RESEARCH

The Bantu-Romance-Greek connection revisited: Processing constraints in auxiliary and clitic placement from a cross-linguistic perspective

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This paper explores a connection between Romance and Greek on the one hand, and Bantu on the other. More specifically, we look at auxiliary placement in Rangi and clitic placement in Tobler Mussafia languages, with a special emphasis on Cypriot Greek, and argue that a common explanation for their distribution can be found once a move into a dynamic framework is made. Rangi exhibits an unusual word order alternation in auxiliary constructions under which the position of the auxiliary appears to be sensitive to an element appearing at the left periphery of the clause. A similar sensitivity to a left-peripheral element can be seen to regulate clitic placement in Cypriot Greek (and generally in the so-called Tobler Mussafia clitic languages). The paper presents a parsing-oriented account of these two phenomena in the Dynamic Syntax framework, arguing that the similarities in syntactic distribution are the result of the encoding in the lexicon of processing strategies that were potentially pragmatic preferences in earlier stages of the respective languages. The account thus leans on the role played by the lexical entries for auxiliary and clitic forms, as well as the assumption that underspecification is inherent in the process of establishing meaning in context. The account is further supplemented by possible pathways of diachronic change that could have given rise to the systems found in present day varieties.

Keywords: Bantu; Greek; grammaticalisation; language change; parsing dynamics; Dynamic Syntax; Romance

1 Introduction

The Bantu-Romance connection is a term that has been used to refer to a number of syntactic and morphosyntactic similarities found in languages from these genetically unrelated language groups (see for example the collected volume by de Cat & Demuth 2008). In this vein, researchers have observed similarities in Bantu and Romance languages with regards to weak object pronominals (Labelle 2008; Marten et al. 2008), the structure of the DP (Carstens 2008; Zamparelli 2008), as well as information structure (Costa & Kula 2008; Frascarelli 2008). This paper continues this endeavor, extending the connection from yet another perspective: we show how different processing strategies that can be encoded as lexical triggers for parsing, appear in similar ways in Bantu, Romance and – adding in this respect a third language family to the emerging picture – Greek. We exemplify this claim by looking at two phenomena which, despite being different in descriptive terms, exhibit a number of similarities in relation to the dynamic parsing process involved in the establishment of propositional structure: auxiliary placement in the Bantu language Rangi on the one hand and clitic placement in Greek dialects (with special emphasis placed on Cypriot Greek) on the other hand.

Bantu languages commonly use a combination of simple and auxiliary-based compound constructions to encode a range of tense-aspect combinations. The Tanzanian Bantu language Rangi exhibits an word order alternation in these auxiliary constructions: whilst the auxiliary appears after the verb in future tense declarative clauses ((1) and (2)), this order is inverted when one of a number of elements appears at the left periphery, yielding auxiliary-verb order (3).

(1)   *Rangi* (Gibson 2012: 107)
        Kw-i-súm-ʊl-a   n-**íise**   ɪ-hɪ   mbʊ́ri   haaha.
        INF-OM9-take-SEP-FV   SM1SG-AUX.FUT1   9-DEM   9.goat   now
        'I will take this goat now.'

(2)   *Rangi* (Gibson 2012: 107)
        Háánd-a   n-**íise**   vi-ryo   ʊ-hʊ   mw-aáká.
        plant-FV   SM1SG-AUX.FUT1   8-millet   DEM-3   3-year
        'I will plant millet this year.'

(3)   *Rangi* (Gibson 2012: 114)
        Ani   á-**rɪ**   ful-a   ingo   j-á   ingovi?
        who   SM1-AUX   wash-FV   9.clothes   9-of   9.celebration
        'Who will wash the clothes for the celebration?'

This state of affairs is remarkably reminiscent of clitic positioning in languages such as European Portuguese (Madeira 1992), Cypriot Greek (Aggouraki 2001; Chatzikyriakidis 2010; 2012), West Iberian (Galician, Gupton 2012) and Asturian (Gonzalez 1994), among others. In these languages, clitic placement is generally enclitic in declarative sentences (as can be seen in example (4) from European Portuguese), but proclitic in case a number of elements appears at the left periphery. For example, in (5) and (6), the negative marker *não* 'not' and the subordinating conjunction *se* 'if' trigger proclitic positioning of the clitic:[1]

(4)   *European Portuguese* (Madeira 1992)
        O   Paulo   deu   me   um   livro.
        the   Paulo   gave.3SG   me.CL   a   book
        'Paul gave me a book.'

(5)   *European Portuguese* (Madeira 1992)
        O   Paulo   não   me   deu   um   livro.
        the   Paul   NOT   me.CL   gave.3SG   a   book
        'Paul did not give me a book.'

(6)   *European Portuguese* (Madeira 1992)
        Se   o   Paulo   me   tivesse   ajudado.
        If   the   Paul   me.CL   had   helped
        'If Paul had helped me.'

In this paper we propose that the regulating factor responsible for determining both auxiliary placement in Rangi and clitic placement in this type of clitic languages, is the association of the preceding elements with specific processing strategies. These

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[1] Note that that we use the terms 'proclisis' and 'enclisis' in a syntactic rather than a phonological sense.

strategies, we claim, are encoded as part of the lexical entries for the clitics and auxiliaries respectively, giving rise to similarities in syntactic distribution despite the descriptive differences (i.e. an auxiliary vs clitic systems). In order to do this, we propose an account for Rangi auxiliary placement along similar lines to that developed by Bouzouita (2008a) for Medieval Spanish and Chatzikyriakidis (2010; 2012) for Cypriotic Greek (CG) clitic positioning. The account is formulated from the perspective of Dynamic Syntax (DS; Kempson et al. 2001; Cann et al. 2005), a parsing-oriented framework which aims to capture the real-time parsing of natural language. We show that such an account naturally brings out the similarities of the two systems as the result of processing dynamics, showing similar effects – and in fact, being able to predict the ordering restrictions – in these unrelated languages.

The structure of the paper is as follows: Section 2 introduces the data from auxiliary placement in Rangi and clitic placement in dialects of Modern Greek, drawing out the parallels in the two systems. Section 3 provides an overview of the Dynamic Syntax framework, introducing the tools and architecture of the theoretical approach. Section 4 presents a formal modelling of the Rangi word order alternation, whilst Section 5 presents an account of the rise of the word order alteration in Rangi based on evidence from Greek and the Tobler Massafia systems more broadly. Section 6 constitutes a conclusion.

2 The Bantu-Romance-Greek connection: An overview of the data

There is a great deal of variation within both the auxiliary systems of Bantu languages and the clitic systems of Romance and Greek. However, a number of generalisations regarding these constructions can still be formulated. The variation in Bantu auxiliary placement can be summarised as falling into two types, as shown in (9).

(9)   ***Bantu type A***
        Auxiliaries consistently precede the verb (the vast majority of Bantu languages, such as Swahili, siSwati, Xitsonga etc.).

        Bantu type B
        Some (or all) auxiliaries appear post-verbally, except when one of a number of elements appears at the left periphery (a limited number of languages, only Rangi, Mbugwe, Gusii, Ngoreme, Simbiti and Kuria, to our knowledge).

Similarly, the variation in Romance and Greek clitic systems can be captured under the two categories, as outlined in (10).

(10)   ***Romance/Greek type A***
        Clitics generally precede the verb in non-imperative finite forms and immediately follow the verbal form in imperatives, gerunds and infinitives (Standard Modern Greek, Italian, Spanish, Catalan).

        Romance/Greek type B
        Clitics generally immediately follow the verb except when one of a number of elements appears at the left periphery (European Portuguese, CG, Old Spanish, Old Portuguese, Old Catalan).

Besides these two major patterns of clitic positioning in Romance and Greek, we further find another pattern exemplified at least with one language, i.e. Brazilian Portuguese (BP), where clitics appear preverbally across the board (Madeira 1992; Wetzels et al. 2016). The following shows a case with an imperative, the prototypical case where A Type languages employ enclisis:

(7)   *Brazilian Portuguese* (Madeira 1992)
         Me   ajude.
         me.CL   help
         'Help me.'

This is similar to Bantu type A as the attentive reader will have noticed. We will come back to this similarity (as well as to its mirror image exemplified by Pontic Greek) in the next section. The intricacies of these two types of system are presented in order below.

2.1 Auxiliary placement in Rangi

Bantu languages employ a combination of simple and complex verbal forms to encode a wide range of temporal and aspectual distinctions. Simple verb forms are comprised of a single verb form marked for subject and tense and/or aspect information. In complex verb forms, one or more verbal or auxiliary forms combines with a lexical main verb. In such instances, the auxiliary is usually inflected for subject information and followed by a main verb, which may also carry subject information or may appear in a bare infinitival form. If the second verb is in a finite form, tense is typically marked on the auxiliary whilst aspect is marked on the main verb. Across the Bantu languages, different grammaticalisation processes have resulted in variation in complex verb forms with respect to the subject-marking properties, the expression of tense-aspect-mood information and constituent order (Gibson and Marten 2016).

   In compound verbal constructions in most Bantu languages, the first element is an auxiliary whilst the second element is the main lexical verb. This is also the case in Rangi in a number of tenses. Thus, the recent past perfective is formed using the auxiliary *-rɪ* and is followed by an inflected main verb, as can be seen in example (11) below. Similarly, the distant past perfective is formed using the auxiliary *-íja* in conjunction with a lexical main verb and exhibits the Bantu-typical auxiliary-verb order (12).

(11)   *Rangi* (Gibson 2012: 43)
         U-ra   mʊ-gonjwa   áá-**rɪ**   a-a-kwíy-ire.
         1-DEM   1-ill.person   SM1-AUX.PAST1   SM1-PAST1-die-PTV
         'That ill person has died.'

(12)   *Rangi* (Gibson 2012: 96)
         A-íja   mʊ-dúúdi   a-**íja**   i-i-fyeen-ire
         SM1-AUX.PAST2   1-small   SM1-AUX.PAST2   SM1-REFL-ressemble-PERF
         na   íyo   w-aavʊ.
         CONN   1a.mother   SM1a-their
         'When s/he was small s/he looked like their mother.'

However, Rangi also exhibits post-verbal auxiliary placement. This verb-auxiliary order is restricted to the immediate future tense which is formed using the auxiliary *-íise* (13) and general future tense which is formed using the auxiliary *-rɪ* (14). In these constructions, an attempt at pre-verbal auxiliary placement in a declarative main clause results in ungrammaticality (15).

(13)   *Rangi* (Gibson 2012: 107)
         Kw-ɪ-sum-ʊl-a   n-**íise**   ɪ-hɪ   mbúri   haaha.
         INF-OM9-take-SEP-FV   SM1SG-AUX.FUT1   9-DEM   9.goat   now
         'I will take this goat now.'

(14)   *Rangi* (Gibson 2012: 101)
      Maama   jót-a   a-**rɪ**   maaji   mpolɪ.
      1.mother   collect-FV   SM1-AUX.FUT1   6.water   later
      'Mother will collect water later.'

(15)   *Rangi* (Gibson 2012: 17)
      *N-**íise**   térek-a   chá-kʊrya.
      SM1SG-AUX.FUT1   cook-FV   7-food
      Intd.: 'I will cook food.'

Whilst the auxiliary obligatorily appears after the verb in declarative main clauses, this order is reversed when the auxiliary construction is part of a wh-question, a negative construction, a relative or subordinate clause or a cleft construction. In all of these instances, the auxiliary construction appears after one of a number of elements at the left periphery. Thus, auxiliary-verb order is found after the wh-element *ani* 'who' (16), the negative marker *sí* (17) and the subordinator *joolɪ* 'how, the way in which' (18).

(16)   *Rangi* (Gibson 2012: 114)
      Ani   á-**rɪ**   ful-a   ingo   j-á   ingovi?
      who   SM1-AUX   wash-FV   9.clothes   9-of   9.celebration
      'Who will wash the clothes for the celebration?'

(17)   *Rangi* (Gibson 2012: 116)
      Nkúkú   sí   jí-**rɪ**   kʊ-tu-héer-a   mayi   tʊkʊ.
      10.chicken   NEG   10-AUX   INF-OM1PL-give-FV   6.eggs   NEG
      'The chickens will not give us eggs.'

(18)   *Rangi* (Gibson 2012: 121)
      N-íyó-wás-a   joolɪ   ndí-**rɪ**   rih-a   ada.
      SM1SG-PROG-think-FV   how   SM1SG-AUX   pay-FV   10.fees
      'I am thinking about how I will pay the fees.'

The future tense is the only context in which this verb-auxiliary order is found in Rangi and the only instance in which a word order alternation is triggered in the aforementioned contexts.[2] In addition to being of interest from a language change perspective, the data provide a challenge in terms of the modelling of the linear word order, as well as the attendant interpretation associated with these constructions.[3]

    The next section presents an overview of clitic placement in Romance and Greek with a focus on a number of varieties which exhibit similarities – and a number of important differences – with the picture in Rangi and Bantu more broadly.

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[2] This is a generalisation which also holds for Bantu more broadly since wh-questions, negation, cleft constructions, relative and subordinate clauses are not commonly associated with a word order change across the language family.

[3] It should also be noted that Rangi is not alone in exhibiting this word order. On-going research has identified five other East African Bantu languages which exhibit post-verbal auxiliary placement, and a number of the same 'alternation contexts' can also be noted in these languages. Whilst an examination of these languages is beyond the remit of the current study, it is proposed that this formal account could be extended in a straightforward manner to the other languages in which this order is found, albeit taking into account the language-specific intricacies in each case.

2.2 Clitic placement in Romance and Greek

Clitic positioning in various Romance and Greek varieties has a long and documented history of both synchronic and diachronic theoretical analysis. There is a striking similarity for languages with synchronically similar clitic positioning systems to have emerged from earlier varieties that also had similar positioning systems diachronically. This has been shown to be the case for Romance languages, where in most cases, a so-called Tobler-Mussafia kind of clitic system was at play at some point in the earlier stage of the language (Mussafia 1886).[4] The same can be said for Greek, the respective varieties of which also derive from earlier Tobler-Mussafia clitic systems (Pappas 2001; Chatzikyriakidis 2010). In some cases, these older systems have been maintained (at least on some level) and Tobler Mussafia languages are present today in both Romance (e.g. European Portuguese) and Greek varieties (e.g. in Cypriot Greek). A note is in order here: the literature on old Romance clitic positioning systems and the Tobler Mussafia is vast and we do not intend to dwell on this in the current paper (the interested reader is however directed to Fontana 1993; Beninca 1994; Fischer 2002 for Romance, and Revithiadou 2006 for Greek, amongst others). The variety which we wish to examine in more detail here is Cypriot Greek due to the striking similarities it exhibits in relation to the system in Rangi.

Cypriot Greek exhibits three different positioning environments: i) enclitic, ii) proclitic and iii) variation environments. Clitics are generally enclitic in indicative and non-indicative contexts (19).

(19)   *Cypriot Greek* (Chatzikyriakidis 2010)
     Ksero   **ton.**
     know.1SG   him.CL-ACC
     'I know him.'

However, proclisis occurs when one of a number of elements appears at the left periphery. These include wh-elements (20a), mood/tense particles (20b), negative markers (20c), fronted constituents (20d) and (20e) or subordinating conjunctions (20f).

(20)   *Cypriot Greek* (Chatzikyriakidis 2010)
     a.   Pios   **ton**   ide?
         who   him   saw
         'Who saw him?'

     b.   Enna   **ton**   do.
         FUT   him.CL-ACC   see.1SG
         'I will see him.'

     c.   En   **ton**   ida.
         NEG   him.CL-ACC   saw.1SG
         'I did not see him.'

     d.   O   Giorgos   **ton**   ikseri.
         the.NOM   George.NOM   him.CL-ACC   know.3SG
         'It is GEORGE that knows him.'

     e.   Xtes   **ton**   ida…
         yesterday   him.CL-ACC   saw.1SG
         'It was yesterday that I saw him…'

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[4] A Tobler Mussafia clitic positioning system is one in which first position clitics are not allowed. This means that enclisis is the norm if the verb is in the first position. However, proclisis obtains when one of a number of elements appears at the left periphery (the type of these elements are quite standard across the languages with a small degree of variation apparent).

f. An   **ton**   dite…
    if   him.CL-ACC   see.3PL
    'If you see him…'

The elements which trigger proclisis in Cypriot Greek can therefore be summarised as follows:

i)   Wh-elements
ii)   Modality/tense/mood markers particles
iii) Subordinating conjunctions
iv)   Negation
v)   Focused elements (both argument and non-argument)

It is quite striking that the contexts in which proclisis are triggered in Cypriot Greek are remarkably similar to those which result in pre-verbal auxiliary placement in Rangi. This is a point that we will return to in Section 4.

2.3 Bantu auxiliary systems and Greek clitic systems: The parallels

Recall the systems outlined in Section 2.1 above. In the Bantu type A systems auxiliaries consistently precede the verb whilst in the Bantu type B systems some (or all) auxiliaries appear post-verbally except when one of a number of elements appears at the left periphery. In the Romance and Greek type A systems, clitics generally precede the verb in non-imperative finite forms and immediately follow the verb in imperatives, gerunds and infinitives. In contrast, in the Romance/Greek type B systems clitics immediately follow the verb except when one of a number of elements appears at the left periphery.

The Type A systems, although similar in some regards, exhibit a major difference. The Bantu A systems are always associated with preverbal positioning whilst the A systems of Romance and Greek are sensitive to the verbal form in which the clitic occurs, i.e. the clitic is postverbal when an imperative, infinitive or a gerund is present, and preverbal otherwise (these are sometimes called the 'finiteness sensitive languages', Mavrogiorgos 2010; Neokleous 2014). However, the similarities between the Type B systems are striking: not only is a change in placement triggered by the presence of an element at the left periphery, but also in many of these cases the elements that trigger this placement are similar. Thus, wh-elements, negative particles, subordinating conjunctions and focus elements all play a role in determining clitic and auxiliary placement in the languages in which an alternation is present.

However, as we have seen, there is a rare case of a clitic system exemplified by BP, let us call this a Type C system, that can be seen as the parallel to Bantu type A systems. Furthermore, Pontic Greek, exhibits the mirror image of this system, i.e. clitics are always enclitic, regardless of the nature of the preceding element and clause type (see, e.g. Drettas 1997; Chatzikyriakidis 2010; Chatzikyriakidis & Kempson 2011, among others). The examples from below are illustrative.

(21)   *Pontic Greek* (Chatzikyriakidis 2010: 235–236)
       a. Entok(en)   **a.**
           hit.3SG.PAST   it.CL
           'S/he hit it.'
       b. Pios   (*a)   entok(en)   **a**?
           who.NOM   it.CL   hit.3SG   it.CL
           'Who hit it?'

c. Ki   (*a)   entok(en)   **a.**
NEG   it.CL   hit.3SG.PAST   it.CL
'S/he did not hit it.'

d. An   (*a)   entok(en)   **a...**
if   it.CL   hit.3SG.PAST   it.CL
'If s/he hit it...'

In this regard, Pontic Greek appears to exhibit the same pattern as is found in the majority of Bantu languages – albeit as a mirror image, while BP exhibits the same pattern. Auxiliaries in the more typical Bantu languages consistently appear pre-verbally regardless of the clause type or the presence of a preceding element at the left periphery (as would be expected of SVO languages more broadly). Similarly, in BP and Pontic Greek, the clitic appears preverbally and post-verbally respectively and are not sensitive to clause type or the presence of a left-peripheral element.

In light of the observed parallels between Bantu auxiliary constructions and Romance and Greek clitic placement, the question is whether these constructions can receive a unified explanation or whether these are two distinct phenomena with only superficially similar properties. The challenge is two-fold. Firstly, we are attempting to draw parallels between unrelated and typologically distinct languages. Secondly, the elements under examination differ in their formal properties: the clitics in Romance and Greek are pronominal in nature whilst the Bantu auxiliaries are more 'verbal' in nature, their interpretation being dependent on a lexical verb in the clause. However, despite their formal differences, we propose here that a unified approach to account for these phenomena can indeed be forwarded. In particular, we develop an account that draws on parsing dynamics, the concepts of underspecification and update and the central role played by the lexical contribution of the auxiliaries and clitics in question in the establishment of propositional structure. The next section introduces the tools of theoretical framework which is adopted to articulate this formal account – Dynamic Syntax.

3 The Dynamic Syntax framework
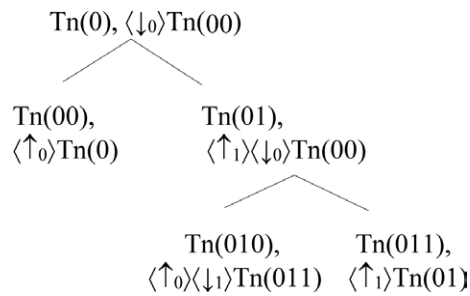### 3.1 Introduction and theoretical preliminaries

The Dynamic Syntax (DS) framework (Kempson et al. 2001; Cann et al. 2005) is a processing/parsing-oriented framework. One of the basic assumptions behind DS is that natural language syntax can be seen as the progressive accumulation of transparent semantic representations with the upper goal being the construction of a logical propositional formula (a formula of type *t*). This process is driven by means of monotonic tree growth, representing the attempt to model the way information is processed in a time-linear, incremental, word-to-word manner. Tree growth is driven by means of requirements (indicated by the question mark (?)). The starting point for every parse, called the AXIOM, reflects the goal of constructing a proposition – indicated by a requirement for a formula of type *t* (22).

(22)   The AXIOM

$?Ty(t), \Diamond$

In common with other syntactic theories, the language of representation consists of binary trees. These binary trees however are underpinned by a language to talk about trees – the Language Of Finite Trees (LOFT; Black & Meyer-Viol 1994). LOFT is an expressive modal language that allows statements to be made about any treenode from the perspective of any treenode. LOFT uses two basic tree modalities, the up and down arrow relations,

$\langle\uparrow\rangle$ and $\langle\downarrow\rangle$ respectively, which correspond to the daughter and mother relations. Left nodes are addressed as 0 nodes, whereas right nodes are 1 nodes. By convention, nodes on the left correspond to argument nodes, i.e. nodes in which arguments are represented, whereas right nodes correspond to the functor nodes, i.e. nodes in which all the various types of predicates are represented. Thus, $\langle\downarrow_0\rangle$ corresponds to the daughter argument node whereas $\langle\downarrow_1\rangle$ to the functor argument node. The rootnode is given the treenode address 0 and it is defined as the sole node that does not have a mother node. This can be seen on examination of the tree in (23) below.

(23)   The LOFT modalities in action

Tn(0), $\langle\downarrow_0\rangle$Tn(00)

Tn(00),   Tn(01),
$\langle\uparrow_0\rangle$Tn(0) $\langle\uparrow_1\rangle\langle\downarrow_0\rangle$Tn(00)

Tn(010),   Tn(011),
$\langle\uparrow_0\rangle\langle\downarrow_1\rangle$Tn(011) $\langle\uparrow_1\rangle$Tn(01)

The tree modalities provide a powerful system for talking about nodes in the tree. As can be seen in the above tree, all nodes have a treenode address and a further statement identifying another node in the tree. For example, the statement $\langle\uparrow_0\rangle\langle\downarrow_1\rangle$ Tn(011) found in the 010 node reads as: if you take a step across the 0 mother relation followed by a step across the 1 daughter relation you will find treenode 011. Additionally, the two kleene operators * and + are used in combination with the basic tree modalities, denoting the reflexive transitive and the transitive closure of the modality in each case. Thus, $\langle\downarrow^*\rangle$ reads as 'somewhere below me including the current node', whereas $\langle\downarrow^+\rangle$ reads as 'somewhere below me but not including the current node'.

   Treenodes are inhabited by tree decorations. Each treenode is associated with a formula and a type value. The first denotes its semantic content, whilst the second denotes its semantic type. These are represented by means of the predicates Fo and Ty respectively, i.e. Fo(John'), Ty(e) etc. The end result of every successful parse of a given natural language string involves a binary tree, in which all the nodes have complete type and formula values and no outstanding requirements are present on the tree. Such a tree standing for the end of result of parsing *John upset Mary* is shown below (24):

(24)   Final tree state of *John upset Mary*

Ty(t), Fo(upset'(mary')(john')), $\Diamond$

Ty(e),   Ty(e→t),
Fo(john')   Fo(upset'(mary'))

Ty(e),   Ty(e→(e→t)),
Fo(mary')   Fo(upset')
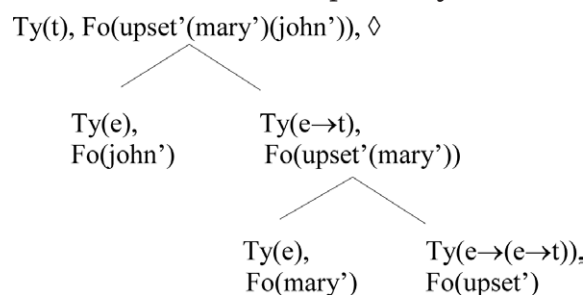
In the above tree all nodes carry formula and type value information. Formula and type values combine via functional application and *modus ponens* respectively.

Since Dynamic Syntax is concerned with the establishment of propositional structure in context, the intermediate steps of tree growth are considered to be as important as the final tree. Section 3.2 below outlines the way in which trees grow.

3.2 The mechanisms of treegrowth

The Dynamic Syntax semantic structure and the associated gradual update are expressed by recourse to binary trees. DS makes use of two basic mechanisms to guide the parsing process: lexical actions and computational actions. The first are language-specific lexical entries associated with morphemes and words in the language, whilst the second comprise general computational rules assumed to be available for every language. Lexical entries are considered to be a closed set of rules that help the parsing process unfold. These involve pointer movement rules that perform functional application and *modus ponens* (for formulas and types respectively) and rules that remove requirements as soon as these are satisfied.

In the case of parsing a sentence such as *John upset Mary*, the final tree for which was shown in (24) above, tree growth proceeds on a word-by-word basis with the lexical entries encoded by the words responsible for the establishment of propositional structure. The subject expression *John* for example can be projected onto argument-requiring type *e* node.[5]

(25)   Parsing: *John…*

$$\text{Tn(0), ?Ty(t)}$$

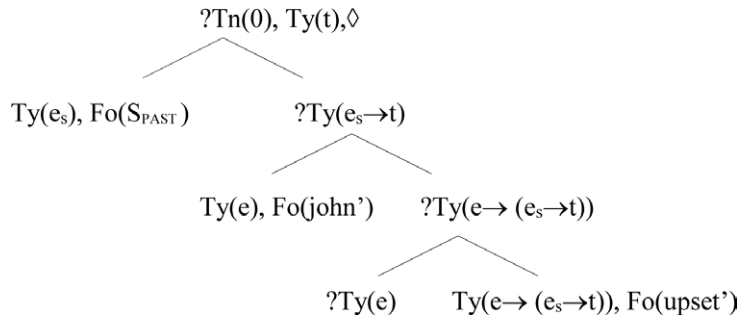$$\text{Ty(e), Fo(john'), } \Diamond$$

Verbs are defined as introducing propositional structure using the predicate to which the verb corresponds and the requisite number of associated argument nodes (determined by the valency of the verb). Parsing a transitive verb therefore, introduces a subject argument node and an object argument node. The next element to come into parse is the finite verb *upset*. The DS account of tense is based on the assumption that every sentence involves a higher situation argument where aspect and tense information is encoded. For the purposes of the current paper, tense and aspect information are represented using a metavariable (S) on this situation argument node. This variable hosts an attribute which determines how the information is to be interpreted, for example, S_{PAST} in the case of past tense or S_{FUTURE} in the case of future tense. The information that is present on this node can be introduced via a variety of elements, including verbs, tense and aspect markers. A more detailed characterisation of tense-aspect information under the DS approach would involve an epsilon event term in which the feature would be a predicate restriction on the event variable. We believe that an appropriate account can be developed in the current paper without recourse to this level of complexity. However, the interested reader is referred to Gregoromichelaki (2006), Chatzikyriakidis (2010) and Cann (2011) for additional details of this approach.

Parsing a transitive verb such as *upset* therefore results in the introduction of a transitive predicate node, the subject and object argument nodes and the situation argument node which is of type e_s. This type e_s is a subtype of type *e*, assuming that the domain *e* contains
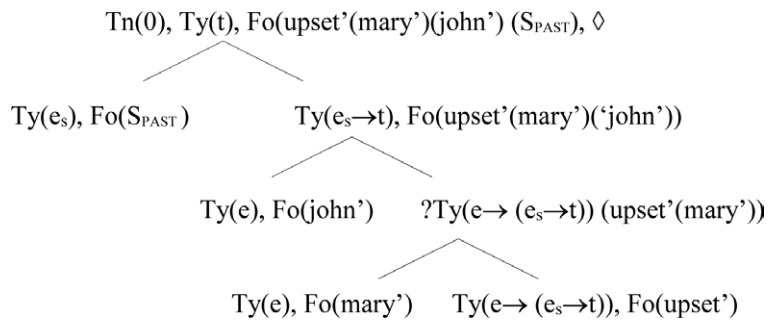
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[5] A more refined account for modelling English (potential) subject expressions, which employs an unfixed node, is also available in the DS framework. We do not enter into the details of such an approach here since this example is only intended to be illustrative of the tree-building process.

both individual entities and situational/event entities. In this case, *upset* is responsible for the projection of this situation argument node, as well as for providing the tense information. This can be seen in the tree in (26) below.

(26)   Parsing: *John upset…*

$$?Tn(0),\ Ty(t), \Diamond$$

$$Ty(e_s),\ Fo(S_{PAST})\qquad\qquad ?Ty(e_s{\to}t)$$

$$Ty(e),\ Fo(john')\qquad ?Ty(e{\to}(e_s{\to}t))$$

$$?Ty(e)\qquad Ty(e{\to}(e_s{\to}t)),\ Fo(upset')$$

Finally, parsing the object argument *Mary* enables the update of the object node to a full formula value. With all the requirements satisfied (recall that these are represented by a ?), the information is compiled up the tree and the tree building process is complete. A snapshot of the final tree state for *John upset Mary* is shown below.

(27)   Parsing: *John upset Mary*

$$Tn(0),\ Ty(t),\ Fo(upset'(mary')(john')\ (S_{PAST})),\ \Diamond$$

$$Ty(e_s),\ Fo(S_{PAST})\qquad\qquad Ty(e_s{\to}t),\ Fo(upset'(mary')('john'))$$

$$Ty(e),\ Fo(john')\qquad ?Ty(e{\to}(e_s{\to}t))\ (upset'(mary'))$$

$$Ty(e),\ Fo(mary')\qquad Ty(e{\to}(e_s{\to}t)),\ Fo(upset')$$

As can be seen in the tree above, in the final tree state, all the requirements are fulfilled and all of the nodes are annotated with type information and complete formula values.

The next section discusses the similarities in parsing terms involved in modelling Rangi auxiliary placement and clitic placement in Romance and Greek, drawing on a combination of lexical actions, computational rules and pragmatic update.

3.3 Building propositional structure: Treegrowth in Greek

In this section we illustrate the way lexical entries and computational rules work together by examining the parse of the following sentence from Cypriot Greek:

(28)   *Cypriot Greek*
         Ide   ton.
         saw.3SG   him.CL-ACC
         'S/He saw him.'

Lexical entries are specified in a simple IF THEN ELSE format. Verbs in pro-drop languages such as Cypriot Greek, as well as in Standard Modern Greek, are assumed to introduce the whole propositional template starting from a requirement to obtain a propositional formula (?Ty(t)). The entry for a transitive verbs in Cypriot Greek is shown below:
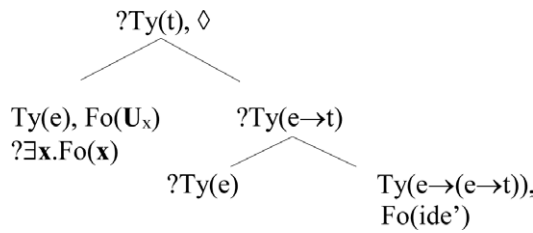
(29)   Lexical entry for the transitive verb *ide* 'saw' in Cypriot Greek
        IF $?Ty(t)$
        THEN   make($\langle\downarrow_1\rangle$), go($\langle\downarrow_1\rangle$); put($?Ty(e{\to}t)$);
                make($\langle\downarrow_1\rangle$), go($\langle\downarrow_1\rangle$); put(Fo(verb'),$Ty(e{\to}(e{\to}t))$);
                go($\langle\uparrow_1\rangle$), make($\langle\downarrow_0\rangle$), go($\langle\downarrow_0\rangle$); put($?Ty(e)$);
                go($\langle\uparrow_0\rangle\langle\uparrow_1\rangle$); make($\langle\downarrow_0\rangle$), go($\langle\downarrow_0\rangle$);
                put($Ty(e)$, Fo($\mathbf{U}_\mathbf{x}$), $?\exists\mathbf{x}.Fo(\mathbf{x})$); gofirst($?Ty(t)$)
        ELSE   abort

The above entry states that if the pointer is at a type-t requiring node, then the entry builds the predicate node, decorates this with a type requirement, builds the transitive predicate node and similarly decorates this with a formula value and a type value. This then further builds the object node and decorates it with a type requirement, as well as building the subject node which it decorates with a type value but a formula metavariable (rather than a full formula value). This last action is done in order to capture the pro-drop properties of the language. Formula metavariables (indicated by bold uppercase letters i.e. $\mathbf{U}$, $\mathbf{V}$, $\mathbf{X}$ etc.) can be seen as content placeholders that require substitution before the parse is complete – either as a result of information provided by context or from the natural language string itself.[6] The statement $?\exists\mathbf{x}.Fo(\mathbf{x})$ encodes the need for substitution of this metavariable with a proper formula value. The pointer (indicated by $\lozenge$) is the device which indicates the node under construction at any given point in the parsing process. The actions contained in the lexical entry subsequently return the pointer to the first type-t-requiring node, resulting in the tree in (30) below:

(30)   Parsing the transitive verb *ide* 'saw' in Cypriot Greek

$?Ty(t)$, $\lozenge$

$Ty(e)$, Fo($\mathbf{U}_\mathbf{x}$) $?Ty(e{\to}t)$
$?\exists\mathbf{x}.Fo(\mathbf{x})$

          $?Ty(e)$ $Ty(e{\to}(e{\to}t))$.
                            Fo(ide')

In the Cypriot Greek sentence currently under examination after *ide ton* 's/he saw him' the next element to come into parse is the third person accusative clitic. Third person accusative clitics in Cypriot Greek (as well as in Standard Modern Greek) are always associated with the direct object (see Chatzikyriakidis 2009; 2010). As outlined above, in regards to positioning, clitics in Cypriot Greek are enclitic in general except when one of a number of functional elements appears at the left periphery, in which case proclisis obtains. First we discuss the enclitic cases. The lexical entry for the third person accusative clitic *ton* 'him' is shown below:

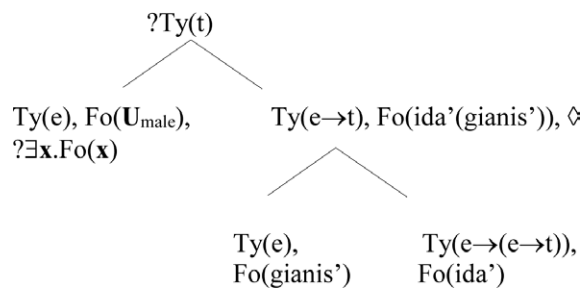(31)   Lexical entry for the Cypriot Greek clitic *ton* 'him'
        IF $?Ty(t)$
        THEN   IF $\langle\downarrow^+\rangle(Ty(x))$
                THEN   make($\langle\downarrow_1\rangle$); go($\langle\downarrow_1\rangle$); make($\langle\downarrow_0\rangle$); go($\langle\downarrow_0\rangle$);
                        put($Ty(e)$, Fo($\mathbf{U}_{male}$), $?\exists\mathbf{x}.Fo(\mathbf{x})$, gofirst($?Ty(t)$))
        ELSE   abort

---

[6] The subscript in the metavariable can also indicate gender or person restrictions, or in the case of Bantu languages, restrictions in terms of noun class. For example, a first person restriction will be represented by $\mathbf{U}_{Speaker}$, whilst a Bantu class 2 restriction will appear as $\mathbf{U}_{CLASS2}$.

This lexical entry says that if you are at a type-t-requiring node and a predicate type exists below ($\langle\downarrow^+\rangle(Ty(x))$), then the clitic goes to the direct object node and decorates it with a type. This node will also be annotated with a formula metavariable that bears a restriction on substitution that requires the updated formula to be marked for masculine gender ($Fo(U_{male})$). The pointer subsequently returns to the type-t-requiring node. At this point, the general computational rules of the system come into play in order to provide us with a well-formed parse.

   First, the pointer goes down to the direct object node via the rule of ANTICIPATION which moves the pointer down whenever an unsatisfied requirement exists. In our case, this rule is applied twice, once moving the pointer to the predicate node and again to move the pointer to the object node. Then, assuming that a proper value is provided by the context, for example *Gianis* 'John', the requirement $?\exists x.Fo(x)$ is satisfied and disappears. Subsequently, another rule known as COMPLETION moves the pointer to the mother node. This rule applies only if a requirement on a node has been satisfied. The rule of ELIMINATION subsequently applies, performing functional application for formula values and *modus ponens* for type values on the daughter nodes, recording the results on the node under development. The result of this process is depicted in the tree structure below:

(32)   After COMPLETION and ELIMINATION

$$?Ty(t)$$

$Ty(e), Fo(\mathbf{U}_{male}),$ $Ty(e{\rightarrow}t), Fo(ida'(gianis')), \Diamond$
$?\exists\mathbf{x}.Fo(\mathbf{x})$

$Ty(e),$ $Ty(e{\rightarrow}(e{\rightarrow}t)),$
$Fo(gianis')$ $Fo(ida')$

From this point on we apply COMPLETION again to move the pointer to the top node and ANTICIPATION to move the pointer to the subject node. Assuming that a value has been provided by the context in the subject node, we can move the pointer to the top node via COMPLETION. At this point ELIMINATION applies and the result is a well-formed parse. Note that we assume that the metavariable for the subject has been substituted by the proper formula value $Fo(stergios')$ which is provided by the discourse context:[7]

(33)   Obtaining a well-formed parse for *ide ton* 'S/he saw him.'
   $Tn(0), Ty(t), Fo(ida'(gianis')(stergios')), \Diamond$

$Ty(e),$ $Ty(e{\rightarrow}t)$
$Fo(stergios')$ $Fo(ida(giani'))$

$Ty(e),$ $Ty(e{\rightarrow}(e{\rightarrow}t)),$
$Fo(giani')$ $Fo(ida')$

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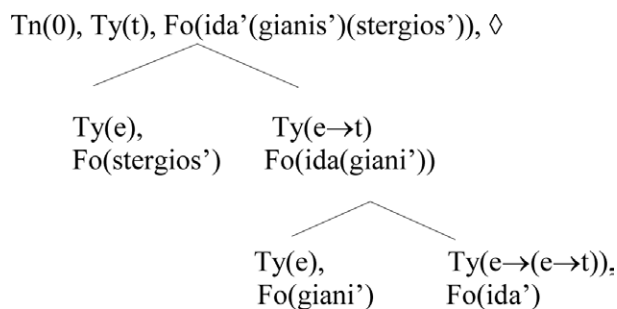
[7] The tree shown in (33) does not involve a situation argument node since the example does not involve an auxiliary and as such, the situation argument is not necessary for illustration purposes. This is not a different analysis from that presented for Rangi for example, but rather a different type of construction.

### 3.4 Underspecification and parsing in context: Bantu clause structure

One of the basic assumptions regarding tree growth and syntax endorsed by Dynamic Syntax is that structural underspecification plays a major role in the way natural language syntax unfolds. In order to encode structural underspecification, DS employs unfixed nodes – nodes which do not have a fully-specified address at the point at which they are introduced into the tree. The *ADJUNCTION rules constitute a family of rules that are used to capture this structural underspecification. The most common rule – *ADJUNCTION – introduces an unfixed node from the top node with a type e requirement, as well as a requirement for a proper treenode address to be found at some point before the parse is complete ($?\exists \mathbf{x}.\mathrm{Tn}(\mathbf{x})$). The rule can only apply when there is no other structure in the tree. If this is the case then an unfixed node can be projected. The structure after introduction of the rule of *ADJUNCTION in tree notation is shown below.

(34)　　The effect of the rule of * ADJUNCTION

$$\mathrm{Tn}(0),\ ?\mathrm{Ty}(t)$$

$$\langle\uparrow^*\rangle\mathrm{Tn}(0),\ ?\mathrm{Ty}(e),\ ?\exists x.\mathrm{Tn}(x),\ \Diamond$$
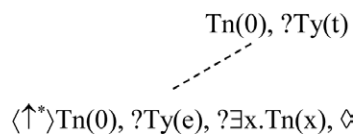
In addition to the rule of *ADJUNCTION which introduces an unfixed node, the rule of LOCAL *ADJUNCTION is also available. The rule of LOCAL *ADJUNCTION introduces a locally unfixed node. Whilst (general) unfixed nodes have the modality $\langle\uparrow^*\rangle$ Tn(0) which indicates that the root node is either at or above the current node, the potential fixing site of a locally unfixed node is further restricted to the local domain. This is captured in the modality $\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle$ Tn(0) which means that this node must ultimately be fixed as an argument node along a (possibly empty) functor chain. The result of LOCAL *ADJUNCTION is a locally unfixed node as shown in (35) (note the distinct $\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle$ modality).

(35)　　The effect of LOCAL *ADJUNCTION

$$\mathrm{Tn}(0),\ ?\mathrm{Ty}(t)$$

$$\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle\mathrm{Tn}(0),\ ?\exists x.\mathrm{Tn}(x),\ \Diamond$$
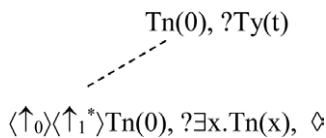
Finally, LINK structures can also be used to encode underspecified structural relations. In contrast to what we have seen so far where a single tree structure is built, LINK structures involve the construction of a pair of trees. LINK structures constitute a formal pairing of one tree to another through the presence of a shared term in each tree. The node from which the LINK starts can be seen as setting the context in which the LINKed tree is parsed. Examples of constructions that are explained using the LINK mechanism include relative clauses, in which case the relative clause is parsed within the context of the head noun and Hanging Topic Left Dislocation (HTLD) constructions, in which case the HTLD sentence is parsed against the backdrop of the left-dislocated element. It is also proposed that subject expressions in Bantu languages can be projected onto either a LINK structure or onto an unfixed node (Gibson 2012). Under the LINK structure analysis, the overt subject expression is projected onto a tree which is constructed in parallel to the main tree. This independent tree is decorated solely with information from the potential subject NP before the rule of LINK ADJUNCTION introduces a requirement that a copy of the information from the nominal expression is also present somewhere in the parallel tree before the parse is complete. The unfixed node approach to Bantu subjects involves the projection of the full potential subject expression onto an unfixed node. This node remains with an unfixed tree node address until fixed structure is introduced into the tree, enabling the update

of this underspecified relation. For the purposes of the current discussion – and to illustrate the LINK mechanism at work – the stages involved in parsing the Rangi subject expression *vasinga* 'children' as shown in example (36) on a LINK structure are outlined.[8]

(36)　*Rangi* (Gibson, field notes)
　　　Va-singa　　v-íyó-terek-a　　　chá-kʊrya.
　　　2-children　SM2-PROG-cook-FV　7-food
　　　'The children are cooking food.'

As always, the parsing process starts from the AXIOM. At this point, the transition rule of LINK ADJUNCTION launches a new type-*e* node from the existing type-*t* root node and the potential subject expression *vasinga* 'children' can be projected onto this node. In building the LINK relation (here indicated by a bold line), the rule of LINK ADJUNCTION also introduces a requirement that the concept *vasinga* 'children' is found somewhere in the eventual tree before the parse is complete (represented by the requirement $\langle ?\downarrow_* \rangle$(vasinga') on the root node of the main tree), as in (37) below.

(37)　Parsing: Vasinga…

$\langle L^{-1} \rangle$ Tn(0), vasinga' Ty(e)

Tn(0), ?Ty(t), $\langle ?\downarrow_* \rangle$(vasinga'), Ty(e), $\Diamond$

The parse then progresses with this LINKed tree taken as background against which the main tree can be interpreted. In the case of a potential subject expression projected onto a LINK structure, this enables the interpretation of the ensuing subject marker with information provided by this LINKed tree.

(38)　Parsing: Vasing va-…

$\langle L^{-1} \rangle$ Tn(0), vasinga' Ty(e)　　　　　$\langle L^{-1} \rangle$ Tn(0), vasinga' Ty(e)

Tn(0), ?Ty(t)), $\langle ?\downarrow_* \rangle$Ty(e) (vasinga'), $\Diamond$　　Tn(0), ?Ty(t)), $\langle ?\downarrow_* \rangle$Ty(e) (vasinga'), $\Diamond$

$\langle \uparrow_0 \rangle \langle \uparrow_1^* \rangle$?Ty(t),　　　　　　　$\langle \uparrow_0 \rangle \langle \uparrow_1^* \rangle$?Ty(t),
Ty(e), Fo($\mathbf{U}_{\text{CLASS2}}$), ?∃x(Fo(x)), $\Diamond$　　Ty(e), Fo(vasinga')

We have seen that the DS system employs computational and lexical rules in the transition from one partial tree state to another tree state, as well as for the introduction of information and elimination of requirements. Two major computational rules that are responsible for structure building in DS are the rule of *ADJUNCTION which introduces unfixed nodes and the rule of LINK ADJUNCTION which builds LINK structures. Lexical rules on the other hand, are language-specific entries associated with words or morphemes in a given language. As we have seen, these are a triggering point which can be seen as checking the context in which the word comes into parse. If the context is compatible with the entry's restriction then the THEN action is initiated, resulting in the associated actions.

　The next section presents an account of auxiliary placement in Rangi, employing the tools of the Dynamic Syntax framework as outlined in the current section.

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[8] The LINK structure analysis of Bantu subject nominal also fits with the view that overt subject expressions in Bantu languages are topical in nature (see, amongst others, Bresnan & Mchombo 1987; Demuth & Johnson 1989), since the LINK strategy is also used to represent topics in DS.

4 Modelling the Rangi auxiliary alternation in Dynamic Syntax

Following on from previous analyses of Bantu clause structure, we consider Rangi overt clause-initial subject expressions (when present) to be projected onto either an unfixed node or a LINK structure (Kempson et al. 2011; Marten 2011; Marten & Kula 2011; Gibson 2012; Seraku & Gibson 2016). Since subject pro-drop is widespread in Rangi and across Bantu, it is also possible for the first element encountered in a future tense construction to be an infinitival verb form (with the subject expression being omitted). We propose that this clause-initial infinitive is projected onto an unfixed node and that auxiliaries project fixed predicate-argument structure into the tree, reflecting their probable historical origins in lexical main verbs (Botne 1989). The stages involved in this process for a sentence such as that shown in (39) are sketched below.

(39)   *Rangi* (Gibson 2012: 107)
        Háánd-a   n-íise   vi-ryo   ʊ-hʊ   mw-aáká.
        plant-FV   SM1SG-AUX   8-millet DEM-3   3-year
        'I will plant millet this year.'

In an auxiliary verb construction such as that shown in (39), the verb is the first element of the clause to be parsed. When the verb appears clause-initially, it is modelled as being projecting onto an unfixed predicate node (even though it may dominate fixed predicate-argument structure as determined by the verb itself). In the case of a transitive predicate such as *háánda* 'plant', the verb introduces the associated subject and object nodes as well as the predicate node. The building of this structure can be seen in the lexical entry for the Rangi verb shown in (40) below (cf. the lexical entry for the verb in Cypriot Greek in (29) above).

(40)   Lexical entry for the Rangi transitive verb *háánd-* 'plant'
        háánd-   IF $?Ty(e{\rightarrow}t)$
                   THEN   make($\langle\downarrow_0\rangle$); go($\langle\downarrow_0\rangle$), put($?Ty(e)$), go($\langle\uparrow_0\rangle$); make($\langle\downarrow_1\rangle$); go
                           ($\langle\downarrow_1\rangle$) put($?Ty(e{\rightarrow}t)$), make($\langle\downarrow_0\rangle$); go($\langle\downarrow_0\rangle$), put($?Ty(e)$),
                           go($\langle\uparrow_0\rangle$); make($\langle\downarrow_1\rangle$), go($\langle\downarrow_1\rangle$), put($?Ty(e{\rightarrow}(e{\rightarrow}t))$) Fo(háánd'),
                           go($\langle\uparrow_1\rangle$), make($\langle\downarrow_0\rangle$); go($\langle\downarrow_0\rangle$), put($?Ty(e)$)
                   ELSE   abort

Note that the verb stem is not analysed as being responsible for the projection of a situation argument (as was also the case in Cypriot Greek above) since the verb stem itself does not encode any tense-aspect information. Instead, this is introduced by the auxiliary (see (43) below). In the case of a transitive verb such as *háánda* 'plant' the resulting structure is that of a two-place predicate (41) below.
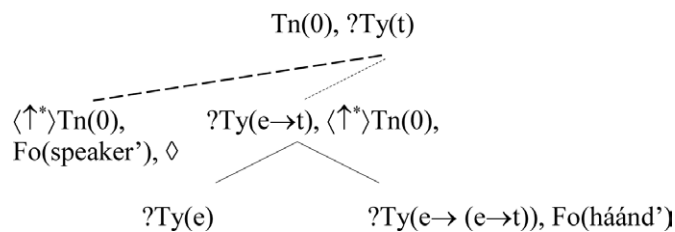
(41)   Parsing: *Háánda…* 'Plant…'

$$Tn(0), ?Ty(t)$$

$$?Ty(e{\rightarrow}t), \langle\uparrow^*\rangle Tn(0),$$

$$?Ty(e), \Diamond \qquad ?Ty(e{\rightarrow}(e{\rightarrow}t)), Fo(háánd')$$

The next element to be parsed is the inflected auxiliary form *níise*. The pointer moves to the root node via ANTICIPATION and parsing the subject marker projects a locally unfixed node annotated with a restricted metavariable. The analysis of Bantu subject markers as projecting a locally unfixed node is developed on the basis of analogy with the analysis of Romance clitics developed in Cann et al. (2005), as well as the observed behavior of subject markers in inversion and passive constructions (see Marten & Gibson 2015). The restricted metavariable limits the possible referents from which the metavariable can receive interpretation, along the lines of noun class and person/number.[9]

In the case of the subject marker *n-*, this encodes a first person singular restriction and can be updated immediately to the content *speaker'*. The partial tree that results at this stage therefore comprises of the node annotated with the predicate *háánda* 'plant' and a locally unfixed node decorated with information about the potential subject marker expression *speaker'*.

(42)   Parsing: *Háánda n-…*

$$Tn(0), ?Ty(t)$$

$$\langle\uparrow^*\rangle Tn(0), \quad ?Ty(e{\rightarrow}t), \langle\uparrow^*\rangle Tn(0),$$
$$Fo(speaker'), \Diamond$$

$$?Ty(e) \qquad\qquad ?Ty(e{\rightarrow}(e{\rightarrow}t)), Fo(háánd')$$

Parsing the auxiliary also introduces a fixed subject node and a fixed predicate node. The introduction of fixed structure by the auxiliary follows the analysis of the English copula *be* provided by Cann (2011) in which *be* is assumed to project fixed predicate-argument structure. This account also reflects the historical origin of Bantu auxiliary forms in main verbs which are modelled in similar terms (see, for example, Marten et al. 2008 and Gibson 2012 for DS analyses of Bantu auxiliaries from this perspective).

(43)   Lexical entry for the Rangi auxiliary *-íise*

-íise   IF $?Ty, \langle\downarrow^*\rangle\langle\downarrow_0\rangle Ty(e)$
         THEN $make(\langle\downarrow_0\rangle); go(\langle\downarrow_0\rangle); put(Ty(e_s) Fo(S_{IMM\ FUTURE})); go(\langle\uparrow_0\rangle);$
         $make(\langle\downarrow_1\rangle); go(\langle\downarrow_1\rangle); put(Ty(e_s{\rightarrow}t), make(\langle\downarrow_0\rangle); go(\langle\downarrow_0\rangle);$
         $put(?Ty(e)) go(\langle\uparrow_0\rangle); make(\langle\downarrow_1\rangle); go(\langle\downarrow_1\rangle); put (Fo(\mathbf{W}), Ty(e{\rightarrow}$
         $e_s{\rightarrow}t), ?\exists y.Fo(y)); go(\langle\uparrow_1\rangle), go(\langle\downarrow_0\rangle)$

The fixed structure introduced by the auxiliary enables the establishment of a fixed tree node address for the information introduced by the infinitival verb. Parsing the auxiliary also results in the introduction of the situation argument node and introduces the immediate future tense annotation $Fo(S_{IMM\ FUTURE})$ where IMM FUTURE represents the immediate future tense. Parsing the object expression *viryo* 'millet' provides the interpretation for the object node. With all the tree node addresses fully specified and all requirements fulfilled, the information is compiled up the tree. The resulting structure is shown in (44) below.

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[9] Subject pro-drop is widespread in Rangi. However, in instances in which an overt subject expression is present, this expression can be projected onto a LINK structure as outlined in Section 2. The subsequent stages of the parse proceed in line with the account provided in the current section and the LINK structure has no bearing on the availability of this strategy.

(44)   Parsing: *Háánda níise viryo* 'I will plant millet.'
Tn(0), Fo(háánd'(speaker'))($S_{IMM\ FUTURE}$), Ty(t), ◊

Ty(e_s), Fo($S_{IMM\ FUTURE}$)   Ty($e_s{\to}t$), Fo(háánd'(speaker')),

Ty(e), Fo(speaker')   Ty(e$\to$ ($e_s{\to}t$)), Fo(háánd')

Ty(e),   Ty(e$\to$ ($e_s{\to}t$)),
Fo(viryo')   Fo(háánd')
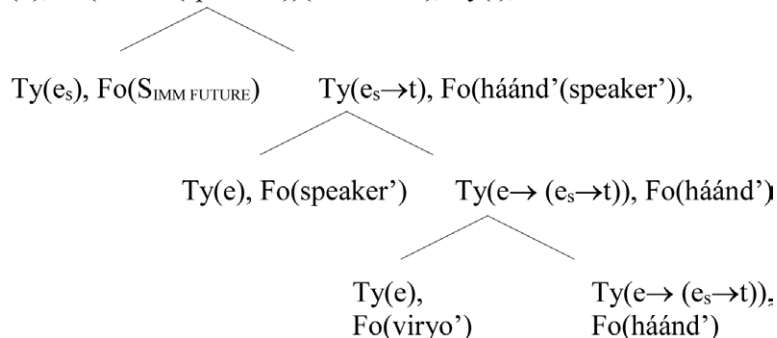
Recall however, that when the construction is preceded by one of the following elements, the order of the auxiliary with respect to the verb is inverted, yielding auxiliary-verb order:

   i)   a wh-element,
   ii)   part of *sí...tʋkʋ* sentential negation,
   iii)   part of a relative clause,
   iv)   part of a cleft construction, or
   v)   preceded by a subordinator.

The proposal is that the elements that appear at the left periphery are also projected onto an unfixed node. And that it is the presence of this unfixed node that enables the auxiliary to be parsed as the next element in the string. Take wh-questions for example, following the approaches adopted by a number of previous analyses (including *inter alia* Kempson et al. 2001; Cann et al. 2005; Bouzouita 2008a; b; 2011; Chatzikyriakidis 2010; Gibson 2012) we model wh-questions as being projected onto unfixed nodes, with this initial node marked with a Q feature indicating its interrogative status. This unfixed node is annotated with a type value and a specialised metavariable WH. If the wh-expression *ani* 'who' is parsed as the first element in the clause, the root node is annotated with the interrogative feature Q and is projected onto an unfixed node which is subsequently decorated with the WH metavariable placeholder. However, *ani* can also appear in object position in which case it provides the WH annotation for the Ty(e) argument node and subsequently the annotation of the rootnode with the feature Q. These actions are captured in the lexical entry outlined in (45) below.[10]

(45)   Lexical entry for the Rangi interrogative pronoun *ani* 'who'
ani   IF   ?Ty(e), $\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle$Ty(t)
        THEN   put((WH_{CLASS1}), gofirst(?Ty(t)), put(Cat(Q));
        ELSE   IF   ?Ty(e)
                THEN   put((WH_{CLASS1}), gofirst(?Ty(t)), put(Cat(Q));
                ELSE   abort
        abort

In order for the wh-expression *ani* 'who' to be parsed, the pointer must be at the ?Ty(t) root node and there must be no fixed structure present in the tree (as encoded in the lexical entry in (45) above). If this triggering condition is met, parsing this question word results in the annotation of the root node with the interrogative feature Q and the annotation of

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[10] Note here that the wh-question word *ani* 'who' is unrestricted in its distribution and can appear either as a subject or as an object in content questions. As such, no case restriction is proposed in the lexical entry.
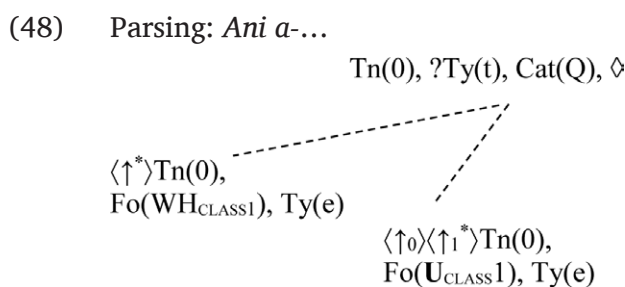
an unfixed node. The question word *ani* 'who' can only be used to ask about class 1 (i.e. singular human) nouns. The WH metavariable introduced by *ani* 'who' is therefore also considered to carry a restriction limiting its possible interpretation to class 1 nouns (indicated by WH_{CLASS1} in the tree below).[11] The emerging tree is shown in (46) below.

(46)   Parsing: *Ani…* 'who'

$$Tn(0), ?Ty(t), Cat(Q), \Diamond$$

$\langle\uparrow^*\rangle Tn(0),$
$Ty(e), Fo(WH_{CLASS1})$
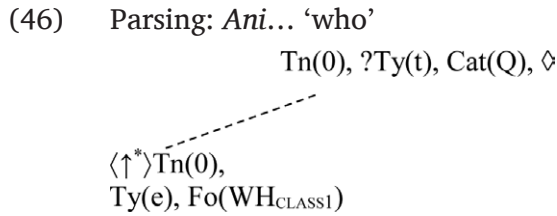
Following the annotation of the unfixed node with the information made available by the wh-expression, the tree can be further developed with content provided by the rest of the clause. Consider the steps outlined below for parsing example (47).

(47)   Ani   á-rɪ   fúl-a   ingo   j-á   ingovi?
        who   SM1-AUX   wash.clothes-FV   10.clothes   10-of   9.celebration
        'Who will wash the clothes for the celebration?'

After the clause-initial wh-expression *ani* 'who' has been projected onto an unfixed node, the auxiliary is the next element to be parsed. The subject marker *a-* is the first element to be parsed. This is modeled as being projected onto a locally unfixed node (following previous accounts of subject markers across Bantu, see for example Kempson et al. 2011; Marten 2011; Marten & Kula 2011; Marten & Gibson 2015; Seraku & Gibson 2015; as well as for Rangi Gibson 2012; 2016). In fact, this unfixed node account is in part motivated by observed parallels between Bantu subject markers and clitics in Romance (Cann et al. 2005; Bouzouita 2008a) and dialects of modern Greek (Chatzikyriakidis 2010) which are modeled in similar terms. This unfixed node is also annotated with a metavariable which restricts the possible substituents in terms of person and number, or noun class. Thus, in the case of the class 1 marker *a-* for example, this appears as $Fo(U_{CLASS1})$ and the construal of this metavariable is restricted to class 1 nouns (in the case of Rangi this represents singular human referents). The resulting tree after parsing the subject marker *a-* on the auxiliary is shown in (48) below.

(48)   Parsing: *Ani a-…*

$$Tn(0), ?Ty(t), Cat(Q), \Diamond$$

$\langle\uparrow^*\rangle Tn(0),$
$Fo(WH_{CLASS1}), Ty(e)$

$\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle Tn(0),$
$Fo(\mathbf{U}_{CLASS}1), Ty(e)$

The next element encountered is the auxiliary *-rɪ*. In terms of the structure building process, the analysis presented here for the auxiliary *-rɪ* is the same as that proposed for the auxiliary *-ɪise* (see (43) above) with the exception of the distinct temporal

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[11] In the case of plural human referents, the question word *valani* 'who (plural)' is used and possible substituents for *valani* would subsequently be restricted to class 2 – which would be indicated by the restricted metavariable WH_{CLASS2}.

information (with *-íise* encoding immediate future tense and *-rɪ* resulting in a general future interpretation).

In order to account for both the pre- and post-verbal placement of the auxiliary, Gibson (2012) proposes a lexical entry for *-rɪ* which involves two embedded triggers that stand in an inclusive-disjunction relation (indicated by | in the entry). The first trigger is the presence of an unfixed predicate node whilst the other trigger is the presence of an unfixed node that has a type e requirement:[12]

(49)   Lexical entry for the auxiliary *-rɪ* in Rangi (from Gibson 2012)

       IF $?Ty(t)$

       THEN   IF $\langle\downarrow_+^*\rangle Ty(e{\rightarrow}t)$ |

                           $\langle\downarrow^*\rangle ?Ty(e)$

            THEN $put(Tns(\text{GEN FUT}))$; $make(\langle\downarrow_0\rangle)$; $go(\langle\downarrow_0\rangle)$; $put(?Ty(e))$; $go(\langle\uparrow_0\rangle)$;

                           $make(\langle\downarrow_1\rangle)$; $go(\langle\downarrow_1\rangle)$; $put(Fo(\mathbf{W}), Ty(e{\rightarrow}t), ?\exists y.Fo(y))$; $go(\langle\uparrow_1\rangle)$

       …

       ELSE   abort

The first trigger under this account therefore covers the elements associated with post-verbal positioning of the auxiliary (as well as negation on the basis that this involved the projection of an unfixed predicate node under the Gibson 2012 account). The second condition captures the pre-verbal placement of the auxiliary on the assumption that these contexts all involve the projection of an unfixed node. However, we propose here that this lexical entry can be further simplified.

Gibson (2012) proposes that infinitives are always parsed on an unfixed node. However, in this paper, we believe that such an account is not necessary. In DS, variant word orders are considered to stem from differences in the parsing strategies used to parse specific words. These differences are either due to general computational actions or are directly encoded in the lexical entries of the words or morphemes in question. In this sense, and assuming that infinitives appearing before the auxiliary can be seen as being (to some extent) fronted, it can be assumed that in the verb-auxiliary order infinitives are parsed on an unfixed node. Indeed, this is a common assumption in DS for fronted elements. However, in the auxiliary-verb order, the infinitive can be immediately associated with fixed structure since it does not appear in a clause-initial position. With this in mind, the lexical entry proposed in Gibson (2012) and outlined in (49) above can be revised.

Instead of making reference to type requirements in the trigger section of the lexical entry, a more streamlined account can be proposed that makes reference simply to the requirement for an unfixed node. This can be formalised as a statement projected in all unfixed nodes that a proper treenode address should be found during the parse ($\langle\downarrow^*\rangle ?\exists x.Tn(x)$, i.e. there is an unfixed node at or somewhere below the current node. The revised lexical entry is shown in (50) below.

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[12] Note here that the lexical entry proposed by Gibson (2012) differs from the account developed in the current paper in a number of ways. The account developed by Gibson (2012) does not include a situation event term and so the lexical entry does not make reference to a situation argument. Similarly, as noted by a reviewer, it appears that the second trigger cannot cover contexts which involve a wh-question word such as *ani* 'who' since this element will already have built an unfixed node with a Ty(e) decoration. These, amongst other issues, are addressed in the revised lexical entry presented in the current paper.

(50)   Lexical entry for the auxiliary *-rɪ* in Rangi (revised version)
          IF $?Ty(t)$
          THEN   IF $\langle\downarrow^{*}\rangle?\exists x.Tn(x)$
                  THEN $make(\langle\downarrow_0\rangle); go(\langle\downarrow_0\rangle); put(Ty(e_s), Fo(S_{FUTURE}));go(\langle\uparrow_0\rangle);$
                          $make(\langle\downarrow_1\rangle); go(\langle\downarrow_1\rangle); put(Ty(e_s{\rightarrow}t),\ make(\langle\downarrow_0\rangle); go(\langle\downarrow_0\rangle);$
                          $put(?Ty(e))\ go(\langle\uparrow_0\rangle); make(\langle\downarrow_1\rangle); go(\langle\downarrow_1\rangle); put(Fo(W),$
                          $Ty(e{\rightarrow}t), ?\exists y.Fo(y)); go(\langle\uparrow_1\rangle), go(\langle\downarrow_0\rangle);$

          …
          ELSE   abort

Under this proposal, what was previously captured under two triggers is unified into a single lexical entry which is able to capture both the pre- and post-verbal placement of the auxiliary: if the verb is parsed first, the verb projects an unfixed node and the trigger is satisfied; if any of the left periphery elements are encountered (wh-questions, negative markers, subordinate clauses etc.), an unfixed node will also be present, again, thereby satisfying the trigger.[13]

The auxiliary *-rɪ* introduces the first fixed structure into the tree, building a fixed subject and a fixed predicate node. The auxiliary is also considered to be responsible for the introduction of the situation argument node which hosts the relevant temporal

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[13] A reviewer enquired as to why such an account of Greek clitics is better than other approaches of Greek cliticisation, e.g. Terzi (1999a; b); Condoravdi & Kiparksy (2001); Revithiadou (2006); Mavrogiorgos (2010). Detailed reviews of these approaches and comparison to the DS account are provided in Chatzikyriakidis (2010; 2012). However, the basic points are summarised here: Terzi's account of Cypriot Greek is based on an incomplete dataset as a number of researchers have pointed out (e.g. Revithiadou 2006; Pappas 2010). In addition to this, there are technical problems with the account, such as the motivation for V to M movement in Cypriot Greek but not in Standard Modern Greek (Terzi 1999b) as well as the motivation for a further move to C with imperatives in Cypriot Greek. The relevant question is why are imperatives not able to check their features in the mood phrase and why do they have to move even higher to C? This has already been raised by Roussou (2000). Condoravdi & Kiparsky (2001) also have a serious flaw in their account that has not been properly worked out: clitics in type C dialects (these are the Greek dialects conforming roughly to the type A systems we have introduced in this paper) do not combine lexically with non-finite forms. This analysis therefore gives us the wrong results for imperatives, no matter our assumptions with respect to imperatives. Assuming imperatives are non-finite verbal forms, the question to be answered is why clitics are possible with these forms. Assuming they are finite verbal forms, the generalisation that Condoravdi & Kiparsky (2002) propose, namely that clitics in type C dialects lexically attach to the left of a finite verb, will fail in the imperative case (Chatzikyriakidis 2010). Revithiadou (2006) offers a prosodic account where prosody has a filtering role in syntax. We cannot go into the details here but there are known problems with this account that have been noted in Pappas (2010) and Chatzikyriakidis (2012). One such problem concerns the element *en tze* which in Revithiadou's account is predicted to be associated with proclisis contrary to fact. Lastly, the account put forth in Mavrogiorgos (2010) is an account of clitics in SMG and it is not clear how it can be extended to give a unified account that will cover the dialectal variation found in Greek. The accounts given in Chatzikyriakidis (2010) and followed in this paper do not suffer from any of these problems and most importantly are able to capture the variety associated with clitic positioning in various dialects of Modern Greek. However, as was also observed by a reviewer, Mavrogiorgos (2013) discusses cliticisation in SMG, Cypriot Greek and Medieval Greek and the discussion contained therein is relevant for the analysis outlined in Section 5 of the current paper. The paper presents an interesting argument according to which clitic positioning should be accounted for under an analysis which employs both syntax and a number of PF operations. Mavrogiorgos himself acknowledges that such a suggestion is only tentative. Also, when discussing the different syntactic accounts of cliticisation in Greek, no accounts outside the GB/minimalist framework are discussed. A number of the arguments presented there do not carry over to accounts outside these frameworks, given their framework-internal nature (movement blocking, the nature of C etc.). Furthermore, Mavrogiorgos uses as an argument for the assumption that PF restrictions are at play in cliticisation, the variable positioning cases in CG. He discusses the case of *oti* arguing that variant positioning obtains there because of the nature of *oti*, being able to appear in a higher or lower C. However, it is not clear how the variation environments with *epidi* or *en tze* would be accounted for under this view.
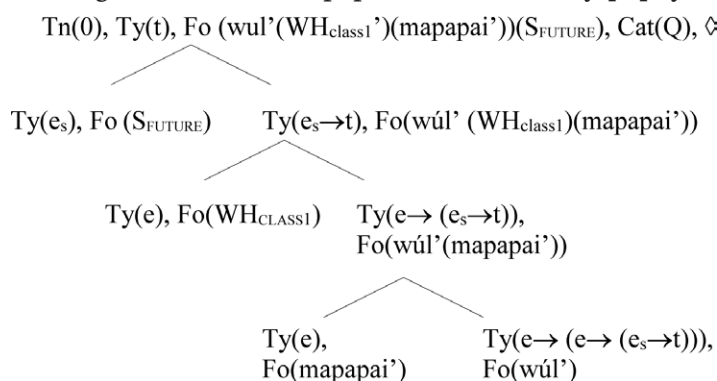
information.[14] The introduction of this structure enables the previously unfixed node annotated with the WH metavariable to be fixed as the subject node.

(51)   Parsing: *Ani a-rɪ…*

$$Tn(0), ?Ty(t), Cat(Q)$$

$$Ty(e_s), Fo(S_{FUTURE}) \qquad ?Ty(e_s{\to}t)$$

$$Fo(\textbf{WH}_{CLASS1}), Ty(e) \qquad ?Ty(e{\to}(e_s{\to}t)), \Diamond$$
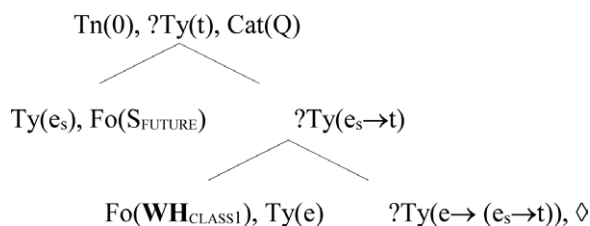
Since we are now examining the auxiliary-verb order, the next element to be parsed is the verb. In addition to the subject and predicate nodes which have already been introduced by the auxiliary, the verb *wúla* 'buy' projects a full template, i.e. subject, object and predicate nodes. The partial tree can be updated and expanded with this information. With all the requirements satisfied, the information is compiled up the tree. This final tree state is shown in (52) below.

(52)   Parsing: *Ani arɪ wúla mapapai?* 'Who will buy papayas?'

$$Tn(0), Ty(t), Fo\ (wul'(WH_{class1}')(mapapai'))(S_{FUTURE}), Cat(Q), \Diamond$$

$$Ty(e_s), Fo\ (S_{FUTURE}) \qquad Ty(e_s{\to}t), Fo(wúl'\ (WH_{class1})(mapapai'))$$

$$Ty(e), Fo(WH_{CLASS1}) \qquad Ty(e{\to}(e_s{\to}t)), Fo(wúl'(mapapai'))$$

$$Ty(e), Fo(mapapai') \qquad Ty(e{\to}(e{\to}(e_s{\to}t))), Fo(wúl')$$

Now to examine the application of the revised lexical entry for *-rɪ* to the other alternation contexts. In the same vein, we propose that negative clauses and subordinate and relative clauses can also be modeled by reference to an unfixed node as part of the processing strategy.

   In the case of sentential negation, the proposal is that the clause-initial negative marker *sí* is projected onto an unfixed predicate node. This is motivated in part by similar observations as to those made for the parsing of the clause-initial infinitive. The negative element *sí* has two primary functions in Rangi: it appears in sentential negation such as that shown in (53) where it forms part of a bipartite strategy for the encoding of the negative polarity of the sentence. However, it also functions as a negative copula in which case it can be the predicative base of a construction (54).

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[14] As a reviewer pointed out, it has already been observed by Gibson (2012) that the auxiliary *-rɪ* is highly polysemous in Rangi and appears as an auxiliary in the formation of distant past construction, as well as functioning as the copula in the present tense. Whilst the specific details of this auxiliary are beyond the remit of the current paper, the reader should be aware of these additional functions of the auxiliary. In order to capture the general future tense interpretation that stems from the use of *-rɪ* in the future tense construction, it is proposed that parsing *-rɪ* in the presence of an unfixed node (as is the case when it is parsed after a wh-question, negative marker etc) is responsible for the future tense interpretation, rather than the parse of *-rɪ* itself. Whilst the account presented in the current paper is compatible with this approach, the interested reader is referred to Gibson (2012; in press) for the precise details of this account.

(53) *Rangi* (Gibson 2012: 116)
      Nkúkú   **sí**   jí-rɪ   kʊ-tu-héer-a   mayi   tʊkʊ.
      10.chicken NEG   10-AUX   INF-OM1PL-give-FV   6.eggs   NEG
      'The chickens will not give us eggs.'

(54) *Rangi* (Gibson 2012: 95)
      Weéwe   **sí**   mʊ-lɪɪhi   tʊkʊ
      2SG.PP   NEG   1-tall   NEG
      'You are not tall.'

The proposal we make here therefore is that *sí* is parsed on an unfixed predicate node, reflecting the underspecified status of its eventual position within the tree. In the cause of its use in sentential negation an (as in (53)) *sí* serves only to encode the negative polarity of the clause. However, when *sí* is functioning as a negative copula, it assumes the role of predicative base and is modelled as introducing the metavariable formula BE (following the account provided by Cann 2006; 2007 for English auxiliaries). The lexical entry for the negative marker *sí* is as shown in (55) below.

(55) Lexical entry for the negative marker *sí*
      sí IF $?Ty(t)$, $\langle\downarrow^*\rangle?Ty(e{\rightarrow}t)$
          THEN   put(Cat(NEG)); go($\langle\downarrow^*\rangle$); make($\langle\downarrow_0\rangle$); go($\langle\downarrow_0\rangle$); put($?e_s$); go($\langle\uparrow\rangle$);
                 make($\langle\downarrow_1\rangle$); go($\langle\downarrow_1\rangle$); put(Ty(e{\rightarrow}t), Fo(**BE**)); go($\langle\uparrow\rangle$)
          ELSE   abort

The negative form *sí* therefore has an unfixed predicate node as its lexical trigger.[15] The actions encoded by *sí* result in the annotation of the root node with the information encoding negative polarity (in this case represented by the *pro tem* notion Cat(NEG)) and the annotation of the predicate node with the metavariable Fo(**BE**). This **BE** metavariable serves as a placeholder linking other metavariable values. However, it can be substituted – or updated by – information from a variety of elements. In the case of use as a negative copula therefore, the BE metavariable can receive interpretation from adjectival elements (such as *mʊlɪɪhi* 'tall'). However, this metavariable can also be updated by full predicate information from a verb (as would be the case when *sí* is used in sentential negation).[16]

Finally, a note on subordinate clauses. We propose that the auxiliary-verb order found in Rangi subordinate clauses can also be captured by reference to the unfixed node trigger proposed in (50) above. Subordinate clauses in Rangi are commonly introduced by a subordinator which we take here as being responsible for the projection of an unfixed node, thereby providing the necessary triggering conditions for the parsing of the auxiliary and yielding the auxiliary-verb order. An example showing a subordinate clause introduced by the subordinator *joolɪ* is presented in (56) below (repeated from (18) above).[17]

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[15] The unfixed predicate node here is introduced by the rule of PREDICATE ADJUNCTION. This rule, as defined by Gibson (2012: 211) enables the introduction of an unfixed predicate-requiring node, building on the availability of structurally underspecified unfixed nodes in the framework as well as different type values. We do not enter into a discussion of the formal elements of this account here. It is instead sufficient to note that the rule of PREDICATE ADJUNCTION allows for the introduction of an unfixed predicate node.

[16] Many of the details of a formal account of negation in Dynamic Syntax remain to be explicitly worked out. Here we adopt the naïve representation in which the negative polarity of the proposition is indicated by the annotation (Cat(Neg)) at the root node.

[17] As was pointed out by a reviewer, the constructions involved in the Rangi auxiliary alternation are also remarkably similar to the future constructions in Medieval Spanish, although there are some notable differences. Bouzouita (2011) analyses these from the perspective of the Dynamic Syntax theoretical framework and treats the analytic future in Medieval Spanish as constructions.

(56)   *Rangi* (Gibson 2012: 121)
        N-íyó-wás-a   joolɪ   ndí-rɪ   rih-a   ada.
        SM1SG-PROG-think-FV   how   SM1SG-AUX   pay-FV   10.fees
        'I am thinking about how I will pay the fees.'

Under such an account, parsing the subordinator *joolɪ* 'how' results in the launch of a LINK relation (as was also proposed to be the case in conditional structures involving the English conditional conjunction *if* (Gregoromichelaki 2006)) and in addition to this Link structure, the projection of an unfixed node. However, this unfixed node is an unfixed situation argument node, reflecting the requirement for there to be a new situation node in the subordinate clause. Following the parse of *joolɪ* 'how' therefore, the tree state looks as is shown in (57) below.

(57)   Parsing: *Níyówása joolɪ…* 'I am wondering how…'

$$Tn(0), ?t, \Diamond$$

$Fo(S_{PRESENT}) \; Ty(e_s)$ $Ty(?e_s \rightarrow t)$

$Fo(speaker'), Ty(e)$ $Ty?(e \rightarrow (e_s \rightarrow t))$

$?Ty(t)$ $Fo(was'), Ty(t \rightarrow e \rightarrow (e_s \rightarrow t)$

$?Ty(e_s)$
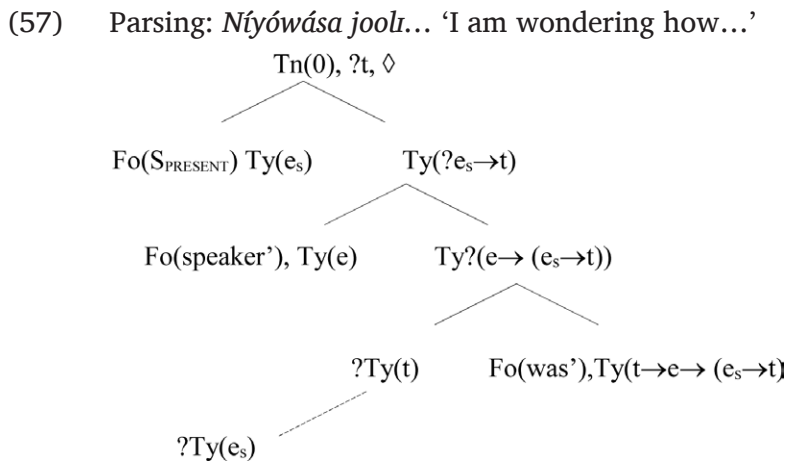
The parse then continues following the assumptions that have been made throughout the paper in terms of the building of tree structure in Rangi. With the subject marker on the auxiliary projecting a locally unfixed node and the auxiliary being responsible for the projection of a fixed predicate-argument skeleton. With subordinate clauses also being modeled by recourse to the presence of an unfixed node as part of the processing strategy, the lexical entry for the auxiliary *-rɪ* proposed in (50) can be maintained, with the presence of an unfixed node enabling the parsing of the auxiliary.

   Having sketched a formal account of Rangi auxiliary placement as it appears in the present day, the remaining issue is what possible steps may have been involved in the development of this system. The emergence of the clitic systems of Romance and Greek is relatively well analysed.[18] The question that naturally arises if any of the aforementioned claims are assumed to be valid is the following: if the clitic systems of Rangi and Greek have structural similarities on the synchronic level, can structural similarities also be found on the diachronic level? Although there is no comparable historical data on which we can draw to better understand the path of development for the auxiliary system in Rangi, we believe that a pathway of historical development for the Rangi auxiliary system can be supported by insights from diachronic evidence from Romance and Greek, as well as synchronic comparative evidence from within Bantu.

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[18] The list here is extensive. However, we direct the interested reader to works within DS, including Bouzouita (2008a); Cann & Kempson (2008); Chatzikyriakidis (2010); Chatzikyriakidis & Kempson (2011), among others, which are relevant for this paper and also include a vast number of other references on similar issues.

5 The development of the Tobler Mussafia systems: Routinisation of an earlier pragmatically-governed system

In Section 2.3 we highlighted the parallels between the Bantu auxiliary systems and the Romance and Greek clitic systems. The Type A clitic systems in Romance and Greek were noted to be those in which clitics generally precede the verb in non-imperative finite forms, whilst clitics immediately follow the verb in imperatives, gerunds and infinitives. Languages which fall into this category (e.g. Standard Modern Greek, Italian, Spanish) have often been proposed to have derived from earlier Type B systems – those in which clitic positioning is dependent on the presence (or absence) of one of a number of elements at the left periphery. Type B clitic systems, as already noted, are commonly referred to as Tobler-Mussafia systems (see, for example, Salvi 1993; Fontana 1997; Fischer 2003).

   For Romance, it has been claimed that, at least for languages such as Medieval Spanish, these derive from the earlier weak pronoun system of Latin, a system which seems to have been less strict in terms of positioning than the subsequent clitic systems that have developed out of it. As Bouzouita (2008a) – and other scholars before her (e.g. Adams 1994; Devine & Stephens 2006) – notes there is a tendency for weak pronouns in Latin to appear as early in the clause as possible. This tendency can receive a relevance-theoretic (Sperber & Wilson 1986) interpretation: pronouns being anaphoric elements that by definition rely on context, tend to appear early in the sentence in order to minimise context search in the identification of the pronoun, in effect, minimising cognitive effort (Cann & Kempson 2008a). The idea is that clitics or weak pronouns, being phonologically weak, rely on another element. The combination of the latter fact and the relevance-theoretic consideration to appear as close to the beginning of a propositional domain as possible, gave rise to a situation where weak pronouns/clitics appeared next to elements that signaled the beginning of such a domain. Classic cases of signaling involve most of the elements which trigger proclisis in the Tobler-Mussafia types of systems (e.g. subordinating conjunctions or wh-elements). These pragmatic considerations resulted in positioning preferences associated with these pragmatic considerations becoming routinized and subsequently stored in the lexical entries of the individual clitics.

   This assumption can be then used in order to provide an explanation of how the medieval systems of Spanish and Greek have arisen from Latin and Koine Greek respectively (Bouzouita 2008a; Chatzikyriakidis 2010, respectively). The way this routinisation process was encoded in the lexical entries for the clitics was not uniform across all dialects of Medieval Greek. This seems to be verified by the data from Pappas (2004), which show that environments which were not categorically associated with either proclisis or enclisis in Koine Greek appear as categorical or near-categorical in some of the medieval dialects. The only difference appears to be the variation in the number of syntactic environments that trigger proclisis, i.e. the number of environments that have lost their old underlying pragmatic basis for proclisis and were stored as conditions for parsing the clitic, thus leaning towards categorical positioning. Consider Tables 1–4 below which show clitic positioning in Koine Greek, Medieval Mainland Greek, Medieval Cypriot Greek and Medieval Pontic Greek.[19]

   Whilst we do not expand on the formal details behind this change here, the general idea is as follows: Koine Greek represented a system whereby clitic positioning seems to have been regulated to a large extent by pragmatic preferences. In contrast, the medieval dialects exhibit a tendency to encode these preferences in the lexical entries of the clitics. For example, in Medieval Mainland Greek, proclisis is generalized to more environments. To give a more specific example, Medieval Mainland Greek had already generalized proclisis for

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[19] The data from the Grottaferata manuscript of Digenis Akritis as presented in Soltic (2012) also point to a similar distribution.

focused elements, compared to the situation found in Medieval Cypriot Greek where this had not yet happened. The three dialects can be actually put onto a cline according to the numbers of elements that were eventually encoded as proclitic triggers. According to this cline, Medieval Mainland Greek (Table 2) had the most proclisis triggers, Medieval Cypriot Greek (Table 3) lies somewhere in the middle and Medieval Pontic Greek (Table 4) had the least proclisis triggers (62). Consider again the case of fronted constituents. In Koine Greek, fronted constituents can be associated with either proclisis or enclisis. In Medieval Mainland Greek, proclitic positioning tends to become almost categorical (see e.g. (59)) with very few examples of enclitic positioning (e.g. (58)):

(58)   *Medieval Mainland Greek* (Belisarios, 344)
         Sintomos   fernusi   **ton**.
         soon   bring.3PL   him.CL
         'Soon they bring him.'

(59)   *Medieval Mainland Greek* (Achilleid, 397)
         Tris   minas   **to**   anatesete.
         three   months   it.CL   assail.3SG
         'For three months, he has been assailing it.'

In Medieval Cypriot Greek, we find an almost categorical tendency towards enclisis (60), with just one example of proclisis in the chronicles of Makhairas:

(60)   *Medieval Cypriot Greek* (Makhairas)
         Gia   tuton   orizomen   **se**.
         for   him   command.3PL   you.CL
         'For this reason, we command you.'

Lastly, Medieval Pontic Greek shows categorical enclisis in these environments:

(61)   *Medieval Pontic Greek*
         Kai   panta   enoxlousan   **soi**.
         CONJ   always   bothered.3PL   you.CL
         'They always bothered you.'

A similar situation is found with other elements as well. Generalizing, we can put the three medieval dialects on a cline from the dialect with the most proclitic triggers (Medieval Mainland Greek) to the dialect with the least (Medieval Pontic Greek):

(62)   Number of proclisis triggers across three stages of the development of Greek

         Medieval Mainland Greek   (most proclitic triggers)

         Medieval Cypriot Greek

         Medieval Pontic Greek   (least proclitic triggers)

A similar process has been claimed to have taken place in the transition from the Latin weak pronoun system to Medieval Spanish (Bouzouita 2008a). Thus, Tobler-Mussafia systems like Cypriot Greek or Medieval Spanish are thought to have developed from earlier systems where clitic positioning was governed by pragmatic preferences and not syntactic restrictions. The situation in Koine Greek as shown earlier in **Table 1** exemplifies this

Environment	Preverbal	Postverbal
Clause initial	4	231
Infinitival complement	12	0
Adverbs	34	14
NP-object	21	15
NP-subject	10	13
PP	13	37
Complementizers	17	37
Wh-expressions	18	16

Table 1: Clitic positioning in Koine Greek (Oxyrynchus Papyri Vol 1–56, adapted from Pappas 2004: 323).

Environment	Preverbal	Postverbal
Clause-initial	59	719
Coordinating conjunction	58	681
Oti (COMP)	8	30
Dioti (SCON)	4	0
Reduplicated object	39	79
Wh-element	439	5
Negation	431	3
Na, ina, as (SBJ)	1525	4
Ean, an, pos (SCON)	324	2
Object, PP, Non-temporal adverb	898	90
Subject	334	130
Temporal expression	86	63
Imperatives	25	305

Table 2: Clitic positioning in Medieval Mainland Greek (adapted from Pappas 2004: 33).

claim. In Koine Greek, as already mentioned, positioning seems to be 'free' in the sense that both proclisis and enclisis are allowed.[20] Whilst there are tendencies for either proclitic or enclitic positioning, no categorical restrictions on positioning appear to have been present. The argument in Chatzikyriakidis (2010) is that the Koine Greek system was governed by pragmatic rather than syntactic considerations. It is these pragmatic preferences (for example that clitics appear as close to an element signaling a propositional domain as possible) which came to be 'routinised' (in the sense of Pickering & Garrod 2004).

Routinisation, as discussed in Pickering & Garrod (2004), is the long-term result of another process, i.e. alignment. Alignment, quite uncontroversially, is a common and integral part of any dialogue process, which occurs on all levels of linguistic organisation, from phonetic/phonological alignment to syntactic/semantic alignment (Markman & Makin 1998; Bard et al. 2000; Branigan et al. 2005, among others). There are also

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[20] The example of the infinitival complement is not relevant for the development of Greek Tobler-Mussafia systems, since infinitives were eventually lost and do not appear in the modern dialects of Greek.

other sorts of alignment, such as reference frame or situation model alignment (Watson et al. 2004; Garrod & Doherty 1994, respectively). There is evidence that this process of alignment can be generalised with the result that it becomes a 'routine', i.e. a stored representation of content. In this sense, routinisation can be seen as a long term-alignment process. According to Jackendoff (2002), anything that is not computed online, is stored as a lexical representation. This is also the idea that we pursue here.

Our proposal is that the passage from Koine Greek to Cypriot Greek involved a process of routinisation whereby earlier positioning patterns governed only by pragmatic considerations were routinised and ultimately stored in the lexical entries of the clitics. Crucially, fronted elements including subjects, objects, prepositional phrases, adverbs or wh-elements, were all associated with a specific parsing strategy – the use of an unfixed node. Producing such elements would involve the projection of unfixed nodes. Frequent use of these fronted elements would mean a greater use of unfixed nodes. Then, as we have already claimed, pronouns tend to appear early in the sentence in order to minimise context search in the identification of the pronoun, in effect, minimising cognitive effort (Cann & Kempson 2008a). This means that as soon as a signal for an emerging domain is there, clitics will tend to appear as soon as possible, i.e. in preverbal position. But, in a system such as that of Koine Greek, this remains just a tendency regulated by pragmatics and not yet encoded into the syntax. The next step, is the combination of these two facts: a) different elements signaling an emergent domain making use of unfixed nodes and b) clitics tending to appear as early as possible when such a signaling takes place. The result is the encoding of the unfixed node strategy as a trigger for parsing the clitic. Routinisation therefore had the effect of adding this strategy as a processing trigger for parsing the clitic, resulting in the loss of the underlying pragmatic basis for the ordering which was instead encoded merely as a syntactic restriction. A further restriction was also at play, which regulated enclitic positioning in the absence of any of these proclisis-inducing environments. It is essential to note that this idea of routinisation – and its application to facts pertaining to historical developments within a language – is not new. Rather, similar ideas have been proposed in the historical linguistic literature. More specifically, the concept of syntactic routinisation as used in this paper bears strong similarities with Givon's idea of 'syntactization' (Givón 1979) and Bybee's concept of 'chunking' (2010) – a connection which has already been noted in the work of Bouzouita (2008a).[21]

Looking at Medieval Cypriot Greek (**Table 3**) we see that function words were nearly always associated with proclisis. Thus, future markers, negation, subordinate conjunctions and wh-elements are associated with proclisis whilst fronted constituents appear to have followed the opposite route and are nearly always associated with enclisis. Chatzikyriakidis (2010; forthcoming) proposes that in Medieval Cypriot Greek a generalisation has occurred whereby all function words introduce some information on the situation argument node e_s, as proclitic trigger. For example, the future marker will add tense information and a tense-aspect particle such as *na* will do the same in terms of tense and/or aspect information. The precise details of this account are not essential for the current paper (for details, the reader is referred to Chatzikyriakidis 2010: Chapter 4). However, crucial to the current account is that parsing these elements involves building a situation argument node and a requirement for an e_s type as well as information about the tense

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[21] Construction Grammar (Fillmore 1988; 1989; Fried & Östman 2004) is notably a framework that makes use of these assumptions, especially chunking. An additional line of enquiry would involve an examination of how the ideas developed in the current paper can be framed in terms of a Construction Grammar approach and to compare the approaches taken by the two frameworks on the basis of this. An exploration of the similarities and differences between the two frameworks would in general be something that would be interesting to explore but unfortunately cannot be done in this paper for reasons of space.

Environment	Preverbal	Postverbal
Clause initial	0	208
Reduplicated object	0	15
Function word	101	3
Fronted constituent	1	14
Subject	0	29
Gerund	0	19
Imperative	0	4

Table 3: Clitic positioning in Medieval Cypriot Greek (adapted from Pappas 2004).

Environment	Preverbal	Postverbal	Century
Clause-initial	0	19	13th,14th, 15th
Fronted constituent	0	10	13th
Temporal expression	0	3	13th, 14th, 15th
Ouk (NEG)	0	1	13th
Kathos (SCON)	0	2	13th
Epei (SCON)	0	1	13th
Mēpōs (DUB SCON)	0	1	13th
Hina (COMP)	14	0	13th, 14th, 15th
As (SBJ)	1	0	13th
Mē (NEG)	1	0	13th
Ōs (COMP)	1	0	13th
Subject	1	1	13th
Wh-expression	7	19	13th, 14th, 15th

Table 4: Clitic positioning in Medieval Pontic Greek (Pappas 2006: 316).

and aspect of the event. The assumption is therefore that these elements provide partial information about properties of the situation but they do not provide a fully-specified type and formula value – this will only be provided once the verb is parsed. Whilst the unfixed node trigger is present at this stage in the diachronic development of the language, it applies only to wh-elements and has not yet generalised to other contexts. The lexical entry for Medieval Cypriot Greek showing the unfixed node as trigger but only applying to wh-elements is provided in (63) below:

(63)   Lexical entry for Medieval Cypriot Greek clitics (unfixed node trigger: only applies to wh-elements)

IF   ?Ty(t)
THEN   IF $\langle\downarrow^*\rangle$?∃x.Tn(x), Fo(WH) | [PROCLITIC TRIGGERS]
                       $\langle\downarrow_0\rangle$?Ty($e_s$) ||
                       $\langle\downarrow^+\rangle$Fo(x)   [ENCLITIC TRIGGER]
                       THEN ACTIONS

…
ELSE   abort

The transition to Cypriot Greek can therefore be explained as the transition from a specific to a generalised trigger for the unfixed node parsing strategy. In effect, proclisis is generalised to (all) fronted constituents. The lexical entry for Cypriot Greek showing the unfixed node as a generalised trigger across all fronted elements is shown in (64) below:[22]

(64)   Lexical entry for clitics in Cypriot Greek (generalised unfixed node trigger)
        IF   ?Ty(t)
        THEN   IF $\langle\downarrow^*\rangle?\exists x.Tn(x)$ | [PROCLITIC TRIGGERS]
                        $\langle\downarrow_0\rangle?Ty(e_s)$ ||
                        $\langle\downarrow^+\rangle Fo(x)$ [ENCLITIC TRIGGER]
                        THEN ACTIONS

        …
        ELSE   abort

The transition from Koine Greek to Cypriot Greek (via Medieval Cypriot Greek) can therefore be seen to have gone from the situation in which clitic positioning patterns were governed purely by pragmatic considerations (in Koine Greek), to a situation where clitic positioning is determined by syntactic constraints (in Cypriot Greek). The intermediate stage of this process is proposed to have involved the routinisation of this previously pragmatically-determined word order with the patterning encoded in the lexical entry for the wh-element. This subsequently generalised to all contexts in which a fronted element appears at the left periphery, resulting in the situation attested in present day Cypriot Greek. A further restriction was also at play, which regulated enclitic positioning in the absence of any of these proclisis-inducing environments.[23]

The relationship to the situation with Rangi auxiliaries is clear at the synchronic level. Alternation in auxiliary placement (which we take here as analogous to clitic placement) occurs in the context of wh-elements, negative markers, focus constructions and relative and subordinate clauses. Similarly, in Cypriot Greek, proclisis occurs with wh-elements, modality-tense-mood markers, negation, subordinating conjunctions and argument and non-argument focused elements. The question that therefore arises is whether in light of these structural similarities on the synchronic level, structural similarities can also be found in the diachronic level.

The main similarity between the Rangi and the Greek systems from a parsing point of view is the encoding of processing strategies as triggers for parsing a particular element. In Cypriot Greek, the unfixed node is taken as a trigger for proclisis, whilst in Rangi the unfixed node is the trigger for parsing the auxiliary. Given that the norm in Bantu more

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[22] As was pointed out by a reviewer, there are cases in Cypriot Greek (and indeed in Greek in general) in which subjects are topics but do not trigger proclisis. Such an observation is accommodated under this approach by reference to a LINK relation which is used rather than an unfixed node. Indeed, this is the standard way of analysing topics in DS (see for example Cann et al. 2005) and is also the technique used to model Bantu subject and topical elements in the current paper.

[23] Placement in Cypriot Greek has been claimed by Agouraki (2001) to have parallels with the positioning of verbal modifiers in Hungarian. Verbal modifiers appear in general pre-verbally, unless one of a number of elements appear in the left periphery, in which case they appear post-verbally. The elements are pretty much the elements that trigger proclisis in Cypriot Greek. We believe that an analysis of Hungarian particles within the same lines sketched for Cypriot Greek could be promising. The idea would be that verbal modifiers involve similar parsing triggers as those found in Cypriot Greek to determine their syntactic distribution. Interestingly, Old Hungarian data show a further similarity with Cypriot Greek. In specific, Old Hungarian, similarly to Medieval Cypriot Greek, appears to have almost the same positioning system as their respective modern counterparts, the only difference being that not all proclitic environments in Medieval Cypriot Greek and post-verbal environments in Old Hungarian are categorical. For example, even though wh-elements trigger post-verbal positioning of the verbal modifier in modern Hungarian categorically, a number of exceptions exist in Old Hungarian. Such exceptions also appear in Medieval Cypriot Greek for example with function words (see **Table 3**).

generally is for the auxiliaries to precede the verb in all syntactic contexts, and it can be assumed that this was also the dominant order in the language which is the predecessor of present day Rangi, the natural question is therefore, how did this entry (and associated unusual word order) develop in Rangi? Above, we showed that in Greek this transition involved a specific trigger encoding the unfixed node processing strategy which subsequently generalised to all elements that are parsed using this strategy. Below we show that this is also a viable explanation for the situation in Rangi.

6 Accounting for the rise of the Rangi auxiliary system: From pragmatic to syntactic constraint?

The proposal developed here is based on the assumption that the verb-auxiliary order found in Rangi is the result of language-internal processes of change.[24] We propose that the stages that lead to the development of clitic systems like Cypriot Greek can also be used to capture the rise of the auxiliary system in Rangi. Specifically, we claim that the use of the unfixed node processing strategy played a major role in the development of both systems. For Rangi, the proposal is therefore that historically the language exhibited the more Bantu-typical order in which the auxiliary appeared before the main lexical verb. However, at some point, the system developed into one whereby the verb could also appear before the auxiliary. One reason for this otherwise unusual word order might have been pragmatic considerations (resulting in further parallels with the clitic systems under discussion in the current paper).

In a number of Bantu languages, verb-fronting can be used to convey predicate focus. Such constructions may involve doubling of a verb form, as can be seen on comparison of the examples from the Bantu language Gikuyu in (65) below.

(65)   *Gikuyu* (Morimoto 2013: 9)
    a. Audu   é-dete   garí   y-aké.   Irá   ne   a-ra-mé-tugát-ire.
        Audu   1-love   car   POSS   yesterday   FOC   1-PST-9-care-PFV
        'Audu loves his car. Yesterday he took care of it.'

    b. Ne   gu-thabía   a-ra-mé-thabi-rié   kana   ne   gu-thodéka
        FOC   INF-wash   1-PST-9-wash-PFV   or   FOC   INF-fix
        a-ra-mé-thodék-ire?
        1-PST-9-fix-PFV
        'Did he wash or fix it?'

    c. Ne   gu-thodék-a   a-ra-mé-thodék-ire.
        FOC   INF-fix-FV   SM1-PST-9-fix-PFV
        'He FIXed it.'

Thus, in Gikuyu verb doubling can be used to convey predicate focus (65c). A similar situation has been noted in a number of other Bantu languages where verb fronting is used to convey a focal reading on the predicate (Hadermann 1996; Güldemann 2003; Morimoto 2013; de Kind et al. 2014). The proposal we make here is that whilst the Rangi examples do not involve doubling of the verb form, the presence in closely related languages of verb fronting constructions which can be used to convey a focus interpretation on the predicate

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[24] An alternative proposal, that this word order is the result of contact with non-Bantu languages spoken in the area has also been forwarded (Stegen 2002; Nurse 2003; Dunham 2005). Whilst we do not go into detail on the relative merits and challenges associated with this proposal, the reader is referred to Gibson (2013). For the purposes of the current discussion however, it is argued that a language-internal account of the rise of the verb-auxiliary order can plausibly be constructed on the basis of comparative-typological data from other Bantu languages, as well as from evidence within Rangi (specifically with reference to the 'alternation contexts').

can be considered as cross-linguistic support for the idea that the verb-auxiliary order in Rangi was, at least historically, pragmatically-motivated.

The proposal would therefore be that at some point in the development of the language, constructions with both auxiliary-verb and verb-auxiliary order would have been possible in Rangi, albeit with different pragmatic interpretations.[25] We propose here that in order for this process of change to occur, the lexical entry for the auxiliaries in Rangi underwent a process of routinisation whereby what started out as a highly specific lexical trigger developed into a generalised trigger – a proposal which also fits with the observations above relating to the Tobler Mussafia systems, particularly that of Cypriot Greek, as outlined above.

The general idea as presented in Gibson (2012) is that auxiliaries can be parsed as soon as a locally unfixed node is present in the derivation. In simple terms, this ensures that auxiliaries are always preceded by a subject marker in order for the trigger to be satisfied. As outlined in Section 4, one option is that infinitives appearing in the non-canonical, clause-initial position (as would have been the case if infinitives were fronted for pragmatic reasons) were essentially treated as fronted constituents and were processed on an unfixed node. During the historical development of the language, auxiliaries developed an additional trigger that allowed them to be parsed in the presence of an unfixed node with a predicate requirement. This would have enabled the parsing of these clause-initial infinitives and would have co-existed with the trigger for capturing the (more standard) pre-verbal auxiliary positioning. With the infinitive therefore appearing as a 'fronted' element, it could be parsed using the unfixed node strategy. This possibility would be reflected in the lexical entry for the auxiliary as attested in present-day Rangi,[26] as shown in (66) below which allows for the auxiliary to be parsed in the presence of an unfixed predicate node ($\langle \downarrow^* \rangle ?\exists x.Tn(x), ?Ty(e \rightarrow t)$), thereby allowing it to appear post-verbally.

(66)   Specific unfixed node trigger for the Rangi auxiliary *-rɪ*
   IF   ?Ty(t)
   THEN IF $\langle \downarrow^* \rangle$ (?∃x.Tn(x), ?Ty(e→t))
        THEN ACTIONS
   …
   ELSE abort

The lexical entry above involves the encoding of the unfixed node strategy as a triggering condition but this strategy is specified for only one of the elements that is parsed using this strategy – the infinitive (encoded by the restriction for a ?Ty(e→t) node in the lexical entry for the auxiliary). The further assumption is that the unfixed node trigger became a generalised strategy which meant that it could also apply to other elements parsed on an unfixed node. Therefore, what started out life as a trigger enabling the auxiliary to be parsed solely in the presence of an unfixed predicate node (as would be the case in the pragmatically-motivated verb fronting construction), generalised to other elements such as negative markers, or wh-elements etc. The lexical entry allows the auxiliary to be parsed in the presence of any unfixed node. Assuming that infinitives are parsed on an unfixed node, this would mean that a common trigger would suffice for pre-verbal

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[25] As was pointed out by one of the reviewers, it is not strictly necessary to posit a diachrony in the ordering of the verb and the auxiliary since both the auxiliary-verb and verb-auxiliary order could have co-existed at a given point in the historical development of the language. This was the case in Latin for instance, where both positions were available, albeit with different pragmatic functions.

[26] The proposed lexical entries showing the transitions involved in the historical development of the Rangi auxiliary were shown in (50) and (66).

positioning across all of the 'alternation contexts' and that this pre-verbal auxiliary place-ment would occur whenever another element is parsed before the auxiliary. The trigger that was previously restricted to contexts in which the infinitive was parsed first, lost this specification but retained the unfixed node requirement. The generalised unfixed node trigger would therefore be as shown in (67):[27]

(67)   Generalised unfixed node trigger for the Rangi auxiliary -*rɪ*
        IF   ?Ty(t)
        THEN   IF $\langle\downarrow^*\rangle$ (?∃x.Tn(x))
                    THEN   ACTIONS
        …
        ELSE   abort

This lexical entry therefore allows for the auxiliary to be parsed in the presence of an unfixed node. It is not necessary to specify whether this is an unfixed predicate node (i.e. introduced by the infinitive) or if it is an unfixed argument node (i.e. introduced by a wh-element), since all of these parsing contexts can be unified by the presence of an unfixed node in the tree ($\langle\downarrow^*\rangle$?∃x.Tn(x)). Crucially, this closely resembles the transition from Koine Greek to Cypriot Greek, as well as resembling the lexical entry for clitics in Cypriot Greek outlined in (64) above. The structural synchronic similarities can therefore be seen to exhibit diachronic similarities in terms of the stages that lead to the development of the systems, as well as in the forms of the lexical entries and the unfixed node processing strategy as a trigger environment which allowed the auxiliary to be parsed, thereby result-ing in the auxiliary-verb order.

7 Summary and concluding remarks

This paper has provided an account of the similarities – in both synchronic and diachronic terms – of the auxiliary system found in the Tanzanian Bantu language Rangi, and clitic positioning systems in dialects of Romance and Greek, with a particular focus on Cypriot Greek. In many regards Rangi exhibits the morphosyntax and clause structure most com-monly associated with Bantu languages: the combination of simple and complex verb forms which are used to encode tense-aspect distinctions, predominantly head-marking morphology and SVO word order which allows for some pragmatically-motivated flex-ibility of word order. However, against this backdrop, Rangi also exhibits an unusual constituent order in which the auxiliary appears after the verb in a highly restricted set of contexts. In the future tense – which is formed through a compound construction – the auxiliary consistently appears post-verbally in declarative main clauses. Moreover, this word order shows a further alternation depending on the clause-type with which the construction is associated. For example, wh-questions and sentential negation exhibit pre-verbal auxiliary placement. Whilst this paper does not provide an in-depth examination of why this system may have developed in Rangi and not in other Bantu languages, it does present an account of the possible genesis of the construction as well as the steps that may have given rise to the system in present-day. This account is formulated from the perspective of the Dynamic Syntax theoretical framework.

    The account relies heavily on the role played by the lexical entries that are encoded by the auxiliaries and the steps which are – and are not – licit at any stage in the parsing

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[27] One way that this process could have happened is via a parsing/production mismatch: the producer would have used an unfixed node trigger as specifically applying to predicate unfixed nodes and the parser could have reanalyzed this by dropping the predicate specification, thus leaving a more general unfixed node restriction. Note that this is also a way to motivate the transition from Medieval Cypriot Greek to Cypriot Greek. Similar considerations have also been proposed by Bouzouita (2008a; b) for Medieval Spanish.

process. In this way, the analysis draws naturally on the concepts of underspecification and update which lie at the heart of DS. The discussion is also informed by observations from clitic placement systems in Romance and Greek varieties, concentrating mainly on Cypriot Greek as a representative example of such a variety. The insights from Romance and Greek provide support for the account developed here, providing clues as to the stages involved in the diachronic development of the present-day system in Rangi, in the absence of detailed documentation of Rangi at earlier stages in its development. This comparative angle therefore is not only compelling from a cross-linguistic perspective but also in terms of its ability to shed light on the diachronic development of the language. Whilst we lack historical data exemplifying the different stages of this process developing in Rangi, we consider the stages sketched above to represent a natural way for the transition to the modern positioning system of Rangi auxiliaries to have occurred.

In the earlier stages of the language, the Bantu-typical auxiliary-verb order would have been found across all compound constructions. The second stage would have involved the availability of verb fronting in these future tense constructions to encode predicate focus, as is still seen in a number of neighboring Bantu languages but it is no longer associated with a focal reading in Rangi. This stage would therefore have involved the co-existence of the auxiliary-verb and the verb-auxiliary order in the future tense construction in language. With fronted elements parsed on an unfixed node in DS – representing their structurally underspecified relation to the rest of the tree – infinitives in this verb-auxiliary order are also analysed as annotating an unfixed node. The lexical entry for the auxiliary would have therefore developed to contain a triggering context in which it could be parsed in the presence of an unfixed predicate node. The proposal made in the paper is that as a result of a process of routinisation, this lexical trigger generalised to all contexts involving an unfixed node. With clause-initial elements such as wh-words and focused constituents being modeled as annotating unfixed nodes, these contexts therefore also acted as triggers enabling the auxiliary to be parsed first. The lexical entry for the auxiliary therefore generalised to cover the presence of any unfixed node (from the previous restriction to just an unfixed predicate node).

In this way, the previously pragmatically-motivated word order alternation got routinised, lost its pragmatic effect and was ultimately encoded as a syntactic constraint operative within the language. This is further supported by observations from dialects of Greek and Romance languages in terms of the development of their clitic systems and involves much the same reasoning as was argued to be the case for the passage from Medieval Cypriot Greek to Cypriot Greek. The final question, as to why this occurred only in the future tense in Rangi and did not generalise out across all auxiliary constructions can perhaps be answered by an observation made by Hyman and Watters (1984) and more recently (Güldemann 2003) who propose that there is a link between the encoding of specific tense-aspect combinations and focus. Specifically, they argue that the present progressive (and often by extension the future tense) is an inherently focal category in Bantu, thereby adding support to the proposal that the exceptional auxiliary order in Rangi has its origins in pragmatic considerations.

The account has, we believe, the advantage of drawing out the observed parallels between distinct phenomena in unrelated languages through reference to a single concept – the encoding of specific parsing processes in the lexical entries of words and morphemes. By modelling the fronted elements on an unfixed node, the account also harnesses the predictive power of the framework and is able to show that this seemingly idiosyncratic word order found in Rangi stems naturally from the basic constraints operative in the DS

system, as well as reflecting apparently common pathways of change for lexical entries, thereby showing the centrality of parsing in context and the power of lexical input.

Abbreviations

Glossing conventions follow the Leipzig Glossing Rules, the following abbreviations are used throughout: 1, 2, 3 etc. = noun class number, ACC = accusative, APPL = applicative, AUG = augment, AUX = auxiliary, AUX.FUT1 = near future auxiliary, CC = complement case, CL = clitic, CON = conjunction, COP = copula, DEM = demonstrative, DUB = dubitative, F = feminine, FOC = focus, FUT = future, FV = final vowel, HAB = habitual, IMM FUTURE = immediate future, IMP = imperative, INC = inceptive, INF = infinitive, LOC = locative, NEG = negative, NOM = nominative, OM = object marker, PASS = passive, PL = plural, POSS = possessive, PLUR = pluractional, PRD = predicative, PROG = progressive, PRO = pronoun, PRF = perfective, PST = past, PTV = perfective, RED = reduplication, REFL = reflexive, RSRS = reversive, SBJ = subjunctive, SM = subject marker, SCON = subordinate conjunction, SG = singular.

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Competing Interests

The authors have no competing interests to declare.

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