

# Obligatory CP nominalization in Ndebele

Asia Pietraszko

University of Connecticut

[joanna.pietraszko@uconn.edu](mailto:joanna.pietraszko@uconn.edu)

## Abstract

This paper argues for the existence obligatory clausal DP-shells – structures in which an embedded CP is directly dominated by a projection of D. While this structure has been proposed in previous literature, it poses a theoretical problem for the well-formedness of extended projections (Grimshaw, 1991, 2000), in which a D head must appear in an extended projection of a noun. A careful investigation of embedded clauses in Ndebele (verb-complement, noun-complement and relative clauses) points to the conclusion that the grammar must allow base generation of direct clauses DP shells.

**Keywords.** Clause nominalization, DP shells, relative clauses, syntax, morphophonology, Bantu, Ndebele.

## 1 Introduction

This paper argues for the existence obligatory clausal DP-shells – structures in which an embedded CP is directly dominated by a projection of D, as shown in (1).

(1) [DP D<sup>0</sup> [CP C<sup>0</sup> ... ]]

Proposals in which CPs are dominated by a nominal layer have appeared in the literature on clausal complementation and nominalization (Rosenbaum, 1967; Lees, 1965; Aygen, 2002; Davies & Dubinsky, 1999, 2001; Takahashi, 2010; Hartman, 2012; Kastner, 2015, a.o.), though they differ in the details of the nominalization structure; for instance, is the nominal layer a bare DP dominating the CP or is there (an additional) N/n projection? While the question is largely empirical, there is a theoretical argument to be considered: the structure in (1) is incompatible with the theory of extended projections in which the category D is defined as being an extended projection of a noun. This characterization of DPs is explicitly stated in Grimshaw (1991, 2000), building on insights about functional categories since Abney (1987). According to this theory, the category D can only be projected from a lexical nominal head, a Noun. Thus, the structure in (1), in which a DP immediately dominates a CP is theoretically incoherent, and it is listed in Grimshaw (2000) as an impossible structure. I refer to this structure as a *direct DP shell* throughout the paper.

On the basis of data from Ndebele, a Bantu language of Zimbabwe (Guthrie: S44), I argue that direct DP shells must be allowed by the grammar. I show a range of facts which point to the conclusions that embedded clauses in Ndebele are obligatorily contained in a DP shell. The sentence in (2) is an illustration of a clausal DP shell in Ndebele. The D head is realized overtly as the so called *augment vowel* – a prefix that appears on all nominal elements in the language. As we see in (2), the exponent of D, *u-*, is prefixed on the complementizer *kuthi*.<sup>12</sup>

(2) Ngicabanga [DP u- [CP kuthi usukile. ]]  
1sg.thought aug COMP 1.left  
'I thought that (s)he left'

<sup>1</sup> 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.

<sup>2</sup> Unless otherwise noted, all data from Ndebele come from the author's fieldwork.

The argument for the existence of direct DP shells is based on refuting two possible reanalysis of this structure. I discuss these two alternative analyses below.

One possible analysis of (2) is the structure in (3), in which a null N intervenes between C (the complementizer) and D (corresponding to the augment vowel in (2)).

- (3) [DP D<sup>0</sup> [NP N<sup>0</sup><sub>∅</sub> [CP C<sup>0</sup> ... ]]

This analysis, proposed for instance in Lees (1965); Aygen (2002) and Hartman (2012), does not violate the well-formedness of extended projections: D is projected from a nominal lexical category. N, being a lexical category, is not subject to the constraints that rule out (1) – it can simply select for a CP complement.

A different treatment of clausal DP shells has been suggested by Hartman (2012), who proposes that clausal arguments are base-generated as bare CPs, and a DP layer is inserted only in those structural contexts that require a DP. Most prominently, this is the case with sentential subjects, which show nominal properties (unlike complement clauses, in many languages) and have been analyzed as CPs with a nominal layer (Lees, 1965; Rosenbaum, 1967; Davies & Dubinsky, 1999, 2001; Han, 2005, a.o.). In some languages, this contrast between clausal complements and clausal subjects is reflected morphologically. For instance, sentential subjects in Polish must be introduced by a demonstrative (4-a). Clausal complements, on the other hand, are impossible with a demonstrative (4-b).

- (4) a. \*(To) ze Marek wyjechal zostalo powiedziane jasno. (Polish)  
DEM that Marek left was said clearly  
'That Marek left was said clearly'
- b. Powiedzialam (\*to) ze Marek wyjechal.  
said.1SG DEM that Marek left.  
'I said that Marek left'.
- c. Powiedzialam to.  
said.1SG this  
'I said this'.

Taking the overt demonstrative as an indication of a nominal shell, we observe that the clausal subject requires a DP shell, while the complement clause in (4-b) disallows it – it must be a bare CP. The latter fact is of importance here: as we see in (4-c), the matrix verb 'say' can take DP objects, suggesting that the impossibility of a DP shell in (4-b) is not due to selectional properties of the matrix verb. Assuming that clausal arguments can be base-generated with a DP shell, it is unclear what precludes the clausal DP-shell in the object position. Hartman (2012) presents paradigms like (4) as a key argument for a last-resort insertion view of clausal DP-shell (5).

- (5) *Last-resort insertion of clausal DP-shell (Hartman, 2012)*

A DP-shell may be inserted to allow a clausal argument to raise to Spec,TP.

In this view, a clausal argument is base-generated as a bare CP. A DP layer is inserted if and only if it secures convergent derivation; for instance, when a clause moves to a subject position, a DP layer is inserted to satisfy the requirement that Spec,TP be filled by a DP. The last-resort insertion view accounts for the fact that clausal DP shells are often in complementary distribution with bare CPs, and that clausal DP shells are not freely generated, even in context which allow DPs (cf. (4-b) and (4-c)).<sup>3</sup> If clausal DP shells are universally the result of such insertion, rather than being base-generated, it becomes dubious if their existence poses a problem for extended projections. Indeed, the very fact that they cannot be freely base generated

---

<sup>3</sup> See Hartman (2012) for more examples of structural complementarity of bare CPs and clausal DP shells in several languages.

(and instead have a last-resort distribution) can be interpreted as supporting Grimshaw's prediction. Thus, what superficially looks like a direct DP shell may be reanalyzed in following two ways (6).

- (6) Two reanalyses of (apparent) direct DP shell [<sub>DP</sub> D [<sub>CP</sub> ]]:
- a. CP + last-resort insertion of D
  - b. [<sub>DP</sub> D [<sub>NP</sub> N<sub>∅</sub> [<sub>CP</sub> ]]]

A careful investigation of Ndebele embedded clauses (verb complement, noun complement and relative clauses) reveals the existence of clausal DP shells whose appearance cannot be analyzed as either last resort insertion or as CP complementation to a null noun. Thus, the Ndebele facts constitute an empirical argument that the theory must allow base-generation of direct clausal DP shells.

The paper consists of two parts. The first part argues for the existence of direct DP-shells by refuting the two reanalyses in (6). Section 2 focuses on verb complement clauses and argues that the DP-layer is present in these contexts and that its distribution does not show the last resort profile observed in other languages. I conclude that, in the absence of a last-resort distribution, the insertion view of clausal DP-shells is untenable for the Ndebele facts. The second reanalysis of the direct DP-shell structure, in which the CP is a complement to a null noun, is argued against in section 2. The argument is empirical and rather simple: CP complements to nouns are otherwise absent in the language. In other words, constructions in which the null N in (3) has an overt counterpart are not attested, rendering the null-N reanalysis empirically unfounded. Moreover, I argue that the direct DP-shell hypothesis, in which embedded CPs obligatorily project a DP layer, helps us understand the absence clausal complements to nouns, as well as the syntax of the constructions which we can descriptively call noun-complement clauses in Ndebele. In a nutshell, clauses, being externally DPs, cannot directly attach to a projection of a noun – an independent fact of the language. Instead, they are introduced by a functional head, *a linker*. In this respect, noun complement clauses resemble possessor DPs – both are adnominal phrases of category D and require the linker in order to appear inside a noun phrase. I conclude that the clausal DP shell in Ndebele can be characterized as neither last-resort insertion nor as structures involving CP complementation to a null noun, suggesting that the grammar must allow base-generation of the direct DP shell structure.

The robustness of obligatory DP shell on Ndebele embedded CPs is corroborated by the syntax and morphophonology of relative clauses. The second part of the paper is a detailed investigation of these constructions and aims to show that relative clauses too show behavior characteristic of DPs. I develop an analysis of relative clauses in Ndebele in which relative CPs are dominated by a DP-shell and discuss its advantages: i) their structural parallelism with noun complement clauses and possessor DPs, and ii) the correct predictions about the morphophonology of relative agreement prefixes. Regarding the first point, relative clauses, like noun complement clauses and possessors, are adnominal DPs, and all three are introduced by the same functional head, the linker. The second advantage of the proposed DP-shell hypothesis is a straightforward derivation of relative agreement prefixes: with the new assumption that relative clauses contain an overt D head, the otherwise irregular paradigm of agreement prefixes follows from regular phonological rules. The derivation is demonstrated in section 5, where I also discuss its advantages over an existing alternative analysis (Khumalo, 1992).

## **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 nominal properties of Ndebele clausal complements are listed in (7) and I discuss them in turn.

- (7) Nominal properties of verb complement clauses in Ndebele

- (i) Clausal complements control object agreement on the matrix verb
- (ii) The complementizer consists of the complementizer root and a determiner, where the latter shows some morphosyntactic independence from the former.
- (iii) Clausal complements can bare oblique case morphology
- (iv) Coordination of clausal complements requires a nominal conjunction marker
- (v) Clauses can be objects of prepositions
- (vi) Clausal subjects are allowed and have the same form as clausal objects.

(i) *Clausal complements control object agreement on the matrix verb*

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’ (8).<sup>4</sup>

- (8) 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 is the fact that clausal complements control object agreement. Consider the parallel between the nominal object of class 15 *ukudla* ‘food’ in (9-a) and the clausal complement in (9-b). Both trigger the appearance of a class 15 object marker *ku-*.

- (9) 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 common property of object marking in related Bantu languages is the obligatoriness of movement, or dislocation: the object which controls object agreement must be dislocated (Baker, 2003; Carstens, 2005). The fact that the object in (9-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 (9-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.<sup>5</sup>

(ii) *The complementizer consists of the complementizer root and a determiner*

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 (10), 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 (11).

---

<sup>4</sup> 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.

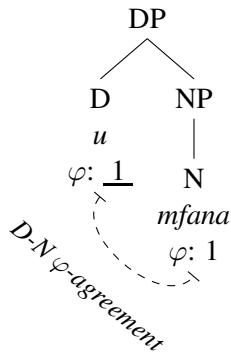
<sup>5</sup> For similar correlation between object marking about dislocation in Zulu see for example Adams (2010); Buell (2005); Cheng & Downing (2009); Halpert (2012); Halpert & Zeller (2015); Van der Spuy (1993); Zeller (2012)

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

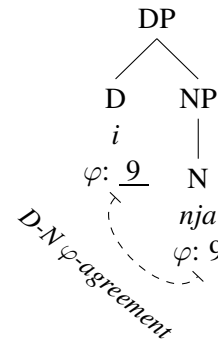
	noun class	augment	class prefix	root	translation
	class 1	<b>u-</b>	m-	fana	‘boy’
	class 2	<b>a-</b>	ba-	fana	‘boys’
	class 5	<b>i-</b>	∅-	luba	‘flower’
(11)	class 6	<b>a-</b>	ma-	luba	‘flowers’
	class 7	<b>i-</b>	si-	lwane	‘lion’
	class 8	<b>i-</b>	zi-	lwane	‘lions’
	class 11	<b>u-</b>	lu-	tho	‘thing’
	class 15	<b>u-</b>	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.<sup>6</sup> As shown in (12),  $\varphi$ -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.

- (12) a. *umfana* ‘the boy’



- b. *inja* ‘the 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.

The augment vowel on Ndebele nouns can sometimes be omitted. The distribution of such 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 in-situ position (Halpert, 2012).<sup>7</sup> The distribution of augmentless nominals is illustrated in (13). The augment can be

<sup>6</sup> 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  $D^0$ .

<sup>7</sup> This characterization is simplified. For details about licensing augmentless nominals in Zulu see Halpert (2012).

dropped in a negative sentence (13-a), but not in an affirmative one (13-b). An additional requirement for augment drop is that the object be in-situ, rather than dislocated. Dislocation of an object is detected by the presence of an object marker. As we see in (13-c), a dislocated object cannot be augmentless, even in a negative sentence (cf. its non-dislocated counterpart in (13-a)).

- (13) a. A-*ngi-funi* [DP (i)-*sinkwa*. ] *negation + in-situ obj.*  
 NEG-1sg.S-want 7aug-7bread  
 ‘I don’t want (any) bread.’
- b. *Ngi-funa* [DP \*(i)-*sinkwa*. ] *no negation*  
 1sg.S-want 7aug-7bread  
 ‘I want bread.’
- c. A-*ngi-si-funi* [DP \*(i)-*sinkwa*. ] *negation + dislocated obj.*  
 NEG-1sg.S-7o-want 7aug-7bread  
 ‘I don’t want the bread.’

The presence of an augment in the negative sentence seems optional, but it corresponds to a semantic difference. In particular, if the augment is present, the DP is interpreted as taking wide scope over negation (i.e. as a definite or a specific indefinite. In the absence of an augment, the object in (13-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.

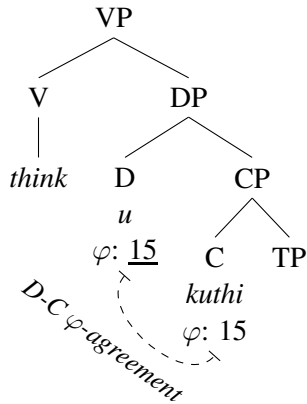
The initial vowel of the complementizer *ukuthi* can be dropped, as well. More importantly, an augmentless complementizer appears exactly in those configurations which license augmentless nominals. In (14-a), the matrix clause is negative, which correlated with the possibility of augment drop on the complementizer. When the matrix clause is affirmative, however, its clausal object must have an augment, just like any other object (14-b) (cf. (13-b)). Finally, augment drop is impossible on a dislocated clausal complement, even if the matrix verbs in negated (14-c).

- (14) a. A-*ngi-cabangi* [DP (u)-*kuthi* uSipho u-za-pheka ].  
 NEG-1sg.S-think aug-15COMP 1Sipho 1S-FUT-cook  
 ‘I don’t think Sipho will cook’. (I don’t think so at all.
- b. *Ngi-cabanga* [DP \*(u)-*kuthi* uSipho u-za-pheka ].  
 1sg.S-think aug-15COMP 1Sipho 1S-FUT-cook  
 ‘I think Sipho will cook.’
- c. A-*ngi-ku-cabangi* [DP \*(u)-*kuthi* uSipho u-za-pheka ].  
 NEG-1sg.S-15o-think aug-15COMP 1Sipho 1S-FUT-cook  
 ‘I don’t think Sipho will cook’.

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 (14-b) is emphatic, and translated with the modifier *at all*. Nonetheless, the morphosyntactic parallel between (13) and (14) 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 complement clauses, as those in (14), project a DP-shell, whose head is realized as the augment vowel, in parallel with nominal arguments (15).



- (15) 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 (15), 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 licensed position.

(iii) *Clausal complements can bare oblique case morphology*

The third 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 ??, which introduces the demoted subject in a passive sentence. Crucially, the oblique prefix appears with a nominal and a clausal subject alike.

- (16) The oblique prefix *yi-* replacing the augment vowel on *u-bumbulu* (14aug-14silliness):

Umama u-dan-is-w-e                      **yi-bumbulu**      buka-Sihle.  
 1mother 1S-worry-CAUS-PSV-PST OBL-14silliness 14.POSS-Sihle  
 ‘Mother was worried by Sihle’s silliness.’

- (17) The oblique prefix *yi-* replacing the augment vowel on *u-kuthi* (15aug-15comp):

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.

(iv) *Coordination of clausal complements requires a nominal conjunction marker*

Another parallel between clausal arguments and DPs is in the use of conjunction markers. There are two clear instances of coordination in Ndebele: TP coordination and DP coordination. TP coordination typically uses a null conjunction (18-a), while DP coordination requires the conjunction *la* (which also functions as a comitative marker) (18-b). The status of VP/vP coordination is unclear since, in most cases, it is difficult to tease it apart from TP coordination. (18-c) shows that, if VP-coordination exists, it uses the null conjunction, like TP coordination. The crucial generalization emerging from (18) is that DP coordination requires *la*, while other types of coordination prohibit it.

- (18) 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’

As indicated in (18-b), the conjunction *la* attaches to the second conjunct DP, creating a vowel hiatus between the conjunction and the augment vowel of the following DP. The morphophonological alternation we observe here is an instance of regular hiatus resolution rules in the language. These rules, also known as vowel coalescence rules, are listed in (19) and are exemplified with coordination of different classes of DPs in (20). Vowel coalescence rules will become relevant again in the discussion of relative clauses in section 4.

- (19) Regular hiatus resolution rules in Ndebele (from Sibanda (2004)):  
 (i)  $a + u \rightarrow o$       (ii)  $a + i \rightarrow e$       (iii)  $V_\alpha + V_\alpha \rightarrow V_\alpha$
- (20) 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’

Going back to coordination, 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 (21-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 (21-b).

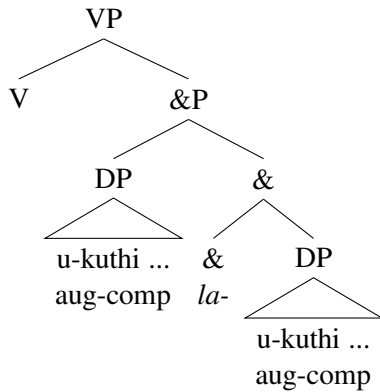
- (21) a. Ngizwe *ukuthi* uMary uyahlabela **lokuthi** uJohn udlala ibhola.  
 Ngizwe [DP *ukuthi* uMary uyahlabela ] \*(**la**) [DP *ukuthi* uJohn udlala ibhola].  
 heard.1sg comp Mary sings & comp John plays soccer  
 ‘I heard that Mary sings and that John plays soccer’
- b. Ngizwe *ukuthi* [TP uMary 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 (21-a) strongly suggests that the conjuncts are DPs. The only other possible analysis of (21-a) is that the conjuncts are CPs and that CP coordination uses *la*. This is, however, untenable, given the matrix clause coordination in (18-a), which only allows the null conjunction. Note that (18-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 (22).

(22) Coordination: V-complement clause



(v) *Clauses can be objects of prepositions*

Under the hypothesis that clauses in Ndebele are externally DPs, we expect them to be well-formed objects of prepositions – a correct prediction. The pair of sentences in (23) illustrates this with the prepositions *nga* ‘about’, where the preposition attaches directly to the following object and coalesces with its augment vowel. The translations remind us that English clauses contrast with DPs in this respect.

(23) 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’.

(vi) *Clausal subjects are allowed and have the same form as clausal objects.*

Recall the contrast between clausal subjects and objects in Polish, repeated in (24), which illustrates a morphologically overt DP layer on clauses in subject positions, and its absence in object positions.

- (24) a. \*(To) ze Marek wyjechal zostalo powiedziane jasno. (Polish)  
 DEM that Marek left was said clearly  
 ‘That Marek left was said clearly’
- b. Powiedzialam (\*to) ze Marek wyjechal.  
 said.1SG DEM that Marek left.  
 ‘I said that Marek left’.

The obligatoriness of a demonstrative in (24-a) is in line with the view of sentential subjects as CPs with a nominal layer (Rosenbaum, 1967; Davies & Dubinsky, 1999, 2001; Hartman, 2012, a.o.): the nominal shell is necessary here because Spec,TP is a DP position. This restriction does not hold for complement positions, in which bare CPs may appear. In the current proposal, the augment vowel on the Ndebele complementizer is an exponent of D, and thus is analogous to the Polish demonstrative. This correctly predicts that Ndebele clauses can appear in Spec,TP and that such sentential subjects have the same form as sentential objects (i.e.

without the appearance of extra nominal morphology). The sentences in (27-b) are an illustration. Note that clausal subjects control class 15 subject agreement.

- (25) **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.’

Some of the nominal properties of clausal complements discussed above have been observed in other Bantu languages, among them in Zulu – a close relative of Ndebele. Halpert (2012) notes that CPs in Zulu behave like nominal arguments in that they control object agreement and can be objects of prepositions.<sup>8</sup> 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 (26). 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.

- (26) \* **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.’

Interestingly, this asymmetry between Zulu and Ndebele clauses correlates with another contrast: unlike in Ndebele, complementizers in Zulu cannot appear without the augment vowel (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, whose distribution is governed by the general principles regulating the distribution of D heads beyond clausal arguments. 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 3.

A crucial contrast between Polish and Ndebele clausal arguments has to do with the possibility of clausal DP shell in complement positions. The impossibility of a demonstrative in Polish clausal complements (24-b) exemplifies the generalization made in previous literature that, unlike clausal subject, clausal objects do not show nominal properties (Bresnan, 2001; Roberts & Roussou, 2003; Hartman, 2012). This fact gives rise to patterns of structural complementarity of bare CP arguments and clauses with a DP shell, such as the one in (24), and underlie the idea, proposed in Hartman (2012), that a clausal DP layer is inserted as a last resort, in order to satisfy some structural requirement, e.g. the requirement that Spec,TP be filled by an element of category D. Crucially, the D layer in Ndebele clauses, exponed by the augment vowel on the complementizer, does not have a last resort distribution. For instance, it appears in subject and object positions alike (27).

- (27) a. \*(U)-kuthi izitha zi-za-buya ku-bal-iw-e e-roof-ini.  
 15aug-15COMP 10enemies 10S-FUT-come 15S-write-PSV-PST LOC-roof-LOC  
 ‘That enemies were coming was written on the roof.’

---

<sup>8</sup> See also Bresnan (1995) for a comparison of English and Chichewa clausal arguments. Bresnan concludes that clauses in Chichewa, but not in English, behave like nominals with respect to a number of diagnostics, including the possibility of taking oblique morphology, functioning as true sentential subjects or objects of prepositions.

- b. Ba-bal-e    \*(u)-kuthi    izitha    zi-za-buya.  
 2S-write-PST 15aug-15COMP 10enemies 10S-FUT-come  
 ‘They wrote that enemies were coming.’

We’ve seen above that the complementizer may be augmentless, but only in contexts which generally allow augmentless nominals. Crucially, there are no positions which only allow augmentless complementizers (analogous to the ban on demonstratives on Polish CPs). Clausal DP shells in Ndebele are obligatory and do not have a last resort distribution. This, in turn, supports the view that clausal DP shells in Ndebele are base generated, rather than inserted as a last resort, ruling out the first reanalysis of a direct DP shell (28).

- (28) Two reanalyses of (apparent) direct DP shell ([<sub>DP</sub> D [<sub>CP</sub> ]]):  
 a. CP + last-resort insertion of D  
 b. [<sub>DP</sub> D [<sub>NP</sub> N<sub>∅</sub> [<sub>CP</sub> ]]]

The question still remains as to whether the base generated DP shell is indeed direct or whether the nominal layer contains a null noun. This second interpretation of clausal DP shells in Ndebele is refuted in the next section, where it is shown that the language does not allow CP complementation to nouns in general.

### 3 Noun complement clauses: an argument against null N complementation

Section 2 provided evidence that external syntax of verb complement clauses 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 embedded clauses are dominated by an obligatory DP layer – its appearance is uniform across different contexts, showing no traces of a last resort phenomenon. The proposed structure of clausal arguments in Ndebele was that they are contained in a based generated DP shell, as shown (29-a). In this section, I consider the alternative analysis in (29-b), in which the nominal shell is not a bare DP layer, but rather a full nominal projection, containing both an N and a D head. Under this alternative, the noun is has zero pronunciation, but its structural presence insures well-formedness of the nominal extended projection, which requires the functional head D to be a projection of the category N.

- (29) *u-kuthi* (15aug-15comp)  
 a. Proposal: [<sub>DP</sub> D<sup>0</sup> *u-* [<sub>CP</sub> C<sup>0</sup> *kuthi* ]]  
 b. An alternative: [<sub>DP</sub> D<sup>0</sup> *u-* [<sub>NP</sub> N<sup>0</sup> ∅ [<sub>CP</sub> C<sup>0</sup> *kuthi* ]]]

I show that the null N alternative receives no support from Ndebele data. CP complements<sup>9</sup> to nouns are generally unattested in the language. The direct DP shell hypothesis, on the other hand, predicts the impossibility of true clausal complements to nouns, and offers a straightforward account of the constructions that we can descriptively call noun complement clauses.

The main empirical point to be considered here is an asymmetry between verbs and nouns in the ability to take clausal complements. The asymmetry is simple: verbs can take clausal complements but nouns cannot:

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

---

<sup>9</sup> We will see that these conclusions hold even under the theory of noun complement clauses as adjoined to NP, rather than as true complements (Moulton, 2009).

While the grammaticality of (30-a) is compatible with both the direct DP shell view (29-a) and the null N analysis (29-b), the ungrammaticality of (30-b) is unexpected under the latter view. The null N analysis involves CP complementation to noun. The constructed example in (30-b) is exactly what we expect a CP complement to a noun to look like. Assuming the present proposal, in which the augment on the complementizer is an exponent of the D layer, we expect to find the augmentless version of the complementizer in this context. The optional augment is included (30-b) to show that the claimed impossibility of CP complements to noun does not depend of the proposed analysis of the complementizer as bimorphemic. Even if we ignored the evidence given in section 2 and assumed that the augment is part of the complementizer root, the conclusion still holds: noun do not take clausal complements the way verbs do. It is worth noting that our interpretation of the facts in (30) wouldn't change if a different analysis of noun complement clauses was assumed – in particular, one in which the CP is not a true complement, but instead is adjoined to the NP (Moulton, 2009), as shown in (31).

$$(31) \quad [\text{DP } D^0 \text{ } [\text{NP } [\text{NP } N^0 \text{ } ] [\text{CP } C^0 \text{ } ]]]$$

The difference between the adjunction view (31) and the true complementation view (29-b) would be string vacuous – in both we would expect some version of (30-b) to be well-formed. Thus, the null N reanalysis of clausal DP shell in Ndebele makes incorrect predictions.

However, if the clauses in (30) are in fact DPs, as proposed here, we can understand the contrast between verbs and nouns (30-b) in terms of a general ban on adnominals of category D. In Ndebele, DPs cannot directly attach to a projection of a noun. This can be seen, for instance, in possessive constructions, where a bare possessor DP is ungrammatical, no matter what its position is (32). Instead, adnominal DPs are introduced by a functional element – the linker *a*. As we see in (54-b), the linker covaries with the class of the possessed NP and attaches to the possessor DP, resulting in regular vowel coalescence with its augment.

- |      |                              |      |                    |             |
|------|------------------------------|------|--------------------|-------------|
| (32) | *{u-mfana} i-mota {u-mfana}. | (33) | i-mota y-a-u-mfana | (> yomfana) |
|      | 1-boy 9-car 1-boy            |      | 9-car 9-LNK-1-boy  |             |
|      | ('the boy's car')            |      | 'the boy's car'    |             |

The linker *a-*, and its cognates in Zulu and other related languages, is often referred to as the *associative marker*.<sup>10</sup> In addition to possessive constructions, it appears in complex NPs with nominal modifiers (e.g. "a house of stone") (Sabelo, 1990). Interestingly, noun-complement clauses are possible if they are introduced by a linker (34). Note that the linker covaries with the noun class of the head noun (the mechanics of linker agreement are discussed at the end of this section).

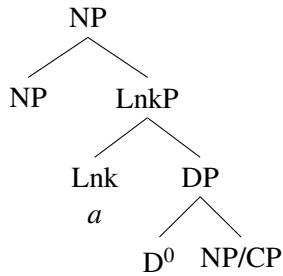
- |      |    |   |
|------|----|---|
| (34) | a. | indaba i- a- [DP u-kuthi u-ya-m-thanda.] (> indaba yokuthi ...) |
|      |    | 9news 9- LNK- 15aug-15COMP 1S-TAM-1o-like                       |
|      |    | 'the news that she likes him.'                                  |
|      | b. | isizatho s- a- [DP u-kuthi u-sukile.] (> isizatho sokuthi ...)  |
|      |    | 11reason 11- LNK- 15aug-15COMP 1S-left                          |
|      |    | 'the reason why she left'                                       |

Note that, like with possessives, the linker in (34) agrees with the head noun and coalesces with the augment vowel of the complementizer in the predicted way. Thus, what we can descriptively call noun

<sup>10</sup> It is worth noting that the term *linker* is not used in the literature consistently. The kinds functional elements that have been previously referred to as linkers in different languages and constructions include elements inside a vP associating two arguments – a phenomenon found in other Bantu languages, for instance in Kinande (Baker & Collins, 2006; Schneider-Zioga, 2015a, b), constructions involving predicate inversion (Den Dikken, 2006), and broadly understood adnominal phrases (Den Dikken & Singhapreecha, 2004). Whether all these instances of "linkers" can receive a uniform treatment is far not obvious and I do not commit to a stand on this issue.

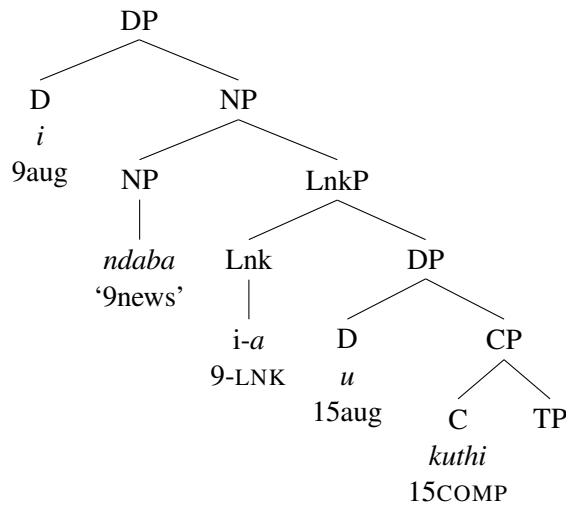
complement clauses in Ndebele, are in fact more complex structures, in which a DP modifier is introduced by a functional head – the linker. I propose that the linking structure is the general structure of NP modification by a DP (35).<sup>11</sup>

(35) The syntax of the nominal linker in Ndebele:



The obligatoriness of the linker in the Ndebele noun complement clauses strongly supports the view that clauses in this language are obligatorily DPs. The DP complement of the linker may have a NP complement (e.g. when it introduces possessors) or a CP complement (giving rise to a noun complement clause). Crucially, the external syntax of the linker’s complement is always the same – a DP. The full structure of the noun-complement clause in (34-a) is given in (36). As in relative clauses (and possessives), the linker selects a DP, and is itself adjoined to an NP – here, the head noun *indaba* ‘news’.

(36) The syntax of noun-complement clauses (structure for (34-a))



This analysis of noun complement clauses is further supported by coordination facts. In particular,

<sup>11</sup> As pointed out by a reviewer, this analysis of possessive constructions treats the possessor DP as an adjunct. To be precise, it is introduced by an adjunct phrase – the LnkP. Evidence that Lnk-introduced possessors are indeed adjoined to the NP come from the fact that the possessor can be freely reordered with other adnominals, such numerals and adjectives (i).

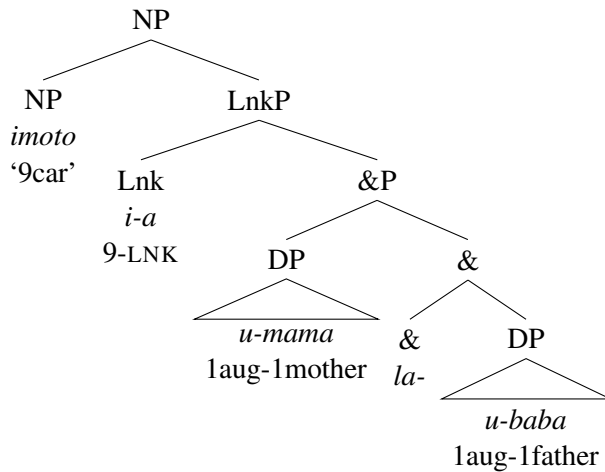
- (i) ‘the boy’s two big dogs’
- a. izinja ezinkulu ezimbili z-a-umfana  
10dog 10big 10two 10-LNK-1boy
  - b. izinja z-a-umfana ezimbili ezinkulu  
10dog 10-LNK-1boy 10two 10big
  - c. izinja ezimbili z-a-umfana ezinkulu  
10dog 10two 10-LNK-1boy 10big

possessors and noun complement clauses are coordinated in the same way, namely by means of the nominal conjunction *la*. Consider coordination of possessor DPs first (37).

- (37) *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’

In this case, both conjuncts are clearly DPs and, as expected, the nominal conjunction *la* is required. The structure of (37) is given in (38).

- (38) Possessor DP coordination



Additionally, the coordination site is necessarily below the linker.<sup>12</sup> In (39), the agreeing linker is contained in both conjuncts, which results in ungrammaticality, irrespective of whether the conjunction marker is *la* or the null morpheme.

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

While it is unclear what prevents coordination of LnkPs, the possibility of DP coordination below it reveals the linker’s structural autonomy.

Coordination of noun complement clauses shows exactly the same pattern: the nominal conjunction *la* must be used, and the coordination site is below the linker, i.e. at the DP level (63)-(40-b). As with verb-complement clauses, coordination is possible at the TP level. In that case, the complementizer is absent in the second conjunct and the nominal conjunction cannot be used (40-c).

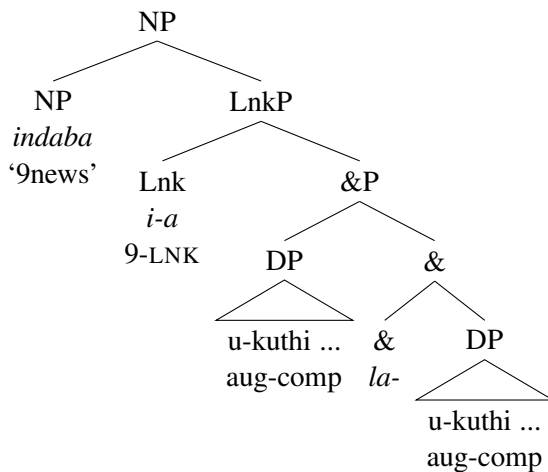
<sup>12</sup> I propose in section 4.3 that the linker always undergoes lowering onto D. This means that, in coordinated structures, the lowering of the linker takes place into a coordinate structure, but does not obey the Coordinate Structure Constraint (it only attaches to the first conjunct). As the 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:  $\varphi$ -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.



- (40) 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 (la)yokuthi uJohn udlala ibhola*  
indaba [LnkP **i-a-ukuthi** uMary uyahlabela ] ( **la** ) [LnkP **i-a-ukuthi** uJohn udlala  
9news 9-LNK-aug-comp Mary sings & 9-LNK-aug-comp John plays  
**ibhola**]  
soccer  
‘the news that Mary sings and that John plays soccer’
- c. *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 (63) 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 (41).

- (41) N-complement clause coordination



A consequence of this analysis of noun-complement clauses is that the surface shape of the complementizer in those constructions (e.g. *yokuthi*, instead of *ukuthi*) is derived by regular vowel hiatus resolution rules. The agreeing linker coalesces with the DP shell augment, as shown in (42) for (34-a).

- (42)  $[[_{\text{Lnk}^0} i-a ] [[_{\text{D}^0} u ] [_{\text{C}^0} kuthi ]]] \rightarrow yokuthi$

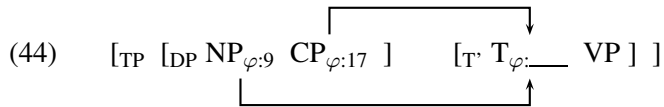
The fact that the complementizer, in its surface form, covaries with the noun class of the head noun is not analyzed as syntactic complementizer agreement. The locus of syntactic agreement is on the linker, which attaches to  $C^{13}$ , creating what looks like an agreeing complementizer.

<sup>13</sup> In section 4.2, I provide a more formal implementation of this concatenation. We will see evidence from relative clauses that the linker and the clausal augment undergo morphological lowering onto C.

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, 2015) 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 (43). 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 (44).

(43) 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'



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 (44): 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 (45).

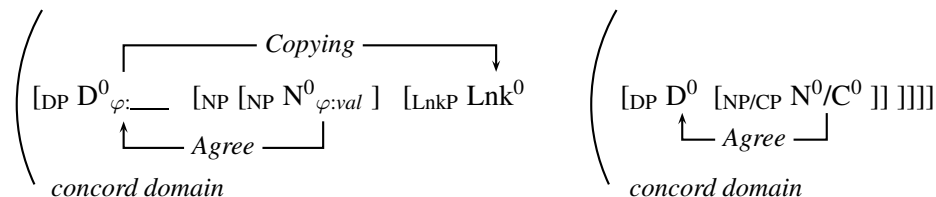
- (45) a. [ **indaba** i-a-ukuthi u-sukile ] **i** -a- ngi- mangalisa. *Ndebele*  
 9news 9-LNK-15comp 1s-left 9S- PST- 1sg.o- surprise  
 'the news that she left surprised me.'
- b. \*[ indaba i-a-**ukuthi** u-sukile ] **ku-** a- ngi- mangalisa.  
 9news 9-LNK-15comp 1s-left 15S- PST- 1sg.o- surprise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

Finally, I treat the  $\varphi$ -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  $\varphi$ -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.  $D^0$ ,<sup>14</sup> 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 (46). This Agree relation is, according to Norris, the first, syntactic step towards the output of concord.

<sup>14</sup> To 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.

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  $\text{Lnk}^0$  as the head of a modifier: it covaries with the noun it modifies, and never with the DP it selects (46).

(46) DP-internal concord in Ndebele linking structures:



The uniformity of possessive constructions and noun complement clauses proposed here is reflected in identical patterns of linker agreement. The linker covaries with the modified NP in both cases, since it is located in the higher concord domain. That results in linker agreement with the head noun of the complement clause and with the possessed NP. In neither construction is the linker predicted to agree with a controller in its c-command domain (the possessor N or the complementizer), since in both cases the lower controller is inside a different DP, and thus in a different concord domain.

In conclusion, the null N analysis of the clausal DP shell in Ndebele is empirically unfounded: it incorrectly predicts CP complements to nouns to be well-formed, contrary to fact. In conjunction with the robust evidence for a clausal DP shell (section 2), this fact points to the conclusion that embedded clauses in this language project a *direct* DP shell – a DP layer not mediated by a projection of N. Furthermore, the DP-shell hypothesis offers a straightforward explanation of the syntax of the so called noun complement clauses in Ndebele. Given their DP status, and the general impossibility of adnominals of category D, complement clauses to nouns are introduced by the linker – a functional head which also introduces possessor DPs. The uniform treatment of embedded clauses as DPs is key to understanding the parallel between possessive constructions 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. Noun complement clauses provide an additional argument against the view that the presence of a clausal DP-shell is the outcome of a last-resort insertion process which secures a convergent derivation, as proposed by Hartman (2012) for other languages. For instance, in the languages discussed by Hartman, DP insertion allowed a CP to appear in the subject position. The insertion of a DP layer in Ndebele noun complement clauses would not serve a similar function. While bare CPs are disallowed in adnominal positions in Ndebele, so are DPs. In order to appear as adnominals, they must be introduced by a linker. Thus, the DP insertion process in Ndebele complement clauses would be neither a last-resort nor a repair mechanism.

In the next section, I extend the DP-shell hypothesis to relative clauses and argue that, upon a closer inspection, they provide further support for the hypothesized obligatoriness of clausal DP shells in Ndebele.

#### 4 DP-shell in relative clauses

We concluded in the previous section that bare CPs cannot directly attach to a projection of a noun, either as complements or adjuncts. Instead, being obligatorily contained in a DP shell, noun complement clauses require a linking structure.

An immediate question arises as to whether CP adjunction to NP is possible in relative constructions. In this section, I provide a detailed analysis of relative clauses in Ndebele and argue that they do not counter the conclusions we've reached so far. In particular, I argue that their basic syntax is identical to that of noun complement clauses and possessive constructions: relative clauses are externally DPs and require a linker

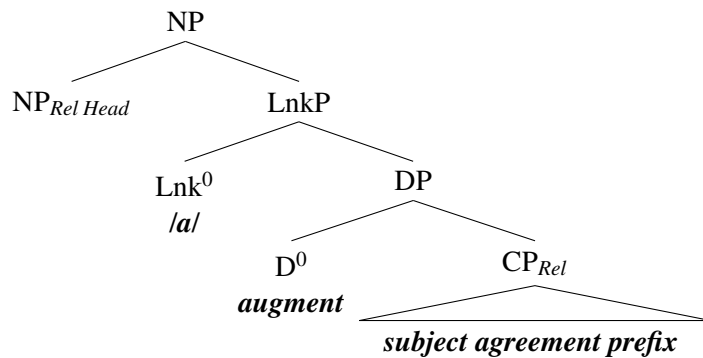
to combine with an NP. Though the nominal status of relative clauses is not immediately transparent from their morphology, they show the crucial characteristics: the presence of a linker and the use of the nominal conjunction in coordination.

Relative clauses in Ndebele differ from other types of embedded clauses in a number of ways. The differences immediately relevant here are the following: first, 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 on relative clauses (Meeussen, 1971; Nsuka Nkutsi, 1982; Khumalo, 1992; Demuth & Harford, 1999; Zeller, 2004, 2006; Cheng, 2006; Henderson, 2006, 2007; Van der Wal, 2010, among many others). As an example, compare the non-relative clause in (47) with the subject agreement prefix *si-* and the relative clause in (48) 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 ((47) and (48)) with class 1 prefixes ((49) and (50)).

- |      |   |      |  |
|------|---|------|--|
| (47) | <u>subject agreement</u><br>i- si- lwane <b>si</b> -yagijima.<br>7aug- 7- lion 7s-run<br>'The lion is running.' | (48) | <u>relative agreement</u><br>i- si- lwane <b>esi</b> -gijimayo<br>7aug- 7- lion 7rel-run<br>'the lion that is running' |
| (49) | <u>subject agreement</u><br>u- m- fana <b>u</b> -yagijima.<br>1aug- 1- boy 1s-run<br>'The boy is running.'      | (50) | <u>relative agreement</u><br>u- m- fana <b>o</b> -gijimayo<br>1aug- 1- boy 1rel-run<br>'the boy who is running'        |

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 (51).

- (51) The syntax of relativization in Ndebele



I propose that the morphological composition of the relative agreement prefix follows from the structure in (51). As shown in (52), the relative agreement prefix is trimorphemic: it consists of the regular subject prefix preceded by an exponent of  $D^0$  (the augment vowel) and the linker *a*. The surface form of agreement prefixes is determined by regular rules of vowel hiatus resolution.

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

The next subsection 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 and noun complement clauses. Subsection 4.3 focuses on the morphology of relative prefixes and their derivation from the proposed linking structure of relative clauses. In subsection 4.2, I present evidence from coordination supporting the view that relative clauses, like other types of embedded clauses, are externally DPs. The analysis of relative prefixes proposed in this section is gains further support from phonology. The phonological evidence will be discussed in section 5, where I demonstrate that the full paradigm of relative prefixes is derived from the linking structure and regular vowel coalescence rules. I also consider the advantages of this analysis over an existing alternative (Khumalo, 1992).

#### 4.1 The linking structure of relative clauses

Relative clauses in Bantu languages related to Ndebele have been analyzed as involving the relative marker *a*, which combines with the relative-clause internal verb (Khumalo, 1992; Demuth & Harford, 1999; Zeller, 2004, 2006; Cheng, 2006; Henderson, 2006, 2007, a.o.) Consider the example below, where relativization is marked by a special form of the subject agreement prefix inside the relative clause, e.g. *o-* for class 1 subjects (53).

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

Under the standard analysis, the relative agreement prefix is bimorphemic: it is the result of coalescence of the relative marker *a* and the agreement prefix on the verb, as indicated by the decomposition of (53).

We will return to the morphology of relative agreements in section 4.2. The binary decomposition suffices for our immediate purposes, namely to observe one syntactic parallel between relative clauses (54-a), possessor DPs (54-b), and noun complement clauses (also DPs) (54-c) – they are all adnominal elements introduced by the marker *a*, here analyzed as an adnominal linker. (Note that there is one difference between the possessive and noun complement clauses on the one hand, and relative clauses on the other: in relative clauses there is no agreement prefix on the linker. I return to this asymmetry in subsection 4.2, where the lack of agreement is treated as the result of impoverishment.)

- (54)    a.    *umfana a-    u- gijimayo*            (> **o-**gijimayo )  
           1boy    LNK- 1S- run  
           ‘the boy who is running’
- b.    *i-mota i- a-    u-    mfana*            (> **yo-**mfana)  
           9-car 9- LNK- 1aug- boy  
           ‘the boy’s car’
- c.    *i-ndaba i- a-    u-    kuthi ...*            (> **yo-**kuthi)  
           9-news 9- LNK- 15aug- 15comp  
           ‘the news that ...’

Thus, relative clauses do show at least one property of DPs – they are introduced by the same marker as possessor DPs and the DP-contained noun complement clauses. The analysis developed in this section builds on this parallelism, proposing that all three constructions in (54) constructions involve the general linking structure proposed above.

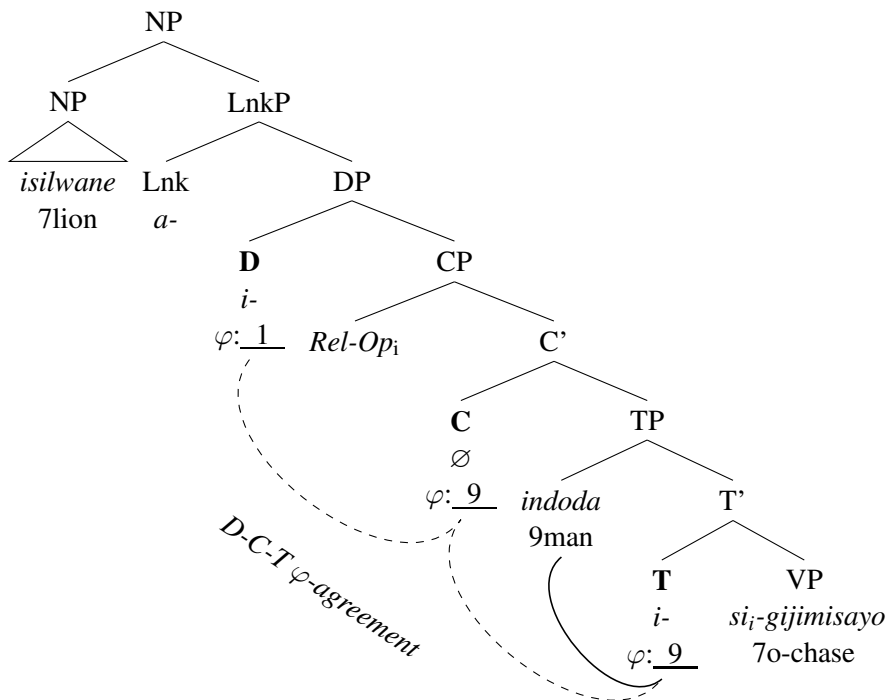
To see the details of relative clause derivation, consider the object relatives in (55). Note that the morphological decomposition of the verbs in (55) is now more detailed to reflect the proposed structure of relativization in (56). In particular, a relative agreement prefix is composed of three morphemes: 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 section 5.

- (55) a. i-si-lwane i-n-doda [a]- i- i- si- gijimisayo. (> e-sigijimsayo)  
 7aug-7-lion 9aug-9-man LNK- 9aug- 9s- 7o- chase.REL  
 ‘the lion that the man is chasing’
- b. i-si-lwane a-ma-doda [a]- a- ma- si- gijimisayo. (> ama-sigijimsayo)  
 7aug-7-lion 6aug-6-man LNK- 6aug- 6s- 7o- chase.REL  
 ‘the lion that the men are chasing’

Note that none of the morphemes which make up the complex relative agreement prefix (*e* in (55-a) and *ama-* in (55-b)) covaries with the relative head, which is of class 7 in both examples in (55). 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 T<sup>0</sup>. This is demonstrated in (56) for the example (55-a). The RC-internal subject controls  $\varphi$ -agreement on T. Subsequently, the relative C is merged and projects a DP shell.

(56) Syntax of relativization (the structure of (55-a))



The D head selecting a relative clause behaves the same way as the D selecting an NP or a non-relative CP. That is, it has a  $\varphi$ -probe which agrees with the head of its complement. The relative C is null, and its  $\varphi$ -features are determined by T, with which C agrees.<sup>15</sup> Recall from section 2 that, in complement clauses, D<sup>0</sup> agrees with an overt C, which has  $\varphi$ -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

<sup>15</sup> 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.



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.<sup>16</sup> 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 (55-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 c-commanding 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.

Finally, it should be noted that 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 (57-a) and as a relative marker (57-b) (data from Cheng 2006).

- (57) a. Hufei de shu  
Hufei LNK book  
‘Hufei’s book’
- b. Hufei mai de shu  
Hufei buy LNK book  
‘the book that Hufei bought’

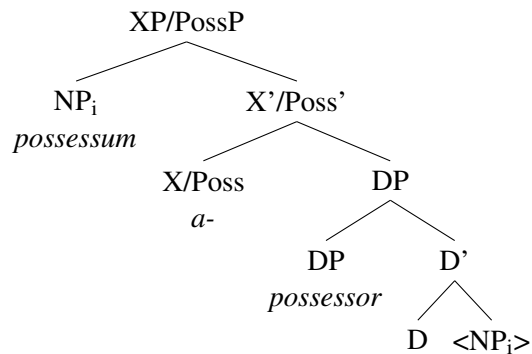
According to Cheng (1986), the marker *de* is a complementizer which may select either a clausal or a nominal complement. Selection of a clause gives rise to relativization. If *de* selects a DP, the result is a possessive construction. Cheng (2006) makes the observation that many Bantu languages employ possessive morphology in the formation of relative clauses (what Cheng calls 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 (58), 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.

- (58) a. varwi v- a- mambo  
2warrior 2- LNK- king  
‘the warriors of the king’
- b. ndimi dz- a- va- no- taura  
10language 10- LNK- 2S- TAM-speak  
‘the languages which they speak’

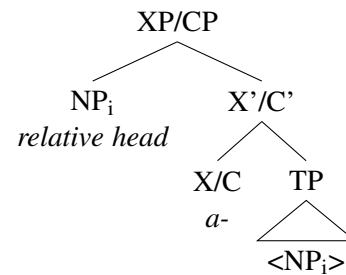
Given the striking parallel in (58), Cheng proposes that the two constructions involve a similar structure, like their equivalents in Chinese. Just like the Chinese *de*, the Shona possessive marker/linker *a* has the option to select for a nominal or clausal complement. The syntax proposed by Cheng for Shona possessives and relative clauses is given in (59) below (from Cheng (2006)).

<sup>16</sup> A reviewer points out the possibility that relative clauses in Ndebele simply do not have a CP layer, and are instead reduced relative clauses. While it seems that we cannot definitively reject this possibility, I find no convincing evidence that relative clauses are in any way more reduced than subjunctive clauses, for instance, which do have an overt complementizer. In the absence of such evidence, I maintain the CP analysis here.

(59) a. Shona possessives

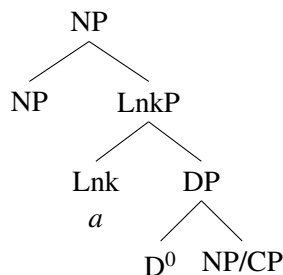


b. Shona relative clauses



In the analysis of proposed here for Ndebele, the structures of relatives and possessives are more uniform than Cheng's (59). 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  $\text{Lnk}^0$ . And second, there is no optionality in the category of its complement: as shown in (60), both in relative clauses and in possessives the linker selects a DP: a possessor or relative clause with a DP shell.

(60) The syntax of the linker in Ndebele:

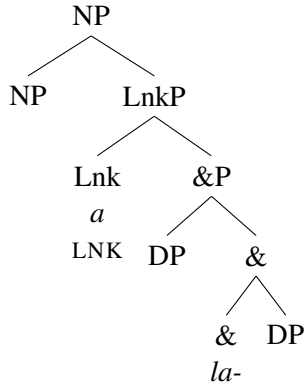


The linking structure in (60) is the structure of both possessive constructions and relative clauses in Ndebele, and it is the syntax of NP modification in this language. The linker is there to facilitate noun modification by another nominal constituent. The difference between relatives and possessives 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 Ndebele relative clauses derives the so called Possessive Strategy of Relativization in this language: 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. In the next subsection, I demonstrate a further parallelism between the three linking structures: like possessors and noun complement clauses, relative clauses are coordinated like DPs.

**4.2 DP-shell in relative clauses: evidence from coordination**

Recall that the coordination of possessor DPs and DP-contained noun complement clauses requires the nominal conjunction *la* and is located below the linker (61).

(61) DP coordination in linking structures



Relative clauses pattern with possessors and noun complement clauses in this respect: the second conjunct RC is necessarily introduced by the nominal conjunction *la* (62)-(64).

(62) *imoto yomama lobaba* Possessor DP coordination

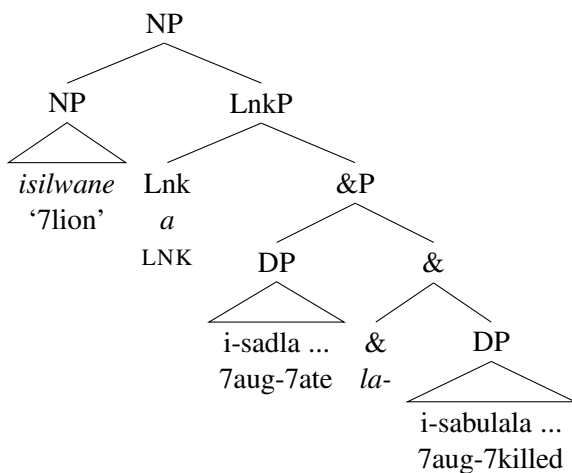
i-moto **i-a-** [DP **umama** ] \*(**la**) [DP **ubaba** ]  
 9-car 9-LNK- 1mother & 1father  
 ‘mom and dad’s car’

(63) *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’

(64) *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’

The structure of relative-clause coordination as DP coordination is given in (65).

(65) Relative Clause coordination



In all three 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 (64), the RC-internal subject is of class 7, for which the augment vowel is *i*-. Thus, *la* in (64) surfaces as *le* after coalescence with the augment *i*.

Like with noun complement clauses, TP coordination is possible in relative constructions, in which case the null conjunction must be used (66).

- (66) *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’
- a. *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’

Finally, LnkPs cannot be coordinated either. This is demonstrated in (67) below, with three constructions which employ the linker: possessives (67-a), noun-complement clauses (67-b) and relative clauses (67-c).

- (67) 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 (67-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.

I argued in this section that even though the DP shell on relative clauses is not transparent morphologically, relative constructions show DP properties: i) they are introduced by a linker, which is required with adnominal DPs, and ii) they employ the nominal conjunction marker in coordination. The coordination facts further reveal the presence of an augment vowel, and thus of a D layer, in relative clauses.<sup>17</sup> The augment vowel is responsible for the surface form of the conjunction *la*, which surfaces as *le* after coalescing with the aug-

<sup>17</sup> Another interesting test for the DP layer in relative clauses, suggested by a reviewer, is the possibility of augment drop. While we don’t observe the typical augment drop as on nominals or complement clauses, it turns out, relative clauses can appear without *both* the linker and the augment. It reminds us of augment drop since it is restricted to cases in which the modified noun is itself augmentless, as shown by the contrast in (i).

ment.<sup>18</sup> In section 5, we will see further evidence from the phonology of relative agreement prefixes for the DP shell analysis of relative clauses. Before that, let me return to a couple of morphological puzzles related to the formation of relative agreement prefixes.

### 4.3 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 noun complement clauses on the one hand and relative clauses on the other: unlike the first two, relative clauses show no linker agreement. 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<sup>0</sup> it selects, i.e. the augment (68). 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 (69).<sup>19</sup>

(68) [NP [NP Rel-head ] [L<sub>nkP</sub> **linker** [DP **augment** [CP ∅ [TP *subject* [T<sup>0</sup> ... ]]]]]]

(69) i-si-lwane i-ndoda a- i- i- si- gijimisayo. (repeated from (55-a))  
 7aug-7-lion 9aug-9man LNK- 9aug- 9s- 7o- chase.REL  
 ‘the lion that the man 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 postsyntactically lower to T. I assume that lowering proceeds cyclically, in a bottom-up fashion, and targets all heads between T<sup>0</sup> and Lnk<sup>0</sup>. 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 (70), 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.

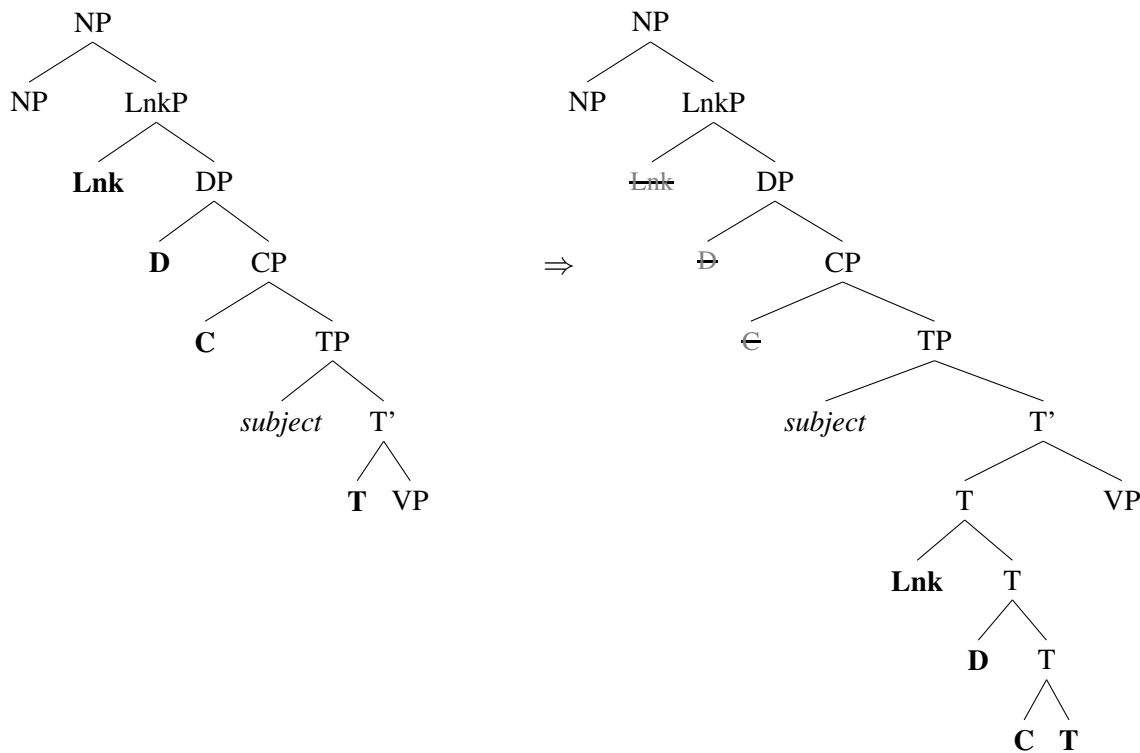
- (i) a. Angiboni i-zinja \*(e)-zi-gijimayo.  
 1sg.see.NEG 10aug-10dog LNK.10aug-10s-run  
 ‘I don’t see the dogs that are running’
- b. Angiboni zinja (e)-zi-gijimayo.  
 1sg.see.NEG 10dog LNK.10aug-10s-run  
 ‘I don’t see dogs that are running’

It remains a puzzle why augment drop on relative clauses necessarily deletes the linker with which the augment coalesces, but the possibility of dropping it at all points to the conclusion that the augment is present in the structure.

<sup>18</sup> A reviewer asks about coordination of non-object relatives, pointing out that their structure would perhaps reveal the augment vowel of the second conjunct RC – in the absence of a linker in the second conjunct, we would perhaps expect the subject agreement prefix to be preceded by a bare augment. Unfortunately, more fieldwork is needed to verify this and so I must leave this question for future research

<sup>19</sup> 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.

(70) 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. 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 (71). The relative complementizer follows the subject because it is an exponent of Fin<sup>0</sup> – a head below Top<sup>0</sup> (following Rizzi (1997)).

(71) [<sub>ForceP</sub> Rel-NP [<sub>TopP</sub> *subject* [<sub>FinP</sub> COMP<sub>rel</sub> 'a-' [<sub>TP</sub> ... ]]]]

The proposal in (71) derives the apparent high position of the subject by 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.<sup>20</sup> This asymmetry between root clauses and relative clauses can be exemplified with the distribution of interrogative pronouns, which, by assumption, are incompatible with a topic position. In matrix clauses, wh-subjects are not allowed preverbally (72-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 (72-b), indicating that the subject is not dislocated. Crucially, the wh-subject still precedes the linker *a-*.

<sup>20</sup> A similar asymmetry between main and certain embedded clauses can be found in Kinande (Schneider-Zioga, 2000, 2007).



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

The 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 (73-a), while RC-internal subjects can (73-b).

- (73) a. \**Umama kuphela* u- pheke 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 LNK- 1s- 9o- cook.PST.REL  
 'This is the meat that only mom cooks.'

Thus, 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 absence of linker agreement in relative clauses. In this respect, they contrast with other linking structure: possessives and noun complement clauses (74).

- (74) a. *umfana a- u- u- gijimayo* (> *o-gijimayo*)  
 1boy LNK- 1aug- 1s- run  
 'the boy who is running'
- b. *i-mota i- a- u- mfana* (> *yo-mfana*)  
 9-car 9- LNK- 1aug- boy  
 'the boy's car'
- c. *i-ndaba i- a- u- kuthi ...* (> *yo-kuthi*)  
 9-news 9- LNK- 15aug- 15comp  
 'the news that ...'

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 (75).

- (75) 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'

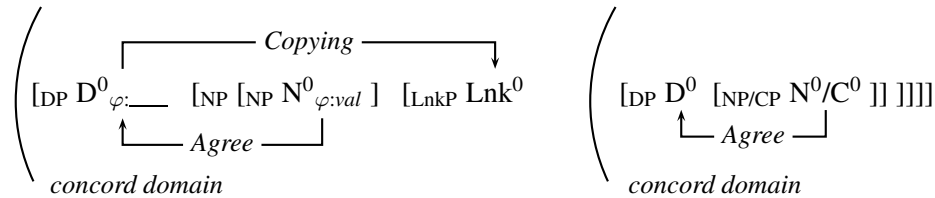
Thus, although both languages employ the same morphological marking possessives and relatives, the parallelism is not perfect due to the lack of linker agreement in Ndebele relatives (76).

(76) Linker agreement variation (Ndebele and Shona)

	Ndebele	Shona
Possessives	<i>Lnk agreement</i>	<i>Lnk agreement</i>
Relative clauses	<b><i>no Lnk agreement</i></b>	<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 (74-a) 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 NP, the head of a noun complement clause or a relative head, but  $\varphi$ -features on the linker are deleted in Ndebele relative clauses. Recall the concord analysis of linker agreement in Ndebele (77).

(77) DP-internal concord in Ndebele linking structures:



I propose that 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) (78). As proposed before,  $\text{Lnk}^0$  lowers onto T in relative clauses, but not in possessives (where the DP selects a possessor NP, not a relative CP), and so  $\varphi$  is not deleted on the linker in possessive constructions.

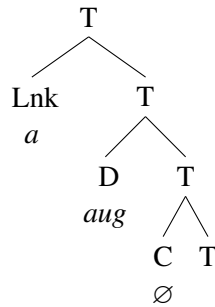
(78) Ndebele  $\varphi$ -impoverishment on  $\text{Lnk}^0$ :

- a. Structural description:  $[[\text{Lnk } \varphi], \text{T}]_{\text{complex head}}$
- b. Structural change:  $[\text{Lnk } \varphi] \rightarrow [\text{Lnk}]$

$\varphi$ -impoverishment does not apply in possessives and noun complement clauses as neither of those constructions involve lowering of the linker onto T. When the linker introduces a possessor, there is no T inside of its complement DP. In noun complement clauses, we've seen that the linker attaches to the complementizer *ukuthi*, and precedes the subject. Thus, relative clauses exhibit lowering to T (79-a), while in noun complement the linker and the augment lower only to C (79-b).

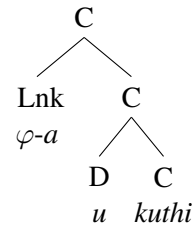
(79) a. Relative clauses

Lowering to T  
→impoverishment



b. N-complement clauses

Lowering to C  
→no impoverishment



The lowering of the linker and the augment in relative clauses creates a complex head in T which, as I argue in the next section, constitutes the relative agreement prefix. As we will see, the presence of an augment vowel in this complex renders the forms of such prefixes entirely predictable from regular phonological rules, further supporting the DP-shell hypothesis for relative clauses.<sup>21</sup>

## 5 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 DP shell in Ndebele relative clauses. In particular, it will be shown that the presence of an augment vowel (D<sup>0</sup>) as part of the relative agreement prefix derives 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 5.2, I discuss further advantages of the proposed account over an existing alternative.

### 5.1 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

<sup>21</sup> As suggested by a reviewer, an interesting question for future research would be to test the DP shell hypothesis for other types of clausal adjuncts, in particular participial NP/VP modifiers. If these can be shown to be reduced clauses and lack CP layer, it could be tested whether clausal DP shells in Ndebele is a property of full clauses only, i.e. inherently related to C, or a broader phenomenon.

attach to the left of a tense marker and, together with the verb, follow a preverbal subject (by assumption, located in Spec,TP) (80).

- (80) 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 (81) below. As we can see, there is no 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 15). In other classes, there is no 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).

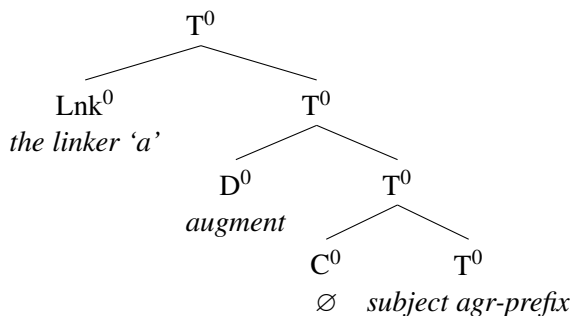
- (81) Two paradigms of subject agreement prefixes

noun class	1	2	3	4	5	6	7	8	9	10	11	14	15
<i>regular agr prefix</i>	u-	ba-	u-	i-	li-	a-	si-	zi-	i-	zi-	lu	bu	ku-
<i>relative agr prefix</i>	o-	aba-	o-	e-	eli-	a-	esi-	ezi-	e-	ezi	olu	obu	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 (e.g. classes 2, 5, 7, 8 and 15 in (81)). Onsetless subject prefixes remain onsetless in the relative paradigm (e.g. 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 (82).

- (82) 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 (83).

- (83) Regular hiatus resolution rules in Ndebele (from Sibanda (2004)):  
 (i) a + u → o      (ii) a + i → e      (iii) V<sub>α</sub> + V<sub>α</sub> → V<sub>α</sub>

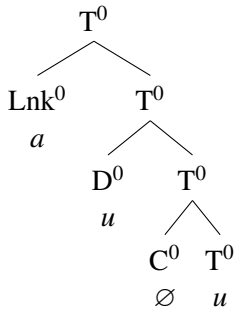
Given the DP-shell proposal for relative clauses in Ndebele, the linker *a* is always in a hiatus – it is immediately followed by an augment vowel. Unless that vowel is identical to the linker (i.e. /a/), the linker and the augment coalesce into a mid vowel, as shown in (84).

(84) Vowel-coalescence derivation of relative agr. prefixes from a trimorphic structure

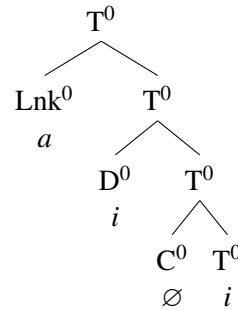
noun class	<i>linker</i>	+	<i>augment</i>	+	<i>subject prefix</i>	⇒	<i>relative prefix</i>
class 1	<b>a-</b>		<b>u-</b>		<b>u-</b>		<b>o-</b>
class 2	<b>a-</b>		<b>a-</b>		<b>ba-</b>		<b>aba-</b>
class 5	<b>a-</b>		<b>i-</b>		<b>li-</b>		<b>eli-</b>
class 6	<b>a-</b>		<b>a-</b>		<b>a-</b>		<b>a-</b>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

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 (83). 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 (84)), the vowels simply coalesce into a singleton vowel of the same quality, as shown in (85) and (86) for classes 1 and 9. The next step is coalescence with the linker *a*, where the familiar height-neutralization applies.

(85) Class 1 relative prefix:  
a + (u+u) → a+u → o



(86) Class 9 relative prefix:  
a + (i+i) → a+i → e



While full DPs which have an augment vowel reflecting its class, 1st and 2nd pronoun have neither (87).

- (87) a. mina '1sg.PRON'                                    c. thina '1pl.PRON'  
      b. wena '2sg.PRON'                                    d. lina '2pl.PRON'

A question arises as to how the clausal augment determined when the RC-internal subject is a 1/2prs pronoun – there is no paradigm, like the one full DPs in (84), which would supply the forms of augment vowels for each class. One possibility is that the augment is of the human class: class 1 (*u-*) for singular pronouns, and class 2 (*a-*) for plural pronouns.<sup>22</sup> This is not what we find. Instead, the form of the augment vowel is a copy of the vowel found on the regular agreement prefix.

<sup>22</sup> I thank an anonymous reviewer for suggesting this possibility.

- (88) a. umfana a- **i-** ngi- m-bonayo (> engimbonayo)  
1boy LNK aug- 1sg.S 1o-saw  
'the boy that I saw'
- b. umfana a- **u- u-** m-bonayo (> ongimbonayo)  
1boy LNK aug- 2sg.S 1o-saw  
'the boy that you saw'
- c. umfana a- **i- si-** m-bonayo (> esimbonayo)  
1boy LNK aug- 1pl.S 1o-saw  
'the boy that we saw'
- d. umfana a- **i- li-** m-bonayo (> elimbonayo)  
1boy LNK aug- 2pl.S 1o-saw  
'the boy that you.pl saw'

Thus, the form of the augment with 1/2 pronouns is treated here as the result of partial reduplication, rather than as class agreement.

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.

## **5.2 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 (89).

- (89) *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 (89) 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 (90)), 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).

(90) 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 (90); 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 (91-a), ii) it employs a rule which alters the relative marker *a* (91-b) and iii) a rule which deletes a subject agreement prefix, if that prefix is a vowel and is preceded by the relative marker (91-c).

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

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

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 (92) for classes 2, 5 and 17.

(92) 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 (91-c) applies to classes 6, 9 and 1 in (92). 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.

It is worth noting that Khumalo’s analysis can handle relative prefixes for 1/2 person subject, discussed in the previous subsection as an instance of partial reduplication. Nonetheless, the approach advocated here has a number of advantages over Khumalo’s Vowel Raising account, both theoretical and empirical. I discuss them below.

First, vowel raising and backness assimilation are not found across intervening consonants in other morphosyntactic contexts in Ndebele.<sup>23</sup> 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 (93), the negative prefix does not undergo raising (or backness assimilation).

- (93) No vowel raising in the negative prefix *a*:
- |    |      |        |                       |   |  |                        |
|----|------|--------|-----------------------|---|--|------------------------|
| a. | a-   | li-    | pheki                 | > | <i>alipheki</i> (* <i>elipheki</i> )     | (cf. class 5 in (92))  |
|    | NEG- | 2pl.S- | cook                  |   |  |                        |
|    |      |        | ‘You are not cooking’ |   |  |                        |
| b. | a-   | ku-    | la-manzi              | > | <i>akulamanzi</i> (* <i>okulamanzi</i> ) | (cf. class 17 in (92)) |
|    | NEG- | 17S-   | COP-water             |   |  |                        |
|    |      |        | ‘There is no water’   |   |  |                        |

The negation marker in (93) is in the same morphophonological context as the relative marker in (92): 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 (20).

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 (92)). 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 (92), 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 (94-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-*

<sup>23</sup> A reviewer brings up a potential counterexample. Demonstratives in Ndebele consist of the demonstrative root *la* and noun class prefix. Interestingly, the vowel of the demonstrative raises to a mid vowel and assimilates in backness to the vowel in the class prefix, as shown in (i).

- |    |          |   |       |
|----|----------|---|-------|
| a. | la + li  | → | leli  |
| b. | la + khu | → | lokhu |

Note, however, that the Khumalo’s Vowel Raising analysis of relative clauses does not immediately account for these facts as it is restricted to apply to the relative marker *a*. Such restriction is necessary because Vowel Raising does not apply across the board. Thus, the Vowel Raising approach would simply need to add another stipulation to the set of contexts in which such raising can apply. The alternative is to view the alternation in demonstratives as revealing an augment vowel in the underlying form of demonstratives, preceding the class marker. I do not venture a further analysis of demonstratives here, but it should be pointed out that it is not particularly surprising that demonstratives can cooccur with determiners, especially in a languages like Ndebele, where demonstratives behave like adjuncts.

‘now’, which combines with an inflected verb (94-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.

(94) Regular rule of *e*-deletion (Sibanda, 2004)

- a.  $e \rightarrow \emptyset / \text{ \_\_\_\_\_\_ } V$
- b.  $i\text{- } se\text{- } i\text{- } pheka \Rightarrow isipheka$  (\*isepheka) (cf. class 9 in (92))  
       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 (91-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 (95).

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

[ a [ i [ i ] ] ]  $\rightarrow$  [ a [ i ] ]  $\rightarrow$  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 (96).

(96) 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 (97).

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

The forms in (97) 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 (97) appear in a relative clause, they are preceded by the relative marker *a*, as shown in (98).

(98) Relative forms of (97):

- 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 (98) 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 (98), 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 (98) 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. (99) attempts a derivation of the forms (98) with this rule ordering, i.e. where gliding is suspended until after the application of Vowel Raising and SP-Deletion.

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

	Input (C <sub>Rel</sub> -SP-T)	Readjustment Rules Vowel Raising    V <sub>SP</sub> Deletion		Regular phonology rules (gliding)
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 (99) removes the environment for gliding, while cyclic application these rules removes the environment for Vowel Raising (as discussed below (98)). Thus, neither order can derive the fact that both gliding and raising take place in these forms.<sup>24</sup>

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* (100). Like in other forms, the derivation of relative prefixes results from cyclic application of regular hiatus resolution rules: here, gliding and vowel coalescence.

(100) 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

<sup>24</sup> There 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).

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 both verb complement clauses (section 2) and noun complement clauses (section 3).

## 6 Conclusion

This paper argued that Ndebele embedded clauses are obligatorily contained in a direct DP shell, a structure in which a CP is immediately dominated by a DP layer. The direct DP shell structure, though problematic for the theory of extended projections (Grimshaw, 1991), was supported by a wide range of empirical arguments. First, I argued that the DP layer in complement clauses, evidenced by both morphological and syntactic phenomena, does not have a last resort distribution, rendering the last-resort insertion view untenable. The claim I put forth was that clausal DP shell in Ndebele are base-generated and obligatory. Further, we've seen that the null N hypothesis, in which the clausal DP shell contains a null noun, is empirically unfounded. It predicts the existence noun complement clauses of the type found in English and other Indo-European language, contrary to fact. The view advocated here, namely that clausal DP shells are direct and obligatory, predicts the impossibility of the English type noun complement clauses. Since the complement clause is externally a DP, its direct attachment to a projection of a noun is ruled out by independent properties of the language, namely the requirement that adnominals of category D be introduced in a linking structure. Thus, the DP-shell view additionally predicts the well-formedness of constructions which resemble noun-complement clauses, in which the complement clause is introduced by the nominal linker and patterns with possessor DPs in this respect. Moreover, the impossibility of adnominals of category D in Ndebele presents further argument against the last resort approach. Recall that, in Hartman's view, a DP layer is inserted if and only if it serves to secure convergent derivation; for instance, when a CP must raise to Spec,TP – a position which requires a DP. Insertion of a DP layer in noun complement clauses would not serve that goal – the structure after such insertion would still be invalid due to the ban on DP adnominals.

The second part of the paper dealt with a potential counterexample to the claim that embedded clauses are obligatorily DPs, namely relative clauses. The DP shell of relative clauses is less transparent than in complement clauses due to the absence of a complementizer and certain phonological processes. Nonetheless, I argued that relative clauses not only can be analyzed as DPs, but also that the DP shell hypothesis allows us to understand a number of properties of relative clauses. First, we saw that relative clauses are introduced by the same linker as possessors and noun complement clauses – a situation expected if their external syntax is nominal. Second, coordination of relative clauses requires the nominal conjunction marker. And third, upon a closer inspection, the DP-shell analysis of relative clauses predicts the forms of the relative agreement prefixes from the application of regular vowel coalescence rules. Thus, the current proposal has an additional advantage over existing analyses of relative clauses in Nguni languages, such as the Vowel Raising analysis, which resort to morphological stipulations in deriving relative agreement prefixes.

## References

Abney, S. P. (1987). *The English noun phrase in its sentential aspect*. PhD thesis, Massachusetts Institute of Technology.

- Adams, N. (2010). *The Zulu Ditransitive Verb Phrase*. PhD thesis, University of Chicago.
- Adger, D. (1997). VSO order and weak pronouns in Goidelic Celtic. *The Canadian Journal of Linguistics*, 42(1-2), 9–29.
- Arregi, K. & Nevins, A. (2012). *Morphotactics. Basque Auxiliaries and the Structure of Spellout*. Springer.
- Aygen, G. (2002). *Finiteness, case and clausal architecture*. PhD thesis, Harvard University.
- Baker, M. (2003). Agreement, dislocation, and partial configurationality. In *Formal approaches to function in grammar* (pp. 107–132). John Benjamins.
- Baker, M. C. & Collins, C. (2006). Linkers and the internal structure of vP. *Natural Language and Linguistic Theory*, 24(2), 307–354.
- Bonet, E. (1991). *Morphology after syntax: Pronominal clitics in Romance*. MIT Press.
- Bresnan, J. (1995). Category Mismatches. In A. Akinlabi (Ed.), *Theoretical Approaches to African Theoretical Approaches to African Linguistics* (pp. 19–46). Trenton, New Jersey: Africa World Press.
- Bresnan, J. (2001). *Lexical-Functional Syntax Blackwell*. Blackwell Publishers.
- Buell, L. C. (2005). *Issues in Zulu Verbal Morphosyntax*. PhD thesis, University of California Los Angeles.
- Buell, L. C. & de Dreu, M. (2013). Subject raising in Zulu and the nature of PredP. *The Linguistic Review*, 30(3), 423–466.
- Carstens, V. (2005). Agree and EPP in Bantu. *Natural Language and Linguistic Theory*, 23(2), 219–279.
- Carstens, V. & Mletshe, L. (2015). Negative concord and nominal licensing in Xhosa and Zulu. *Natural Language and Linguistic Theory*.
- Cheng, L. L.-S. (1986). *de* in mandarin. *Canadian Journal of Linguistics*, 31, 313–326.
- Cheng, L. L.-S. (2006). Decomposing Bantu Relatives. In *Proceedings of NELS 36*.
- Cheng, L. L.-S. & Downing, L. (2009). Where’s topic in Zulu? *The Linguistic Review*, 26, 207–238.
- Davies, W. D. & Dubinsky, S. (1999). Sentential subjects as complex nps: New reasons for an old account of subjacency. In *Papers from the Thirty-Fourth Regional Meeting, Chicago Linguistic Society* (pp. 83–94).: Chicago Linguistic Society, University of Chicago.
- Davies, W. D. & Dubinsky, S. (2001). Functional architecture and the distribution of subject properies. In W. D. Davies & S. Dubinsky (Eds.), *Objects and other subjects: Grammatical functions, functional categories, and configurationality* (pp. 247–279). Dordrecht: Kluwer.
- de Dreu, M. (2008). The internal structure of the Zulu DP. Master’s thesis, Universiteit Leiden.
- Demuth, K. & Harford, C. (1999). Verb raising and subject inversion in Bantu relatives. *Journal of African Languages and Linguistics*, 20, 41–62.
- Den Dikken, M. (2006). *Relators and linkers: The syntax of predication, predicate inversion, and copulas*. MIT Press.
- Den Dikken, M. & Singhapreecha, P. (2004). Complex noun phrases and linkers. *Syntax*, 7(1), 1–54.
- Diercks, M. (2010). *Agreement with subjects in Lubukusu*. PhD thesis, Georgetown University.
- Doke, C. M. (1954). *The southern Bantu languages*. International African Institute by Oxford University Press.
- Embick, D. & Noyer, R. (2001). Movement operations after syntax. *Linguistic Inquiry*, 32(4), 555–595.
- Giusti, G. (1997). The categorial status of determiners. In L. Haegeman (Ed.), *The New Comparative Syntax* (pp. 95–124). London: Longman.
- Grimshaw, J. (1991). Extended projections. Brandeis University, Ms.
- Grimshaw, J. (2000). Locality and extended projection. *Amsterdam Studies in the Theory and History of Linguistic Science Series*, 4, 115–134.
- Halle, M. (1997). Impoverishment and fission. In Y. K. Benjamin Bruening & M. McGinnis (Eds.), *PF: Papers at the interface, MIT Working Papers in Linguistics*, volume 30 (pp. 425–450). MIT Press.
- Halle, M. & Marantz, A. (1999). Some key features of distributed morphology. *MIT Working Papers in Linguistics*, 21, 275–188.
- Halpert, C. (2012). *Argument Licensing and Agreement in Zulu*. PhD thesis, MIT.

- Halpert, C. (2015). *Argument licensing and agreement*. Oxford University Press.
- Halpert, C. (2016). Surmountable barriers (handout). *Talk presented at ACAL 47, UC Berkeley*.
- Halpert, C. & Zeller, J. (2015). Right dislocation and raising-to-object in zulu. *The Linguistic Review*, 32, 475–513.
- Han, H. J. (2005). A dp/np-shell for subject cps. *Annual Meeting of the Berkeley Linguistics Society*, 31(1), 133–144.
- Harley, H. & Noyer, R. (1999). Distributed morphology. *GLOT International*, 4(4), 3–9.
- Hartman, J. (2012). *Varieties of Clausal Complementation*. PhD thesis, Massachusetts Institute of Technology.
- Henderson, B. M. (2006). *The syntax and typology of Bantu relative clauses*. PhD thesis, University of Illinois at Urbana-Champaign.
- Henderson, B. M. (2007). The syntax of agreement in Bantu relatives. *Texas Linguistics Society*, 9, 167–184.
- Henderson, B. M. (2013). Agreement and person in anti-agreement. *Natural Language and Linguistic Theory*, 31, 453–481.
- Hendrikse, A. P. (1975). A pre-theoretical analysis of the relative marker in Xhosa. *Topics in Xhosa relativization*.
- Kastner, I. (2015). Factivity mirrors interpretation: The selectional requirements of presuppositional verbs. *Lingua*, 164, 156–188.
- Katamba, F. (2003). Bantu nominal morphology. In D. Nurse & G. Philippson (Eds.), *The Bantu Languages*. Routledge.
- Khumalo, J. S. (1992). The morphology of the direct relative in zulu. *African linguistic contributions*, (pp. 210–226).
- Lees, R. B. (1965). Turkish nominalizations and a problem of ellipsis. *Foundations of language*, (pp. 112–121).
- Letsholo, R. M. (2002). *Syntactic domains in Ikalanga*. PhD thesis, University of Michigan.
- Mawadza, A. M. (2009). *A Basic Ndebele Grammar*. Dunwoody Press.
- Meeussen, A. E. (1971). Relative clauses in Bantu. *Studies in African Linguistics*, 2, 3–10.
- Mischke, G. (1998). Southern sotho verbal relative constructions. *South African Journal of African Languages*, 18(4), 106–111.
- Moulton, K. (2009). *Natural Selection and the Syntax of Clausal Complementation*. PhD thesis, University of Massachusetts, Amherst.
- Norris, M. (2014). *A Theory of Nominal Concord*. PhD thesis, University of California, Santa Cruz.
- Noyer, R. (1992). *Features, positions and affixes in autonomous morphological structure*. PhD thesis, Massachusetts Institute of Technology.
- Nsuka Nkutsi, F. (1982). *Les structures fondamentales du relatif dans les langues bantoues*. PhD thesis, Musée royal de l’Afrique centrale.
- Poulos, G. (1982). *Issues in Zulu relativization*. Number 11 in Communication. Grahamstown: Rhodes University.
- Poulos, G. (1999). Grammaticalisation in south-eastern bantu and the linguistic ‘dynamics’ underlying this process. *South African Journal of African Languages*, 19(3), 204–214.
- Poulos, G. & Msimang, C. T. (1998). *A linguistic analysis of Zulu*. Cape Town: Via Africa/Collegium Educational Publishers.
- Progovac, L. (1993). Non-augmented nps in kinande as negative polarity items. *Theoretical aspects of Bantu grammar*, 1, 257–270.
- Rizzi, L. (1997). The fine structure of the left periphery. *Elements of grammar*, (pp. 281–337).
- Roberts, I. & Roussou, A. (2003). *Syntactic change: A minimalist approach to grammaticalization*. Cambridge University Press.
- Robinson, C. (2008). Agreement in scottish gaelic: A distributed morphology analysis. Master’s thesis,

- University College Dublin.
- Rosenbaum, P. S. (1967). *The grammar of English predicate complement constructions*. Cambridge, MA: MIT Press.
- Sabelo, N. (1990). The possessive in zulu. Master's thesis, University of Zululand, KwaDlangezwa, South Africa.
- Schneider-Zioga, P. (2000). Anti-agreement and the fine structure of the left edge. *University of California Irvine working papers in linguistics*, 6, 94–114.
- Schneider-Zioga, P. (2007). Anti-agreement, anti-locality and minimality. The syntax of dislocated subjects. *Natural Language and Linguistic Theory*, 25(2), 403–446.
- Schneider-Zioga, P. (2015a). Linking, Predication and Symmetry: On the Syntax of the Linker in Kinande. In *Proceedings of the 32nd West Coast Conference on Formal Linguistics* (pp. 323–331).: Cascadilla Proceedings Project Somerville, MA.
- Schneider-Zioga, P. (2015b). The linker in Kinande re-examined. In *Selected Proceedings of the 44th Annual Conference on African Linguistics* (pp. 264–276).
- Sibanda, G. (2004). *Verbal Phonology and Morphology of Ndebele*. PhD thesis, University of California, Berkeley.
- Takahashi, S. (2010). The hidden side of clausal complements. *Natural Language & Linguistic Theory*, 28(2), 343–380.
- Taraldsen, K. T. (2010). The nanosyntax of Nguni noun class prefixes and concords. *Lingua*, 120(6), 1522–1548.
- Van der Spuy, A. (1993). Dislocated noun phrases in Nguni. *Lingua*, 90(4), 335–355.
- Van der Wal, J. (2010). Makhwa non-subject relatives as participial modifiers. *Journal of African Languages and Linguistics*, 31, 205–231.
- Visser, M. (2002). The category DP in Xhosa and Northern Sotho. *South African Journal of African Languages*, 22(4), 280–293.
- Visser, M. (2008). Definiteness and specificity in the isiXhosa determiner phrase. *South African Journal of African Languages*, 28(1), 11–29.
- von Staden, P. (1973). The initial vowel in Zulu. *African Studies*, 32(3), 163–181.
- Wojdak, R. (2007). *The linearization of affixes: Evidence from Nuu-chah-nulth*, volume 73. Springer Science & Business Media.
- Zeller, J. (2004). Relative clause formation in the bantu languages of south africa. *Southern African Linguistics and Applied Language Studies*, 22(1-2), 75–93.
- Zeller, J. (2006). On the relation between noun prefixes and grammaticalisation in nguni relative clauses. *Studia Linguistica*, 60(2), 220–249.
- Zeller, J. (2012). Object marking in isiZulu. *Southern African Linguistics and Applied Language Studies*, 30(2), 219–235.
- Ziervogel, D. (1967). *A Handbook of the Zulu language*. Pretoria: J.L. van Schaik.