A Dynamic Syntax account of the conjoint/disjoint alternation in Zulu

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MA Dissertation

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Contents

Abstract

The conjoint/disjoint alternation is a verbal phenomenon found in many Eastern Bantu languages in which the choice between a so-called *conjoint* or *disjoint* verb form is governed by syntactic constituency and/or information structure (van der Wal, 2017). This dissertation collates data from published sources to provide an empirical overview of the phenomenon in Zulu (Guthrie no S42, South Africa), which has been argued to have a constituency-sensitive alternation (e.g. van der Spuy, 1993; Buell, 2003). It is shown that existing formal accounts are only partially satisfactory, and so the dissertation presents an analysis within the Dynamic Syntax (DS) framework. This choice of framework is motivated based on the fact that the alternation is largely surface-driven, supporting an incremental processing account. The developed account extends its empirical coverage beyond canonical present tense data and captures the alternation using independently motivated parts of the theory. The dissertation ends with a discussion of the implications of the analysis, namely (i) a better understanding of the near past data, (ii) the argument that the alternation in Zulu should be understood with respect to information structure, with object markers as pronominal clitics, and (iii) a DS view of the lexicon with complex lexical entries and underspecified semantic types that are updated on-line.

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Chapter 1

Introduction

The conjoint/disjoint alternation is a verbal phenomenon found in many Eastern Bantu languages in which the choice between a so-called *conjoint* and *disjoint* verb form is governed by syntactic constituency and/or information structure (van der Wal, 2017). The alternation appears to reflect surface order, with the alternation sensitive to constituency as evaluated after any dislocation. In this dissertation, I will collate empirical data concerning the conjoint/disjoint alternation in the Zulu language (Guthrie no S42, South Africa) and then provide a full formal account within the framework of Dynamic Syntax (Cann et al., 2005), showing how the conjoint/disjoint markers can be construed as affecting the building of the verbal predicate structure.

Chapter 2

Background

2.1 The Zulu language

Zulu, or isiZulu, is a Bantu language of the Niger-Congo family. Its Guthrie classification is S42 (see Maho, 2003), positioning it as a South African language of the Nguni subgroup (alongside Bhaca, Hlubi, Lala, Ndebele, Nhlangwini, Phuthi, Swati, and Xhosa). Zulu is one of the 11 official languages of South Africa, and is spoken preedominantly on the Eastern Cape by approximately 11,600,000 people as a first language, with 15,700,000 L2 speakers (Simons et al., 2018; Webb, 2002).

As a brief grammatical overview, Zulu has SVO basic word order, allows subject and object *pro*-drop, and has a noun class system governing agreement relations, as is characteristic of Bantu languages. Zulu has high and low tones, which can play grammatical functions, for example in the distinction between 2nd and 3rd person singular subject markers *ù-* and *ú-* (see e.g. Doke, 1963:126). This dissertation will focus on one aspect of Zulu grammar, namely the *conjoint/disjoint alternation*. Unlike the aspects sketched above, which are found across the Bantu family, this alternation is only found in Eastern Bantu languages (van der Wal, 2017; see §2.2.1 below), making it particularly interesting for both Bantu and general linguistics.

Given that the conjoint/disjoint alternation is an alternation in verb forms, it is useful to give an overview of the Bantu verb. The following template shows the different slots used in Zulu (simplified from Meeussen, 1967):

(1) **Basic Zulu verbal template:**[1]

SM	tense	OM	verb stem	extensions	aspect	FV

Not every slot is filled in every verb form, but the order is fixed. This will be important for the Dynamic Syntax analysis in §4.3 below, given that the framework works incrementally on a morpheme-by-morpheme basis.

2.2 The conjoint/disjoint alternation

2.2.1 The phenomenon

The conjoint/disjoint alternation is a verbal alternation whereby a so-called *conjoint* verb form alternates with a *disjoint* form. A generally-applicable definition is given in van der Wal (2017):[2]

> "The conjoint/disjoint alternation is an alternation between verb forms that are formally distinguishable, that are associated with an information-structural difference in the interpretation of verb and/or following element and of which one form is not allowed in sentence-final position." (van der Wal, 2017:56)

In literature on Nguni languages, especially 20th century work such as Doke (1963), the terms *short* and *long* are used, capturing that the conjoint form is typically shorter than the disjoint one in the Nguni languages. Other terminology used in the Zulu literature are *final* and *non-final* (e.g. Canonici, 1995), which reflect the constituency conditions on the alternation (to be seen below in §3). For this dissertation, I follow standard practice in using Meeussen's (1959) original terms *conjoint* and *disjoint*. This terminology allows for cross-linguistic comparison beyond the Nguni subgroup, given that the terms apply equally well

[1] See the appendix for glosses/abbreviations.

[2] The details of the alternation differ between languages; the working definition quoted gives a summary of the general characteristics found across languages. See van der Wal (2017) for discussion.

to languages that mark the phenomenon with tonal alternations as those that use segmental markers (see Hyman, 2017 for discussion).

The phenomenon is reported only in Eastern Bantu languages, as the map below shows:[3]

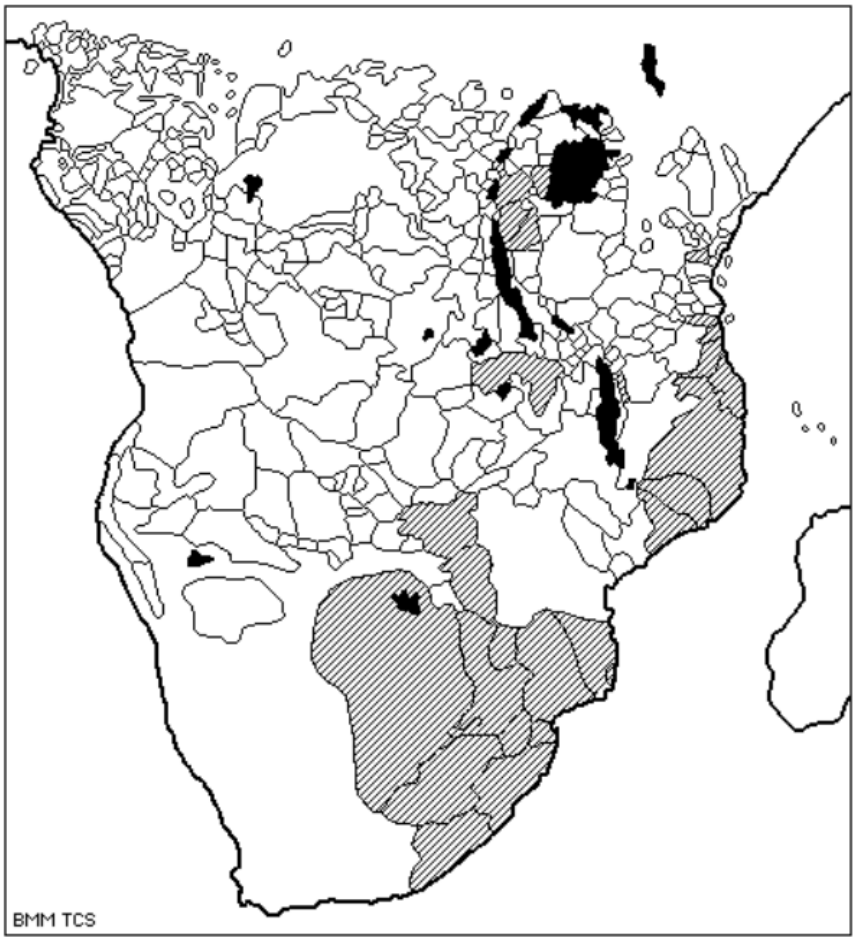


Figure 2.1: Map of sub-Saharan Africa showing languages found to have a conjoint/disjoint alternation (indicated by grey line shading). Source: Van der Wal (2017:17).

[3] See Morimoto (2017) and Hyman (2017) for phenomena in other Bantu languages that may parallel the conjoint/disjoint alternation. Such crosslinguistic equivalences within and beyond Bantu require further study.

2.2.2 Theoretical interest

While van der Wal & Hymans's (2017) recent volume has collated empirical data on the conjoint/disjoint alternation and how it varies crosslinguistically, there is currently a lack of formal analyses of the phenomenon. In §4.1 below I will overview existing work, which will be seen to be restricted in coverage to the present tense. Being able to provide a fleshed-out analysis in this dissertation will therefore result in greater empirical coverage, and so presents an original contribution to the literature.

As will be seen in the empirical section §3 below, the conjoint/disjoint alternation in Zulu is sensitive to the finality of the verb within the verb phrase constituent. One interesting point is that this finality condition is evaluated at the surface, meaning that dislocated arguments (e.g. left-dislocated topics) are not considered to be part of the verb phrase. This surface-orientation is a challenge for some theoretical accounts. However, the Dynamic Syntax framework (DS; Kempson et al., 2001; Cann et al., 2005) is intuitively a good fit for such data, considering that it is surface-oriented and parses left-to-right. A core research question behind this dissertation is therefore to see how well the Dynamic Syntax framework can account for the Zulu data, and what predictions such an analysis makes when compared with other frameworks.

Before turning to the analysis, section §3 below will give an overview of the phenomenon in Zulu.

Chapter 3

The conjoint/disjoint alternation in Zulu

3.1 Section overview

The empirical side of the conjoint/disjoint alternation has been particularly well-studied in Zulu, both from a syntactic (Buell, 2005; Halpert, 2012, 2016) and a phonological (Cheng & Downing 2009; Halpert 2017; Zeller et al., 2017) perspective, with data from elicitations (Buell, 2005; Halpert, 2012, 2016), corpora (Buell, 2005), and some experiments (Zeller et al., 2017). In this section, I will collate information from published sources to present an empirical overview of the phenomenon in Zulu, before section §4 turns towards building a formal account.

We will see that the conjoint/disjoint alternation is marked segmentally in main clause affirmatives of two tenses: present tense (*-ø-/-ya-*), and near past (*-é/-il-e*). Each tense will be discussed in turn and evidence will be presented to show that the alternation is sensitive to syntactic constituency. While the section will begin with the canonical examples of DP complements[1] with no object marking, coverage will move on to object marking, clausal complements, locatives, adverbs, and relatives.

First then, let us consider present tense affirmatives.

[1] I used the abbreviation DP as a descriptive term for nominal or determiner phrases.

3.2 Present tense

The most canonical data exemplifying the Zulu conjoint/disjoint alternation in the literature is the present tense, where a disjoint morpheme *ya-* alternates with an unmarked, or zero-marked (∅-) conjoint form in main clause affirmatives, as below:[2]

(2) a-ba-fana ba-**ya/*∅**-cul-a
AUG-2-boy 2.SM-**DJ/CJ**-sing-FV
'The boys are singing.'

(3) a-ba-fana ba-∅**/*ya**-cul-a i-ngoma
AUG-2-boy 2.SM-**CJ/DJ**-sing-FV AUG-9.song
'The boys are singing a song.'

(Buell, 2013:10)

Here, we have an overt DP subject *abafana* 'the boys', followed by a verb composed of the stem *-cul* 'sing' and inflectional affixes. In the intransitive case in (1), disjoint marking with *ya-* is obligatory and conjoint marking (∅-) is ungrammatical. In contrast, in the transitive case in (2) with the overt DP object *ignoma* 'song', the grammaticality judgements are reversed. This alternation in forms is what is known as the conjoint/disjoint alternation.

Based on the examples above, we can hypothesise that the disjoint form is required when the verb is final, whereas the conjoint is used when something follows the verb. Later (e.g. §3.4), we will refine this finality condition to show that Zulu is sensitive to finality within the verb phrase constituent, as opposed to finality in the sentence, as has been convincingly shown by many authors (van der Spuy 1993; Buell 2005; Halpert 2012, 2016, i.a.). We will also see that the post-verbal constituent is not always a canonical DP object, as it may also be a clausal complement (§3.5), locative phrase (§3.6), or adverb (§3.7) and similarly require conjoint marking. First though, we will cover the other tense in which the CJ/DJ alternation is segmentally marked in Zulu, namely the near past.

[2] I adapt glosses in order to standardise notation between authors; see appendix. I add in a null-marked conjoint ∅- where some authors leave it out, for presentational reasons rather than to make a theoretical statement about null morphemes (which we will see in §4 are not used in the Dynamic Syntax analysis).

3.3 Near past

3.3.1 Overview

Zulu distinguishes two grades of past tense, the near/recent past (events in the the interval between a day ago and the present moment) vs. the remote past (events that took place further back than yesterday; Canonici, 1995). As in other Bantu languages with multiple gradations, these tenses display different morphosyntactic marking. In Zulu, only the near past displays the conjoint/disjoint alternation, as in examples (4)-(5) below:[3]

(4) Ngi-cul-**ile**
1SG.SM-sing-PERF.DJ
'I sang.'

(5) Ngi-cul-**e** i-ngoma
1SG.SM-sing-PERF.CJ AUG-9.song
'I sang a song.'

(Buell, 2005:57-8)

A further example (this time without subject *pro*-drop) is given by the following paradigm in (6)-(7) below. Note also that the final vowel in the conjoint is realised with a high tone *-é*, in contrast to the low-toned final vowel of the disjoint form.[4]

(6) uMlungisi u-phek-**ile**
AUG.1.Mlungisi 1.SM-cook-PFV.DJ
'Mlungisi cooked.'

(7) uMlungisi u-phek-**é** iqanda
AUG.1.Mlungisi 1.SM-cook-PFV.CJ AUG.5.egg
'Mlungisi cooked an egg.'

[3] Given that the variability in glossing of the conjoint/disjoint endings between authors is theoretically significant, I do not alter these glosses from the original source. In §3.3.2 I will review further literature and argue for a particular glossing.

[4] Unfortunately, published data on Zulu generally do not show tone, partly as a result of the lack of tone marking in the official orthography. I provide tone marking where it is given in the source, with <á> and <à> being high and low toned respectively.

(Halpert, 2016:121)

While the patterning of these near past conjoint and disjoint-marked forms is the same as was seen with the present tense examples in (2)-(3) above with respect to finality-sensitivity, what is noticeable is the locus of this morphological marking. Instead of being realised in the pre-stem tense slot as with the present forms, in the near past the conjoint/disjoint morphology occupies the post-stem aspectual slot (cf (1) and Nurse , 2003:23). The historical explanation for this positioning is that the disjoint ending *-ile* derives from the proto-Bantu *-ịde*, a perfective aspectual marker found across the Bantu family (Nurse, 2008:24). The next section will consider how such an ending should be synchronically understood.

3.3.2 Tense vs aspect

The precise semantic interpretation of the disjoint *-ile* ending and the conjoint counterpart *-é* is hard to determine from the secondary data available from the descriptive and syntactic literature, where, typically, a particular glossing is used and an English free translation provided without elaboration of the precise semantics or supporting evidence such as presupposition tests or discourse context. The examples in the literature are glossed in contradicting ways, e.g. with *-ile/-é* as conjoint/disjoint forms of the perfect aspect (PERF, e.g. Halpert, ibid), perfective aspect (PFV, e.g. Buell, ibid), and past tense (PAST, e.g. Zeller, 2012). Given the insufficiency of the data for determining the correct semantics, it is therefore useful to consider the semantics literature on Zulu.

Although I have followed convention in labelling these data the "near past", it is up to debate whether such forms are tensed or actually tenseless and aspectual. The confusion in delineating these options is expressed by Gowlett (2003:631), who describes *-ile* as neither a tense nor an aspect, but a "tensespect". Fortunately, Botne & Kershner (2003) give a detailed investigation into tense and aspect in Zulu. Summarising previous non-decompositional analyses of the data, they argue instead for a breakdown of *-ile* into *-il* (a perfective aspect) + *-e* (a final vowel indicating completion). Evidence for such a decomposition of *-ile* includes the ability for the passive suffix *-w* to intervene (⟹ *-iwe*, with phonologically-predictable *l*-deletion). The conjoint form *-é* is argued to be a fusion of the completive final vowel and a grammatical high tone.

Zeller et al. (2017) also argue for a decompositional approach to *-ile* and that the high tone of *-é* functions as a conjoint marker. I will therefore adopt such an approach in this dissertation. Furthermore, based on experimental results, Zeller et al. (2017) argue that some speakers have generalised the high tone to other tenses. However, as such results were unsystematic, I will confine discussion to tenses in which the alternation is marked segmentally for the purposes of this dissertation, and instead move on to discussing object marking.

3.4 Object marking

As seen in (3), (5), and (7) above, it is possible to have an overt postverbal object with no object marker on the verb, provided that the verb is in the conjoint form. In this section, we will see that disjoint marking is required when verbs are object-marked. Furthermore, various syntactic and prosodic evidence has been put forth to show that these objects are right-dislocated, meaning that they are in a different structural position from the objects in the non-object-marked cases seen above.

Consider the near past paradigm from Zeller et al. (2017:222) below, where we see that objects not marked on the verb require the conjoint form (8), while ones that are marked require the disjoint (9)-(10):

(8) Ngi-∅-theng-a le moto
1SG.SM-CJ-buy-FV DEM.9 9.CAR
'I'm buying this car.'

(9) *Ngi-∅-**yi**-theng-a le moto
1SG.SM-CJ-9.OM-buy-FV DEM.9 9.CAR

(10) Ngi-**ya**-**yi**-theng-a le moto
1SG.SM-DJ-OM9-buy-FV DEM.9 9.CAR
'I'm buying (it) this car.'

(Zeller, 2012:222)

The structural position of the object in these cases can be determined by various tests, such as inserting

the focus-sensitive particle *kuphela* 'only'. The data below show that marked objects are right-dislocated outside of the verb phrase constituent whereas unmarked objects remain within the verb phrase:

(11) Ngi-bon-**e** i-kati (kuphela)
1SG.SM-see-CJ.PFV.FV AUG-5.CAT only
'I saw (only) the cat.'

(12) *Ngi-**li**-bon-**e** i-kati (kuphela)
1SG.SM-5.OM-see-CJ.PFV.FV AUG-5.CAT only

(13) Ngi-**li**-bon-**il**-**e** i-kati (*kuphela)
1SG.SM-5.OM-see-PFV.DJ-FV AUG-5.CAT only
'I saw it, (*only) the cat.'

(Zeller et al., 2017:298)

This constituent boundary between the object-marked verb and the object DP is made explicit in the bracketing below, where *vP* indicates the verb phrase:[5]

(14) Ngi-**li**-bon-**il**-**e**]$_{vP}$ i-kati
1SG.SM-5.OM-see-PFV.DJ-FV AUG-5.CAT
'I saw it, the cat.'

(Zeller et al., 2017:298)

These data provide evidence that object markers are pronominal in Zulu. This conclusion is supported by the fact that objects can be omitted (e.g. (16) below) and is indicated by Zeller et al.'s (ibid) English translation in the use of *"it"*. When an overt object is used with a conjoint form and no object marking, as in (8), the object is new information, whereas when the object marker is used (10), the object is old information. This corroborates with the correlation between structural position and information structure discussed for Zulu in Cheng & Downing (2009).

[5] The theoretical differences between *v*P and VP in Minimalism will not concern us here; both cases are the verbal constituent, just with different levels of assumed structure.

Negative evidence showing that disjoint marking cannot be used with a non-marked object is provided in elicitation data from Halpert (2016):

(15) uSipho u-**(*ya)**-phek-a iqanda
AUG.1.Sipho 1S-DJ-cook-FV AUG.5.egg
'Sipho is cooking an egg.'

(Halpert, 2016:124)

Furthermore, evidence for the topicality of objects in disjoint cases is provided by the possibility of object drop (i.e. omission of the DP), and the object appearing in a left-dislocated position at the beginning of the sentence, as with hanging topics:

(16) (iqanda) (uSipho) u-***(ya)**-li-phek-a
AUG.5.egg AUG.1.Sipho 1S-DJ-5OM-cook-FV
'(As for) the egg, Sipho is cooking it.'

(Halpert, ibid)

For double object constructions, the verb appears with the post-stem applicative extension *-el-*, e.g. *-phekela* 'cook for' vs. *-pheka* 'cook'. Only one object marker may appear on the verb (Zeller, 2012:219-220), and the verb must be conjoint unless both objects are right-dislocated (Halpert, 2012:125). For space reasons, I will not cover these examples here, and refer the reader to the sources cited.

In summary, then, there are two possibilities for sentences with direct objects in Zulu: (i) a conjoint verb form occurs with an overt DP object within the verb phrase, or (ii) a disjoint verb form occurs with object marking and either object *pro*-drop or a dislocated DP object. The two strategies differ in information structure, with verb-phrase-internal objects new information and dislocated objects old information.

3.5 Clausal complements

So far, we have seen the conjoint/disjoint alternation with postverbal elements that are DP, i.e. nominal. However, Zulu also allows verbs to take clausal complements (termed CPs in the Minimalist framework).

This section will overview the relevant data for such cases.

Zulu has multiple complementisers, which pattern differently with respect to the conjoint/disjoint alternation. The complementiser *ukuthi* permits the disjoint form, whereas *sengathi* only allows the conjoint form, as illustrated below:

(17) uMandla u-**(ya)**-bon-a [**ukuthi** ngi-ya-m-thand-a]
AUG.1.Mandla 1.SM-(DJ)-see-FV that 1SG.SM-DJ-1.OM-like-FV
'Mandla sees that I like him.'

(18) uMandla u-**(*ya)**-bon-a [**sengathi** ngi-ya-m-thand-a]
AUG.1.Mandla 1.SM-(*DJ)-see-FV that 1SG.SM-DJ-1.OM-like-FV
'Mandla is of the opinion that I like him.' (implies that I don't)

(Halpert, 2012:152-3)

Halpert (2012) provides evidence from syntactic constituency tests (e.g. vocative insertion, question particle) to demonstrate that CP complements introduced by *sengathi* are within the *v*P constituent, whereas those introduced by *ukuthi* or without an overt complementiser attach above that constituent, external to the verb phrase. The conjoint/disjoint alternation with clausal complements therefore displays the same sensitivity to finality within the verb phrase as was seen above for nominal complements.

In terms of object marking, the behaviour is just as was seen for nominal complements in §3.4 above. If the main verb is object-marked for a clausal complement (which is achieved using class 17 morphology *ku-*), then the disjoint form is required (19), meaning that only *ukuthi* is permitted as a complementiser and that the clausal complement is right-dislocated:

(19) ngi-***(ya)**-ku-cabang-a [**ukuthi** uMlungisi u-ya-bhukud-a manje]
1SG-(DJ)-17.OM-think-FV that AUG.1Mlungisi 1.SM-DJ-swim-FV now
'I think that Mlungisi is swimming now.'

(Halpert, 2016:148).[6]

[6] Note that the *ukuthi* complementiser is derived from the class 17 subject marker *uku-* and the verb *-thi* 'to say', whereas the *sengathi* complementiser has verbal prefixal morphology.

Again matching the distribution seen for objects, Halpert (2016:150-151) shows that information structure affects speakers' preference for conjoint or disjoint in *ukuthi*-CPs. Disjoint is preferred when the matrix verb is focussed or when the predicate has a verum focus reading, and conjoint is preferred when the complement clause contains new information. For example, in (21) below the complement clause is in focus, and so the conjoint form of the matrix verb *ngicabanga* 'I think' is used (vs. the disjoint *ngiyacabanga*):

(20) Q: u-cabang-a ukuthi uMlungisi w-enz-a-ni manje?
2SG.SM-think-FV that AUG.1.Mlungisi 1.SM-do-FV-what now
'What do you you Mlungisi is doing now?'

(21) A: ngi-cabang-a ukuthi u-ya-bhukud-a manje
1SG.SM-think-FV that 1.SM-DJ-swim-FV now
'I think that he is swimming now.'

(Halpert, 2016:255)

In sum, clausal complements are strikingly similar to nominal complements, with the conjoint/disjoint alternation sensitive to finality in the verb phrase, object marking only permissible with disjoint forms, and information structure important. Further detail on clausal complements including raising to object constructions and small clauses can be found in Halpert (2016); given the space limitations of this dissertation, I will now move onto other data.

3.6 Locatives

With locative complements, verbs can appear in conjoint or disjoint form. However, the choice is not unrestricted, with a difference between goal and location readings. Taking goal readings first, we see that only the conjoint is permitted:

(22) uMfundo u-∅/***ya**-gijim-el-a e-sitolo
AUG.1.Mfundo 1.SM-CJ/DJ-run-APPL-FV LOC-AUG.7.store
'Mfundo is running to the store.'

(Halpert, 2012:148)

For location readings, in contrast, both the conjoint and the disjoint forms are possible, with the alternation sensitive to information structure (Halpert, 2012). As we saw above with DP objects and clausal complements, the disjoint form is preferred when the locative complement is old information, and the conjoint when it is in focus. For example, in (24) below, the locative complement *esitolo* 'in the store' is in focus, and so the verb is in conjoint form:

(23) Q: uMfundo w-enza-ni?
AUG.1.Mfundo 1.SM-do-what
'What is Mfundo doing?'

(24) A: uMfundo u-∅-gijim-a e-sitolo
AUG.1.Mfundo 1.SUBJ-CJ-run-FV LOC-7.store
'Mfundo is running in the store.'

(Halpert, 2016:147)

In the context below, however, the location is old information, with verum focus on the predicate, resulting in disjoint morphology:

(25) Q: uMfundo u-∅-gijim-a e-sitolo yini?
AUG.1.Mfundo 1.SM-CJ-run-FV LOC-7.store what
'Is Mfundo running in the store?'

(26) A: Yebo, u-**ya**-gijim-a e-sitolo!
yes 1.SM-DJ-run-FV LOC-7.store
'Yes, he is running in the store!'

(Halpert, 2012:149)

The behaviour of location complements therefore parallels the information structure sensitivity of clausal complements and objects seen above.

3.7 Adverbs

The conjoint/disjoint alternation is triggered not only by nominal and clausal verbal complements, but also by adverbs, as this section will discuss. Some adverbs are generally judged as ungrammatical with the disjoint, as below:

(27) uSipho u-∅/***ya**-gijim-a kahle
AUG.1.Sipho 1.SUBJ-CJ/DJ-run-FV well
'Sipho runs well.'

(Halpert, 2012:147)

However, Halpert (ibid) also reports that such adverbs can co-occur with disjoint morphology provided that the adverb is old information and the verbal predicate has a verum focus reading:

(28) Q: uMfundo a-ka-bhukud-i kahle, a-ngi-thi?
Q AUG.1.Mfundo NEG-1.SM-swim-FV.NEG well NEG-1SG.SM-say
'Mfundo doesn't swim well, does he?'

(29) A: cha, u-ya-bhukuda kahle, kodwa uMthuli u-ya-m-hlul-a
A no 1.SM-DJ-swim well but AUG.1.Mthuli 1.SM-DJ-1.OM-surpass-FV
'No, he does swim well, but Mthuli is better.' [verum focus on predicate]

(Halpert, ibid)

For other adverbs, both verb forms are possible, but with information structural differences:

(30) Ba-**ya**-dlal-a phandle
2.SUBJ-**DJ**-play-FV outside
'They're playing outside.'

(31) Ba-∅-dlal-a phandle
2.SUBJ-**CJ**-play-FV outside
'They're playing OUTSIDE.'

(Buell, 2013:10-11)

Transitive examples with a DP object are given below:

(32) Si-bon-e i-zi-tshudeni kaningi
1.PL.SUBJ-see-CJ.PAST AUG-8-student often
'We saw the students often.'

(33) *Si-zi-bon-e i-zi-tshudeni kaningi
1.PL.SUBJ-8.OBJ-see-CJ.PAST AUG-8-student often

(34) Si-zi-bon-e kaningi i-zi-tshudeni
1.PL.SUBJ-8.OBJ-see-CJ.PAST often AUG-8-student
'We saw the students often.'

(Van der Spuy, 1993:346, cited in Zeller, 2012:221)

These information structural differences and the varying accetability of conjoint vs disjoint marking indicates variability in height of attachment. The *kahle*-type attach low, whereas the *phandle*-type can be low or high. Interestingly, relating these data to varying structural positions mirrors what was argued for objects in §3.4 above, suggesting that a more faithful English translation of (31) would be something like "*Outside, they're playing*".

3.8 Relatives

Zulu displays relativised predicates which are formed by a relative subject marker on the verb, composed of the relative concord (Doke, 1963), as well as a relative suffix *-yo* in certain contexts. This relative suffix is noted to be finality-sensitive by Canonici (1995:46), Zeller (2004:79), Buell (2005:177), and Halpert (2016:121), amongst others. Halpert describes it as being found in disjoint environments only, as with *ya-* or *-ile* above, and gives the following data:

(35) umuntu o-phek-a iqanda
AUG.1.person 1.RC-cook-FV AUG.5.egg
'a person who cooked an egg'

(36) umuntu o-phek-a-yo
AUG.1.person 1.RC-cook-FV-RS
'a person who cooked'

(Halpert, 2016:121)

Surprisingly for an analysis of *-yo* as a disjoint marker, it may co-occur with the near past *-il-e* form, as below:

(37) inja [umfana a-yi-theng-**il-e-yo**]
9.dog 1.boy 1.RC-9.OM-buy-DJ.PFV-FV-RS
'the dog which the boy bought'

(Zeller, 2004:8)

Other differences from the normal behaviour of the conjoint/disjoint alternation are that *-yo* may occur in negative forms (39), whereas the conjoint/disjoint alternation is crosslinguistically confined to main clause affirmatives (van der Wal & Hyman, 2017).

(38) A-bantwana aba-nga-cul-i-yo ba-phum-ile
2-2.child REL=2.SBJ-NEG-sing-REL 2.SBJ-leave-PERF
'The children who don't sing have left.'

(Buell, 2005:92 fn23)

Because of these discrepancies, I will leave the status of *-yo* aside for further work. Other points to test include whether *-yo*-marked forms can be followed by goals or low adverbs (predicted not to be possible if it is truly a disjoint marker). I am not aware of any relevant data for this point.

3.9 Summary

Based on the data we have now seen, we can conclude that the conjoint/disjoint alternation in Zulu is found segmentally in two tenses, and is sensitive to whether material follows the verb within the verb phrase

constituent. This material may be a nominal phrase as in §3.2-4, a clausal complement (§3.5), locative phrase (§3.6), or an adverb (§3.7). There is also some evidence of constituency-sensitivity within relatives, although it is somewhat unclear whether this can be described as conjoint/disjoint marking (§3.8). When there is optionality, this was seen to correlate with information structure, with conjoint marking appearing when the complement is in focus and disjoint marking when the complement is old information.

Having now rounded off the empirical section, we can turn to a formal analysis of this phenomenon.

Chapter 4

Analysis

4.1 Section overview

This section will give an overview of the existing analyses of the conjoint/disjoint alternation in §4.2, showing that they are limited in scope. Based on the arguments presented in §2.2 above, an analysis will then be developed within the Dynamic Syntax (DS) framework in §4.3, giving fleshed-out derivations for both tenses in which the alternation occurs in Zulu, as well as discussion of how the data presented in §3 can be analysed within this formalism. Section §4.4 will then consider the implications of the analysis presented here, before section §4.5 concludes.

4.2 Previous analyses

4.2.1 Overview

While the empirical side of the conjoint/disjoint alternation in Zulu has been well-studied (§3.1), there are few existing theoretical accounts. To my knowledge, three distinct formal accounts have been proposed: (i) a Cartographic account of Kirundi by Ndayiragije (1999), (ii) a Cartogrpahic account of Zulu by Buell (2005), and (iii) a Minimalist account of Zulu by Halpert (2012, 2016).

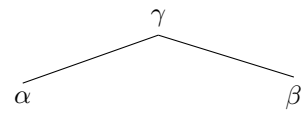
For space limitations, I cover only Halpert's (2012, 2016) Minimalist analysis here, as it builds from the

previous analyses by Buell and Ndayiragije, and because the Kirundi data is significantly different from Zulu, meaning that the accounts are not transferable.[1]

4.2.2 Theoretical background

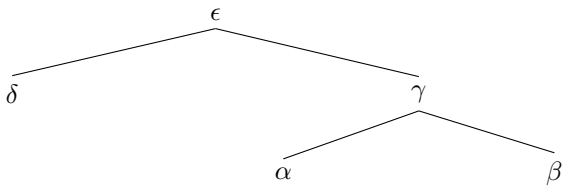
Minimalism (Chomsky, 1995) is a production-based framework in which derivations are built bottom-up in the syntactic component of the grammar via an algorithm called *Merge*. Merge simply takes two elements, α and β, and combines them, as below:[2]

(39)



As derivations proceed bottom-up, the next stage may look like the following:

(40)



Alongside this structure-building Merge operation, there is *Agree*. This operation is built on the notion of *features*, which are abstract representations of semantic information such as masculine gender (a feature with attribute gender and value masculine, i.e. [GEN: masc]). The idea is that certain elements, like nouns, have intrinsic semantic features, such as gender, number, and case. Based on the fact that many languages show agreement with nouns (e.g. *He sing**s*** vs *They sing* for English present tense, showing number agreement on the verb), elements such as verbs need to match their features with the nouns they combine with. As verbs like *sing* above don't have intrinsic feature values, they need to look down the tree[3] to find a noun with the relevant feature value, which they match. In this example, the verb is a *probe* and the noun is its

[1] Specifically, the alternation in Kirundi is based on a particular exhaustive focus reading expressed by the conjoint, which is not found in Zulu.

[2] For our purposes, it does not matter what the label γ is.

[3] Some authors posit upwards or 'reverse' Agree, e.g. Zeijlstra (2012), but such details will not concern us here for Zulu.

goal; the operation relating probes and goals is *Agree*.

Once a given tree section (called a *phase*) has finished being built, it is sent from the syntax to the phonology, called *spell-out*, meaning that elements within that phase can no longer be altered. There is an assumption of a universal base structural order of elements (e.g. Kayne's (1994) *Universal Base Hypothesis*, related to semantic criteria like theta-roles of verbs. However, surface order of elements vary across languages. To derive the correct surface order of linguistic elements in a given language, *movement* is induced, which is a version of Merge that results in an element moving to a higher position in the tree, where it is pronounced after spell-out.

The tree structures built are syntactic, and are taken as the input for semantics. Strictly speaking, the tree structures simply reflect hierarchical relations between constituents, and do not have a linear order until they are linearised by a post-syntactic linearisation algorithm. Linearisation algorithms (e.g. Kayne's (1994) *Linear Correspondence Axiom*) generally derive order from asymmetric c-command, which is a tree-structural notion of dominance.

4.2.3 Analysis

Having set out the bones and mortar of the framework, we can turn to Halpert's (2012, 2016) analysis of Zulu. This account is only fleshed out for the present tense. Halpert posits the existence of a structural position just above the *v*P (verb phrase) called LP ('licensor phrase'), responsible for the licensing of nominals. The head of this phrase, L, probes down for an appropriate goal. If it finds one, the head is null (conjoint), but if this agreement process fails, the morpheme *ya-* is spelled out in L to mark the failure (following Preminger, 2014, where morphology can mark failed Agree relations).

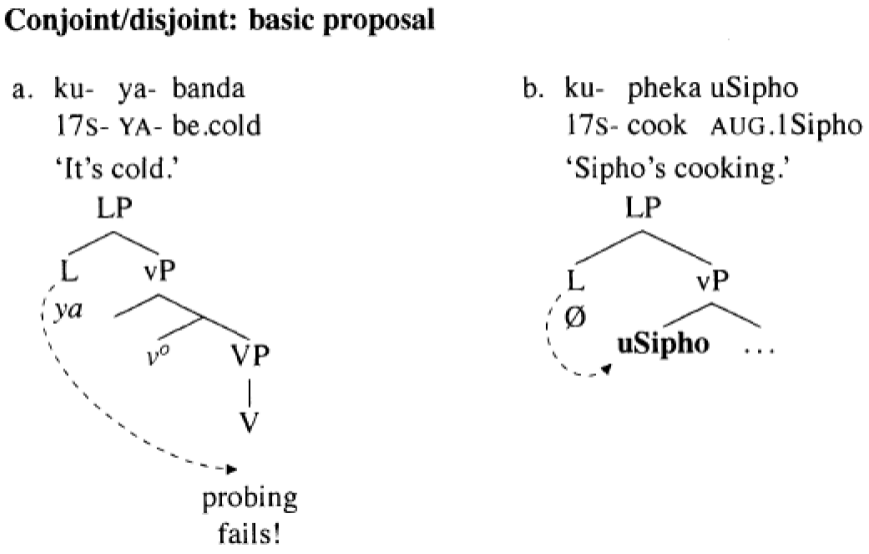


Figure 4.1: Agree-based Minimalist analysis of the conjoint/disjoint alternation in present tense, where lack of material within *v*P results in *ya*- spelled out as an agreement failure (Halpert, 2012:140).

While this approach derives the necessary data, it is somewhat stipulative. Firstly, the existence of a so-called LP above vP lacks supporting evidence from other languages, and presents a strong claim about the variability of Case positions cross-linguistically (see Halpert, 2012, 2016 for discussion). Secondly, the analysis as here presented derives the correct linear order for the conjoint/disjoint alternation in the present tense (pre-stem ∅-/*ya*-), but in its current form cannot account for the post-stem realisation of the alternation in the near past tense.[4] Thirdly, the account says that *ya*- spells out failure of Agree, but this is more of a description of the data than an explanatory account. Finally, little is said to link the conjoint/disjoint marking to information structural notions of focus and topicality, hindering the ability to account for the distinctions in object properties observed above, and also hindering the extension of such an account to other languages in which the alternation is more closely linked to focus.[5]

For these reasons, we currently lack a satisfactory account of the conjoint/disjoint alternation, and it is therefore worth pursuing an alternative one. Furthermore, pursuing an analysis within a different

[4] Halpert (2012, 2016) also does not give an explanation of how disjoint morphology (*-il-e*) can co-occur with the relative suffix *-yo*, which she analyses as a disjoint marker (cf §3.8).

[5] A notable advantage of Halpert's analysis is the links drawn between the conjoint/disjoint alternation and the phenomenon of augment-drop. Unfortunately, this is beyond the scope of this dissertation, and so the DS analysis of such data are left for future work.

framework may provide new insight into the phenomenon and make different predictions.

4.3 Dynamic Syntax approach

4.3.1 Overview

Following on from the discussions in §2.1, this section will provide the reader with a background into the DS formalism, before turning to account of the Zulu data.

4.4 Theoretical background

Dynamic Syntax (DS) is a relatively recently-developed framework that is processing- rather than production-oriented, under a 'grammar-as-parser' model (Kempson et al, 2001; Cann et al., 2005). Under the DS view, syntax is the parsing mechanism that leads to a truth-conditional semantic structure. These semantic interpretations are represented by tree structures, under a formal system called 'the logic of finite trees' (LOFT; Blackburn & Meyer-Viol, 1994). Parsing is monotonic and time-linear, meaning that trees grow incrementally based on updates from the lexical input and the syntactic rules of a given language, in a time-linear manner. This incrementality makes ordering differences of significant importance, in contrast to frameworks such as Minimalism where not only are derivations built bottom-up, but also syntactic operational domains are typically bounded by chunks such as phases, giving greater freedom on order.

The benefits of Dynamic Syntax as a parsing-based framework include the practical advantages of being well-suited for adaption into tools such as dialogue systems, as demonstrated for example in Purver et al. (2006), Eshghi et al. (2012), and Shalyminov et al. (2017). Thus, while the framework is aimed at facilitating advances in theoretical linguistics (Kempson et al., 2001; Cann et al., 2005), being able to account for the conjoint/disjoint alternation using this framework gives a readily transferable foundation for computational linguistics work on modelling the Zulu language.

In DS, nodes are decorated by three types of information:

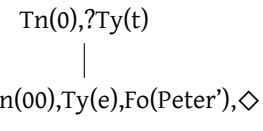
Node annotations in DS:

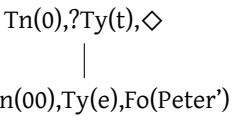
Tn(x)	Tree node address, e.g. Tn(0) = root node
Ty(x)	Semantic type, e.g. Ty(e) = individual term ($x \in D_e$); Ty(t) = proposition
Fo(x)	Formula value, i.e. semantic content

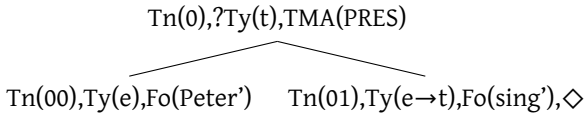
Following on from Relevance Theory (e.g. Sperber & Wilson, 1995), DS views conversations as exchanges of propositions. Each parse therefore begins with an axiomatic requirement for a truth-conditional proposition (?Ty(t)) at the root node:[6]

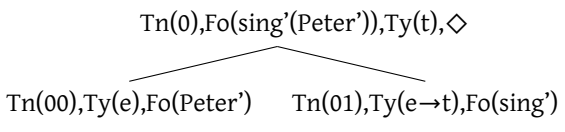
(41) Tn(0),?Ty(t),◇

From this start point, the tree builds up, with arguments being drawn on the left by convention, and functors on the right. For example, a simplified derivation for the English example *Peter sings* would proceed as follows:

(42)


(43)


(44)


(45)


[6] The pointer symbol, ◇, indicates the current node being built. See the Appendix for a glossary of DS symbols.

Here, the subject is parsed on the Tn(00) argument node (42), the pointer moves back to the root node ready for further input (43), the verb is heard and parsed on a functor node Tn(01) (44), and then in the absence of further lexical input, the tree completes via Functional Application (45). We therefore how structures update incrementally in DS.

Another core principle for the framework is the notion of underspecification. This includes the following two sub-types:[7]

Types of underspecification in DS (to be extended):

Structural underspecification	An unfixed node, i.e. one whose exact location in the target tree has not yet been established. E.g.: a hanging topic.
Semantic underspecification	A node without a full formula specification. Represented by a *metavariable* in capital boldface, e.g. Fo($\mathbf{U}_{3SG.M}$), ?∃x.Fo(x) for 'he', before resolution from discourse context.

In sum, an utterance is grammatical if there is a parsing route which results in a type-complete propositional tree. During the derivation of such a tree, it is possible for information to be not fully specified.

Let us consider how we might use DS to capture the basic conjoint/disjoint data from the present and near past data in §3.2 and §3.3. I will begin by showing that the most obvious DS analysis, using type specification of conjoint and disjoint verb forms, is unsuitable, and will then develop a more complex and satisfactory account.

4.4.1 Type-based approach

Given that the canonical data presented for the conjoint/disjoint alternation are the intransitive/transitive pairs from §3.2-3 above, an intuitive DS analysis would be to take the forms as lexically specifying transitivity. This is modelled via semantic type annotation, where disjoints are intransitive of Ty(e→t) and

[7] In section §4.3.3 below I will argue for a third type, namely type underspecification.

conjoint forms are transitives of Ty(e→(e→t)).

Null elements in the lexicon are typically avoided in DS analyses and so a lexical entry of ∅- as a present tense conjoint marker is not assumed. Instead, the analysis for the present must be from the overt disjoint marker *ya-* in combination with the verb stem's lexical entry, which must be transitive or intransitive depending on whether the disjoint marker is parsed.[8] The disjoint marker therefore provides a cue to the parser as to the type of the verbal predicate being built. This approach is formalised below:

(46) **Lexical entry for *-cul* (to be revised):**[9]

-cul	IF	?Ty(t)
	THEN	make($\downarrow_0$), go($\downarrow_0$), put(?Ty(e)), go($\uparrow_0$), make($\downarrow_1$), go($\downarrow_1$), put(?Ty(e→t), make($\downarrow_0$), go($\downarrow_0$), put(?Ty(e)), go($\uparrow_0$), make($\downarrow_1$), go($\downarrow_1$), put(Ty(e→(e→t))),Fo(sing'))
	ELIF	?Ty(e→t)
	THEN	put(Ty(e→t), Fo(sing'))
	ELSE	abort

This lexical entry for the verb stem *-cul* has two different potential triggering environments: (i) ?Ty(t), i.e. a requirement for a proposition at the root node, or (ii) ?Ty(e→t), namely a requirement for a verbal predicate, in the case where such structure has already been built, reflecting the different contexts in which a verb stem may be parsed (e.g. after a tense marker, or without one in cases such as imperatives).

As the present tense conjoint marker is null, only the disjoint marker would have its own lexical entry:

(47) **Lexical entry for *ya-* (to be revised):**

[8] The effect of null marking is therefore added complexity to the verb's lexical entry, which results in a different structural update depending on whether overt elements have been parsed (Ruth Kempson, p.c).

[9] See appendix for a DS glossary with explanations of IF, ELIF, ELSE, and THEN. I have departured from DS convention in adding an indent to the IF statements; this is to make the lexical entries more human-readable and bring them in line with conventions in programming languages.

-ya-	IF	?Ty(t)
	THEN	make($\downarrow_0$), go($\downarrow_0$), put(?Ty(e)), go($\uparrow_0$)
		make($\downarrow_1$), go($\downarrow_1$), put(?Ty(e→t),[⊥])
	ELSE	abort

This entry specifies that *ya-* is parsed at the root node and projects the verbal predicate structure. Moreover, it decorates Tn(01) with a requirement for an intransitive (the bottom restriction [⊥] prevents further arguments being incorporated). The fact that *ya-* builds Tn(00) and Tn(01) means that the pointer ends up at Tn(01), fitting the ?Ty(e→t) triggering context for the verb stem *-cul* (47) and so leading to the intransitive version of the verb being built.

While these lexical entries account for the basic data seen in §3.2-3, such an approach is not tenable. The most concerning issue is that object-marked verbs appear obligatorily with disjoint morphology, not conjoint, meaning that the disjoint marker *ya-* **can** be parsed in a transitive context. Furthermore, the object marker appears after *ya-* (cf (1)), meaning that the parser cannot know when hearing *ya-* what the type of the verb will be; the account therefore faces a look-ahead problem. As the lexical entry in (42) limits *ya-* to intransitives of Ty(e→t), the account therefore fails.

4.4.2 Introducing verbal type underspecification

So far we have seen that verbs such as *-cul* 'sing' can occur with both conjoint and disjoint morphology, meaning that the verb type can vary between Ty(e→t) and Ty(e→(e→t)). Having seen that the difference cannot be solved by specifying Ty(e→t) in the disjoint marker's lexical entry (43), we need an alternative way to capture this variability.[10]

Relevant prior work within Dynamic Syntax is Marten's (2001) analysis of English verbs as being Ty(e*→(e→t)). The Kleene star *e** reflects that a verb may be intransitive (e→t), transitive (e→(e→t)), ditransitive (e→(e→(e→t))), and so on. The fact that the same lexical item may be underspecified for type is backed up by the ability for one item to appear in multiple such environments, as below:

[10] NB: I take positing two distinct lexical entries as metatheoretically undesirable.

(48) I sang.

(49) Kelly was singing.

(50) Kelly was singing a song.

(Marten, 2001:115)

Given that we saw this same variability in argument structure in Zulu, we can use Marten's (2001) verbal type underspecification for our analysis of Zulu, proposing that a verb like *-cul* can be underspecified as Ty(e*→(e→t)) in the lexicon.[11]

Based on this, we have the following summary of underspecification in DS:

Types of underspecification in DS (complete):

Structural underspecification	An unfixed node, i.e. one whose exact location in the target tree has not yet been established. E.g.: a hanging topic.
Semantic underspecification	A node without a full Formula specification. Represented by a *metavariable* in capital boldface, e.g. Fo($\mathbf{U}_{3SG.M}$), ?∃x.Fo(x) for 'he', before resolution from discourse context.
Type underspecification	A node whose type is not yet precisely established, e.g. Ty(e*→(e→t)). Must be structurally unfixed.

These three types of underspecification correspond to the three elements that decorate every node in DS: (i) tree node address Tn(x), (ii) formula value Fo(x), and (iii) semantic type Ty(x). Having now introduced and motivation type underspecification in DS, we can turn to building an analysis of the data presented in §3 above, starting with the present tense.

[11] Note that the possibility of underspecification does not mean that the verb is always underspecified, as there may be a particular triggering environment at which the type of the verb is already determined.

4.4.3 Present tense

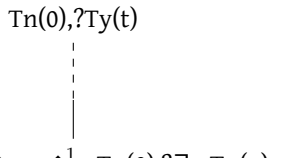
4.3.5.1 Disjoint present: *bayacula* 'they sing'

For the disjoint present, as with other verb forms, the parse begins with the subject marker, in this case class 2 *ba-*. Following Marten et al.'s (2008) treatment of Otjiherero (Bantu R30, Namibia) and Cann et al.'s (2005:256) analysis of Swahili (Bantu G42, East Africa), the subject marker is parsed on a locally unfixed node, with a metavariable formula variable Fo($\mathbf{U}_2$) restricting its reference to a class 2 entity:[12]

(51) **Lexical entry for SM.2 *ba-*:**

ba-	IF	?Ty(t)
	THEN	make(<$\downarrow^1_*$><$\downarrow_0$>),go(<$\downarrow^1_*$><$\downarrow_0$>), put(Ty(e),Fo($\mathbf{U}_2$),?∃x.Tn(x),?∃x.Fo(x))
	ELSE	abort

(52)



In order to fulfil the requirement for a fully specified formula value (∃x.Fo(x)), a class 2 referent must be retrieved from the discourse context. I do not formalise this here, but this can be construed as a search through the immediately LINKed parse trees.[13] In this example, we can take *abafana* 'the boys' as the referent,[14] assuming this is salient in the discourse. Once this update takes place and the formula requirement

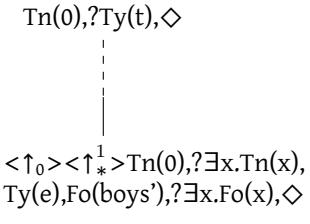
[12] I include the building of the unfixed node in the subject marker's lexical entry, though it could also be induced by a DS rule form. I am not aware of a predictive difference between these choices.

[13] In DS, LINKed structures provide context. Once a tree is completed, the next tree can be thought of to be parsed from a LINK relation from Tn(0) of the prior tree, leading to a chain of trees joined by LINK relations at the root node. Resolving anaphora cross-sententially is then modelled as a search through the LINKed trees, subject to certain locality or memory conditions which I will not pursue here.

[14] For brevity, I do not decompose DPs in Zulu. A more full analysis would have the augment vowel *a-* as a determiner of Ty((e→t)→e) which combines with the Ty(e→t) NP *-bafana* 'boys'. See e.g. Asiimwe (2014) for such a decomposition of Bantu nominals. Furthermore, I do not delve into quantification and simply express plurality by the label Fo(boys').

of the node is THINNED,[15] the pointer moves back to Tn(0) via COMPLETION, ready for further lexical input.

(53)



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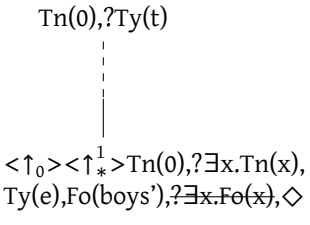

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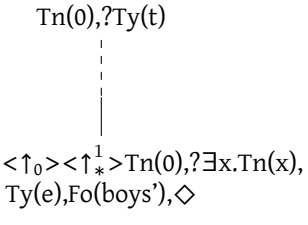
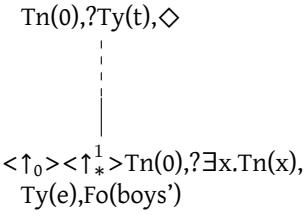


(56)

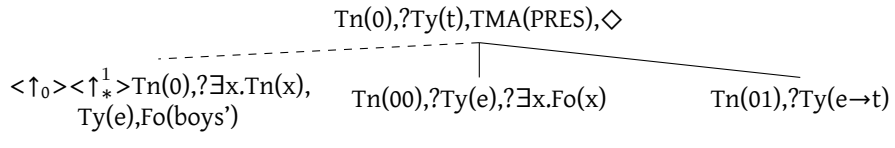


Next in the input is the disjoint marker *ya-* in the pre-stem tense slot. This marker confirms a verbal entity and so projects Tn(00) and Tn(01). As *ya-* only appears in the present tense, this tense information can also be added to the tree. Here, I follow the DS convention of simply adding a decoration to the root

[15] See appendix for a glossary.

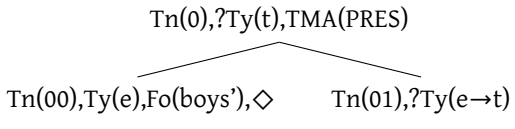
node to indicate tense (Cann et al., 2005, i.a).[16]

(57)



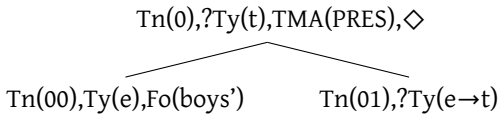
At this point, the requirements of Tn(00) are met by unifying with the unfixed node via MERGE.

(58)

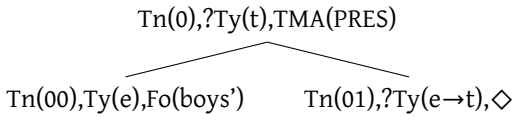


The pointer then moves back up via COMPLETION and then down to Tn(01) via ANTICIPATION.

(59)



(60)



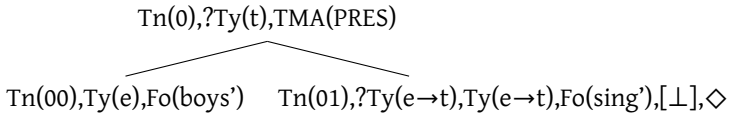
At this point, we could hear an object marker but in this example hear the verb stem *-cul* 'sing' (*bayacul-*). The triggering environment for the verb stem is therefore ?Ty(e→t). As we will see a different triggering environment for verb stems in object-marked and conjoint forms, we can lexically specify the ?Ty(e→t) environment as selecting a verb specified for Ty(e→t), adding the bottom restriction:

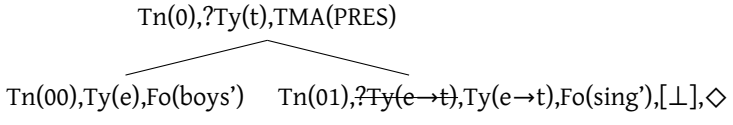
(61) **Lexical entry for *-cul* 'sing' (partial):**

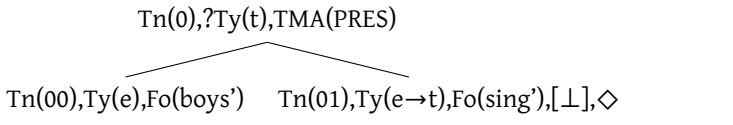
[16] I have adapted 'Tns(PRES)' to 'TMA(PRES)' to unify the description of tense and aspect in the present and near past/perfective examples. I use this annotation as a shorthand, in absence of a satisfactory account of tense/mood/aspect within DS (see however Gregoromichelaki (2006) and Cann (2018) for incorporation of event semantics within DS).

-cul	IF	?Ty(e→t)
	THEN	put(Ty(e→t),Fo(sing'),[⊥])
	ELIF	[...]
	THEN	[...]
	ELSE	abort

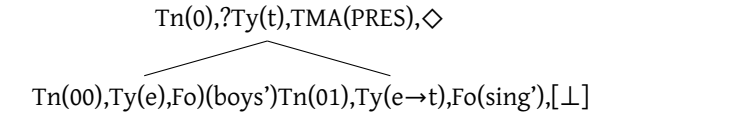
This lexical specification results in the following updates at Tn(01):

(62)


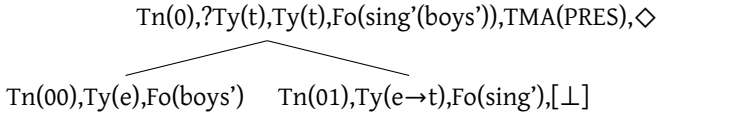
(63)


(64)


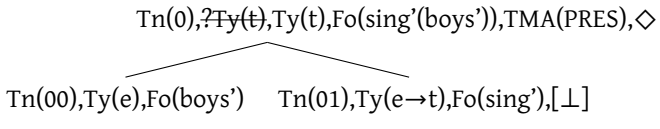
Parsing the final vowel *-a* moves the pointer up the tree to the root node. As this node has already been decorated for tense/mood/aspect, there is no further annotation necessary.

(65)


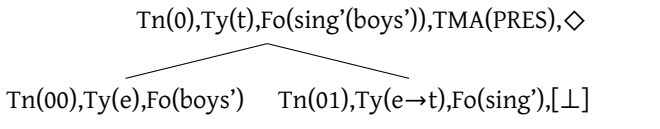
Functional Application results in the root node being type-complete and decorated with a Formula value and type, THINNING the outstanding type requirement:

(66)


(67)



(68)

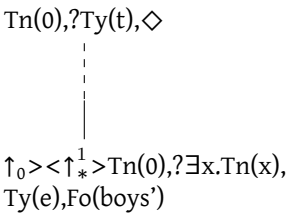


We now have a type-complete propositional tree, and no further lexical input, so the derivation is successful and *baycula* is correctly predicted to be grammatical in Zulu. Furthermore, the ungrammaticality of **baycaula ignoma* (§3.2) is shown by the inability to integrate a further Ty(e) element into the tree structure given the bottom restrction [⊥] at Tn(01).

4.3.5.2 Conjoint present: *bacula ignoma* 'they sing a song'

Turning to the conjoint present example *bacula ignoma* 'they sing a song', the subject marker *ba-* is parsed in exactly the same way as for the disjoint case above, and so we can begin the derivation from this partial tree:

(69)



The conjoint present has no tense marking, and so it must be the verb stem that projects Tn(00) and Tn(01).[17] At this point in the parse (*bacul-*), we do not know that the form will be conjoint, as it could also be a disjoint near past (*baculile* 'they sang'). This means that the type of the verb must still be unspecified

[17] An alternative would be to have a null tense marker ∅- which lexically projects the relevant structure, but DS prefers having null marked forms affect the behaviour of overt forms, with null elements in the lexicon only used for very specific and fully predictable cases (Kempson, p.c; cf Cann et al., 2005:98, 123); cf §4.3.

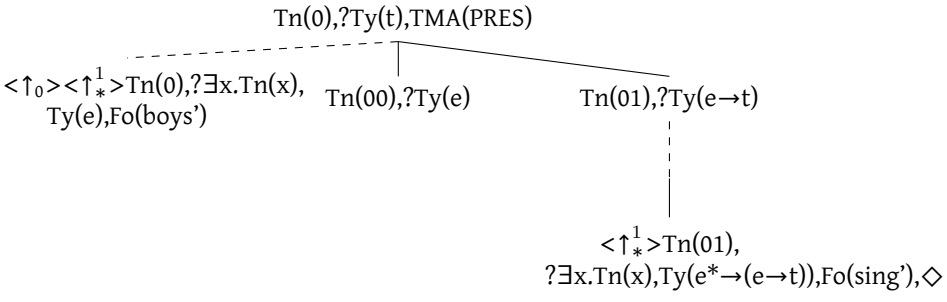
at this stage of the parse. We therefore add to the lexical entry for *-cul* 'sing' sketched above as follows:[18]

(70) **Lexical entry for *-cul* 'sing' (revised):**

-cul	IF	?Ty(e→t)
	THEN	put(Ty(e→t),Fo(sing'),[⊥])
	ELIF	?Ty(t)
	THEN	make(<↓$_0$><↓$_1$>), go(<↓$_0$>), put(?Ty(e)), go(<↑$_0$>), go(<↓$_1$>), put(?Ty(e→t)), make(<↓$^1_*$>), go(<↓$^1_*$>), put(?∃x.Tn(x),Ty(e*→(e→t)),Fo(sing'))
	ELSE	abort

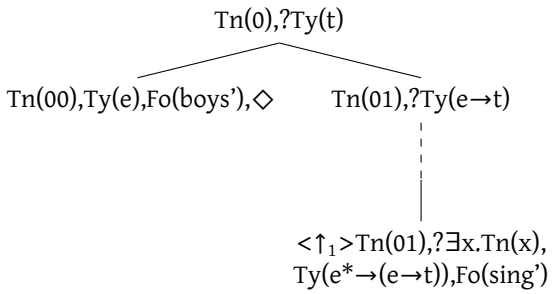
This lexical entry results in the following verbal predicate structure:

(71)



From here, the unfixed argument node can be fixed as the subject at Tn(00) via MERGE, exactly as with the disjoint case:

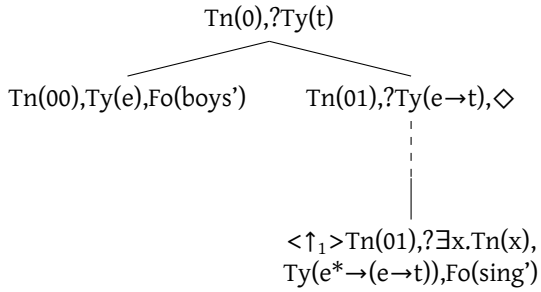
(72)



[18] For readers familiar with DS, it is worth pointing out that this tree structure does not violate the Unique Unfixed Node Constraint as the two unfixed nodes are structurally distinct.

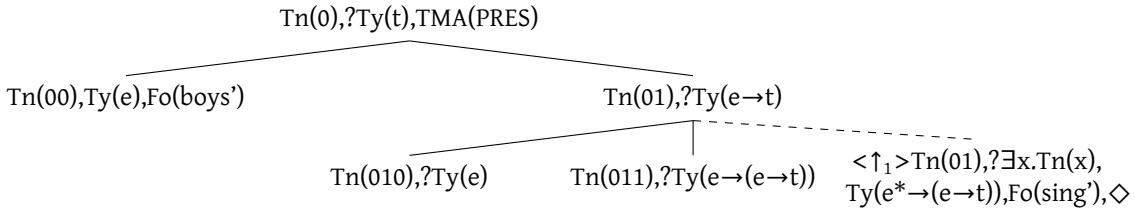
The pointer then moves via ANTICIPATION to Tn(01).

(73)



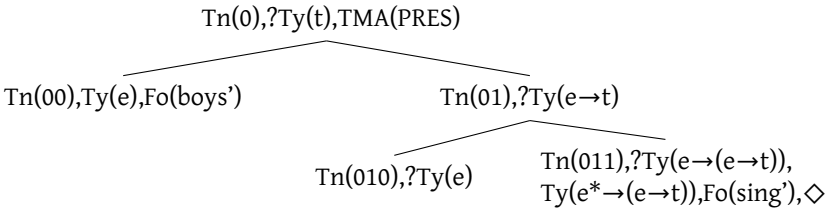
The next lexical input is the final vowel *-a*. In contrast to the disjoint case, where the final vowel *-a* was parsed at Tn(01) with a [⊥] annotation, here there is no such annotation and an unfixed node dominated by Tn(01). We can therefore take this structure to be a different triggering environment for the final vowel *-a*, and model that it projects Tn(010) and Tn(011), given that at this point of the parse we know that the verb is conjoint and therefore requiring of a further Ty(e) element within the verb phrase:

(74)

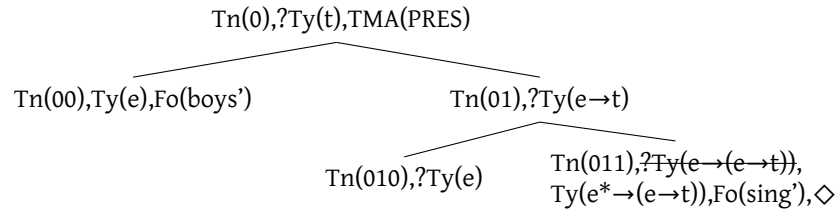


Here, now past the point at which valency-increasing morphology such as the applicative extension could have been included (as the final vowel occupies a slot after the post-stem extensions slot), the unfixed node fixes to Tn(011) via MERGE:

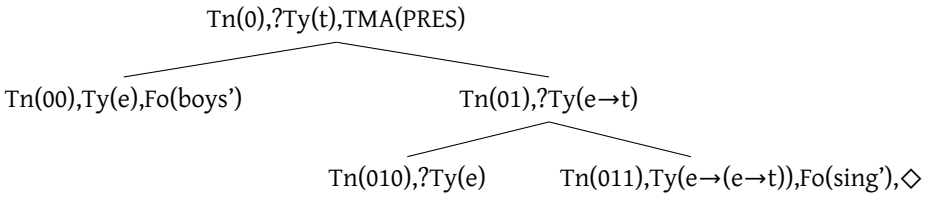
(75)



(76)

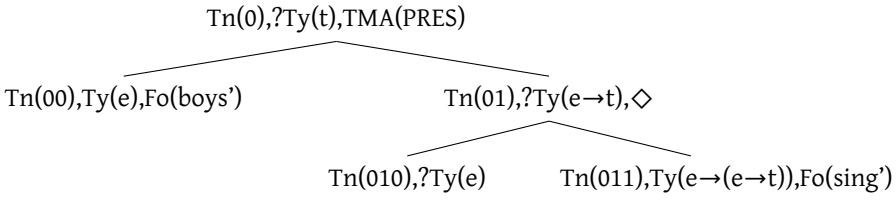


(77)

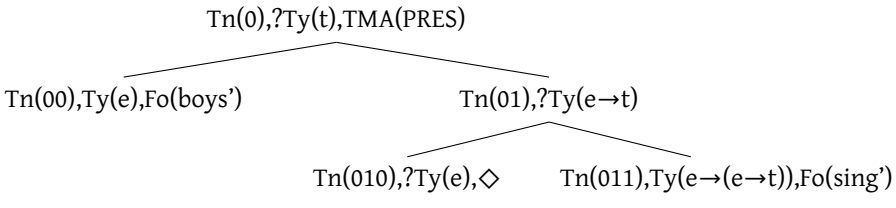


The pointer then moves to Tn(010) via COMPLETION and ANTICIPATION.

(78)

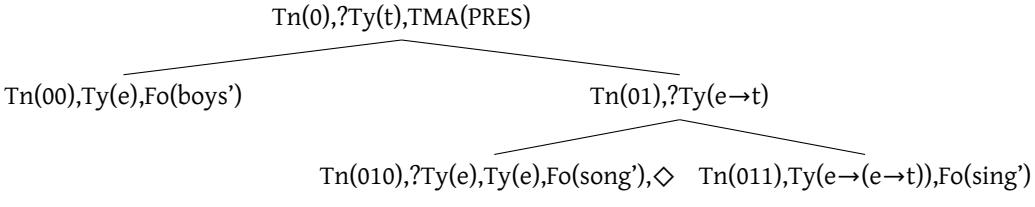


(79)

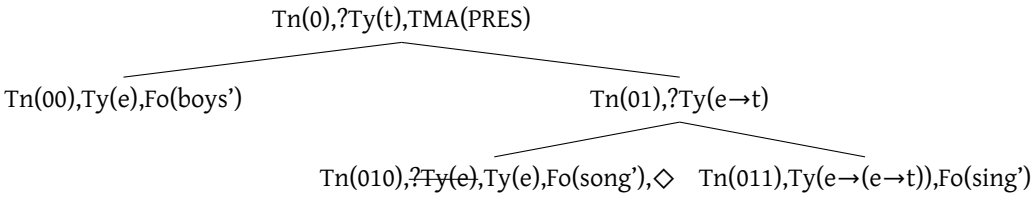


In order for the requirements in the verb phrase to be satisfied, there now needs to be a Ty(e) element in the lexical input. We receive this with the DP object *ignoma* 'song', and so parse this at Tn(010):

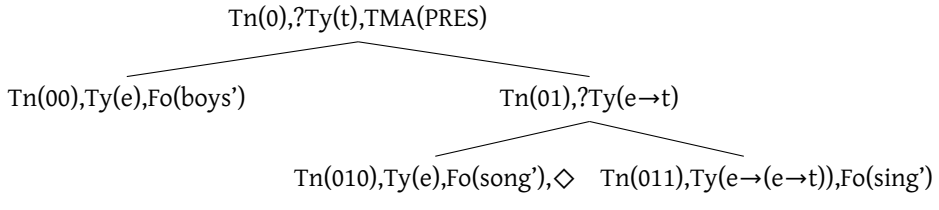
(80)



(81)

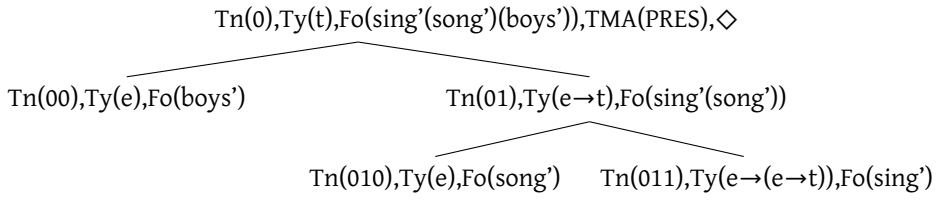


(82)



Now Tn(010) is complete, the pointer moves up to Tn(01) via COMPLETION and the outstanding requirement are THINNED after Functional Application.

(83)



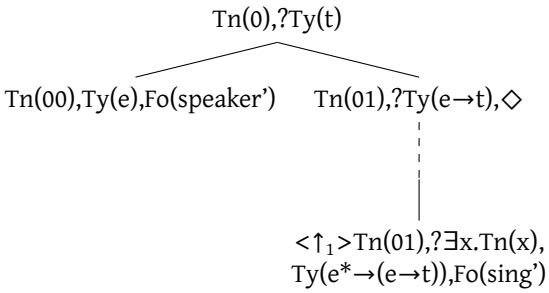
The tree is now fully specified, and so represents a grammatical Zulu sentence.

4.4.4 Near past

4.3.6.1 Disjoint past *ngiculile* 'I sang'

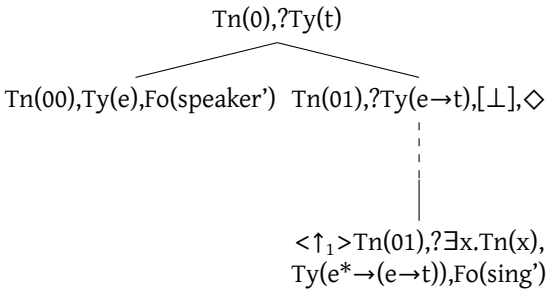
For the disjoint near past *ngiculile* 'I sang', the parse proceeds identically as it did for the conjoint present *bacula ignoma* up to the verb stem (*ngicul-*), aside from the change in the subject formula value, given that the structure is identical until this point. We therefore can take up the derivation from the following partial tree:

(84)

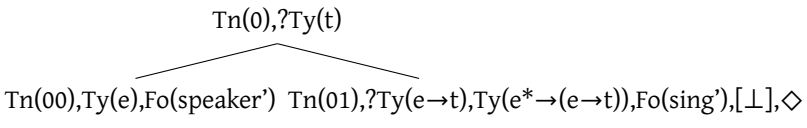


The next lexical input after the verb stem *-cul* 'sing' is the near past disjoint marker *-il* (*ngiculil-*). The disjoint marker *-il* fixes the type requirements of the verb phrase as complete at this point in the derivation via the bottom restriction [⊥], meaning that the unfixed node must MERGE with Tn(01):

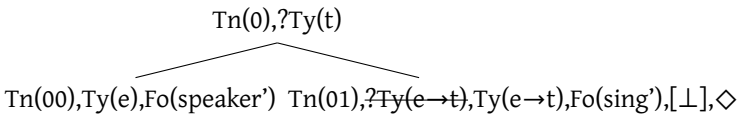
(85)



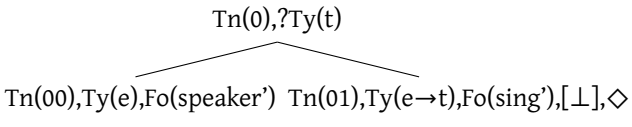
(86)



(87)



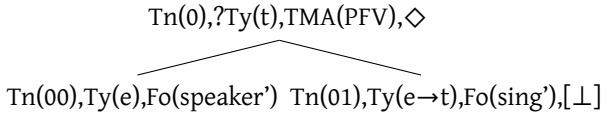
(88)



Parsing the final vowel *-e* moves the pointer up to the root node and annotates tense/aspect information.[19]

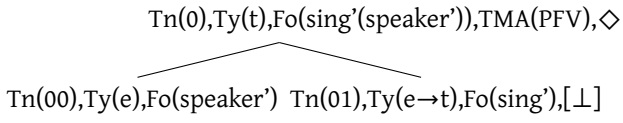
[19] It would be also be possible to have the TMA annotation given by *-il*.

(89)



The tree then completes by Functional Application.

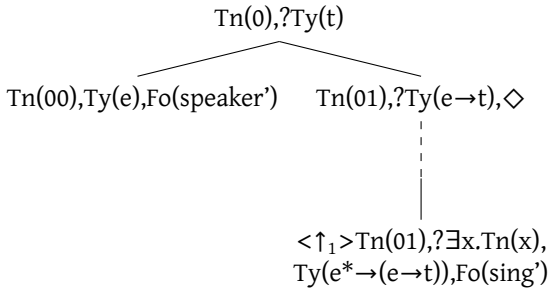
(90)



4.3.6.2 Conjoint past *ngiculé ignoma* 'I sang a song'

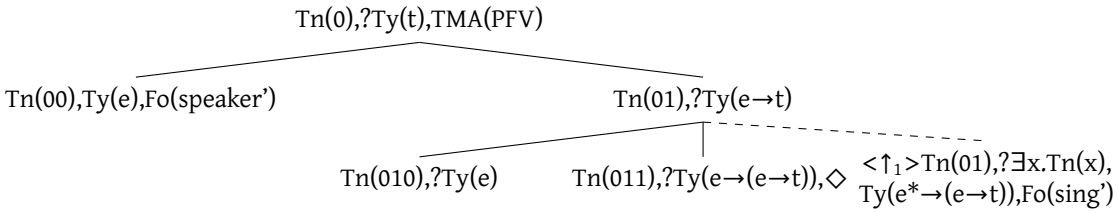
The treatment of the conjoint near past is identical to that of the disjoint parse up until after the verb stem *-cul* 'sing' is parsed:

(91)



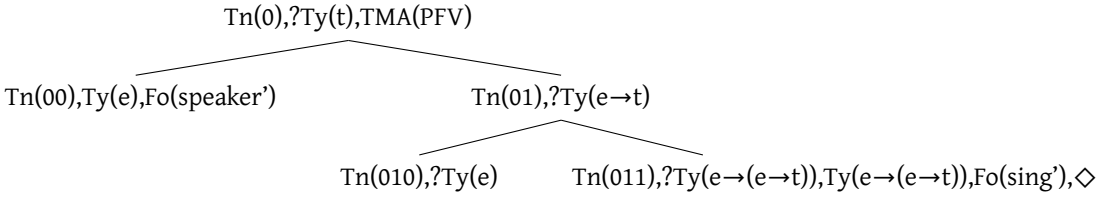
Now, the lexical input is *-é*, where the final vowel contains TMA information of near past perfective as well as conjoint marking, which necessitates Ty(e→(e→t)) of the verb. The lexical entry for *-é* therefore leads to TMA information being annotated at Tn(0) and Tn(010) and Tn(011) being projected:

(92)

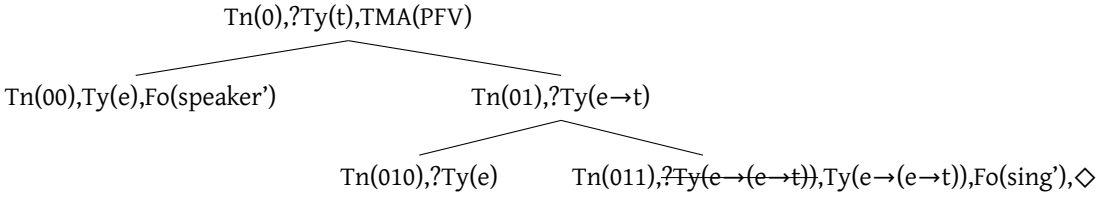


The unfixed node then MERGEs with Tn(011):

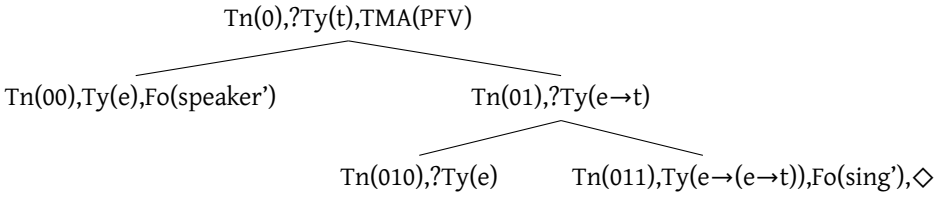
(93)



(94)

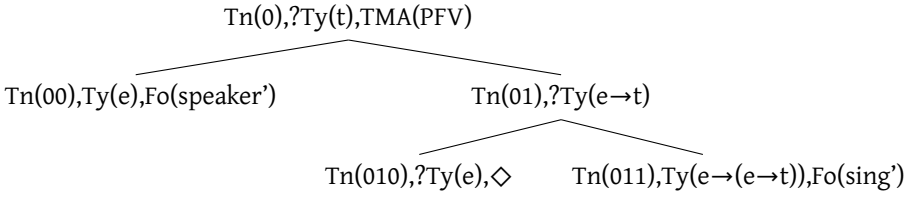


(95)



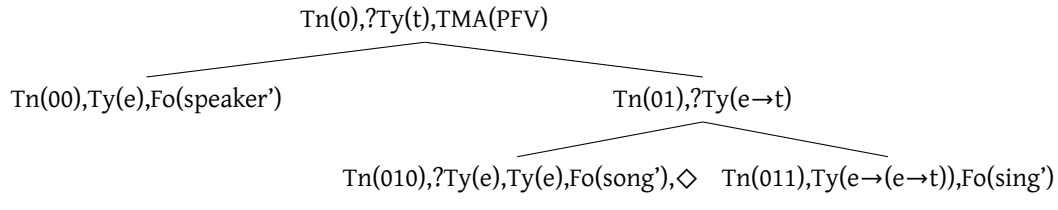
COMPLETION and ANTICIPATION then move the pointer to the outstanding type requirement at Tn(010):

(96)

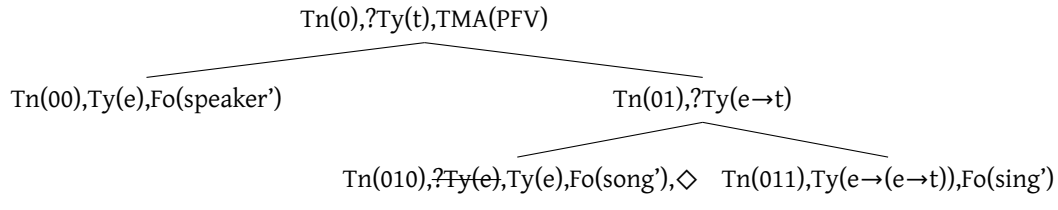


The derivation therefore now needs a Ty(e) element in order to be grammatical. This is fulfilled by parsing the DP object *ignoma* 'song' at Tn(010):

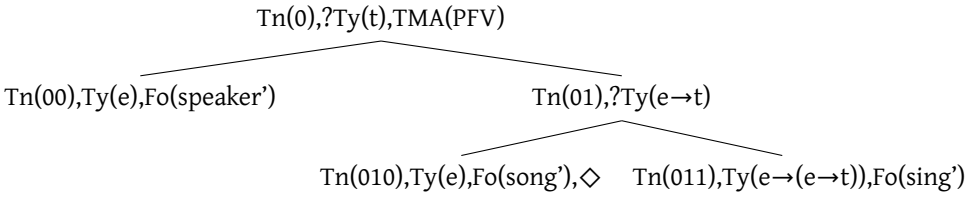
(97)



(98)

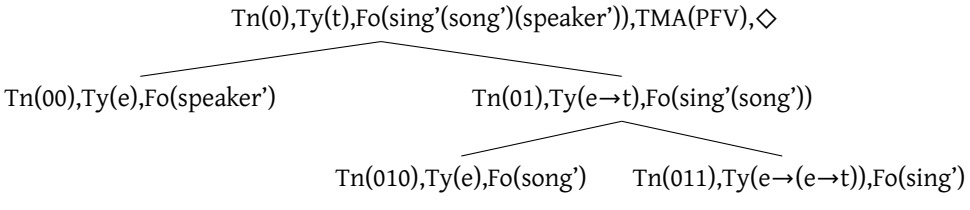


(99)



The tree now completes by Functional Application, with no further lexical input, arriving at a grammatical parse.

(100)



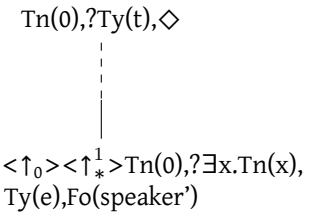
Having now seen the derivation of transitive examples for the conjoint present and near past, we can turn to object-marked cases.

4.4.5 Object marking

As was shown in §3.4 above, object-marked forms are only permissible in Zulu with disjoint morphology. Zulu allows object-drop (i.e. omission of overt DP objects) when the verb is object-marked. This section will show using the example of the object-marked near past that these empirical data support object markers being parsed as pronominal clitics in Zulu, meaning that they satisfy the ?Ty(e) requirement of the verb phrase.

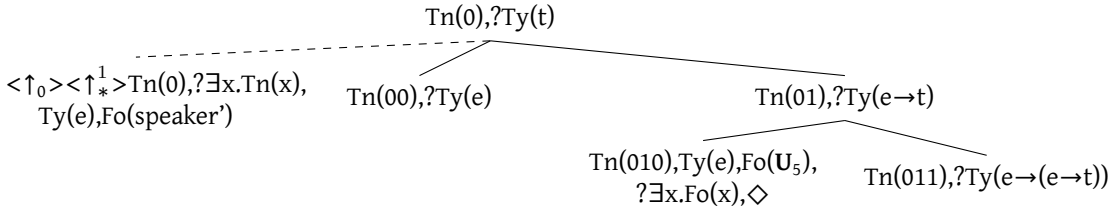
Taking *ngilibonile ikati* 'I saw it, the cat' ((13)) as an example, we start with the parsing of the 1st person singular subject marker *ngi-* just as was seen before:

(101)



In this example, there is no pre-stem tense marker, and the next lexical input is the class 5 object marker *li-*. This object marker therefore projects Tn(00) and the verbal predicate from Tn(01), which is minimally transitive. The metavariable at Tn(010) restricts the formula value specification to a class 5 object.

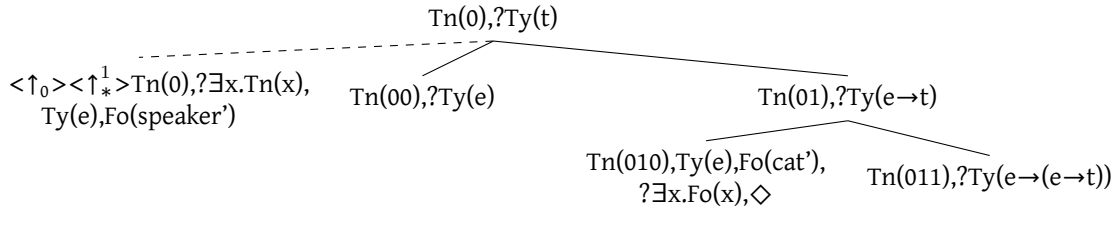
(102)



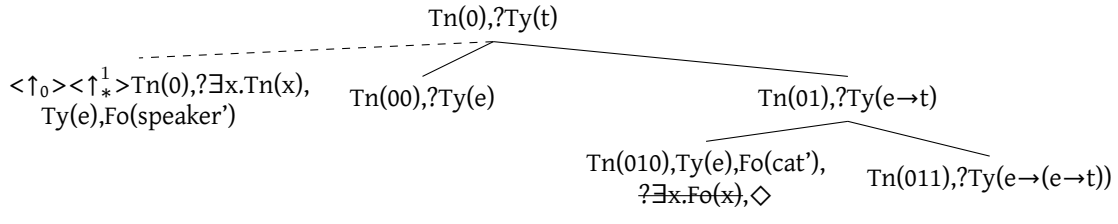
Just as was discussed above for referent resolution of the metavariable of subject markers, a search of the discourse context allows for the ?∃x.Fo(x) requirement at Tn(010) to be resolved, in this case by specification of Fo(cat'). Note that this means that, like subjects, objects in object-marked disjoint forms must be topical (i.e. old information) in Zulu. This point will be discussed further in §5 below and shown

to be empirically desirable. First, let us continue with the tree derivation by showing the update to Tn(010):

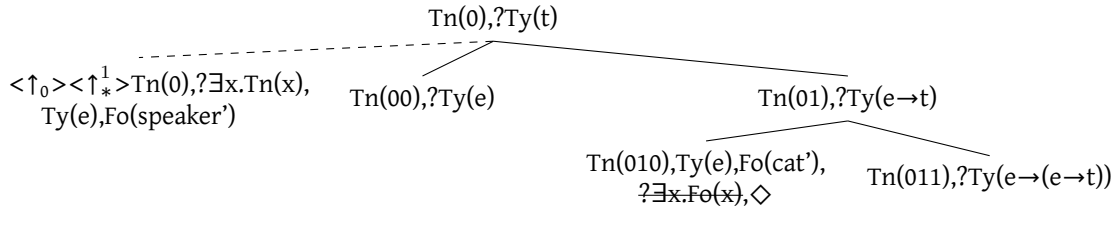
(103)



(104)

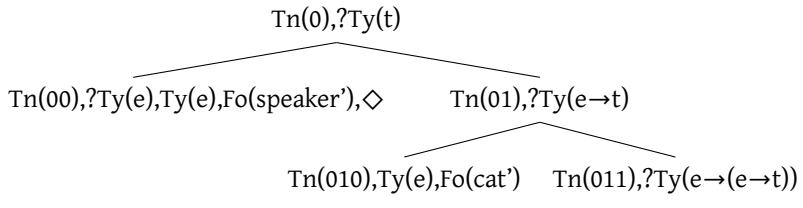


(105)

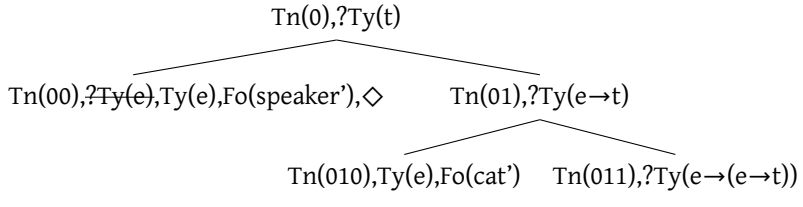


Now, the unfixed node can fulfil the type requirement at Tn(00) via MERGE:

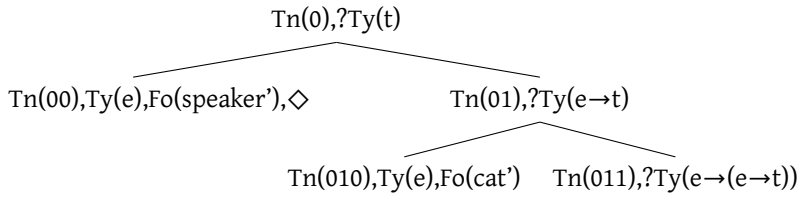
(106)



(107)

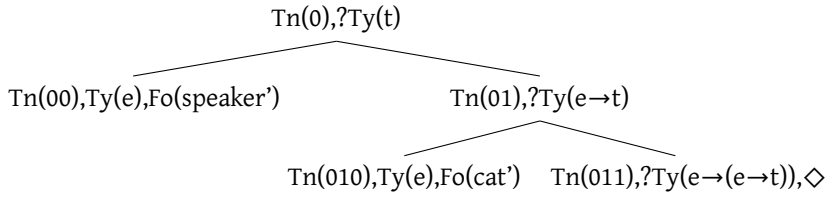


(108)



The pointer then moves to the incomplete Tn(011) by COMPLETION and ANTICIPATION:

(109)



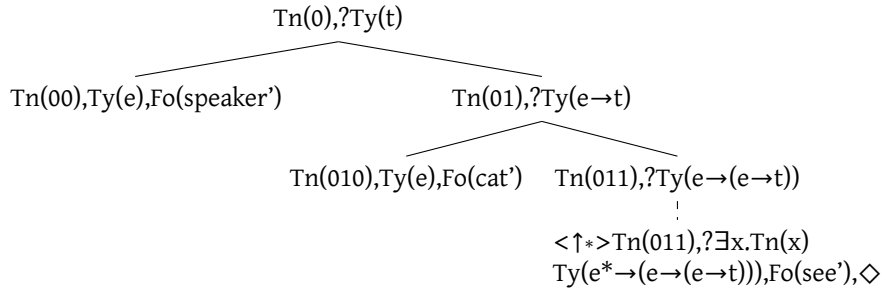
The next lexical input is the verb stem *-bon* 'see'. As we do not yet know the exact valency of the verb (e.g. whether it will be part of a double object construction), we again project an unfixed node with underspecified verbal type, though this time of Ty(e*→(e→(e→t))) as we know that this is a minimally transitive usage.

(110) **Lexical entry for *-bon* 'see':**

-bon	IF	?Ty(e→t)
	THEN	put(Ty(e→t),Fo(see'))
	ELIF	?Ty(t)
	THEN	make(<↓$_0$><↓$_1$>), go(<↓$_0$>), put(?Ty(e)), go(<↑$_0$>), go(<↓$_1$>), put(?Ty(e→t)), make(<↓$^1_*$>), go(<↓$^1_*$>), put(?∃x.Tn(x),Ty(e*→(e→t)),Fo(see'))
	ELIF	?Ty(e→(e→t))
	THEN	make(<↓$^1_*$>), go(<↓$^1_*$>), put(?∃x.Tn(x),Ty(e*→(e→(e→t))),Fo(see'))
	ELSE	abort

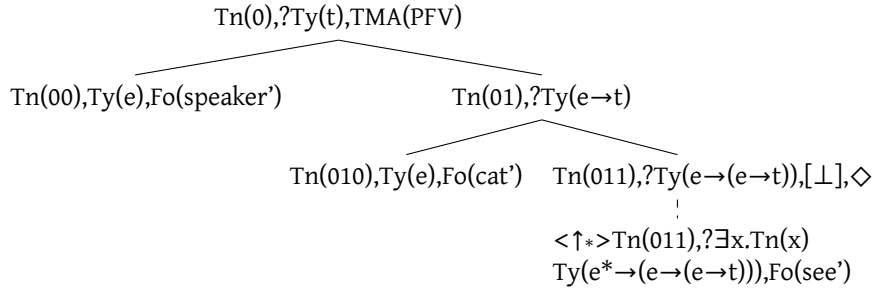
The triggering environment here is ?Ty(e→(e→t)) at Tn(011), and so the tree updates as follows:

(111)



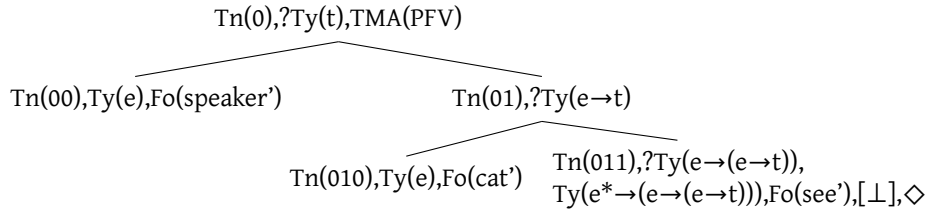
Next in the lexical input is the disjoint marker *-il*. This marker annotates tense/mood/aspect information at the root node and gives the constituency information that Tn(011) is the most the verb phrase will develop to, and so it adds the bottom restriction [⊥] to this node.[20]

(112)



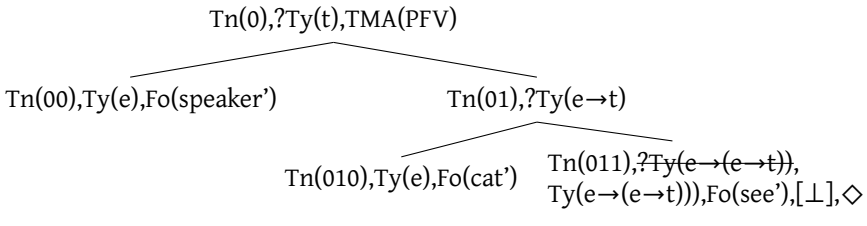
With the bottom restriction on Tn(011), the unfixed node MERGEs to fulfil the type requirements:

(113)

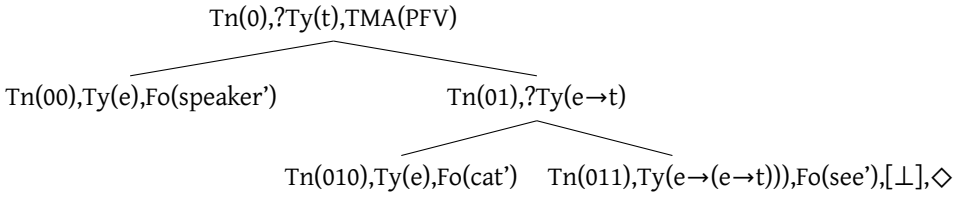


[20] Note that the disjoint marker occupies an aspectual slot that is after any valency-increasing extensions such as the applicative. It is also relevant that double object constructions with the applicative are only permissible with conjoint marking in Zulu (Halpert, 2012:145).

(114)

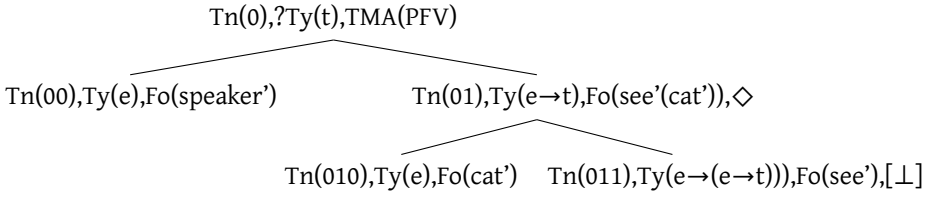


(115)

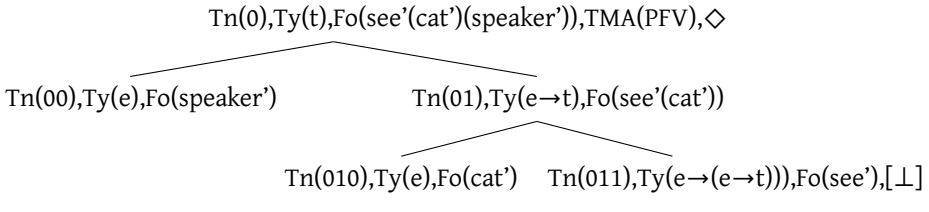


The final vowel *-e* mvoes the pointer up, with the tree completing via Functional Application, moving the pointer up to Tn(0). As this node is already decorated for TMA information, no further annotation is required.

(116)

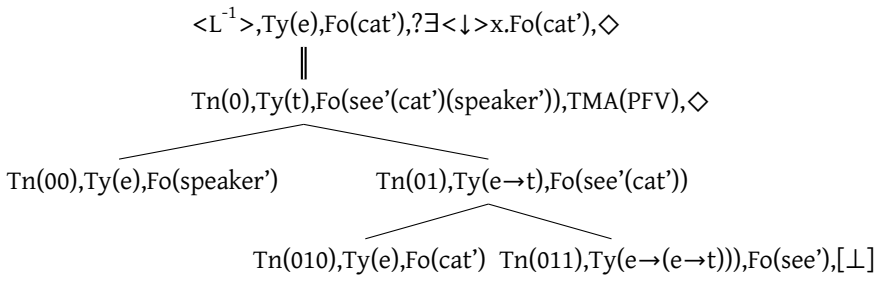


(117)



Such a tree is a successfully completed parse, indicating that *ngilibonile* is a possible standalone utterance of Zulu. However, in the example here, there is another element parsed after COMPLETION of Tn(0), namely the right-dislocated object *ikati* 'cat'. This is captured in DS by means of a LINK structure, which acts as contextual enrichment of the main propositional tree, as shown below by the double-lined $\langle L^{-1} \rangle$ node which attaches to Tn(0):

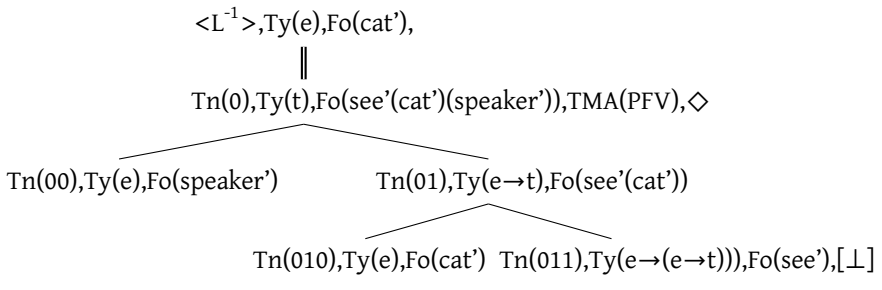
(118)



The LINKed node contains an identity requirement for the same formula value to be found within the main propositional tree, as a check for grammaticality. In this case, Fo(cat') matches, capturing that *ngilibonile ikati* is a licit string of Zulu, but something like **ngilibonile ignoma* (intd: 'I saw the song') would not be not licit (as the class 5 object marker does not have the same reference as the class 9 overt object, and so the LINKed structure's formula identity requirement would not be satisfied).

In this case, we find Fo(cat') within the matrix tree, and so can satisfy the LINKed structure's identity requirement and complete the tree:

(119)



Notably, the derivation differs from the conjoint transitive example in §4.3.2 above by the LINK relation at the root node and the different order of derivation. These differences predict differences in interpretation and information structure, as will be discussed in section §5.

4.4.6 Non-DP complements

A type-based approach can account for clausal complements by having Zulu verbs such as *-cabanga* 'think' as having different type values from the Ty(e*→(e→t)) cases seen so far, as is standard practice.

I assume that locatives are taken to be nominal elements of Ty(e), meaning that they are built in the same way as with DP elements above. By treating clausal and locative complements this way, the analysis can proceed just as was seen above (I therefore do not repeat the derivations). Note that Halpert (2016:160), working in a Minimalist framework, effectively comes to the same conclusion, arguing that such complements have a nominal goal that the syntactic head L probes for. Evidence for this approach comes from the noun class morphology found on the *ukuthi* complementiser and locatives, supporting an analysis which treats them as nominal. A more formalised DS account can be developed in future by considering the internal structure of nominals (cf fn14).

4.4.7 Adverbs

The typical DS approach to adjuncts is to parse them on LINKed structures (Cann, 2018; Cann et al., 2005, Kempson et al., 2001). However, it is unclear how such an apporach results in the correct truth conditions, as LINKed structures are thought of as contextual information that may help fulfil a ?∃x.Fo(x) node with the relevant formula value of a discourse topic, but do not affect the truth conditions.

Marten (2001) sketches an approach with adverbs being Ty(X→X), i.e. they map one type to the same type. If the adverb attaches to the verb phrase, it is therefore Ty((e→t)→(e→t)); a sentential adverb would be Ty(t→t), and so on. Cann (2018) proposes a similar analysis for English passives, with the difference that event semantics is employed, and adverbials build downwards from fixed structure rather than in the middle with unfixed structure (as in Marten, 2001). For reasons of space, I do not flesh out such an approach here, but refer the reader to the papers cited in order to show that adverbial complements can be accounted for within this DS analysis. The variability in whether an adverb can appear with a conjoint or disjoint form (cf §3.6) is understood as variability in the height of attachment, e.g. Ty(t→t) vs Ty((e→t)→(e→t)). As this approach is discussed in Marten (2001), I do not repeat it here.

4.5 Section summary

In summary, this section gave a brief overview of existing analyses of the conjoint/disjoint alternation in §4.2, the most recent of which being Halpert's (2012, 2016) Minimalist account. Disadvantages of the current analyses were put forth, and so a new analysis was presented in §4.3 from the perspective of Dynamic Syntax. This framework is significantly different from Minimalism in that it is surface-based and builds derivations incrementally. Using the mechanism of semantic type underspecification (§4.3.3), an analysis of the data from §3 was sketched out, with coverage for both present and near past tenses.

Chapter 5

Implications

Having now developed a Dynamic Syntax analysis of the conjoint/disjoint alternation in Zulu, we can consider its implications. I will begin with the implications for Zulu specifically, and then discuss wider implications about the conjoint/disjoint alternation and about syntactic theory.

5.1 A better understanding of the near past

Firstly, this dissertation brought together syntactic and semantic accounts of the near past *-ile*/*-é* in Zulu (§3.3), arguing following Botne & Kershner (2003) and Zeller et al. (2017) that the disjoint *-ile* should be broken down into a disjoint marker *-il* and the final vowel *-e*, while the final vowel is realised with a high tone as *-é* in the conjoint. For the DS analysis, this means that *-il* has a separate lexical entry from *-e*. This contrasts with authors such as Halpert (2012, 2016) who gloss the *-ile* form monomorphemically.

5.2 Object marking and information structure

Secondly in terms of Zulu, but also with implications beyond it, was the account of object marking. The analysis here presented mandates that object markers function as pronominal clitics, as opposed to being reflexes of agreement. Subject markers are similarly analysed as clitics. The fact that object markers are pronominal means that any overt DPs that occur with object-marked verbs are parsed off the matrix tree

as LINKed structures, predicting that they are always associated with contextual information.

This prediction of the theory matches the empirical data, on two key counts: (i) object-drop (i.e. omission of DP objects) is possible when the verb has object marking, reflecting that the verb phrase is type-complete prior to parsing an overt object, and (ii) overt objects that do appear with object-marked verb forms always have a topical information status. In parallel to this, overt DP objects that occur with conjoint verb forms (which cannot be object-marked) are predicted to always be new information. This matches what has been reported in the literature. A good way to test this more thoroughly in future empirical work would be a corpus study or other evaluation of discourse. Furthermore, this result provides a new perspective on the debate as to the status of subject and object markers in Bantu (e.g. Bresnan & Mchombo, 1987; Baker, 2003, a.o) and opens the field for Zulu as a comparison point with other clitic systems such as Romance (cf Marten & Kempson, 2008).

5.3 Constituency is information structure

Leading on from this observation that conjoint/disjoint marking for verbs with direct objects relates to the topicality of the objects, we can conclude tha0,t although Zulu is reported to be a language in which the conjoint/disjoint alternation is based on constituency rather than focus (cf Buell, 2013), the alternation is reducible, ultimately, to information structure. It is therefore potentially misleading to label Zulu as a constituency-type language, as information structural factors such as topicality of objects is shown to affect the alternation. While it is generally acknowledged that the conjoint/disjoint alternation relates to information structure directly or indirectly (Hyman, 2017), there is a tendency to group languages into "constituency-type" and "focus-type" ones (e.g. Buell, 2003 for Zulu, and van der Wal, 2017 for the crosslinguistic picture). Instead, I argue that such terms are misleading, in that information structure is fundamental to the alternation even in a constituency-type language like Zulu.

5.4 Verbal type underspecification in DS

Looking more generally at the DS formalism, this dissertation has highlighted two main points. The first concerns semantic types of verbs. Following Marten (2001), I proposed that types are not rigidly determined in the lexicon, and instead can be underspecified, e.g. with *-cul* 'sing' as Ty(e*→(e→t)). The final type of the verb is determined as a result of the environment in which it is parsed. We can therefore think of DS as a framework in which types are construed on-line, which parallels accounts from other frameworks such as Koenig & Jurafsky's (1994) account for HPSG.

5.5 Non-uniform semantics and lexical complexity

The second theory-specific point made by this dissertation is the observation that morphemes do not have a single semantics in DS. Instead, their precise contribution is determined by the triggering environment, i.e. the context of the parse. This reflects the difference in uncertainty at various parse states. The result is a heavy lexical entry with many different possible triggering environments. While this may be viewed as undesirable, what is important is that an analysis is able to capture all and only the possible grammatical parse routes, which in DS is achieved by making sure the triggering environments are only applicable in the relevant cases. Furthermore, avoiding lexical entries for null elements such as a null tense marker ∅- in the conjoint present means that lexical entries for overt elements such as verb stems must be made more complex, in order to capture the effects of prior null vs overt material. Adoption of the DS analysis therefore results in large and multi-conditional lexical entries.

Chapter 6

Conclusion

In conclusion, this dissertation has collated research on Zulu to provide an overview of the conjoint/disjoint alternation, an alternation between verb forms that is sensitive to the constituency of the verb phrase. I presented this phenomenon as a case study for Dynamics Syntax (DS), a relatively recent surface-based framework which builds parses incrementally and monotonically. In this approach, conjoint/disjoint morphology relates to the type specification of the verb phrase, and was seen to affect information structural interpretation. The DS approach significantly differs from existing accounts in terms of the core assumptions of the framework, such as the lack of primitive notions of topic and focus or specific structural positions for these.

In §5 I highlighted the implications this account makes for our understanding of Zulu and syntactic theory, as seen through this DS lens. Necessary future work to bolster the DS account would be (i) an analysis of corpus/dialogue data from Zulu to test information structure sensitivity and the predictions made by the pronominal clitic account of object markers, (ii) further detail on the analysis of adverbs, potentially working in the event-based semantics approach by Cann (2018), and, relatedly, (iii) better DS models of issues such as tense/mood/aspect.

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Appendix

Glossary of Dynamic Syntax terms

This glossary gives a brief overview of the Dynamic Syntax terms used in this dissertation; further detail can be found in the textbooks Kempson et al. (2001) and Cann et al. (2005).

Term	Meaning
◇	Symbol showing the current node being developed, called 'the pointer'
?X	Requirement for X, e.g. ?Ty(e) = a requirement for a type e entity. All requirements must have been met by the end of the parse in order for it to be grammatical
[⊥]	Bottom restriction. Forbids further development of that node.
$\langle\uparrow_0\rangle$ / $\langle\downarrow_0\rangle$	One argument node up / down
$\langle\uparrow_1\rangle$ $\langle\downarrow_1\rangle$	One functor node up / down
$\langle\uparrow_*\rangle$ / $\langle\downarrow_*\rangle$	Any number of nodes up / down, whether argument or functor
$\langle L^{-1}\rangle$	LINK node. Provides context to main tree.
ANTICIPATION	Pointer moves down the tree to a node with an outstanding type requirement as DS trees need to end up with no outstanding requirements
AXIOM	Requirement for a proposition at the root node, i.e. Tn(0),?Ty(t). All derivations begin with this.
COMPLETION	Moves pointer back up tree when all the requirements of a node are met
ELIF	'Else, if' - alternative triggering environment within a lexical entry (see IF)

ELSE	Failure condition for when none of the triggering environments of a lexical entry are applicable and so the lexical item cannot be parsed at that stage of the derivation
IF	Trigger environment for a lexical entry. These conditions must be met for the entry to be valid for the lexical item parsed
LINK	Contextual structure built from matrix tree. Does not contribute to truth conditions.
MERGE	Unfixed node collapses with a fixed node, under the condition that there is no clash in annotation
pointer	see ◇
requirement	see ?X
THINNING	Deletion of satisfied requirements e.g. ?Ty(e),Ty(e) → ~~?Ty(e)~~,Ty(e) → Ty(e)

Glossing convention

See below for a list of abbreviations used in glossing. Note that I have adapted glosses in some cases from the original source material, in order to make them more consistent.

Gloss	Meaning
1, 2, 3..	Bantu noun class number
1PL	1st person plural
1SG	1st person singular
APPL	applicative
AUG	noun augment, also called pre-prefix or initial vowel
CJ	conjoint
DEM	demonstrative
DJ	disjoint
FV	final vowel
LOC	locative marker
NEG	negation
OM	object marker
PAST	past tense
PERF	perfect aspect
PFV	perfective aspect
PL	plural
PRES	present tense
RC	relative concord
RS	relative suffix
SG	singular
SM	subject marker