GRAMMATICALIZATION AND 'LATERAL' GRAMMATICALIZATION, FORMALISM AND FUNCTIONALISM

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1. INTRODUCTION

Grammaticalization occurs cross-linguistically and is a challenge for Lighfoot's (1999, 2006) models of language change which predict that language evolution should not have cross-linguistic trends. Roberts and Roussou (R & R) (2003:2-7) and van Gelderen (2011:4) propose that grammaticalization is a natural type of change that can occur cross-linguistically.

In section 2, I set out the premises of their arguments.

In section 3, I compare R & R's grammaticalization with Simpson and Wu's (S & W) (2002) 'lateral' grammaticalization. As the latter analyse Chinese *de* (determiner (D) > past tense marker (T(past))), I compare it with R & R's analysis of the Romance future (verb (V) > future tense marker (T(future))), since both are geneses of verbal inflections under T.

Section 4 is my conclusion where I reply to Vincent and Borjars (V & B) (2010).

2. GENERATIVE MODELS OF LANGUAGE CHANGE

2.1. Lightfoot

Lightfoot (1999:60-74, 2006:10-15, 88-89) argues that grammar is moulded during first language acquisition, which is hence the locus for language change. There are three components (Lightfoot (1999:66-68, 2006:10, 45)): (1) internal grammar (IG) (2) universal principles and parameters of grammar (UG) (3) the trigger experience in the form of primary linguistic data (PLD). IG is formed by children scanning their PLD and setting the parameter values of their UG:

  a. Linguistic triggering experience (genotype $\longrightarrow$ phenotype)
  b. Primary linguistic data (Universal Grammar $\longrightarrow$ internal grammar)

As UG is a genetic constant, the source for language change lies in the PLD and how it is re-analysed by children (Lightfoot (1999:66-68, 178-179, 2006:11-2, 87-90)).

2.2. R & R (2003), Roberts (2010) and van Gelderen (2011)

Lightfoot asserts that language evolution is random because PLD is cross-linguistically unpredictable: "the expression of the cues changed in such a way that a threshold was crossed and a new grammar was acquired (parameter resetting). That is as far as this model goes, *and it has nothing to say about why the distribution of cues should change*." (my brackets and italics) (Lightfoot (1999:166)). Lightfoot's model predicts that the cross-linguistic distribution of 'cues' is random.

R & R and van Gelderen introduce a learning device in language acquisition that chooses the 'simpler' alternative in ambiguous 'cues' (R & R (2003:14-17)), and since grammaticalization always leads to 'simpler' structures, it is a natural mechanism in language acquisition that can occur cross-linguistically.[1] R & R (2003) define 'simplicity' as the reduction of 'feature syncretisms', namely "the presence of more than one formal feature in a given structural position: H [+F, +G…]" (R & R (2003:201), Roberts (2010:49)), whereas van Gelderen (2011:4, 16-17, 20-21, 41-43) argues that uninterpretable features are 'simpler' than interpretable ones in not having feature-values.

3. GRAMMATICALIZATION AND 'LATERAL' GRAMMATICALIZATION

Campbell and Janda (C & J) (2001) give a long catalogue of different definitions of grammaticalization, and they conclude that the only common denominator is 'some linguistic element > some more functional element' (C & J (2001:107)), which entails both 'lexical > functional' and 'functional > more functional'. I propose to expand on this by including aspects of grammaticalization that are numerically significant in C & J's catalogue. Of the thirty-six definitions, I count 'semantic bleaching' (mentioned 18 times), 'phonological weakening' (mentioned 13 times), and 'univerbation' (mentioned 18 times) as numerically significant. 'Re-analysis' (mentioned 5 times) and 'cross-linguistic distribution' (mentioned 7 times) are not numerically as significant, but as they are crucial to the Minimalist framework of grammaticalization (see previous section), they are also included here.[2] I shall form a partition of these phenomena in comparing the two changes.

3.1. Similarities

I argue that 're-analysis' and 'cross-linguistic distribution' are the two main similarities between grammaticalization and 'lateral' grammaticalization.

3.1.1. 'Re-analysis'

(1) item   in   mult-is   hoc   re-bus   dic-ere   hab-emus
     likewise in many-ABL.PL this thing-ABL.PL say-INF have-PRES.1PL
     'Likewise in many cases we have this to say.'
                                            (Lucretius *De rerum natura* 6.711) (99 – ca. 55 BC)
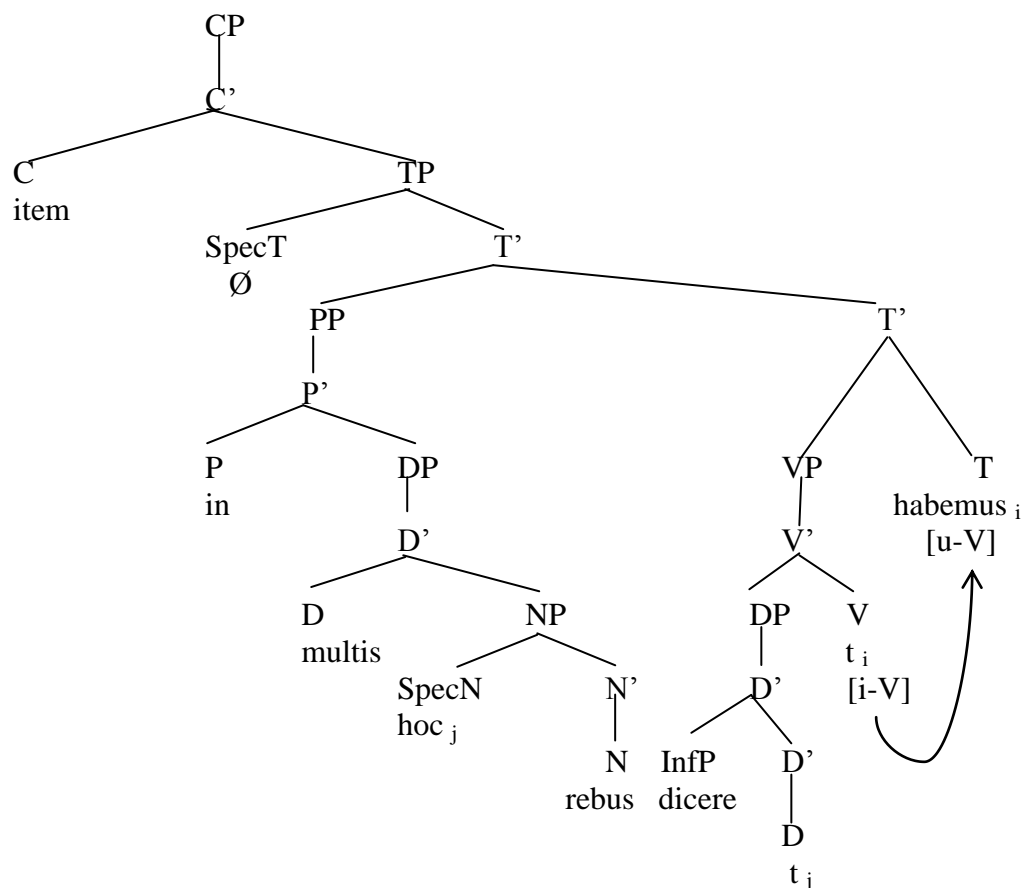
In this first attestation of *habere* + infinitive, *habere* is a lexical verb denoting possession and taking a direct object (*hoc*) modified by the infinitive (*dicere*):[3]

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[1] It is not clear whether this learning device is part of UG or not. V & B (2010:280, 293) consider it as part of UG, but van Gelderen (2011:9) equates it with Chomsky's 'third factor principles' i.e. principles not specific to UG. Either way this device plays an important role in Minimalism.

[2] The conceptual importance of these phenomena is confirmed by the fact that these are the aspects of grammaticalization that are examined in Campbell's (2001) critical analysis of grammaticalization theory.
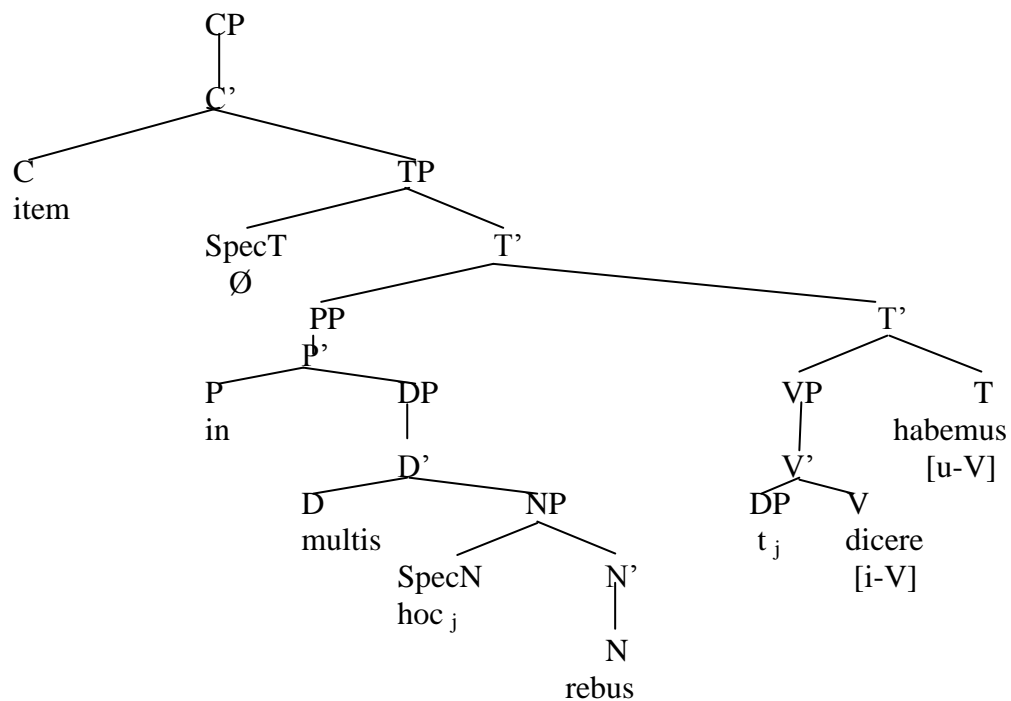
[3] Pinkster (1985:202, 1987:208-209) argues that the infinitive in this construction is equivalent to an earlier predicative gerundive. Since gerundives are adjectival in Latin (Woodcock (1958:158-159, 163)), this infinitive is represented as modifying the object here.

(2)

```
                        CP
                        |
                        C'
            _____/ _____
           C                          TP
         item                _____/  _____
                            SpecT                T'
                              Ø          _____/ _____
                            PP                             T'
                            |                       _____/ _____
                            P'                     VP              T
                       ____/ \____                 |           habemus i
                      P          DP                V'            [u-V]
                     in          |             ___/ \___
                                 D'           DP        V
                          _____/ _____     |        t i
                         D              NP     D'      [i-V]
                       multis     _____/ \___  |
                               SpecN        N' |
                               hoc j        |  |
                                            N  InfP  D'
                                          rebus dicere |
                                                       D
                                                       t j
```

However, as modality is implied,[4] *habere* can be re-analysed as a modal auxiliary verb in T and the infinitive (*dicere*) as V governing the direct object (*hoc*) i.e. 'likewise in many cases we have to say this':

(3)

```
                        CP
                        |
                        C'
            _____/ _____
           C                          TP
         item                _____/  _____
                            SpecT                T'
                              Ø          _____/ _____
                            PP                             T'
                            P'                      _____/ _____
                       ____/ \____                 VP              T
                      P          DP                V'           habemus
                     in          |             ___/ \___         [u-V]
                                 D'           DP        V
                          _____/ _____     t j     dicere
                         D              NP            [i-V]
                       multis     _____/ \___
                               SpecN        N'
                               hoc j        |
                                            N
                                          rebus
```
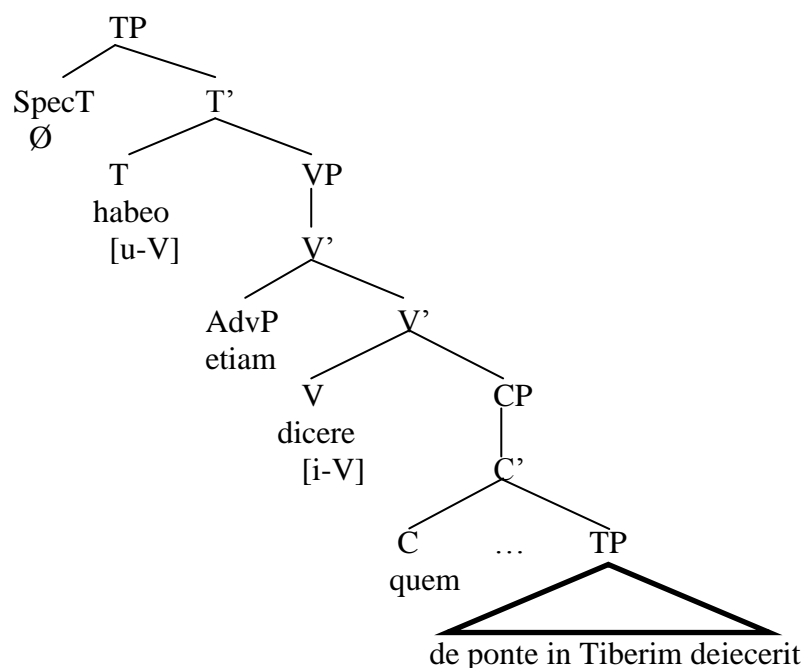
(3) has fewer 'feature syncretisms' than (2) since the V-to-T movement in (2) is lost and there are fewer feature place-holders in (3). Furthermore, as *habemus* is re-analysed as a modal auxiliary in T, its interpretable verbal features ([i-V]) become uninterpretable ([u-V]), which are 'simpler'. In the other earliest attestation of *habere* + infinitive, it is preferable to analyse *habere* as a modal auxiliary verb in T:

(4)   hab-eo   etiam   dic-ere   qu-em...   de
      have-PRES.1SG   even   tell-INF   REL.PRO-ACC.SG   from
      pont-e   in   Tiber-im   deic-erit.
      bridge-ABL.SG   into   Tiber-ACC.SG throw.down-PERF.SUBJ.3SG
      'I even have an example to tell you, namely the man whom he threw from the
      bridge into the Tiber.'   (Cicero *Pro S. Roscio Amerino* 100) (80 BC)

(5)
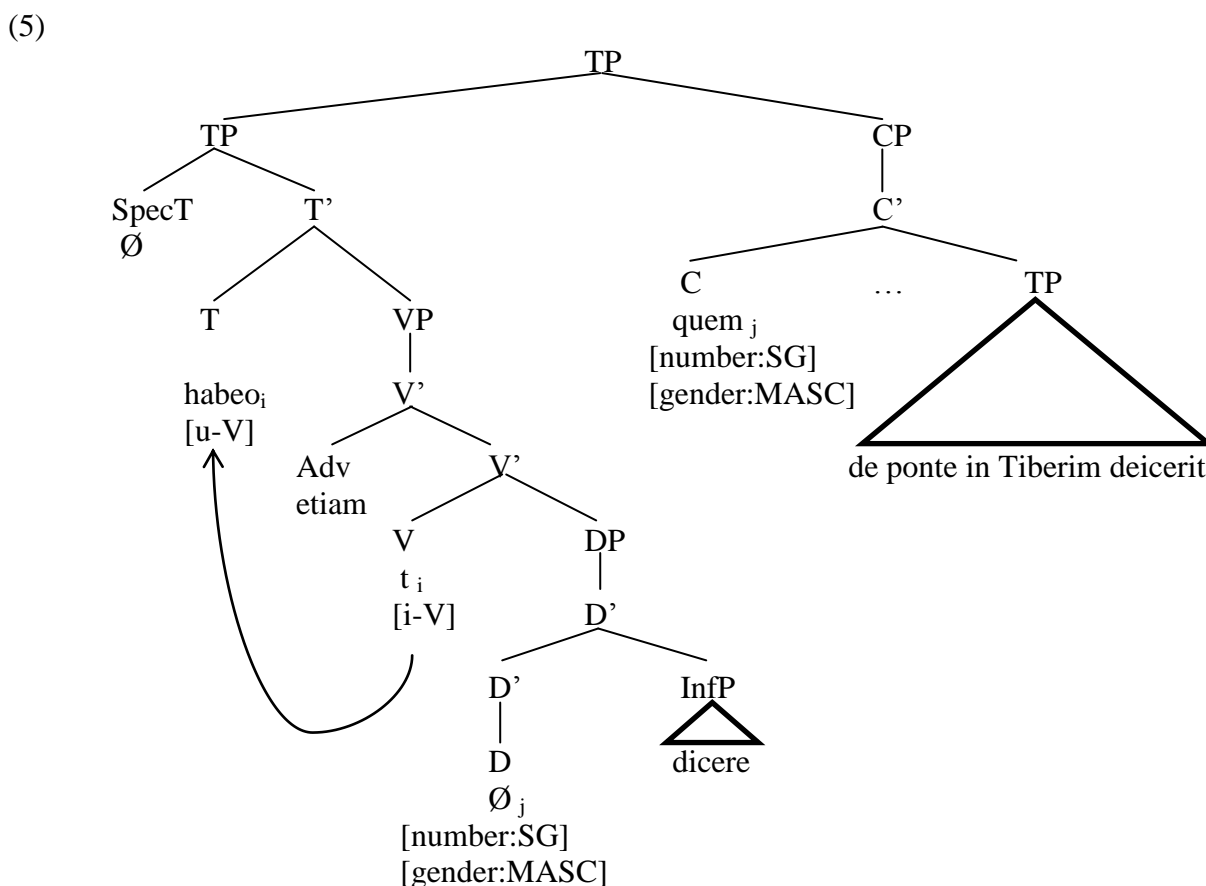
As the antecedent of the relative pronoun (*quem*) is ellipsed (*habeo* (Ø$_j$) *dicere quem*$_j$ ('I have (an example$_j$) to say, namely whom$_j$ …')), it is preferable to re-analyse this as an indirect question where *habeo* is re-analysed as a modal auxiliary verb in T: 'I have (an example) to tell you, namely whom…he threw from the bridge into Tiber' > 'I have to tell you whom… he threw from the bridge into Tiber':

(6)

```
                              TP
                        ┌──────┴──────┐
                    SpecT            T'
                      Ø        ┌──────┴──────┐
                               T            VP
                             habeo           │
                             [u-V]           V'
                                       ┌──────┴──────┐
                                     AdvP           V'
                                     etiam    ┌──────┴──────┐
                                              V            CP
                                           dicere           │
                                           [i-V]            C'
                                                      ┌──────┴──────┐
                                                      C    …        TP
                                                    quem     ◁──────────▷
                                                        de ponte in Tiberim deiecerit
```

(6) is 'simpler' and is hence preferred in language acquisition. *Habere* is now re-analysed as a modal verb denoting 'obligation/necessity' (see note 4). The semantic similarities between 'obligation/necessity' and futurity are obvious, since when one is obliged to do something, one will inevitably do it in the future (Coleman (1971:219), Lyons (1977:824)):

(7) etiam   fili-us   de-i   mor-i   hab-uit
     even   son-NOM.SG   God-GEN.SG die-INF   HABERE-PERF.3SG
     'Even the son of God had to die.' i.e. 'he would die.'[5]

                        (Tertullian *de cultu feminarum* 1.1.2) (160-220 AD)

*Habere* here is a modal auxiliary denoting 'obligation/necessity':

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[5] Both Romance future and conditional (future-in-the-past) are formed by the infinitive + *habere* with *habere* in the present tense marking future and in the imperfect/perfect tense marking future-in-the-past (Coleman (1971:215)). These are related developments and their outcomes in Romance can therefore be interpreted as occupying the same functional node in T, namely T(future) (Fleischmann (1982:59-61, 66), Fruyt (2011:800)).

(8)
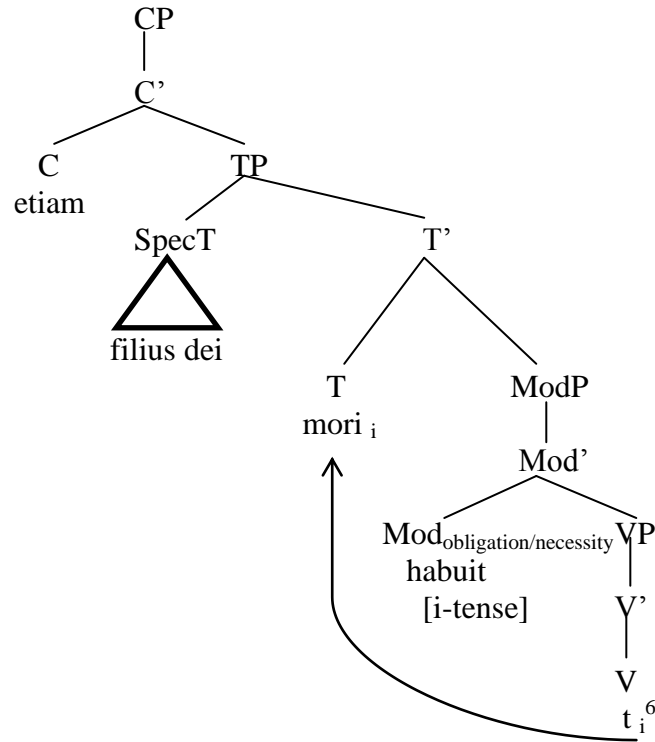
Habere can also be analysed as a future tense suffix:

(9)
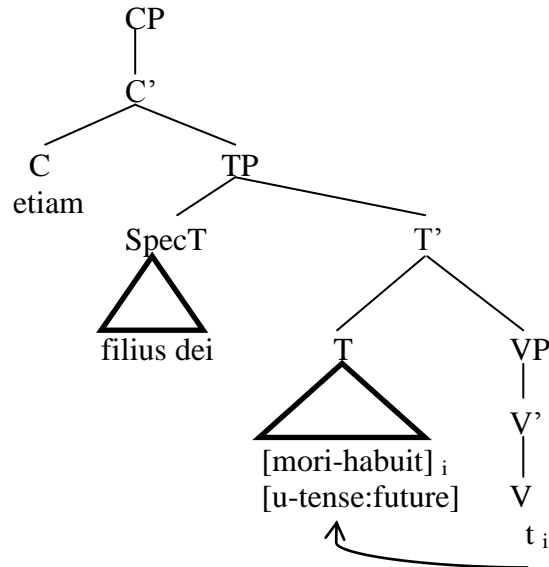
(9) is 'simpler' than (8), since the ModP is eliminated as *habere* is suffixed to the infinitive (*mori*), and the interpretable tense features ([i-tense]) become uninterpretable ([u-tense]). There is a particular type of 'obligation/necessity', namely 'predestination', which is first attested in Tertullian (160-220 AD) (Benveniste (1968:89-90), Raiskila (1990:214)):

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[6] By the time of Tertullian, *habere* coming after the infinitive is a clitic, given that it is more than often attached to the infinitive and is only separated from it by unstressed words (Raiskila (1990:213)). In capturing the clitic status of *habere* in (7-9), I follow R & R (2003:54-55) and Roberts (2010:60) by positing V-to-T movement for the infinitive (*mori*), the main verb, which bypasses the auxiliary verbal clitic (*habere*) in Mod_obligation/necessity.

(10) innation-ibus   a   qui-bus   magis
      innation-ABL.PL   by   REL.PRO-ABL.PL   most
      suscip-i   habe-bat
      accept-INF.PASS   HABERE-IMPF.3SG
      'Among the nations by which most was to be accepted.'
                                              (Tertullian *Adversus Marcionem* 9.9)

The subject of the sentence (*magis*) is 'obliged by fate' to undergo the imminent action (*suscipi*):

(11)
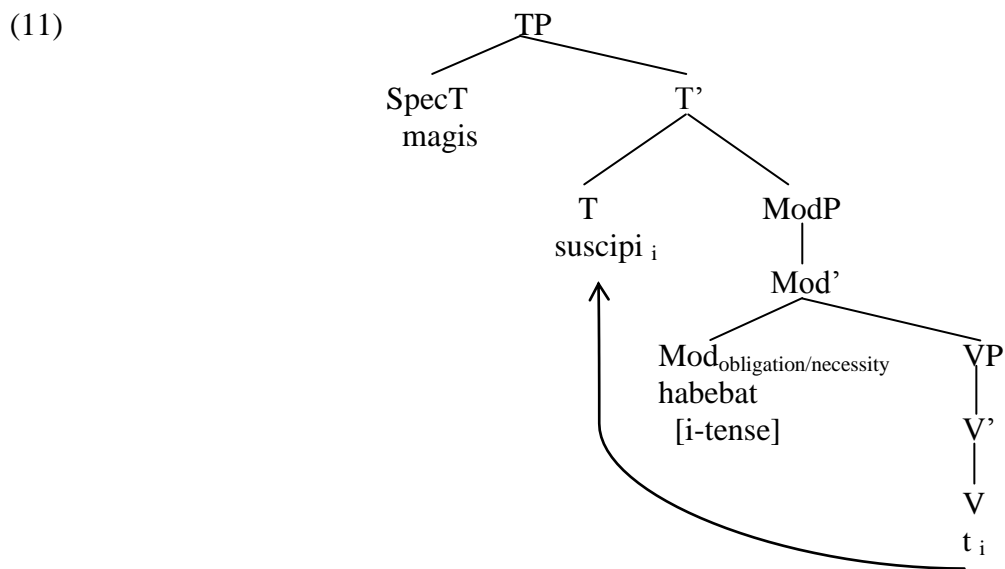
However, as the subject (*magis*) displays no 'intention/volition' whatsoever, futurity is more appropriate, since 'intention/volition' is argued to be related to 'obligation/necessity' and the lack of the former weakens the latter (Bybee et alii (1991:26-29), Fleischman (1982:56-58)):

(12)
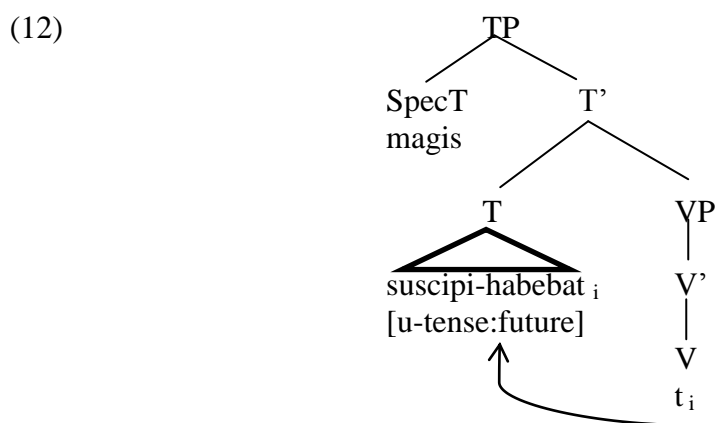
(12), the 'simpler' alternative, is preferred.
      As for Chinese *de*, the following alternation is found in certain dialects of Chinese: [7]

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[7] (13b) is argued to be derived from (13a), since examples like (13a) are attested earlier and are pan-Chinese whereas (13b) only occurs in certain dialects (S & W (2002:171)). One is therefore investigating why *de* has been preposed from sentence-final position (13a) to a verbal suffix (13b) rather than the other way round (S & W (2002:171-175). This has parallels in historical Chinese syntax, namely the Chinese perfective suffix *le*, which is derived from sentence-final *liao* (S & W (2002a:174-175), Wu (2004:122-125, 200ff)).

(13) a.   woshi   zuotian   mai   piao   de
          I be   yesterday   buy   ticket   DE
     b.   woshi   zuotian   mai   de   piao
          I be   yesterday   buy   DE   ticket
          'It was yesterday that I bought the ticket.'

S & W (2002:180-189) analyse *de* as a determiner (D) and *zuotian mai piao* as a clause that is part of a complex noun phrase (NP) headed by *de*:

(14)
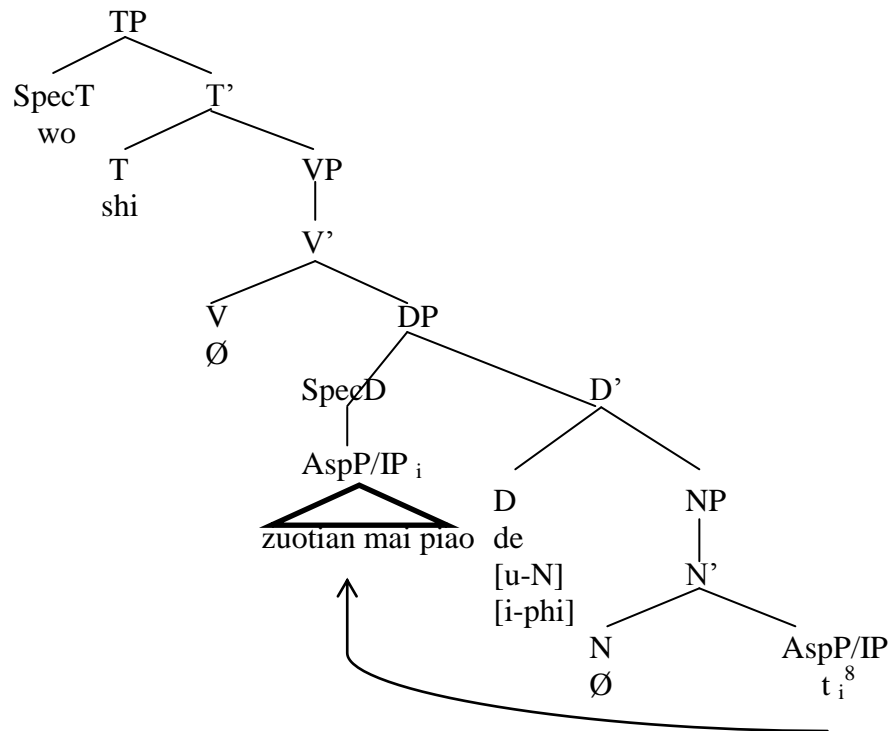
As this construction often implies that the action of the embedded clause (here *zuotian mai piao* 'to buy ticket yesterday') has already occurred (S & W (2002:175-177)), *de* can be re-analysed as a past tense marker (T(past)) and the embedded clause as part of this TP:

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[8] S & W (2002:186) justify the syntactic movement of the clause (*zuotian mai piao*) as theyargue that *de* is a clitic and causes its complement to be preposed.
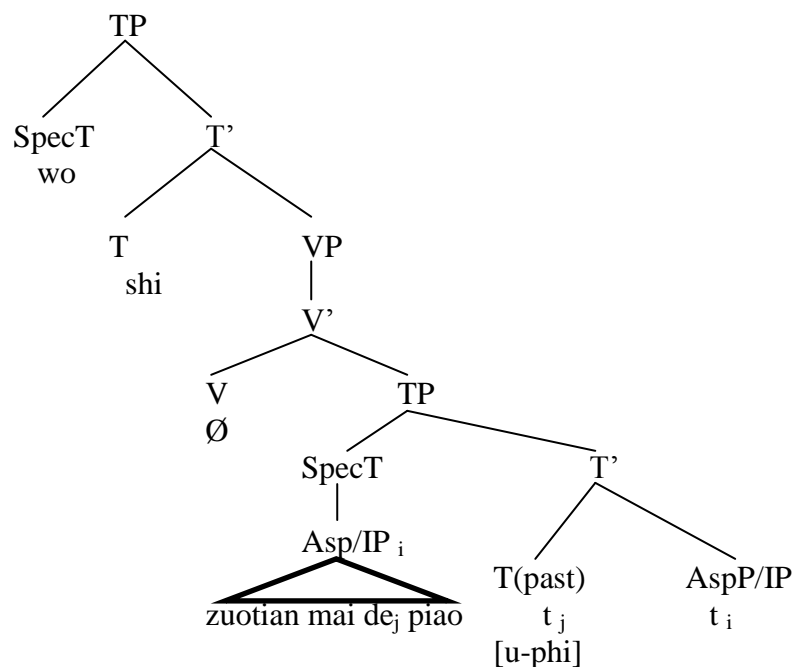
(15)

```
                        TP
                       /  \
                  SpecT    T'
                   wo     /  \
                         T    VP
                        shi    |
                               V'
                              /  \
                             V    TP
                             Ø   /  \
                            SpecT    T'
                              |     /  \
                          AspP/IP i      T(past)   AspP/IP
                            /\          de          t i
                    zuotian mai piao   [u-phi]
```
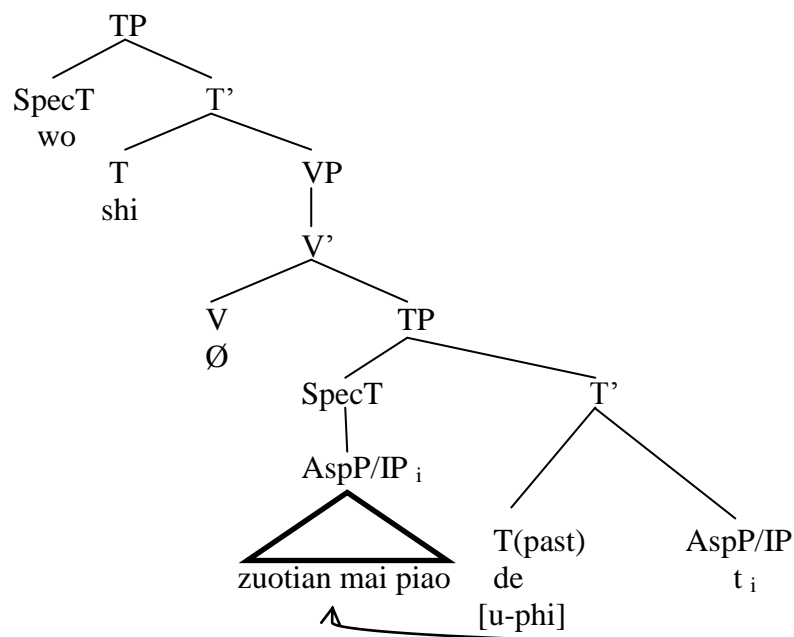
(15) has fewer 'feature syncretisms' than (14) since the Agree relation ([u-N]) between *de* as a determiner and its (empty) nominal complement is lost[9] and there are fewer feature place-holders in (15). Furthermore, while *de* as a determiner holds interpretable phi-features [(i-phi)], as it is originally part of a complex noun phrase (S & W (2002a:180-185)), as a past tense marker it holds uninterpretable phi-features [(u-phi)], which are 'simpler'.

Examples like (13b) where *de* is juxtaposed to the verb (*mai*) only permit past-time interpretation for the embedded action (S & W (2002:176-177)), and so *de* must be base-generated in T(past) and suffixed onto the verb (S & W (2002:190-191)):

(16)

```
                        TP
                       /  \
                  SpecT    T'
                   wo     /  \
                         T    VP
                        shi    |
                               V'
                              /  \
                             V    TP
                             Ø   /  \
                            SpecT    T'
                              |     /  \
                          Asp/IP i   T(past)   AspP/IP
                            /\        t j        t i
                   zuotian mai de_j piao  [u-phi]
```

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[9] The nominal complement of *de* in (14) is necessarily empty since S & W (2002:180-181, 189-190) argue that the noun in the complex noun phrase is a phonetically null light noun.

3.1.2. Cross-linguistic distribution

Both Romance future and Chinese *de* have cross-linguistic counterparts that undergo 'structural simplification' as well. As for lexical verb 'to have' > Mod$_{obligation/necessity}$, one parallel is English *have to* (Fischer (1994:147-150), Denison (1993:316)), which, like (1), originally has the lexical verb 'to have' taking a direct object modified by the infinitive:

(17) Þu   hefdest   cla ð   to   werien
     you had   clothes   to   wear
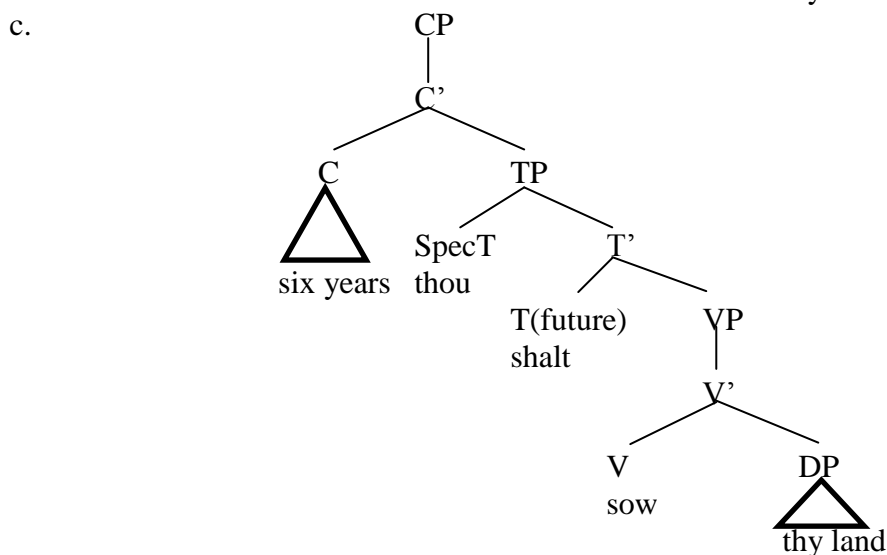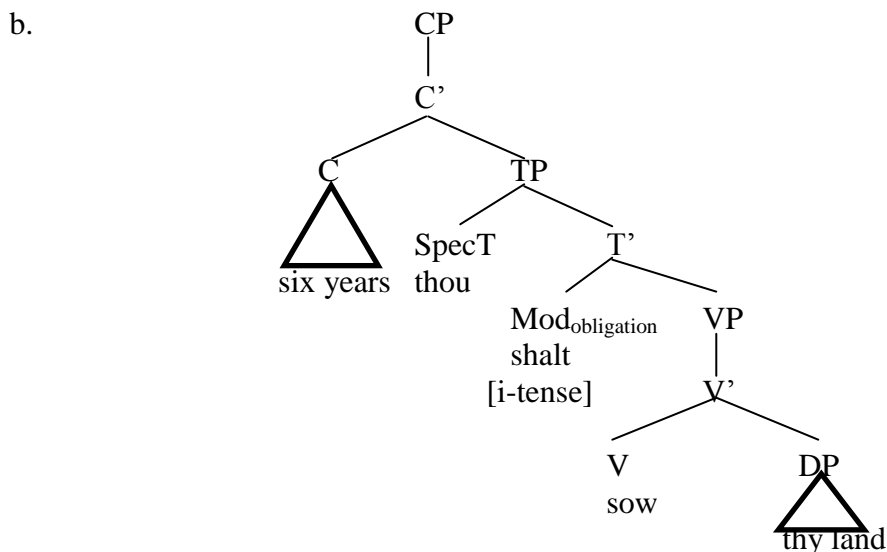   (Old English, 900-1066 AD)

(18)
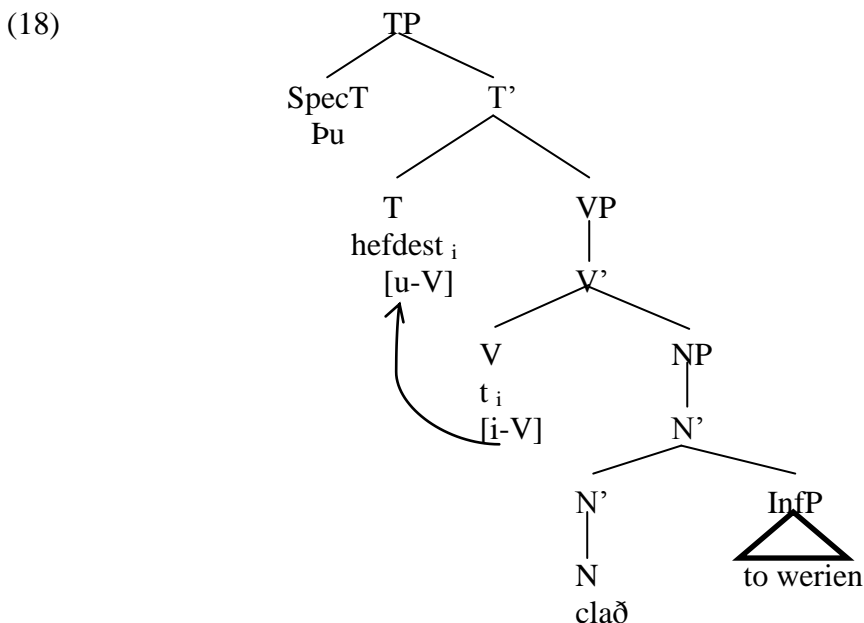
Alternatively, the verb 'to have' can be re-analysed as a modal auxiliary in T with the infinitive in V taking a direct object (Denison (1993:316), Fischer (1994:141, 147-150)):

(19)
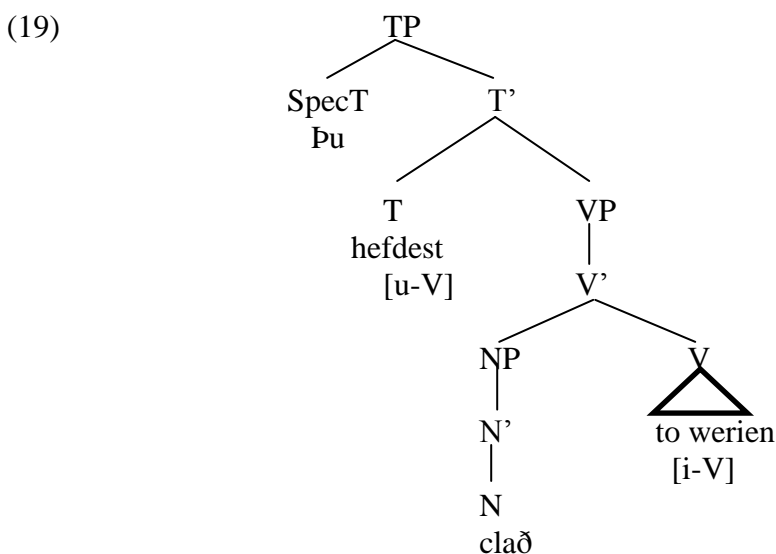
(19) is 'simpler' than (18) since, like (3), V-to-T movement is lost and interpretable verbal features ([i-V]) become uninterpretable ([u-V]).

Like (4), English *have to* also goes through weakening of the direct object relation of the verb 'to have', since SOV > SVO change in English caused the object to be shifted from before the infinitive to after it (Fischer (1994:149)):

(20) a.

Þat	he	hefde	to	iwiten	seouen	hundred	scipen
So.that	he	had	to	guard	seven	hundred	ships

(Middle English, 1100-1300 AD)

b.

c.

As the object (*seouen hundred scipen*) is closer to the infinitive ((*to*) *iwiten*) and is farther away from the verb 'to have' (*hefde*), it is better analysed as the object of the infinitive (Fischer (1994:149-150)). (20c), the 'simpler' analysis, is preferred.

As for Mod$_{obligation/necessity}$ > T(future), modern English *shall* is derived from *sceal* denoting 'obligation/necessity', which, like (7), is ambiguous between 'obligation/necessity' and futurity (Visser (1969:1582)):
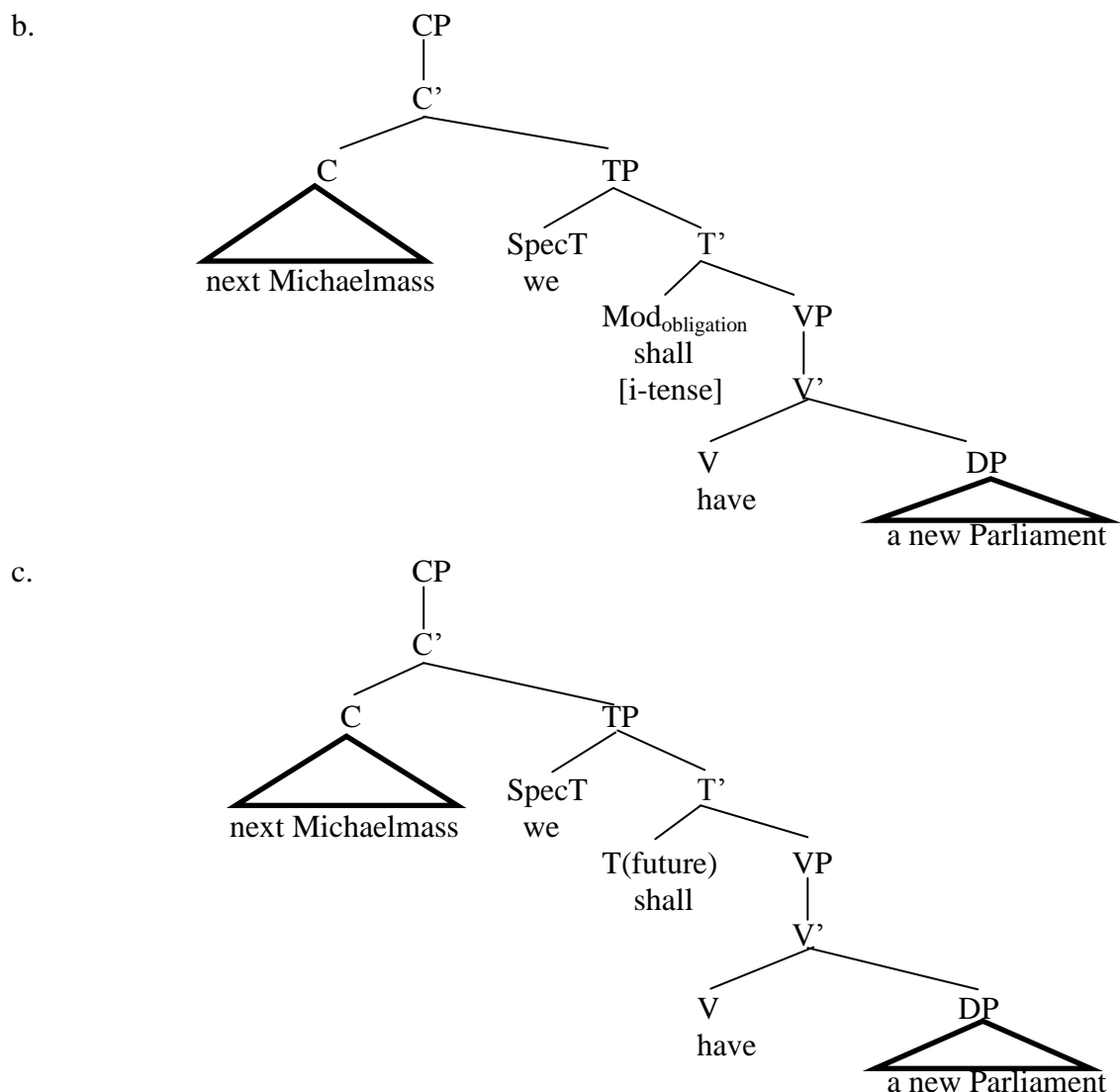
(21) a. Six   years thou shalt sow   thy   land
         Six   years you   shall sow   your land
         'For six years you must sow your land.' i.e. '… you will sow your land.'
                                                (*Bible Exodus* 23.10) (1611 AD)

   b.

```
                              CP
                              |
                              C'
                         /         \
                        C           TP
                      /   \        /    \
                   [six years]  SpecT    T'
                              thou     /    \
                                  Mod_obligation   VP
                                   shalt           |
                                   [i-tense]        V'
                                               /        \
                                              V          DP
                                             sow       /    \
                                                    [thy land]
```

   c.

```
                              CP
                              |
                              C'
                         /         \
                        C           TP
                      /   \        /    \
                   [six years]  SpecT    T'
                              thou     /    \
                                  T(future)   VP
                                   shalt       |
                                               V'
                                           /        \
                                          V          DP
                                         sow       /    \
                                                [thy land]
```

(21c) is 'simpler' than (21b) since T(future) cannot inflect for tense and hence does not have tense features whereas Mod_obligation/necessity does.

   Like (10), English *sceal* acquires the meaning of 'predestination' (Flesichman (1982:57 fn 48), Visser (1969:1581-1582, 1601ff)):

(22) a. next   Michaelmass we   shall have a   new Parliament
                                                (Dyrden, *Letters* 63) (1655-1700 AD)

b.

```
                    CP
                    |
                    C'
          ┌─────────┴─────────┐
          C                   TP
     ╱─────────╲         ┌────┴────┐
   next Michaelmass    SpecT       T'
                        we     ┌───┴───┐
                          Mod_obligation  VP
                              shall       |
                            [i-tense]     V'
                                      ┌───┴───┐
                                      V       DP
                                    have   ╱──────╲
                                        a new Parliament
```

c.

```
                    CP
                    |
                    C'
          ┌─────────┴─────────┐
          C                   TP
     ╱─────────╲         ┌────┴────┐
   next Michaelmass    SpecT       T'
                        we     ┌───┴───┐
                          T(future)    VP
                             shall      |
                                        V'
                                    ┌───┴───┐
                                    V       DP
                                  have   ╱──────╲
                                      a new Parliament
```

Here the character is expressing a fated prediction rather than a wish or intention (Visser (1969:1601)), and given that 'intention/volition' is related to 'obligation/necessity' (Bybee et al (1991:26-29), Fleischman (1982:56-58)), (22c) is preferred.

S & W (2002:199-202) give cross-linguistic examples for Chinese *de*, namely determiner (D) > copula verb (T) e.g. Chinese *shi* (Li and Thompson (L & T) (1977)):

(23) qian   li   er   jian   wang
     Thousand   mile   then   see   king
     shi wo   suo   yu   ye
     this I   NOMINALISER   desire DECLARATIVE.PARTICLE
     'To see the king after travelling a thousand miles, this (is) what I want.'
     (Mencius 4th century BC)

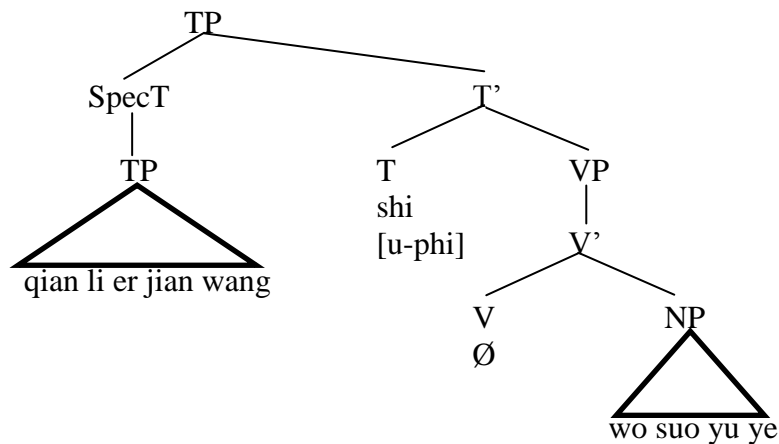Chinese *shi* is analysed as the subject pronoun in apposition with the topic[10] and the predicate:

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[10] According to Rizzi (1997), topics are part of the CP layer.

(24)

```
                              CP
                              |
                              C'
                    ┌─────────┴──────────┐
                  TopP                    TP
                   |              ┌────────┴────────┐
                  TP i           DP                 T'
              ╱──────╲            |          ┌──────┴──────┐
        qian li er jian wang     D'          T             VP
                            ┌─────┴─────┐     Ø             |
                            D          NP                   V'
                           shi i       Ø¹¹            ┌──────┴──────┐
                           [u-N]                      V           NP i
                           [i-phi]                    Ø          ╱────╲
                                                            wo suo yu ye
```
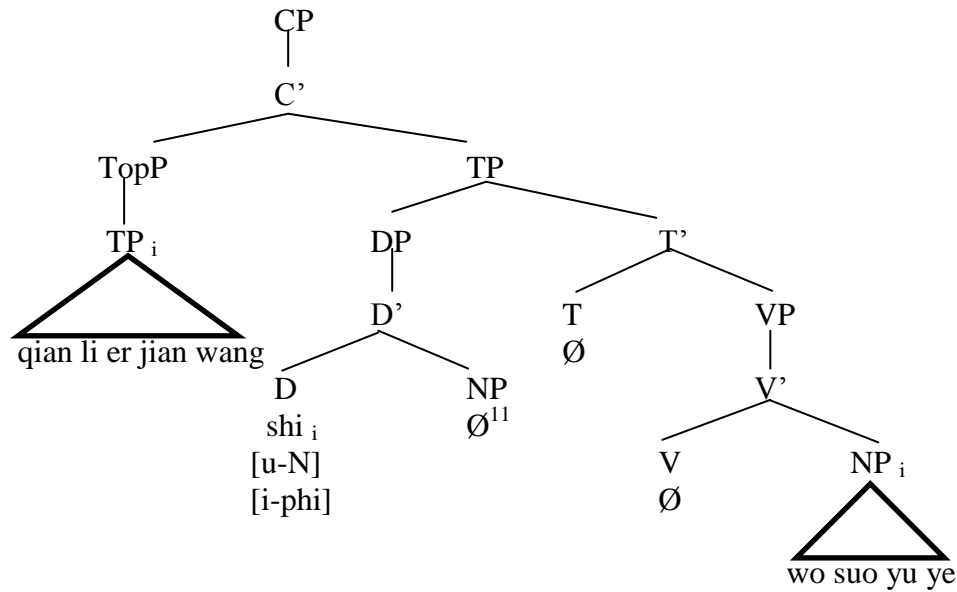
However, as identity between the three constituents is implied, *shi* can be re-analysed as a copula verb ('to see the king after travelling a thousand miles is what I want'):

(25)

```
                         TP
               ┌─────────┴─────────┐
            SpecT                   T'
              |              ┌──────┴──────┐
             TP             T              VP
          ╱──────╲         shi             |
    qian li er jian wang   [u-phi]         V'
                                    ┌───────┴───────┐
                                    V              NP
                                    Ø             ╱────╲
                                            wo suo yu ye
```

(25) is 'simpler' than (24), since the Agree relation between *shi* and its (empty) nominal complement ([u-N]) and that between *shi*, the topic and the predicate are lost. Furthermore, the interpretable phi-features ([i-phi]) held by *shi* become uninterpretable ([u-phi]) in (25).

    There are many examples of subject (demonstrative) pronouns becoming copula verbs (see L & T (1977), van Gelderen (2011: chapter 4)), of which S & W (2002:200) mention copula verbs in Panare, which are derived from different demonstrative pronouns. Like (23), these are originally equational constructions where the demonstrative pronouns are the subject in apposition to the dislocated constituent and the predicate, though Panare is head-final and shows leftwards complementation and right dislocation (Gildea (1993:57-58)):

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[11] As *shi* in Middle Chinese is attested with nominal complements (L & T (1977:422-423)), the DP it heads should contain a NP complement.

(26) a.   maestro   këj   mëj
            teacher   DEM.PRO.PROXIMAL   PRO.PROXIMAL
            'A teacher (is) he here, this guy.'
     b.   maestro   nëj   kën
            teacher   DEM.PRO.DISTAL   PRO.DISTAL
            'A teacher (is) he there, that guy.'

a.

b.

Like (23), identity is implied and so these pronouns can be re-analysed as copula verbs:

(28) a.

```
                        TP
                   ┌─────┴─────┐
                  T'            DP
              ┌────┴────┐        △
             VP         T       mëj
             │         këj
            V'        [u-phi]
         ┌───┴───┐
        DP       V
        △        Ø
     maestro
```
        'This guy here is a teacher.'

b.

```
                        TP
                   ┌─────┴─────┐
                  T'            DP
              ┌────┴────┐        △
             VP         T       kën
             │         nëj
            V'        [u-phi]
         ┌───┴───┐
        DP       V
        △        Ø
     maestro
```
        'That guy there is a teacher.'

(28a) and (28b) both have fewer ''feature syncretisms'' than (27a) and (27b) respectively, since the *Agree* relations are lost and interpretable phi-features become uninterpretable. There are even examples where there is a conflict of deixis between the three constituents:

(29) a. maestro nëj   mëj
         teacher DEM.PRO.DISTAL PRO.PROXIMAL
         'This guy here was/will be a teacher.'
    b.   maestro këj   kën
         teacher DEM.PRO.PROXIMAL   PRO.DISTAL
         'That guy there is being a teacher right now.'

This conflict of deixis means that there cannot be *Agree* relations between the three constituents, and so these demonstrative pronouns must be analysed as copula verbs. Their deixes are interpreted temporally and not spatially: *këj*, which is a proximal demonstrative pronoun, is interpreted as a present tense copula here (T(present)), whereas *nëj*, a distal demonstrative pronoun, denotes past or future tense (T(past/future)) (Gildea (1993:57-62)).

There are therefore well-attested cross-linguistic counterparts to Romance future (lexical verb 'to have' > Mod$_{\text{obligation/necessity}}$ > T(future)) and Chinese *de* (D > T).

3.2. Differences

I argue that 'phonological weakening', 'univerbation', 'semantic bleaching', 'lexical > functional' and 'functional > more functional' are the key differences. These can be divided into two further groups: 'univerbation' involves bound morphemes that are phonologically

weak (Zwicky (1985:286-287)), and so it can be analysed as the consequence of 'phonological weakening'; 'semantic bleaching' can also be seen as the consequence of 'lexical > functional', since lexical categories are semantically richer than functional ones in having antonyms (words with opposite meaning) (Radford (1997:45)).

3.2.1. 'Phonological weakening' / 'univerbation'

V > T change displays 'phonological weakening' and 'univerbation' e.g.

(30)   dar-as
            give-FUT.2SG
            'You will give.' (*Fredegar's Chronicle,* c. 613 AD)

In this example, Latin *habere* is 'phonologically weakened' and 'univerbated' as a verbal inflection (*-as*). English *have to* is 'phonologically weakened' and 'univerbated' as *hafta* (Fleischman (1982:58-59)), and English *shall* is 'phonologically weakened' as [ʃəɬ] / [ʃɬ] (R & R (2003:226)) and may even be 'univerbated' as '*ll* [ɬ] (R & R (2003:230)).

    With 'lateral grammaticalization', however, the evidence for 'phonological weakening' and 'univerbation' is much harder to find. Chinese *de* is already 'phonologically weak' (toneless) and 'univerbated' as a determiner (D) (S & W (2002:173-174, 186, 190-194)), and it is hard to argue that its use as a past tense suffix (T) is 'phonologically weaker' than as determiner. Chinese *de* as a past tense suffix can be said to be more 'univerbated' than its use as a determiner, since the former is a verbal suffix (section 3.1.1, ex. (13b)) whereas the latter is a clitic attached to a clause (section 3.1.1, ex. (13a)). However, this greater 'univerbation' is not necessarily the result of 'phonological weakening', since in both cases *de* is phonetically realised as toneless with no perceptible difference. [12] The greater 'univerbation' of *de* could be an incidental result of the re-analysis from D to T, since verbal suffixes marking tense and aspect (i.e. T) are typically attached to the verb in Chinese (S & W (2002:174-175, 190-191)). 'Phonological weakening' is a sufficient, not necessary, condition for 'univerbation',[13] and in the case of Chinese *de* 'phonological weakening' is not justified, despite greater 'univerbation'. I find no evidence for copula verbs derived from (demonstrative) pronouns undergoing 'phonological weakening' or 'univerbation' either.[14][15]

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[12] I am an L1 speaker of Chinese and I am not aware of any phonetic difference between these two uses of *de*. I have consulted two speakers of northern Mandarin dialects, both of whom agree with me on this.

[13] Cf Wu's (2004:234-236) analysis of the grammaticalization of Chinese perfective aspect *liao > le*, where she argues that *liao* is 'univerbated' as a verbal suffix before undergoing 'phonological weakening' (see note 7). There is therefore no causal connection between 'phonological weakening' and 'univerbation' here.

[14] Chinese *shi* is still toned (tone 4) in modern Mandarin i.e. phonologically and syntactically independent. I am grateful to two anonymous L1 speakers of Palestinian Arabic for confirming the <u>absence</u> of 'phonological reduction' and 'univerbation' in *hiyye* and *huwwe* (L & T (1977:431-433)), to Joanna Kowalik for that in Polish *to* (van Gelderen (2011:134-135)), to two Russian speakers for that in Russian *eto* (van Gelderen (2011:134-135)), and to Anat Greenstein for that in Hebrew *hu* and *ze* (L & T (1977:427-431)).

[15] Campbell (2001:121-122) argues that 'phonological weakening' is a probabilistic, not absolute, tendency in grammaticalization. Nonetheless, the total absence of it in the corpus of copula verbs derived from (demonstrative) pronouns is striking. Nick Welch (University of Calgary, personal communication) tells me that the copula verb in Tsúùt'inà has undergone 'phonological weakening' (ʔát'à > ʔáʔà), but this is derived from a lexical verb (V > T) and its 'phonological weakening' further highlights the absence of it in D > T change. The absence of 'phonological weakening' in 'lateral' grammaticalization is therefore a real empirical difference.

3.2.2. 'Semantic bleaching' / 'lexical > functional'

Lexical verbs in V have antonyms (Latin *habere* 'to have' vs *carere* 'to lack', English *to have* vs *to lack*), whereas auxiliary verbs in T do not. V > T is hence a 'lexical > functional' change, which has resulted in 'semantic bleaching'. Both D and T are classified as functional by Radford (1997:45-49), and there is no 'semantic bleaching' or 'lexical > functional' here.

3.3. Similarities in Minimalism

'Re-analysis' is essential to generative models of language change and is hence a common similarity (see section 2.1). 'Cross-linguistic distribution' can also be explained by the fact that all the examples in sections 3.1.1 and 3.1.2 undergo 'simplification', which makes them natural types of change that can occur cross-linguistically (see section 2.2).

3.4. Differences in Minimalism

3.4.1. 'Phonological weakening' / 'univerbation' in Minimalism

In V > T re-analysis, the lexical verb loses its V-to-T movement and is merged in a higher position (T). Furthermore, when $Mod_{obligation/necessity}$ is grammaticalized as T(future), it is merged in an even higher position in the T hierarchy established by Cinque (1999:106)):

$Mood_{SpeechAct}$ $Mood_{Evaluative}$ $Mood_{Evidential}$ $Mod_{Epistemic}$ T(Past)
T(Future) $Mood_{Irrealis}$ $Mod_{Obligation/Necessity}$ …

R & R (2003:224-232) argue that functional hierarchies are defective in terms of 'Phonological Form' (PF), and so when a lexical verb is re-analysed as a T element, it undergoes 'phonological weakening' and consequently 'univerbation'. There also seems to be an inversely proportional scale of PF in this hierarchy, since while *habere* as a modal verb is a clitic (see footnote 6), as a future tense marker it is an affix (section 3.2.1, ex. (30)), which is even more phonologically weakened and univerbated (Zwicky (1985:287-288), Zwicky and Pullum (1983:503-506)).[16] An upward shift in the T hierarchy can seem to cause more 'phonological weakening' and 'univerbation'.

3.4.2. 'Semantic bleaching' / 'lexical > functional' / 'functional > more functional' in Minimalism

R & R (2003:218-224) argue that functional categories are also defective in terms of Logical Form (LF), and T is weaker than V in terms of argument structure (R & R (2003:218-221)). As lexical verbs, *habere* and *have* are both transitive and are two-place predicates (see section 3.1.1, ex. (1-6), section 3.1.2, ex. (17-20c)) whereas as a modal verb *habere* has no argument structure as it can be used intransitively/passively (section 3.1.1, ex. (7-12)). Furthermore, when $Mod_{obligation/necessity}$ is grammaticalized as T(future), both *habere* and English *shall* lose interpretable tense features (section 3.1.1, ex. (7-12), section 3.1.2, ex. (21a-22c)). There is therefore also an inversely proportional scale of LF in the T hierarchy, since an ascent from $Mod_{obligation/necessity}$ to T(future) seems to cause even more 'semantic bleaching'. 'Functional > more functional' can therefore be defined in terms of Cinque's

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[16] The same can be said for English *shall*, since its shortest (i.e. phonologically weakest and most univerbated) form *'ll* seems to be reserved mainly for its future function rather than its modal functions (Heine (1993:51)).

hierarchy where higher elements are 'more functional' than lower ones in being 'semantically weaker'.

'Lateral grammaticalization', on the other hand, is either a wholesale replacement of a DP by a 'simpler' TP (Chinese *de*, section 3.1.1, ex. (13)) or it is the re-analysis of SpecT as T (determiners > copula verbs, section 3.1.2, ex. (23-29)). These positions do not correlate to any functional hierarchy and so there is no weakening of PF or LF in D > T change.

4. V & B (2010)

V & B (2010:291-293) criticise R & R (2003) and Roberts (2010) thus:

> "it ('lateral' grammaticalization) does not follow from the principles and mechanisms established by Roberts and Roussou (2003), nor from the cartographic approach (i.e. Cinque's hierarchy) adopted by Roberts in this volume (Roberts (2010)). This is problematic, since, if both 'upward' and 'sideways' types of grammaticalization exist, then we still need to seek the generalization that accounts for them, or else conclude that there is not after all a unified phenomenon from the point of view of UG." (V & B (2010:293))

Here I defend R & R (2003) and Roberts (2010) by pointing out that 'simplicity' is defined as the reduction of 'feature syncretisms' and the presence of uninterpretable features, both of which account for the cross-linguistic distribution of both changes (see sections 3.1.2, 3.3). R & R's (and van Gelderen's) account is very much supported by S & W's 'lateral' grammaticalization, since their definitions of 'simplicity' have independently and coincidentally predicted and explained its 'cross-linguistic distribution'. The structural differences between the two changes (section 3.4) also allow us to capture their empirical differences (section 3.2). Minimalism is therefore an elegant model in accounting for the relationship between grammaticalization and 'lateral' grammaticalization.

V & B (2010) also assert that formalism and functionalism should not be seen as mutually exclusive. Formalism is argued "to model this data in terms of the innate asymmetries of Universal Grammar (R & R's and van Gelderen's 'simplicity')" (my brackets) (V & B (2010:280)), while functionalism "seeks to explain these diachronic patterns with reference to discourse and interpersonal communication strategies" (V & B (2010:280)). In section 3.1.2, I have shown that while R & R's 'simplicity' (formalist) holds for all the cross-linguistic examples, the examples themselves (functionalist) are by no means cross-linguistically random: Latin *habere* (1) and English *have to* (17) have the verb 'to have' taking a direct object modified by the infinitive implying modality and both subsequently undergo weakening of their direct object relation ((4), (20)); Latin modal *habere* (7) and English *sceal* (21) imply 'obligation' and 'futurity' simultaneously and both go through weakening of 'intention/volition' via 'predestination' ((10), (22)); all the copula verbs that are derived from (demonstrative) pronouns (23-29) originate from equational constructions where the subject pronouns are in apposition with the dislocated constituent and the predicate. Such cross-linguistic patterns contradict Lightfoot's prediction of random PLD (section 2.3)

Furthermore, functionalist factors can be used to support formalism. In V-to-T and D-to-T re-analyses, there are many sub-types: while lexical verbs 'to have' are re-analysed as $Mod_{obligation/necessity}$ (section 3.1.1, ex. (1-6), (17-20c)), both Latin *habere* and English *have* are also grammaticalized as markers of perfective aspect ($Asp_{perfect}$) in modern Romance and English (R & R (2003:56-58)). Panare demonstrative pronouns are also grammaticalized as different copula verbs marking different tenses (section 3.1.2, ex. (29)). All this can be

accounted for by functionalist factors, namely the different semantic and pragmatic readings that are implied by different verbs/demonstratives in different constructions, and these dictate the T nodes under which they are merged in grammaticalization. Formalism and functionalism are therefore not only not mutually exclusive, they can also mutually support one another.

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