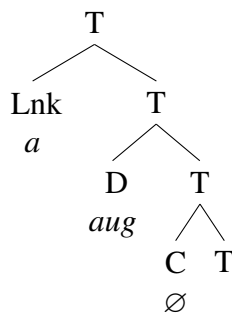
Thus, the asymmetry between verb- and noun-complement clauses follows from the DP-shell hypothesis. Verb-complement clauses are directly selected by verbs, the same way nominal objects are. Noun-attached clauses, including relative and noun-complement clauses, require a linker. The structure of the noun-complement clause in (61-a) is given in (63). As in relative clauses (and possessives), the linker selects a DP, and is itself adjoined to an NP – here, the head noun *indaba* ‘news’.

(63) The syntax of noun-complement clauses (structure for (61-a))

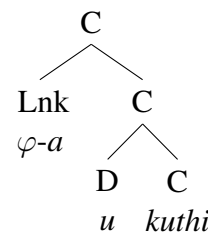
Note that the predicted DP-internal concord pattern is observed: within the higher DP, the nominal feature (class 9) is copied onto the linker, while the lower D expresses the feature of its complement – the complementizer *ukuthi*. Unlike in relative clauses, the linker in noun-complement clauses shows overt agreement with the modified NP. This is expected since the impoverishment rule in (38) deletes φ -features on Lnk only when Lnk is in the same complex head as T. We have seen that this is the case in relative clauses, where C is null and the linker lowers all the way to T (64-a). Noun complement clauses, however, have an overt complementizer and lowering takes place only to C (64-b).

(64) a. Relative clauses

Lowering to T
→impoverishment

b. N-complement clauses

Lowering to C
→no impoverishment



Finally, the expected vowel coalescence rules apply after lowering of the DP-shell augment and the linker onto the complementizer, as shown in (65) for (61-a).

$$(65) \quad [C^0 [L_{nk}^0 i-a] [C^0 [D^0 u] [C^0 kuthi]]] \rightarrow [ya] [ukuthi] \rightarrow yokuthi$$

A consequence of this analysis of noun-complement clauses is that the surface shape of the complementizer (here *yokuthi*) is derived by regular vowel hiatus resolution rules. The fact that

the complementizer, in its surface form, covaries with the noun class of the head noun is not analyzed as syntactic complementizer agreement. The locus of syntactic agreement is on the linker, which lowers to C, creating what looks like an agreeing complementizer. While this appears to be true in Ndebele, Zulu seems to have developed a true agreeing complementizer in this context: the complementizer in Zulu noun-complement clauses looks the same as in Ndebele (it covaries with the head noun) but the presence of a DP-shell and of a linking structure is dubious. Recall the discussion of Zulu vs Ndebele verb complement clauses (section 2), where we observed two asymmetries between those languages which likely correlate with the presence or absence of a DP-shell: the possibility of sentential subjects (in Ndebele but not in Zulu) and the possibility of augment drop (in Ndebele but not in Zulu). If Zulu embedded clauses indeed lack a DP-shell, as those facts suggest, and are in fact CPs, perhaps the linking syntax is not necessary in noun-complement clauses. If, in turn, there is no linker, the agreeing category must be C. There is some evidence that noun-complement clauses in those two languages do have a difference syntax. Halpert (2012) proposes an analysis of Zulu noun-complement clauses as NP-adjoined CPs. The adjunction relation between the NP and its "complement" CP is argued to be responsible for a type of agreement optionality: when the complex NP is in a subject position, both the NP and the CP can control agreement on the verb (66). In Halpert's analysis, the adjunction relation renders the NP (class 9) and the CP (class 17) equidistant from T, resulting in optionality of agreement controller (67).

(66) Zulu (Halpert, 2012, 264)

- a. [**indaba** y-okuthi w-a-thatha umhlala phansi] y- a- ngi- mangaza
 9news 9-17COMP 1S-PST-take 1sit down 9S- PST- 1sg.o- surprise
 'The news that he retired surprised me'
- b. [indaba y-**okuthi** w-a-thatha umhlala phansi] kw- a- ngi- mangaza
 9news 9-17COMP 1S-PST-take 1sit down 17S- PST- 1sg.o- surprise
 'The news that he retired surprised me'

(67)
$$\left[\text{TP} \left[\text{DP NP}_{\varphi:9} \text{ CP}_{\varphi:17} \right] \left[\text{T}^i \text{ T}_{\varphi: _} \text{ VP} \right] \right]$$

The DP-shell analysis of Ndebele clauses predicts a different agreement pattern. The CP in noun-complement clauses is more deeply embedded than the CP in (67): it is introduced by a linker. Since the category adjoined to the head NP is not a CP, but LnkP, the complementizer and the head noun are not equidistant from T and no optionality is expected. Indeed, agreement with complex NPs in Ndebele is always controlled by the head NP and never by the complement clause (68).

(68) Ndebele

- a. [**indaba** i-a-ukuthi u-sukile] i -a- ngi- mangalisa.
 9news 9-LNK-15comp 1s-left 9S- PST- 1sg.o- surprise
 'the news that she left surprised me.'
- b. *[indaba i-a-**ukuthi** u-sukile] ku- a- ngi- mangalisa.
 9news 9-LNK-15comp 1s-left 15S- PST- 1sg.o- surprise
 'the news that she left surprised me.'

The uniform treatment of embedded clauses as DPs is key to understanding the parallel between relative clauses and noun-complement clauses, and the asymmetry between verb- and noun-complement clauses. While verbs may directly merge with a DP, nouns require a linking structure to do so. The next subsection provides converging evidence from coordination showing that all three types of embedded clauses behave like DPs.

5.2 DP-shell in three types of embedded clauses: evidence from coordination

There are two clear instances of coordination in Ndebele: TP coordination and DP coordination. TP coordination typically uses a null conjunction (69-a), while DP coordination requires the conjunction *la* (which also functions as a comitative marker) (69-b). The status of VP/vP coordination is unclear since, in most cases, it is difficult to tease it apart from TP coordination. (69-c) shows that, if VP-coordination exists, it uses the null conjunction, like TP coordination. The crucial generalization emerging from (69) is that DP coordination requires *la*, while other types of coordination prohibit it.

- (69) a. [Wena u-dlile] \emptyset /**la* [mina ngi-nathile]. *TP coordination*
 2sg.PRON 2sg.S-ate & 1sg.PRON 1sg.S-drunk
 ‘You ate and I drank’
- b. UJohn u-dle [_{DP} isuphu] *(*la*)- [_{DP} isinkwa]. (> *lesinkwa*) *DP coordination*
 1John 1.S-ate 9soup &- 9bread
 ‘John ate soup and bread’
- c. UJohn [_{VP} u-dlile] \emptyset /**la* [_{VP} u-nathile]. *VP coordination*
 1John 1S-ate & 1S-drunk
 ‘John ate and drank’

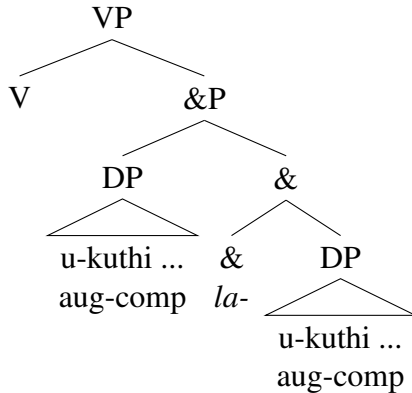
Embedded clauses behave differently than matrix clauses (and than VPs) in that they do not allow the null conjunction. Instead, they require the marker *la*, like DPs (70-a). The marker *la* and the complementizer *ukuthi* in the second conjunct undergo coalescence, giving rise to the expected surface form *lokuthi*. The zero conjunction is allowed only if the second conjunct does not include the complementizer, i.e. when the coordination site is below C (70-b).

- (70) a. *Ngizwe ukuthi uMary uyahlabela lokuthi uJohn udlala ibhola.*
 Ngizwe [_{DP} ukuthi uMary uyahlabela] *(*la*) [_{DP} ukuthi uJohn udlala ibhola].
 heard.1sg comp Mary sings & comp John plays soccer
 ‘I heard that Mary sings and that John plays soccer’
- b. *Ngizwe ukuthi [_{TP} uMary uyahlabela] \emptyset /**la* [_{TP} uJohn udlala ibhola.]*
 heard.1sg comp Mary sings & John plays soccer
 ‘I heard that Mary sings and John plays soccer’.

The presence of the nominal conjunction *la* in (70-a) strongly suggests that the conjuncts are DPs. The only other possible analysis of (70-a) is that the conjuncts are CPs and that CP coordination uses *la*. This is, however, untenable, given the matrix clause coordination in (69-a), which only allows the null conjunction. Note that (69-a) is potentially ambiguous: the conjuncts could be

either TPs or CPs. What this example shows is that, if CP-coordination exists in Ndebele, it does not use the conjunction *la*. Thus, the obligatoriness of *la* in embedded-clause coordination provides strong evidence that the conjuncts are indeed DPs, as expected under the DP-shell hypothesis (71).

(71) Coordination: V-complement clause



Noun complement clauses also behave like DPs with respect to coordination – they require *la*. While verb-complement clauses are selected by verbs directly (and coordinated like nominal objects), noun-complement clauses are DP-complements of the linker. Thus, their coordination parallels that of possessor DPs. Both in possessor-DP coordination (72) and noun-complement clause coordination (73-a), the coordination site is below the linker and requires the nominal conjunction *la*. (We will see shortly that coordination of LnkPs is impossible.) As with verb-complement clauses, coordination is possible at the TP level (73-b). In that case, the complementizer is absent in the second conjunct.

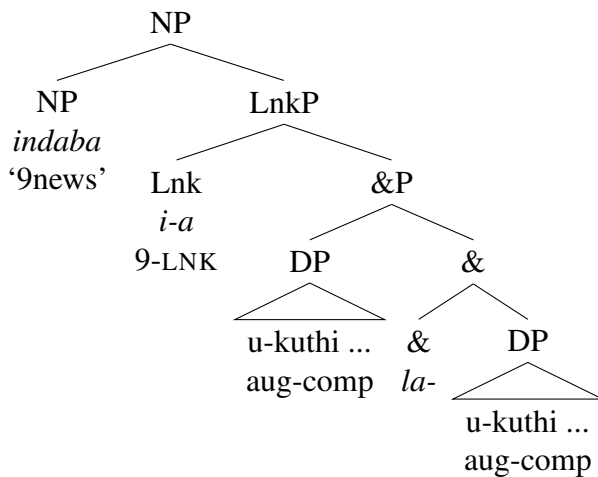
(72) *imoto yomama lobaba* Possessor DP coordination
 i-moto **i-a-** [DP **umama**]*(**la**) [DP **ubaba**]
 9-car 9-LNK- 1mother & 1father
 ‘mom and dad’s car’

(73) a. *indaba yokuthi uMary uyahlabela lokuthi uJohn udlala ibhola*
 indaba **i-a-** [DP **ukuthi uMary uyahlabela**]*(**la**) [DP **ukuthi uJohn udlala ibhola**]
 9news 9-LNK- comp Mary sings & comp John plays soccer
 ‘the news that Mary sings and that John plays soccer’

b. *indaba yokuthi uMary uyahlabela uJohn udlala ibhola*
 indaba **i-a-ukuthi** [TP uMary uyahlabela] ∅/***la** [TP uJohn udlala ibhola]
 9news 9-LNK-comp Mary sings & John plays soccer
 ‘the news that Mary sings and John plays soccer’

Notice that the complementizers introducing each conjunct in (73-a) have different surface forms. The first instance of *ukuthi* is preceded by the inflected linker *ya* (coalescing to *yokuthi*), while the complementizer in the second conjunct is not. Rather, it only coalesces with the preceding conjunction *la* (to form *lokuthi*). The linker analysis correctly derives only one instance of agreement in both possessives and noun-complement clauses – the agreement prefix is on the linker, which attaches to the leftmost conjunct but, syntactically, is not included in the coordination (74).

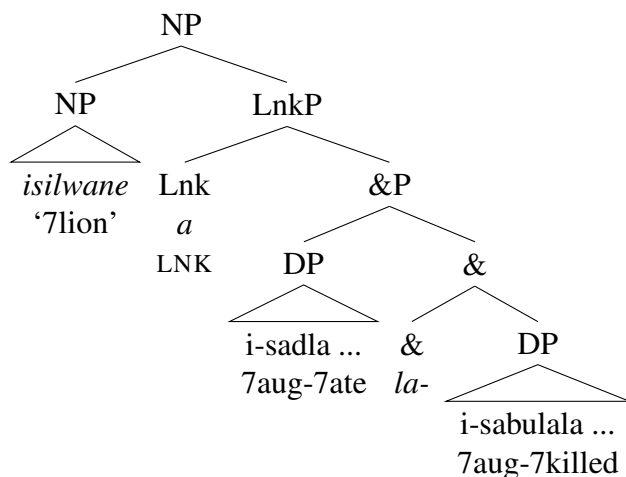
(74) N-complement clause coordination



Finally, relative clause coordination requires the DP conjunction *la*, as well. Like in other linking structures, *la* coalesces with the augment vowel of the second conjunct DP. Recall that in relative clauses, the DP-shell augment covaries with the RC-internal subject. In (75-a), the RC-internal subject is of class 7, for which the augment vowel is *i*-. Thus, *la* in (75-a) surfaces as *le* after coalescence with *i*-. Again, TP coordination is possible, in which case the null conjunction is used (75-b). The structure of relative-clause coordination as DP coordination is given in (76).

- (75) a. *Ngidinga isilwane esadla inkomo lesabulalainja.*
 Ngidinga isilwane a- [DP i- sadla inkomo] *(la)- [DP i- sabulalainja.]
 look-for.1sg 7lion LNK- 7aug-7ate 9cow &- 7aug-7killed 9dog
 ‘I’m looking for the lion that ate the cow and killed the dog’
- b. *Ngidinga isilwane esadla inkomo sabulalainja.*
 Ngidinga isilwane a- i- [TP sadla inkomo] ∅/*la [TP sabulalainja.]
 look-for.1sg 7lion LNK- 7aug- 7ate 9cow & 7killed 9dog
 ‘I’m looking for the lion that ate the cow and killed the dog’

(76) Relative Clause coordination



As discussed before, relative clauses are the type of embedded clause whose external DP layer is not transparent morphologically, unlike in embedded clauses with an overt complementizer. The presence of an augment vowel in the relative periphery was argued for on the basis of the forms of relative agreement prefixes. The coordination facts further reveal the presence of an augment vowel, and thus of a D layer, in relative clauses. The augment vowel is responsible for the surface form of the conjunction *la*, which surfaces as *le* after coalescing with the augment.¹³

We conclude from the discussion above that coordination of embedded clauses is possible at two levels, TP and DP. The DP-type coordination of embedded clauses is especially important in the present discussion since it strongly supports the hypothesis that embedded clauses in Ndebele project a DP shell. In the remainder of this section, I briefly discuss other coordination sites which are logically possible given the proposed syntax of embedded clauses, namely CP and LnkP coordination. It appears that neither of those categories can be coordinated in Ndebele.

As mentioned above, the existence of CP coordination in the language is dubious, given no parallel between matrix and embedded clauses. Moreover, coordination of embedded CPs below the D-layer is impossible. Recall that the complementizer is bimorphemic: the augment vowel is the DP-shell augment, while C contains an augmentless complementizer root. As we see in (77), coordination of CPs below the augment is ungrammatical, whether or not *la* is used. This can be seen in verb-complement clauses (77-a) and noun-complement clauses (77-b), where both D and C are overt in their periphery. It cannot be shown for relative clauses, however – the relative C is null and so CP coordination would have the same shape as TP coordination (75-b).

- (77) a. *Ngizwe **u-**kuthi uMary uyahlabela (*la*) kuthi uJohn udlala ibhola.
 *Ngizwe **u-** [CP kuthi uMary uyahlabela] (*la*) [CP kuthi uJohn udlala ibhola].
 heard.1sg aug comp Mary sings & comp John plays soccer
 ('I heard that Mary sings and that John plays soccer.')
- b. *indaba **yo-**kuthi uMary uyahlabela (*la*) kuthi uJohn udlala ibhola.
 *indaba **i-a-u-** [CP kuthi uMary uyahlabela] (*la*) [CP kuthi uJohn udlala ibhola].
 9news 9-LNK-aug comp Mary sings & comp John plays soccer
 ('the news that Mary sings and that John plays soccer')

Finally, LnkPs cannot be coordinated either. This is demonstrated in (78) below, with three constructions which employ the linker: possessives (78-a), noun-complement clauses (78-b) and relative clauses (78-c).

¹³I assume that lowering of the linker takes place into a coordinate structure, but does not obey the Coordinate Structure Constraint (it only attaches to the first conjunct). As the CSC is a syntactic constraint, post-syntactic movement is not expected to induce CSC violations. Even though ATB-type of lowering has been observed in various languages and constructions, there is evidence that syntactic and post-syntactic movement behave differently wrt to the CSC (Adger, 1997; Wojdak, 2007; Robinson, 2008). In the present discussion of Ndebele, this assumption is necessary given the impoverishment analysis of linker agreement: φ -features on Lnk are deleted after lowering to T. While more evidence is needed to determine how lowering works in coordinate structures in Ndebele, this assumption is compatible with all my data involving coordination. A similar question arises for the conjunction *la*; again, more data is needed to see if it lowers onto the second conjunct.

- (78) LnkP is not a possible coordination site:
- a. **imoto yomama (la)yobaba*
 *i-moto [**i-a-** **umama**] (la) [**i-a-** **ubaba**]
 9-car 9-LNK- 1mother & 9-LNK- 1father
 ('mom and dad's car')
 - b. **indaba yokuthi uMary uyahlabela (la)yokuthi uJohn udlala ibhola.*
 *indaba [**i-a-ukuthi** uMary uyahlabela] (la) [**i-a-ukuthi** uJohn udlala ibhola]
 9news 9-LNK-comp Mary sings (&) 9-LNK-comp John plays soccer
 ('the news that Mary sings and that John plays soccer')
 - c. **Ngidinga isilwane esadla inkomo (la)esabulalainja.*
 *Ngidinga isilwane [**a-** **i-** sadla inkomo] (la) [**a-** **i-** sabulalainja].
 look-for.1sg 7lion LNK- 7aug- 7ate 9cow (&) LNK- 7aug- 7killed 9dog
 ('I'm looking for the lion that ate the cow and killed the dog')

The impossibility of LnkP coordination is very transparent in possessives and in noun-complement clauses due to overt linker agreement. The second conjunct cannot contain an inflected linker, whether the conjunction *la* is used or not. The evidence from relative clauses is weaker: due to the lack of overt linker agreement, the second conjunct always starts with a mid vowel (*e* in (78-c)), and it is difficult to predict the surface form after coalescence with the conjunction *la*. The example does show, however, that LnkP in relative clauses cannot be coordinated with the zero conjunction. The facts above additionally show that noun complement clauses in Ndebele cannot be analyzed as bare CPs with an agreeing complementizer. If that were the case, we would perhaps expect *yokuthi* to appear in both conjuncts in (78-b). This is, however, impossible. Rather, noun complement clauses parallel possessive constructions, in which agreement is on the linker and must be outside of the coordination (as discussed above).

In sum, this section discussed three types of embedded clauses in Ndebele in the light of the DP-shell hypothesis. We have seen that the hypothesis accounts for the following facts: i) an asymmetry between verb- and noun- complement clauses (the latter are noun-attached DPs and so they require a linker), ii) a parallel between relative and noun-complement clauses (both are noun-attached DPs and so both require a linker) and iii) the use of a nominal conjunction in all three clause types (they are all externally DPs).

6 Conclusion

I argued that embedded clauses in Ndebele are nominalized – they project a DP-shell with its standard realization as the augment vowel. Of special interest were relative clauses, which lack morphologically transparent manifestation of the DP layer. The presence of an augment vowel in the relative periphery is revealed by the derivation of relative agreement prefixes, whose surface forms follow from regular phonological rules and the external DP syntax, without resorting to unmotivated morphophonological rules. The proposed structure of relative clauses in Ndebele differs from the standard syntax of relativization where a noun phrase is modified by a CP. Here, the modifying constituent is a LnkP, headed by the linker *a*. The linking structure was proposed to be the general structure of modification in the language where the modifying constituent is a DP.

Thus, we find linkers introducing possessors, relative clauses and noun-complement clauses. The DP-shell analysis accounts for a range of syntactic and morphophonological properties of the three types of embedded clauses, for the parallel between relative and noun-complement clauses (noun-attached clauses require a linker), and for the asymmetry between verb- and noun-complement clauses (the latter require a linker because they are noun-attached DPs).

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