Grammaticalization and ‘lateral’ grammaticalization: new perspectives on linguistic interfaces and functional categories

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Abstract:

Simpson and Wu (2002a) analyse Chinese shi-de constructions and propose a new type of grammaticalization in the Minimalist framework called 'lateral' grammaticalization, which conforms to Roberts and Roussou (2003) and van Gelderen's (2004a, 2011) Minimalist analysis of grammaticalization in that it displays 'structural simplification' but differs from it in that it does not show Roberts and Roussou's (2003:200) 'upward feature analysis', since it consists of a 'lateral' reanalysis from one functional category (D) to another (T). This entails empirical differences, namely the lack of phonological, morphological and semantic weakening in the grammaticalizing elements (Chinese shi and de) when it is traditionally assumed that weakening is a diagnostic trait of grammaticalization and is entailed by the rise in frequency of the grammaticalizing element (Bybee (2003, 2011)). This dissertation proposes a direct comparison between 'standard' grammaticalization (Roberts and Roussou (2003), van Gelderen (2004, 2011), e.g. the Romance future (Latin habere)) and 'lateral' grammaticalization (Simpson and Wu (2002a), Wu (2004), e.g. Chinese shi and de) and argues that the different formal properties ('upward feature analysis'/'lateral feature analysis') entails differences in collostructional frequencies (cf Stefanowitsch and Gries (2003, 2004)) which can be correlated with the differences in morphophonological weakening in grammaticalization. The traditional assumption that functional categories are necessarily weak (see e.g. Roberts and Roussou (2003:217-229)) is hence deemed as simplistic (if not mistaken), and a new mechanism in generative syntax-phonology interface is proposed where the empirical properties of functional categories are argued to be derivable from their frequencies in grammaticalization, which will be known as 'Functional Spell-Out'.

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It has been a long, hard, but fruitful journey. Studying linguistics at the University of York has been a mixed experience, since, as mentioned above, it has been a difficult yet amazing educational experience. York is such a beautiful city in which to live and study, and the Department of Language and Linguistic Science here is fantastic, especially for my research focus (formal historical syntax). There are many people, institutions and organizations whose help has made it possible for me to write (and finish) this dissertation, and I must acknowledge all of them.

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‘Ιπποι δ’ Αιακίδαο μάχης απάνευθεν εοντες

κλαιον, επεί δή πρωτα πυθέσθην ηνιόχοιο

εν κονίησι πεσόντος υφ’ Έκτορος ανδροφόνοιο...δάκρυα δέ σφι

θερμα κατα βλεφάρων χαμάδις ρέε μυρομενοιιν

ηνιοχοιο πόθωι, θαλερη δ’ εμιαίνετο χαίτη

ζεύγλης εξεριπουσα παρα ζυγον αμφοτέρωθε.’ (Homer’s Iliad 17:426-440)

‘fortunati ambo! si quid mea carmina possunt,

nulla dies umquam memori vos eximet aevo,

dum domus Aeneae Capitol immobile saxum

accolet imperiumque pater Romanus habebit.’ (Vergil’s Aeneid, 9.445-449)

Thank you all for your help in improving my work, and here it is.

Declaration:

I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are ackniowledged as References.

Introduction:

Simpson and Wu (S&W) (2002a) and Wu (2004:chapter 4) propose a new type of grammaticalization called 'lateral' grammaticalization (LG) within the Minimalist framework. They analyse Chinese cleft sentences, which display the following alternations:

1a)	wo	shi	zuotian	mai	piao	de
	I	BE	yesterday	buy	ticket	DE
1b)	wo	shi	zuotian	mai	de	piao
	I	BE	yesterday	buy	DE	ticket

'It was yesterday that I bought the ticket.' (S&W (2002a:169), Wu (2004:120))

As S&W (2002a:186-190) and Wu (2004:138-141) analyse sentence-final *de* (ex. 1a)) as a determiner (D) and verbal suffix *–de* (e.g. *mai-de* in ex. 1b)) as a past tense marker (T(past)), they define LG as a change where one functional category (e.g. D) is 'laterally' re-analysed as another (e.g. T) (S&W (2002a:198-202), Wu (2004:149-153)).[1] In Tse (2011, 2013a, b), I compare LG with Roberts & Roussou (R&R) (2003) and van Gelderen's (2004a, 2011a) Minimalist analyses of grammaticalization (henceforth 'standard' grammaticalization (SG)) and argue that while LG displays R&R and van Gelderen's 'structural simplification' (Tse (2011:section 3, 2013a:96-110, 2013b:99-105)), it does not display R&R's 'upward feature analysis' (Tse (2011:sections 3.5-3.6, 4.4, 2013a:112-113, 2013b:99-105)), which is a diagnostic trait of SG (R&R (2003:200)). Furthermore, while SG regularly displays weakening in phonology ('phonological weakening'), morphology ('univerbation') and semantics ('semantic bleaching') (R&R (2003:218-229)), LG does not (Tse (2011:sections 3.3-3.6, 4.2-4.4, 2013a:110-113, 2013b:106-107)). This leads to the conclusion that weakening in grammaticalization is caused by 'upward feature analysis', which occurs in SG but not in LG (Tse (2011:sections 4.2-4.4, 2013a:112-113, 2013b:106-107)).

[1] This is neatly summed up as follows:
'Syntactically, such D-to-T conversion is suggested to be an example of 'lateral grammaticalization', a process in which a functional head from one type of syntactic domain may under appropriate circumstances undergo re-interpretation as an equivalent functional head in a second domain, D and T here both being elements which (potentially) assign deictic reference to their complements and therefore having largely corresponding function in the nominal and clausal domains' (original brackets) (S&W (2002a:170), Wu (2004:121)).
'This additional route of categorial reanalysis does not result from any movement and reanalysis within a single lexical-functional domain, but instead critically involves the reanalysis of a functional category from one lexical-functional domain to a functional head in a discrete second type of domain, a kind of 'lateral' *cross-domain* reanalysis/grammaticalization' (original italics and brackets) (S&W (2002a:201-202), Wu (2004:152)).

These conclusions are significant, since it is widely noted that functional elements tend to be morphophonologically and semantically weak (Takeshi (1971:2-6), Abney (1987:64-65), Selkirk (1995:1-2, 1996:187-188, 2004:464-465), Muysken (2008:39-41)).[2] Similarly, weakening is so common in grammaticalization that it is assumed to be a diagnostic feature (Heine and Reh (1984:15ff, 67), Lehmann (1985:305-310, 1986:1-3, 1995:chapter 4, 2004:157), Heine (2002:84, 2003:578-579), Heine and Kuteva (2002:2, 2005:15, 80)). The evidence from LG, however, suggests that not only are functional elements not necessarily weak, their empirical properties can (and should) be derived from independent principles of grammar rather than be assumed a priori (see footnote 2). The most influential explanation for weakening in grammaticalization is Bybee's (2003a, 2011) theory of frequency. However, as Bybee does not take into account the relative and differing frequency and weakening effects of grammaticalization, her theory cannot account for the lack of weakening in LG either (Tse (2011:section 5.2)). It remains to be explored whether the formal differences between SG and LG entail differences in frequency and hence empirical differences. In this dissertation, there are three interrelated research aims: 1) to derive the empirical properties of functional categories from grammaticalization, as grammaticalization is the process which creates functional elements[3] 2) to propose new mechanisms of syntax-related interface which can account for the weakening (and lack thereof) of functional elements in grammaticalization 3) to establish LG as a unique sub-type of grammaticalization which does not entail weakening to the grammaticalizing element.[4] In order to achieve these aims, this dissertation will consist of six chapters:

1) a formal comparison between SG and LG within the Minimalist framework, as proposed by R&R (2003), Roberts (2010, 2012), S&W (2002a), van Gelderen (2004a, 2009d, 2011a, b) and Wu (2004)

[2] This leads to R&R's (2003:229-232) 'Interface Defectivity Hypothesis' (IDH), which assumes that functional elements are necessarily defective at the interfaces and that when lexical categories are re-analysed as functional in grammaticalization, they necessarily undergo weakening (cf R&R (1999:1012-1013)). Similar assumptions are made in Prosodic Phonology, namely Selkirk's 'Principle of Categorial Invisibility of Functional Words' (PCI), which states that functional categories are invisible to phonological rules and are hence necessarily subsumed within the prosodic domains of neighbouring lexical words (Selkirk (1984:335-337), cf Selkirk et al. (1987, 1990), Truckenbrodt (1995, 1999)). These assumptions are problematic, not only due to the lack of weakening in LG, but also because they have no explanatory value whatsoever (cf Elordietta (2007:139, 2008:247)).

[3] This is indeed one of the main research goals in R&R (2003) (R&R (2003:2-5, 218-234)) (cf previous footnote).

[4] One might argue that LG is not grammaticalization (SG) at all, since it does not have the same empirical effects, namely weakening to the grammaticalizing element (I am grateful to Dr George Tsoulas for this). However, as grammaticalization has been minimally defined as the creation of functional categories (Campbell and Janda (2001:107)), LG should be classified as grammaticalization, since it does produce functional (T) elements (see ex. 1)). Furthermore, as weakening in grammaticalization has been argued to be probabilistic and is hence neither a sufficient nor a necessary criterion for grammaticalization (Campbell (2001:118-122)), the lack of weakening in LG is not a strong reason for separating it from grammaticalization. Moreover, as LG does seem to conform to R&R and van Gelderen's 'structural simplification' (Tse (2011:section 5.1, 2013a:113)), it should be subsumed within the same type of formal syntactic change as SG, namely grammaticalization.

2) an analysis of the differences between SG and LG in light of Bybee's (2003a) model of frequency and a proposal of a new model of syntax-phonology interface called 'Functional Spell-Out'

3) a comparison between two case studies of SG and LG, namely the grammaticalization of Latin habere as the Romance future tense marker (Latin *habere*) (V > $Mod_{obligation/necessity}$ > T(future)) (SG) and the grammaticalization of Chinese copula *shi* (D > T) (LG), since both produce T elements (cf ex. 1a-b))

4) a cross-linguistic analysis of the typological patterns of weakening in my case studies, namely V 'to have' > Mod, $Mod_{obligation/necessity}$ > T(future) and D > T (copula verb)

5) an analysis of the diachronic frequencies of the grammaticalizing elements in my case studies, namely Latin *habere* + infinitive as the Romance future (SG) and Chinese copula shi (LG)

6) concluding remarks, where the correlation between the diachronic frequencies of the grammaticalizing elements in SG and LG and their morphophonological weakening will be explained

Through this dissertation, I hope to demonstrate the explanatory power of diachronic syntax by analysing two types of grammaticalization (SG/LG) whose similarities and differences can be used to account for some very important issues in synchronic linguistics, namely the empirical properties of functional categories and the mechanisms of syntax-phonology interface which underlie them. Furthermore, I hope to show that Minimalism is indeed an elegant model for analysing syntactic change, since it successfully distinguishes two types of grammaticalization (SG/LG) whose formal differences do seem to account for their empirical differences (cf Tse (2011:section 5.1, 2013a:113)).

Chapter 1: Grammaticalization: a formal account:

Formal analyses of grammaticalization argue that grammaticalization is a form of 'structural simplification' which occurs cross-linguistically because 'simpler' structures are favoured in language acquisition and change (R&R (2003:2-8), van Gelderen (2011a:3-30), cf Clark and Roberts (1993:315-316)).[5] In this chapter, I introduce the definitions of 'simplicity' and 'structural simplification' which are argued to underlie grammaticalization and compare SG and LG within the Minimalist framework.

Section 1.1: 'standard' grammaticalization (SG):

R&R (2003:200-202) define 'simplicity' as the reduction of 'feature syncretisms' as they argue that 'structural simplification' in grammaticalization involves the elimination of *Move* and *Agree* in favour of *Merge*, as exemplified by the following schemata (R&R (2003:198-199)):[6]

1) $[_{XP}\ Y{+}X\ [_{YP} \ldots t_Y \ldots]] > [_{XP}\ Y{=}X\ [_{YP} \ldots Y \ldots]]$
2) $[_{XP}\ X_F \ldots\ [_{YP} \ldots Y_F \ldots]] > [_{XP}\ X_F \ldots\ [_{YP} \ldots Y \ldots]]$
3) $[_{X8P}\ YP\ X \ldots [\ \ldots t_{YP} \ldots\ ]] > [_{XP}\ Y{=}X \ldots [\ \ldots\ ]]$[7]

[5] It is traditionally assumed that language change occurs in language acquisition where children acquire a different grammar from that of the previous generation (Hale (1998:2-3, 8ff), Kroch (2001:699-703, 708ff), Roberts (2007:chapter 3), cf Niyogi and Berwick (1995, 1996, 1997)). Furthermore, generative models of language acquisition assume an innate component of language (Universal Grammar (UG)) which interacts with the child's linguistic environment (Primary Linguistic Data (PLD)) in setting the parameter values of the universal principles of grammar (Chomsky (1986a:24ff, 1993:1-4, 1995:14-15, 167-170, 219), Lightfoot (1991:1-10, 1999:49-68, 2006:9-12), cf Hyams (1986), Guasti (2002), Niyogi (2006)). Language change, therefore, consists of parameter resettings in language acquisition (Clark and Roberts (1993:300), Lightfoot (1991:157-173, 1997:174-176, 1999:77-91, 105-108, 178ff), Roberts (2007:226ff)). In recent Minimalism, factors that are independent of language (Third Factor Principles (III)) are also argued to play a role in language acquisition (Chomsky (2004:105, 2005:6, 2007:3, 2008:133, 2013:37)), and these are argued to include the child's preference for 'simpler' structures (van Gelderen (2008b:200, 2009b:133, 2011a:9), Roberts and Holmberg (2010:50-54), cf Chomsky (2005:6, 9, 2007:3, 9, 2013:37)). Language acquisition and change, therefore, can be schematised thus:

1) Trigger + genotype + extra-linguistic factors ⟶ phenotype
2) PLD + UG + III ⟶ Grammar

(cf Lightfoot (1989:321, 1991:1, 1999:66-67, 2006:10, 45), Lightfoot and Anderson (2002:162))

As it is previously assumed that language evolution is random (Roberts (1993a:252), Battye and Roberts (1995:11), cf Lightfoot (1999:chapters 5-6, 2006:87ff)), this preference for 'simpler' structures accounts for the cross-linguistic distribution of grammaticalization (see e.g. Heine and Kuteva (2002)), since grammaticalization is argued to be a natural mechanism in language acquisition and change which creates 'basins of attraction' within the parametric space (R&R (2003:2-8, 209-218), cf Roberts (2001:91ff)).

[6] This is summed up as follows:

'Feature syncretisms can be defined as the presence of more than one formal feature in a given structural position: H [+F, +G…]. Thus the structure with the least occurrences of multiple features on single positions is the simplest. Structural simplification should be understood in terms of PF realization of these features, so a lexical item which realizes X and Y (two syntactic projections i.e. *Move/Agree*) is more complex than one which realizes X (one syntactic projection i.e. *Merge*) only.' (my brackets) (R&R (2003:201)).

[7] R&R (2003:12-15) assume a cue-based model of language acquisition where 'cues' are fragments of sentences which express parameter values (cf Clark and Roberts (1993:317-318), Gibson and Wexler

In 1) and 3), *Move* (Y+X… t_Y, YP X…t_{YP}) is lost and the grammaticalizing element (Y) is shifted upwards from its original base position (t_Y, t_{YP}) to a higher functional head via *Merge* (Y=X),[8] while in 2), *Agree* (X_F…Y_F) is lost and the grammaticalized element is shifted to a functional head via *Merge* (X_F).[9] In all three types, syntactic dependencies (*Move/Agree*) are lost and the grammaticalizing element is shifted to its respective functional head (*Merge*).[10] R&R (2003:209-213), therefore, posit the following cline of parametric markedness which underlies grammaticalization (cf Gianollo, Guardiano and Longobardi (2008:119), Roberts and Holmberg (2010:45-46)):

4) $F^*_{Move/Move} > F^*_{MoveXP/Merge} > F^*_{MoveX/Merge} > F^*_{MoveXP} > F^*_{MoveX} > F^*_{Agree} > F^*_{Merge} > F$[11] [12]

(1994:407-410), Lightfoot (1997:176-189, 1999:144-167, 2006:77-86), Fodor (1998:4ff, 2001:736ff), Dresher (1999:28-29)). In order to bring about parameter resettings (see footnote 5), there need to be structurally ambiguous 'cues' which can yield alternative parameter expressions and re-analysis (Clark and Roberts (1993:302, 318-319, 325), Lightfoot (1997:176-185, 1999:77-79, 87-91, 105-108), Roberts (2007:132-133), cf Langacker (1977:58), Timberlake (1977:141-151), Harris and Campbell (1995:50, 61, 70ff)). As parameters are currently assumed to be associated with particular lexical items, namely functional categories (Biberauer (2008:23ff), Roberts and Holmberg (2010:32ff), cf Borer (1984), Fukui (1986), Ouhalla (1991), Chomsky (1995), Kayne (2005)), syntactic change can be analysed in terms of changes in functional categories (Roberts (2001:107-123, 2007:chapters 1-2), cf Longobardi (2003)).

[8] Cf van Gelderen's Late Merge Principle (LMP) and Head Preference Principle (HPP):

i) 'Merge as late (i.e. high) as possible' (LMP)
(my brackets) (van Gelderen (2004a:12, 28, 2004b:61)), cf S&W (2002b:291-292))

ii) 'Be a head, rather than a phrase (i.e. specifier)' (HPP)
(my brackets) (van Gelderen (2004a:11, 2004b:61), cf S&W (2002b:308))

LMP applies to exs. 1) and 3) (higher *Merge*) while HPP applies to 3) (Specifier > Head).

[9] Interestingly, examples of 2) involve the grammaticalizing element being shifted downwards to a lower functional head e.g. Greek *ινα* > *να* (C > M) and Latin *modo ut* > Calabrian *mu* (C > M) (R&R (2003:73-97), cf Rizzi (1997:288) who argues that M (=Fin) is lower than C (=Force)). Although R&R (2003:199) maintain that there is an upward shift of subjunctive features from the verb (T) to the mood particles (M) themselves, it remains the case tha.t these grammaticalizing elements are shifted downwards in the functional hierarchy of C elements (C > M). In Tse (2012:section 3, 2014), I similarly argue that prepositional case-markers are shifted downwards in the functional hierarchy of prepositions (P > K) due to loss of *Agree* (cf Cinque and Rizzi (2010:*passim*) who argue that K is lower than P).

[10] As Chomsky (2000:101, 2001:3-5, 2004:114) argues that *Agree* and *Move* consist of probe-goal relations and feature-checking, R&R's analysis can be further generalised as the loss of probe features and the shift of the grammaticalizing element to the goal features in its respective functional head (cf Roberts (2010:50-51, 2012:353-354)), which can be either 'upwards' in the loss of *Move* or 'downwards' in the loss of *Agree* (see previous footnote, cf Zeijlstra (2012)). R&R (1998:1-7, 1999:1015-1017, 2002:24-27, 2003:27-34) and Roberts (2001:97-100) reject feature-checking and dispense with uninterpretable (i.e. probe) features in their account, but this is problematic, since their definition of 'feature syncretisms' (see footnote 6) entails that lexical items enter the derivation with interpretable formal features (i.e. fully inflected) (R&R (2003:200-201)), which is a lexicalist approach (cf Chomsky (1993:27-32, 1995:195-200)), but their argument that grammaticalizing (i.e. functional) elements are merged in functional heads is an anti-lexicalist approach (Cinque (2001a:6), cf Halle and Marantz (1993)). In my analysis, I retain the use of uninterpretable features and feature-checking in deriving *Move/Agree*, the loss of which can be attributed to the loss of uninterpretable features, which still conforms to R&R's reduction of 'feature syncretisms' (see footnote 6, cf Roberts (2010:49-51, 2012:352-354)). Parametric variation, therefore, can be defined by uninterpretable features associated with functional heads (see footnote 7, cf Collins (2005:117)).

[11] The asterisk indicates that the functional head requires phonological material at Spell-Out (R&R (1999:1017-1018, 2003:29)), and since R&R (2003:17-27) assume that functional categories project syntactically (cf

Van Gelderen (2008a, 2009a, 2011a) further proposes 'Feature Economy', which states that uninterpretable features are preferred to interpretable features in language acquisition and change:[13]

5) Semantic features > i-F > u-F > ø

(van Gelderen (2008a:297, 2009a:8, 2010:145, 2011a: 17-20, 2011b:54))

According to this cline, lexical categories with interpretable features (i-F) are prone to be reanalysed as their respective functional categories with corresponding uninterpretable features (u-F) (van Gelderen (2008a:297-299, 2009a:6-8, 2011a:4, 17, 20)).[14] The following examples of grammaticalization are hence derived:

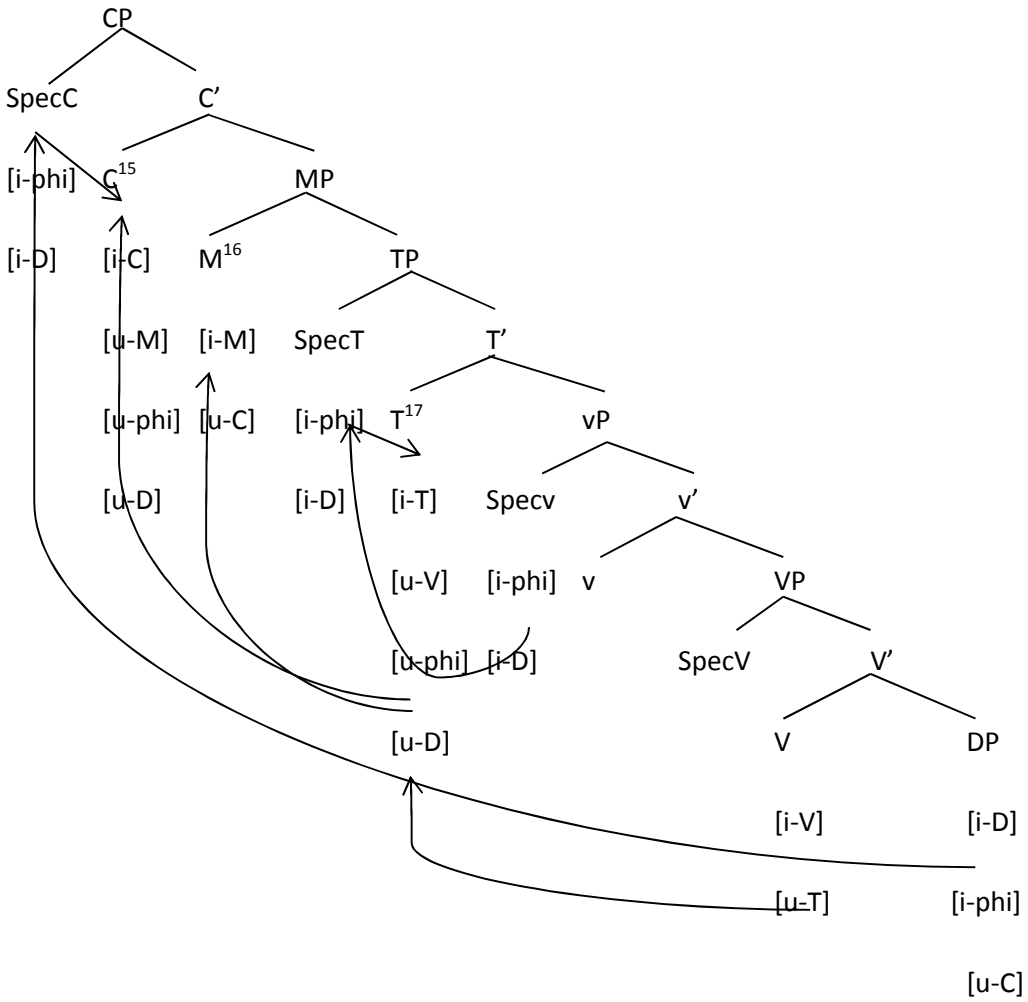
Chomsky (1986b, 1995), Ouhalla (1991)), functional categories are open to syntactic operations (*Merge, Move, Agree*) which define parametric variation (R&R (2003:17-33)).

[12] Although *Merge* (External Merge) is no longer considered 'simpler' than *Move* (Internal Merge) (Chomsky (2004 *et seq*), *pace* Chomsky (1991, 1993, 1995, 2000, 2001)), it is still possible to argue that F_{Merge} is 'simpler' than $F_{Move/Agree}$, since while F_{Merge} only merges the functional head (Merge), $F_{Move/Agree}$ requires merging the functional head and its lexical complement (and any successive chain positions (Chomsky (1993:15ff, 1995:214ff, 250ff)) and establishing syntactic dependencies between them, which minimally involves merging two elements and triggering feature-checking (i.e. matching (Chomsky (2000:122, 2001:5)) between them (Merge, Merge, Match) while F_{Move} also involves moving the element, creating copies of it and deleting those that are not pronounced (Merge, Merge, Match, Move, Copy, Delete) (cf Chomsky (1995:249-256, 2000:101, 114, 122-123, 2001:3-10, 2004:110-111, 2005:13, 2007:10-12, 2008:140, 2012:3)), which are significantly more complex than F_{Merge} (cf van Gelderen (2008a:296, 2011a:16)). $F_{Move/Agree} > F_{Merge}$, therefore, can be reinterpreted as the elimination of feature-checking, merger operations and feature places, which may be argued to conform to Chomsky's 'Minimize Computation' (MC), a third factor principle which eliminates copies in the derivation (Chomsky (2008:146, 2012:3, 2013:41, 2014:3)). Furthermore, an elimination of feature-places entails a reduction of lexical items in the numeration/lexical array, which reduces the load on cognitive memory (cf Chomsky (2000:100-106)). R&R's 'structural simplification' still holds under current Minimalist assumptions. More will be said about this below.

[13] Van Gelderen (2009a:8, 2011a:17-18)) derives 'Feature Economy' from Hicks' (2009:203-205) 'Maximize Featural Economy' and Schutze's (1997:113-114, 2009:86)) 'Accord Maximization Principle', which state that uninterpretable features should be maximised wherever possible and are reformulated as 'Minimize Interpretable/Semantic Features' (van Gelderen (2008a:297, 2009a:8, 2011a:17)). Evidence for 'Feature Economy' (i-F > u-F) in language acquisition is given in van Gelderen (2006a:2-4, 2006c:4ff, 2008a:292-293, 2011a:21-30) (cf Radford (2000)).

[14] Van Gelderen (2009a, 2011a) hence argues that grammaticalization is cyclic, since the grammaticalizing element (i-F > u-F) ends up probing (u-F) for its original category (i-F) (cf Givón (1971:411-412, 1979:209), Croft (1990:230)).

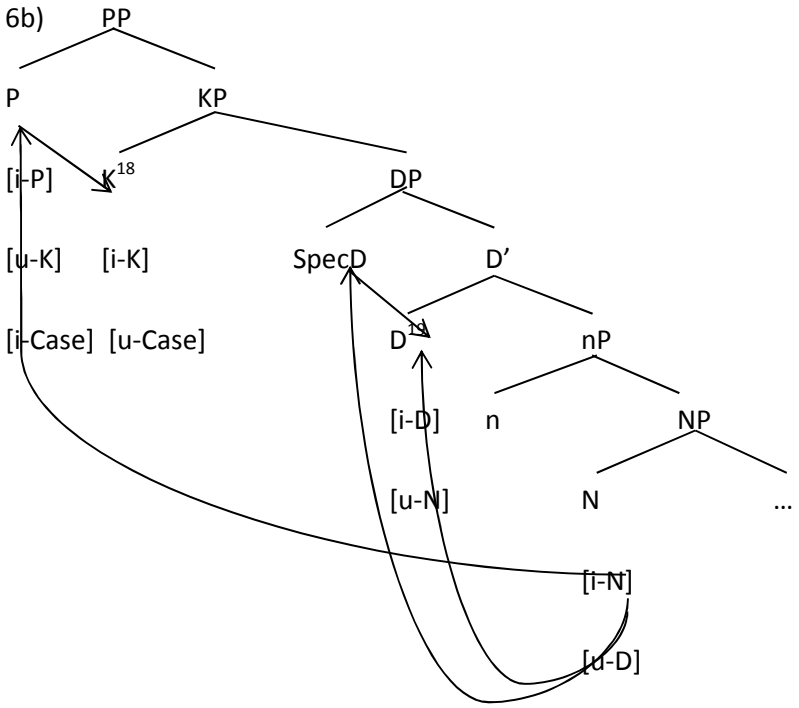
6a)



[15] C triggers wh-*Move* for interrogative/relative pronouns (D-to-SpecC), the loss of which leads to them being re-analysed as finite complementisers (D > C) (e.g. Germanic and Greek finite complementisers (R&R (2003:110-121), cf van Gelderen (2004a:77-99, 2004b:71-76, 2009b:139ff)). C also triggers V-to-C *Move* for lexical verbs, the loss of which leads to them being re-analysed as verbal complementisers (V > C) (e.g. African complementisers (R&R (2003:121-127)), cf van Gelderen (2004a:123, 2004b:71-78, 2009b:140ff)).

[16] M triggers *Agree* with complementisers (C-M), the loss of which leads to them being re-analysed as mood particles (C > M) (e.g. Greek and Calabrian mood particles (R&R (2003:74-97), cf footnote 9)). Furthermore, M may host auxiliary verbs (T > M) (e.g. Greek *θελω να* > *θα* (R&R (2003:58-71)).

[17] T triggers V-to-T *Move* for lexical verbs, the loss of which leads to them being re-analysed as auxiliary verbs (V > T) (e.g. English modals (R&R (2003:36-48), cf van Gelderen (2004a:230-231)). T also triggers *Move* for external arguments (Specv > SpecT), the loss of which leads to them being re-analysed as subject agreement markers (D > T) (e.g. Northern Italian subject clitics (R&R (2003:175-192), cf van Gelderen (2011a:chapter 2, 2011c)).



In both the clausal (ex. 6a)) and nominal (ex. 6b)) hierarchies, grammaticalizing elements are shifted to their respective functional heads (see arrows), and these shifts define the cross-linguistic pathways of grammaticalization (cf R&R (2003:202), Roberts (2010:46-49, 54-65, 2012:352, 355-363)).[20] [21] The shift of grammaticalizing elements to their respective functional heads will hence be known as 'Functional Attraction' (F-attraction), which is a diagnostic trait of SG.[22]

[18] K triggers *Agree* with lexical prepositions (P-K), the loss of which leads to them being re-analysed as case-markers (P > K) (e.g. Romance and English case-markers (Tse (2012:section 3, 2014)).

[19] D triggers *Move* for nouns and lower D elements (e.g. Dem > SpecD), the loss of which leads to them being re-analysed as determiners (N > D, Dem > D) (e.g. Romance and Germanic determiners (R&R (2003:131-156, 161-175), van Gelderen (2007:287ff), cf Wu (2004:chapter 1)).

[20] There are some striking parallels between the clausal (ex. 6a)) and nominal (ex. 6b)) hierarchies: loss of V-to-T *Move* (V > T) and loss of N-to-D *Move* (N > D) (see footnotes 17 and 19), loss of *Move* to SpecT (> T) and loss of *Move* to SpecD (> D) (see footnotes 17 and 19), loss of C-M *Agree* (C > M) and loss of P-K *Agree* (P > K) (see footnotes 16 and 18). These diachronic parallels indicate the structural similarities between the clausal and nominal domains (cf Abney (1987), Lamontagne and Travis (1987, 1992)).

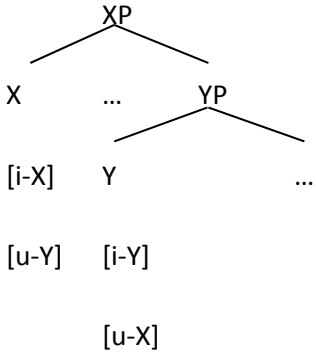
[21] There are other examples of grammaticalization which do not easily fit into these generalised structures e.g. prepositional complementisers (P > C) (e.g. Dutch *van* (van Gelderen (2004a:30-33, 2004b:90-92)), negators (D > Neg) (e.g. French *pas* (R&R (2003:154-161), cf Roberts (2007:64-77), van Gelderen (2004b:78-87, 2008b:197ff)), all of which display upward shift due to loss of *Move*.

[22] There are other types of syntactic change where *Move* is lost but the formerly moved element remains *in-situ* e.g. loss of V2 (V-to-C *Move*) (Roberts (1993b)), loss of V-to-T *Move* (Roberts (1999)), OV > VO (Roberts (1997)), loss of wh-*Move* (Roberts (2007:81-92)). In these changes, there is no 'structural simplification' as there is no elimination of feature-checking or feature-places but a change from overt to covert *Move* (or *Move* > *Agree* (Chomsky (2000, 2001)). The empirical differences are outlined in R&R (2003:205-209), and these include morphophonological and semantic weakening, which occurs in grammaticalization and not elsewhere.

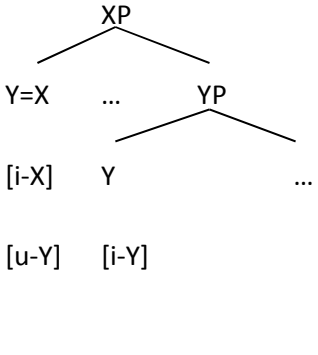
Section 1.2: 'Functional Attraction' (F-attraction):

F-attraction in SG can hence be represented thus (cf R&R (2003:200)):

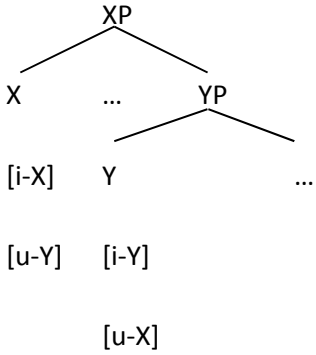
7a)



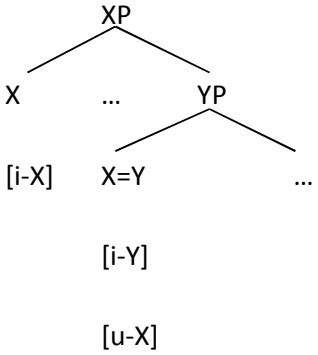
7b)



8a)



8b)



In both cases, *Move/Agree* ([u-Y], [u-X] in ex. 7a), 8a)) is lost and the grammaticalizing element (Y in ex. 7), X in ex. 8)) is shifted either upwards or downwards to its respective functional head via *Merge* (Y=X in ex. 7b), X=Y in ex. 8b)) where its originally interpretable features become uninterpretable ([i-Y] > [u-Y] in ex. 7), [i-X] > [u-X] in ex. 8)) and hence select a new complement of its original category (Y in ex. 7b), X in ex. 8b)) (cf footnote 14). 'Structural simplification' can be understood as the loss of syntactic dependencies (*Move/Agree*) and the elimination of merger operations and feature places which result from 'F-attraction' (*Merge*) (cf footnote 12). Such is R&R and van Gelderen's Minimalist analysis of grammaticalization (SG). In the next section, I analyse LG within their assumptions.

Section 2.1: 'lateral' grammaticalization (LG):

S&W (2002a) and Wu (2004) cite Chinese *de* in cleft constructions as their case-study of LG, which displays the following alternations in northern Mandarin dialects:

9a)	wo	shi	zuotian	mai	piao	de
	I	be	yesterday	buy	ticket	DE
9b)	wo	shi	zuotian	mai	de	piao
	I	be	yesterday	buy	DE	ticket

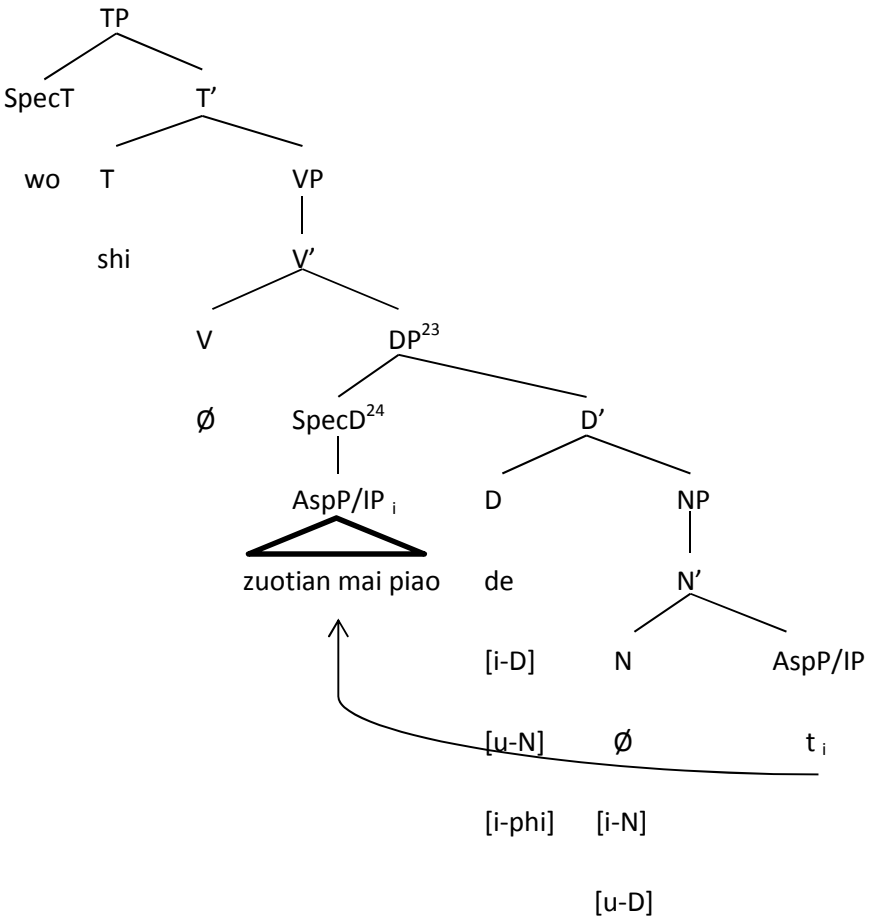
'It was yesterday that I bought the ticket.' (S&W (2002a:169), Wu (2004:120))

As the word order in ex. 9a) is pan-Chinese and is attested earlier and more widely than that in ex. 9b) (S&W (2002a:171), Wu (2004:122, 130-131), cf Chao (1968:297), Paul and Whitman (2008:428)), it is argued that de has been preposed from sentence final position to being a verbal suffix (*zuotian mai-de$_i$ piao* t$_i$) (S&W (2002a:173-174), Wu (2004:122-125)). In this section, I analyse de in Chinese cleft constructions.

Section 2.2: Chinese *de*:

Chinese cleft constructions consist of the copula shi and a predicate ending in *de* (hence *shi-de* constructions) (Chao (1968:296-298), Li and Thompson (1981:587-591)), and cleft focus is assigned to the constituent immediately after shi (Lee (2005a:3-4), Paul and Whitman (2008:415ff), Hole (2011:1710-1712)). S&W (2002a:179-181) and Wu (2004:132ff) analyse the predicate as a complex noun phrase (CNP) with an empty noun which explains the situation regarding the subject (e.g. *wo shi zuotian mai piao de ø* 'As for me, the (situation/thing) is that I bought tickets YESTERDAY' (cf Chao (1968:296), Li and Thompson (1981:587-593), Kitagawa and Ross (1982), Ross (1983)). 9a), therefore, is represented thus (S&W (2002a:186-189), Wu (2004:139-140)):

9a)



As sentence-final *de* tends to indicate past-time reference in the embedded clause,[25] *de* is argued to be re-analysed as a past tense marker (T(past)) and cliticise onto the verb in the relative clause (*zuotian mai-de*$_i$ *piao* t$_i$) (S&W (2002a:173-175, 190-193), Wu (2004:123-125, 141-146)):

[23] S&W (2002a:185-188) and Wu (2004:138-141) analyse CNPs as relative clauses headed by *de* (D) which selects a nominal complement (NP) in which the relative clause (here *zuotian mai piao*' (pro) bought tickets yesterday') raises to SpecD (cf Simpson (2001, 2003)).

[24] In this analysis, it is unclear how focus is assigned to the constituent immediately after *shi* (here *zuotian* 'yesterday') (cf Hole (2011:1715)), though Wu (2004:152ff) posits LF-focus to it (cf Chiu (1993), Huang (1982), Shi (1994), Lee (2005a), Hole (2011:1716)).

[25] S&W (2002a:175-177) and Wu (2004:126-127) point out that when sentence-final *de* is used, the embedded clause tends to refer to past time events (cf Lee (2005a:150-152), Hole (2011:1713)):

i) wo shi gen Zhangsan qu Beijing (de)
I BE with Zhangsan go Beijing DE
With *de*: 'It was with Zhangsan that I went to Beijing.'
Without *de*: 'It is with Zhangsan that I am going to Beijing.' (S&W (2002a:176), Wu (2004:126))

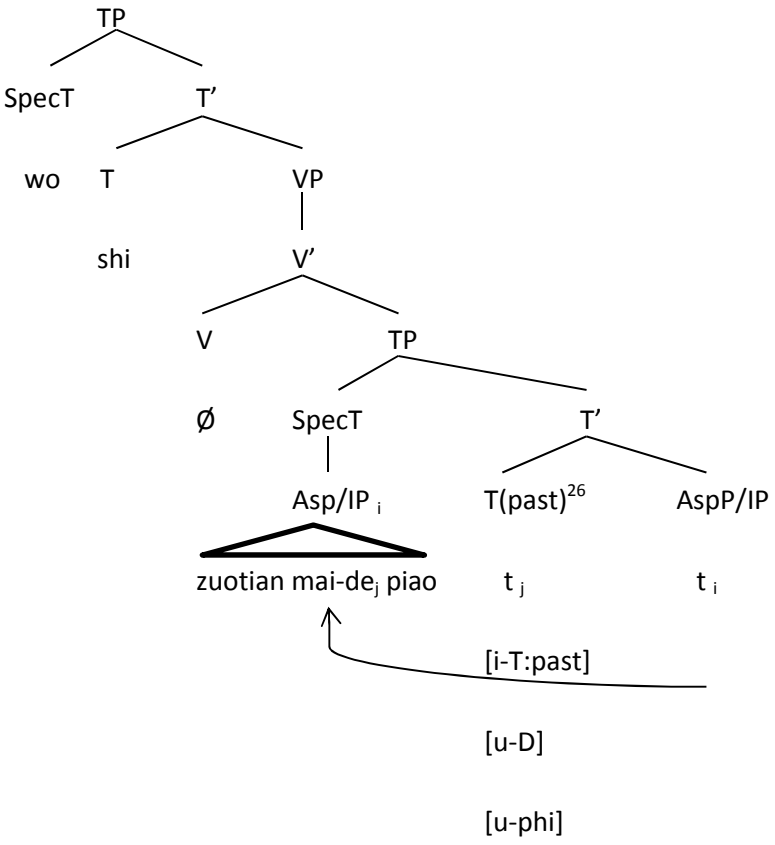
Furthermore, *de* is obligatory when the embedded clause refers to past events (S&W (2002a:175-176), Wu (2004:126-127)):

ii) ta shi zuotian qu Beijing *(de)
he BE yesterday go Beijing DE
'It was yesterday that he went to Beijing.' (S&W (2002a:176), Wu (2004:126))

Moreover, when *de* is used in non-past contexts, future/modal auxiliaries are required to override the past-time implicature (S&W (2002a:176), Wu (2004:126)):

iii) ta shi mingtian *(cai hui) qu Beijing de

9b)



9b) is 'simpler' than 9a), since de as a determiner holds an *Agree* relation with its (empty) nominal complement ([u-N], [u-D] in ex. 9a)) (cf Abney (1987), Cinque (1994), Longobardi (1994, 1996, 2001), Lyons (1999)), which is lost when de is re-analysed as a T element and the empty noun is eliminated (ex. 9b)) (cf S&W (2002a:189-190), Wu (2004:140-142)). Furthermore, *de* as a determiner holds interpretable D and phi-features which become uninterpretable when *de* is re-analysed as a T

He BE tomorrow only-then will go Beijing DE
'It is tomorrow that he will go to Beijing.' (S&W (2002a:176), Wu (2004:126))

This past-time implicature of sentence-final *de* forms the background for the re-analysis of *de* as a past tense marker (S&W (2002a:175-177), Wu (2004:140ff), cf Lee (2005a:149ff, 2005b:144ff), Hole (2011:1713)).

[26] This re-analysis is supported by the fact that when *de* is cliticised as a verbal suffix, the embedded clause obligatorily refers to the past and is incompatible with any non-past adverbial constituent (S&W (2002a:176-177, 190), Wu (2004:126-128, 141), Lee (2005a:142-143, 2005b:144-148), Paul and Whitman (2008:429-433), Hole (2011:1713), cf previous footnote, ex. iii)):

i) *Ta shi mingtian cai hui qu de Beijing
He BE tomorrow only-then will go DE Beijing
'It is tomorrow that he will go to Beijing.'

Whitman and Paul (2008:430-437) further point out that verbal suffix *de* cannot be used with modal verbs:

ii) Zhangsan shi shang ge xingqi (*neng/*dei) qu de Beijing
Zhangsan SHI last CL week can/must go DE Beijing
'It was last week that Zhangsan could/had to go to Beijing. (Whitman and Paul (2008:430))

Paul and Whitman (2008:436-437) hence argue that *de* is base-generated in an aspectual head (Asp) in the embedded clause to which the verb raises, since Asp is lower than tense and modal nodes in the functional hierarchy of T elements (cf Cinque (1999)), but this is less convincing, since it cannot account for the association between sentence-final *de* and past-time implicature (see previous footnote) or the re-positioning of *de*. In my analysis, I retain S&W (2002a) and Wu's (2004) analysis of sentence-final *de* which cliticises onto the verb in the embedded clause.

element ([i-D] > [u-D], [i-phi] > [u-phi]) (cf Chomsky (1995:340-342, 2000:102-104, 2001:5-10)).[27] The grammaticalization of Chinese *de*, therefore, conforms to R&R's and van Gelderen's 'structural simplification' (see section 1). However, as *de* is re-analysed as a past tense marker (T(past)), it holds T features (ex. 9b)) which are not in the original structure (ex. 9a)) but are re-analysed from the past-time implicature of sentence-final *de* (see footnote 25). This differs radically from 'F-attraction' in SG where the grammaticalizing element is shifted to a particular functional head in the original structure (see section 1, exs. 6-8)). This will be known as 'Lateral Shift' ('L-shift'), namely the creation of a new functional category (e.g. T) which is absent in the original structure. More will be said about this below.

Section 2.3: Chinese *shi*:

In Tse (2011:section 3.2, 2013a:108-110, 2013b:102-105), I argue that the fact that LG displays 'structural simplification' entails cross-linguistic distribution (cf footnote 5), and I point out another example of LG in the grammaticalization of subject determiners (D) as copula verbs, which can be analysed as T elements since copula verbs regularly inflect for tense and subject agreement (Lyons (1968:322), Li and Thompson (1976:436), Hengeveld (1992:32), cf Roy (2014))[28] e.g. Chinese copula *shi*, which is originally a demonstrative pronoun in Old Chinese and is used as the subject in equational constructions with a co-referring topic (Li and Thompson (1976:420ff), Feng (1993:288ff, 2003:31ff)):

10) qian li er jian wang

thousand mile then see king

shi wo suo yu ye

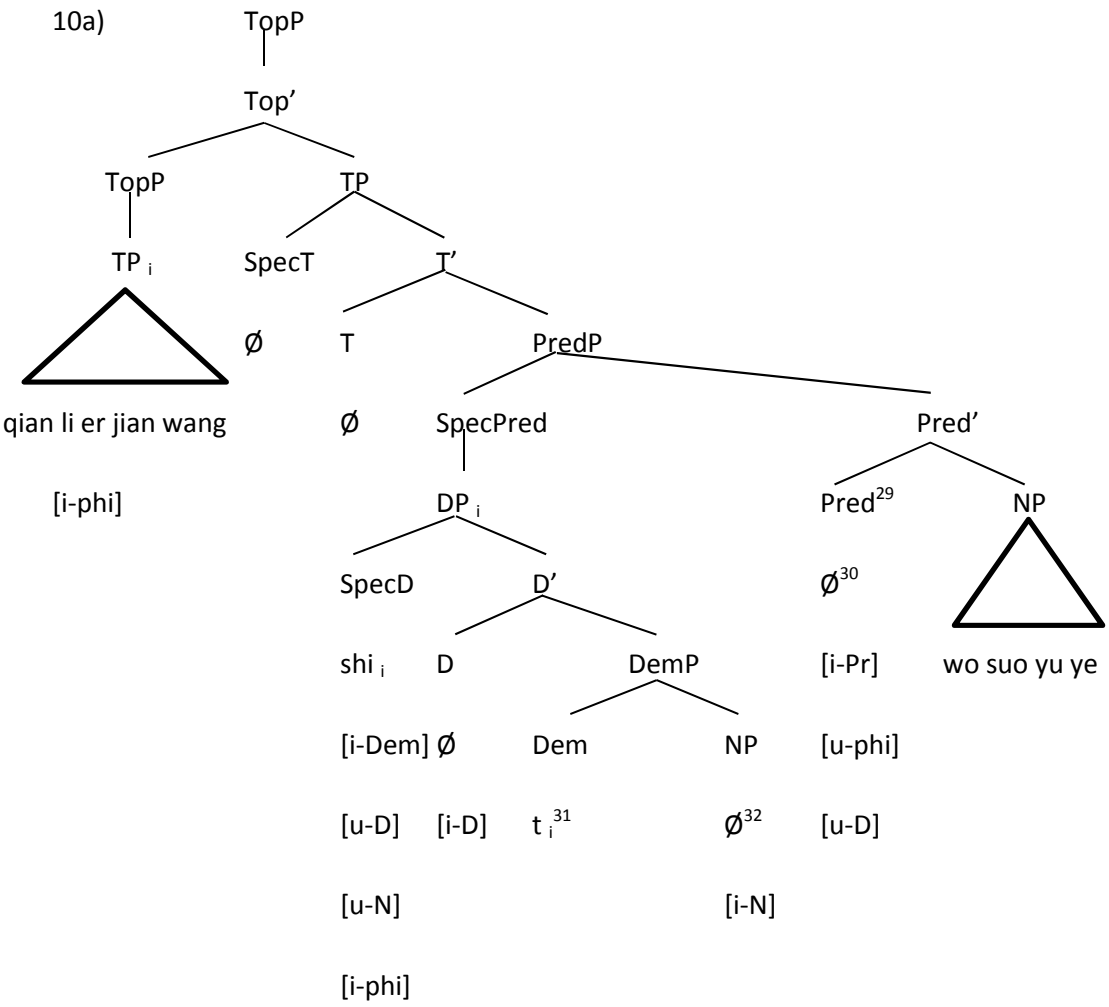
this I NOMINALISER desire DECLARATIVE.PARTICLE

'To see the king after travelling a thousand miles, this (is) what I want.'

(Mencius, 4th century BC)

[27] Technically, D elements hold uninterpretable phi-features which are valued by the interpretable phi-features of their nominal complements (van Gelderen (2007:279, 2011d:3ff)), but since the re-analysis of *de* as a T element (ex. 9b)) eliminates the empty noun and its interpretable features (ex. 9a)), it still conforms to van Gelderen's definition of 'Feature Economy' as 'Minimize semantic/interpretable features' (see footnote 13).

[28] Tense (T) and subject-agreement (AgrS) features are commonly subsumed under T (Chomsky (1993:6-9, 1995:172ff, 340ff)), and auxiliary verbs are generally assumed to undergo have a *Move/Agree* relation with T (Pollock (1989), Chomsky (1991)). Copula verbs, therefore, can be argued to be T elements.



As identity is implied, *shi* can be re-analysed as a copula verb in Pred linking the topic (> subject) and the predicate: 'to see the king after travelling a thousand miles, this (shi) what I want' > 'to see the king after travelling a thousand miles is (shi) what I want' (Li and Thompson (1976:423-426), Feng

[29] Bowers (1993;595ff) posits a unique functional category called Pred(icate) for copular elements (cf Svenonius (1994), Adger and Ramchand (2003:325ff), den Dikken (2006:11-12, 15-20)), which strongly resembles little v as both introduce external arguments as their specifier (Bowers (1993:595-596), cf Bowers (2002:183ff), Hale and Keyser (1993), den Dikken (2006:11-12)). There is hence Spec-Head *Agree* between Pred and SpecPred which ensures labelling (van Gelderen (2015a, 2015b), cf Chomsky (2013, 2014)). In my analysis, I place Pred lower than T and postulate *Agree* between Pred and SpecPred. The alternative analysis of copula verbs as raising verbs (Bowers (2001:301ff)) probably does not make much difference to my proposed analysis.

[30] As the comment of equational constructions consists of small clauses (Li and Thompson (1976:420), Feng (1993:289, 2003:32), Chang (2006:142)), Pred is empty here (cf Bowers (1993:595-596, 2001:301-302)).

[31] As it is assumed that demonstratives are lower than D and move to SpecD in order to check D features (Brugè (2001), cf Lyons (1999)), *shi* is base-generated in Dem (or SpecDem (Brugè (2001:32ff)) and moves to SpecD.

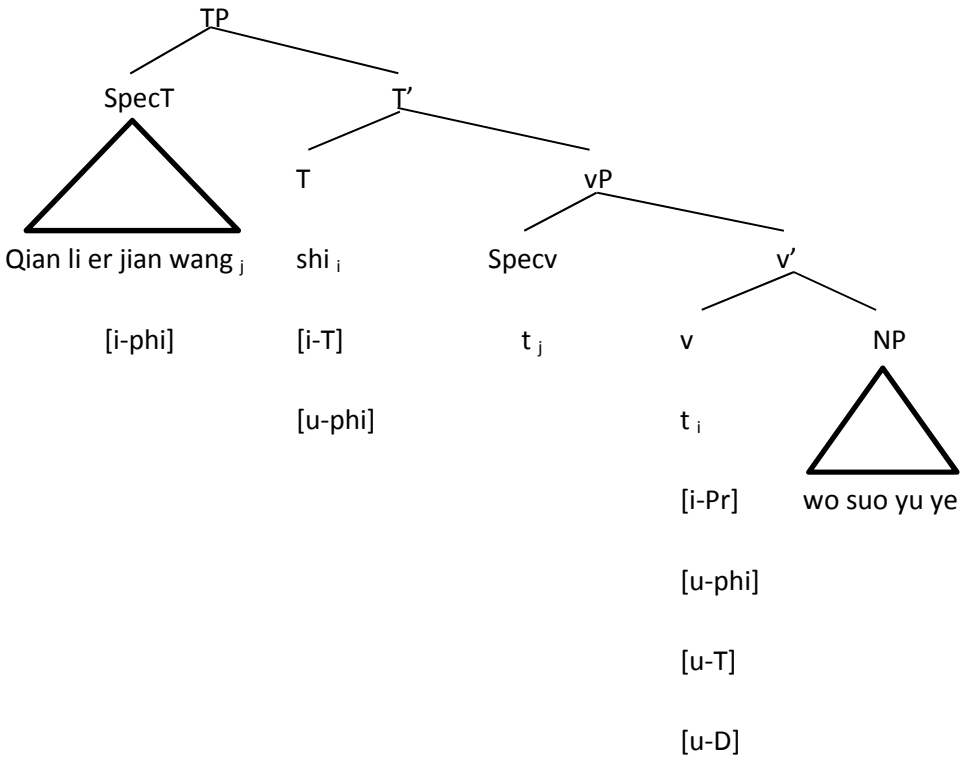
[32] Old Chinese *shi* is a demonstrative pronoun meaning 'this' and is attested with nominal complements (Wang (1958), Li and Thompson (1976:422-423), Chen (1995), Chang (2006:133)):

i) Zi yu shi ri ku
Confucius at this day cry
'Confucius cried on this day.' (Mencius, 5th century BC)

I therefore assume an empty nominal complement in the DP headed by *shi* (*shi* (ø) 'this (thing)').

(1993:289-291, 301, 2003:30-35), Chang (2006:142ff), van Gelderen (2011a:130-131, 2015c)), and since copula verbs are assumed to check T features (see footnote 29), *shi* moves to T and causes the new subject to move to SpecT via EPP:

10b)



10b) is 'simpler' than 10a), since the *Agree* relation between *shi* in SpecPred and Pred is lost (see footnote 29) and shi is re-analysed as a copula verb (SpecPred > Pred) (Lohndal (2009:218ff), van Gelderen (2011a:chapter 4, 2015c), cf Whitman (2000:233-238)). The internal DP structure of shi (see footnotes 31 and 32) is hence lost and the former topic (qian li er jian wang) is re-analysed as the new subject (Top > SpecPred).[33] Moreover, the interpretable D and phi-features of shi become uninterpretable when it is re-analysed as a copula verb ([i-D] > [u-D], [i-phi]> [u-phi]), which hence select the former topic as the new subject (cf van Gelderen (2011a:chapter 4)).[34] The grammaticalization of Chinese *shi*, therefore, conforms to R&R and van Gelderen's 'structural simplification'. However, while the shift of shi from SpecPred to Pred conforms to 'F-attraction' (cf section 1, ex. 6-8), see footnote 8), shi also acquires new T features ([i-T] in ex. 10b)) which are not in

[33] The re-analysis of topics as subjects is cross-linguistically robust (Givón (1976:151-155, 1979:209)) and van Gelderen posits a 'simplicity' principle called 'Specifier Incorporation Principle' (SIP) (cf footnote 8):

i) Where possible, be a specifier rather than an adjunct (e.g. topic). (my brackets)
(van Gelderen (2006b:17, 2006c:7-8, 2006d:15, 2008c:250, 2009d:105))

[34] Technically, demonstratives have uninterpretable D and phi-features which are checked by D and N respectively (van Gelderen (2011d:3ff), cf footnotes 31 and 32). Nonetheless, as the re-analysis of *shi* as a copula verb eliminates the subject DP and its interpretable features, it conforms to van Gelderen's 'Feature Economy' (cf footnote 27).

the original structure where there is no verb (ex. 10a), see footnote 30),[35] [36] which comes under 'L-shift' in LG (see section 2.2). The grammaticalization of subject determiners (D) as copula verbs (T), therefore, seems to be a combination of SG ('F-attraction') and LG ('L-shift').[37]

The two examples of LG (Chinese *de* and *shi*), therefore, conform to R&R and van Gelderen's 'structural simplification' but differ from SG in that they display 'L-shift', namely the creation of a new functional category (e.g. T) which is not in the original structure. This may be taken as a diagnostic trait of LG.

[35] Interestingly, copulas verbs derived from subject determiners often display morphological distinctions of tense and subject agreement which correlate with their original deixes as determiners e.g. Panare *këj* ([i-D:proximative] > [i-T:present]), *nëj* ([i-D:distal] > [i-T:future/past]) (Gildea (1993)), Hebrew *hu* [i-phi:MASC.3SG] > [u-phi:MASC.3SG], *hi* [i-phi:FEM.3SG] > [u-phi:FEM.3SG], *hem* [i-phi:MASC.3PL] > [u-phi:MASC.3PL], *hen* [i-phi:FEM.3PL] > [u-phi:FEM.3PL] (Gilnert (1989)). More will be said about this in later chapters.

[36] A closely related change is the re-analysis of subject determiners (D) as subject agreement markers (T), which is categorially the same (D > T) and it also originates from constructions where the subject determiner shows co-reference/phi-agreement with the topic, and as the former is re-analysed as a subject agreement marker, the latter is re-analysed as the new subject (Fuss (2005:chapter 6), cf van Gelderen (2011a:chapter 2, 2011c, 2015a, b), R&R (2003:175-186), cf footnote 33) e.g. non-standard French subject-agreement markers:

i)	Moi	je	porte	la	table
	Me	I	carry-PRES.1SG	DEF.ART	table

'As for me, I carry the table' > 'I carry (*je-porte*) the table' (Gerlach (2002:224))

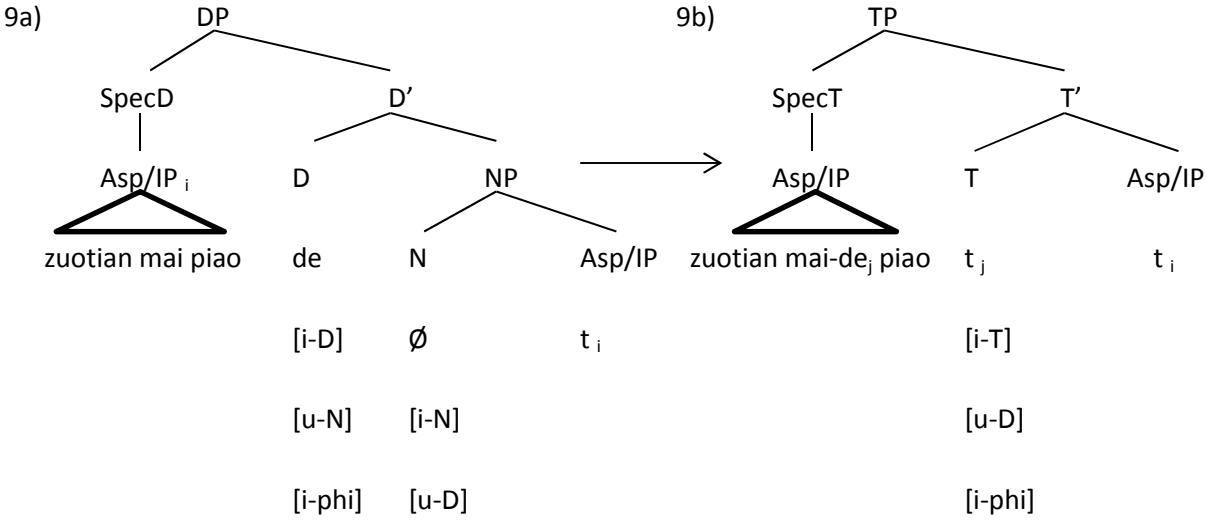
In contrast to equational constructions where there is no verb (ex. 10a), see footnote 31), there is a finite verb (here *porte*) and the grammaticalizing element (here *je*) is shifted to T as a subject-agreement marker (*je-porte*), which conforms to 'F-attraction' (SG) (R&R (1999:1026-1027, 2003:175-192)). The grammaticalization of subject-agreement markers (D > T) and the grammaticalization of copula verbs (D > T), therefore, form minimal pairs. More will be said about this in later chapters.

[37] It might be possible to term this change 'semi-lateral' grammaticalization, as it displays mixed effects of SG ('F-attraction') and LG ('L-shift'). More will be said about this in later chapters.

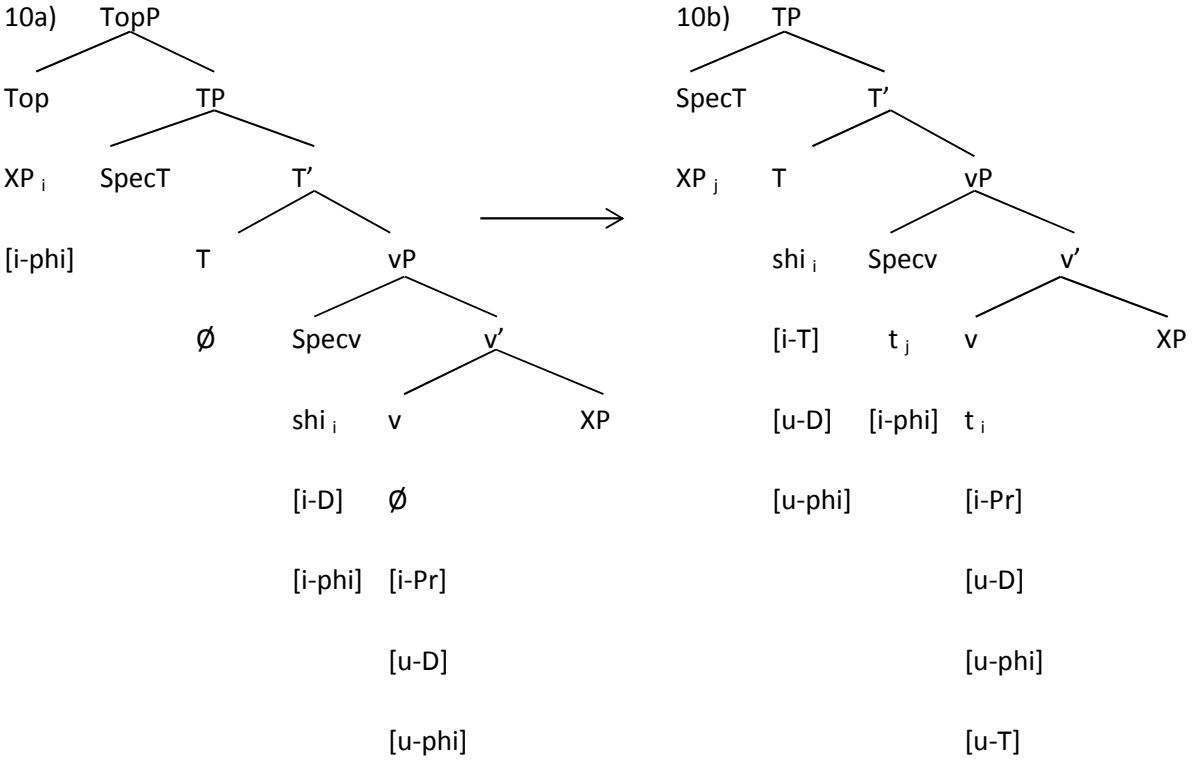
Section 2.4: 'Lateral Shift' (L-shift):

The two examples of LG can hence be represented thus:

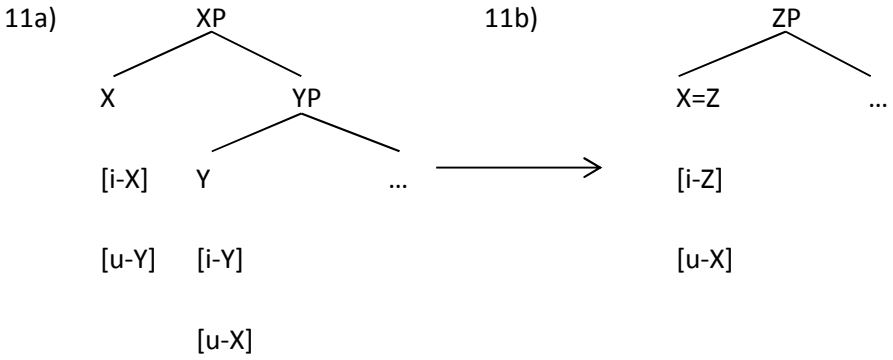
Chinese *de* (section 2.1, ex. 9)):



Chinese *shi* (section 2.2, ex. 10)):



As both Chinese *de* and *shi* acquire new features ([i-T]) which are not in the original structure, 'L-shift' in LG can be generalised thus:



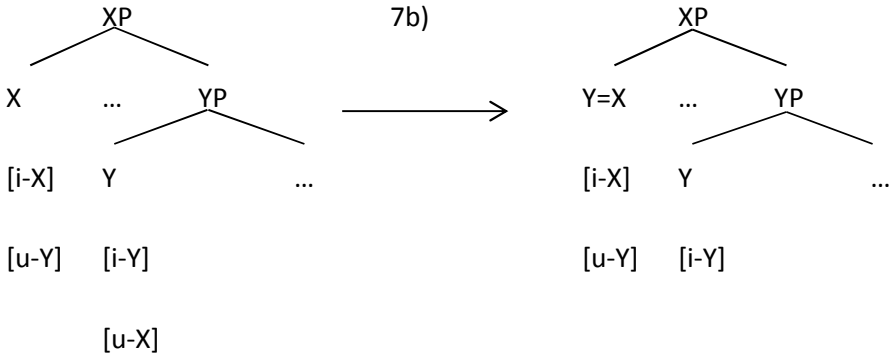
In LG, there is 'structural simplification' in that there is loss of Agree ([u-Y], [u-X] in 11a)), reduction of feature places (Y in 11a)) and 'Feature Economy' ([i-X] > [u-X]). However, as the grammaticalizing element is re-analysed as a new functional category entirely (X=Z in 11b)), it holds new formal features ([i-Z] in 11b)) which are not in the original structure. 'L-shift' in LG hence differs radically from 'F-attraction' in SG (see section 1.2, exs. 7-8), the empirical consequences of which are explored in the next section.

Section 3: 'standard' grammaticalization (SG) vs 'lateral' grammaticalization (LG):

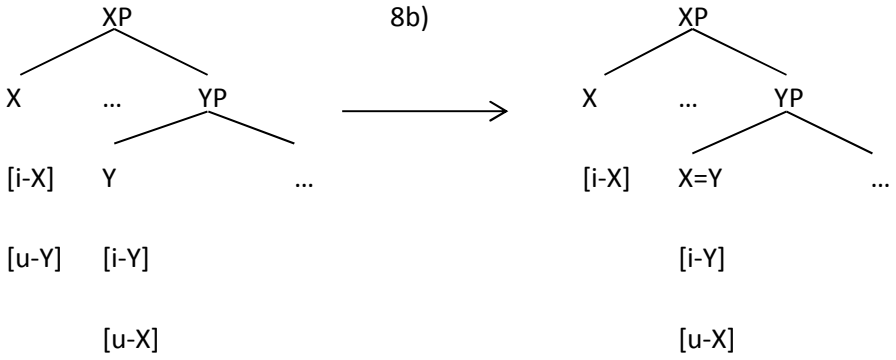
The formal representations of SG and LG are repeated here as follows:

SG (=section 1.2, ex. 7-8)):

7a) 7b)

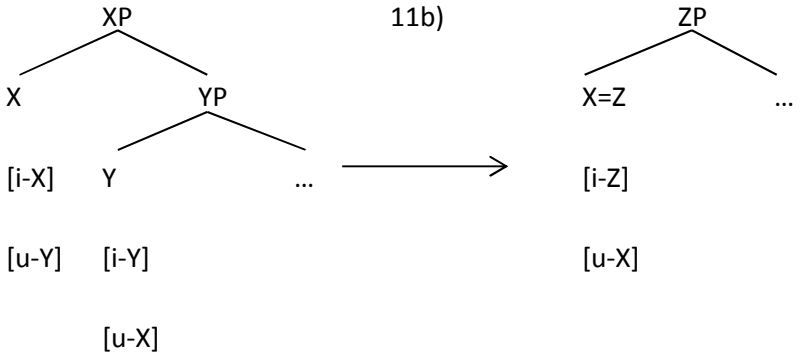


8a) 8b)



LG ((=section 2.4, ex. 11)):

11a) 11b)



As 'F-attraction' in SG entails that the grammaticalizing element is no longer base-generated in its original position (Y in ex. 7a), X in ex. 8a)) but shifted to its respective functional head (Y=X in ex. 7b), X=Y in ex. 8b)), this entails loss of lexical semantics, namely those associated with the original

(lexical) base-position of the grammaticalizing element.[38] In LG, on the other hand, although there is also a reduction in feature-places (Y in ex. 11a)), 'L-shift' entails that the grammaticalizing element ends up holding new formal features which are not in the original structure ([i-Z] in ex. 11b)) but derived from pragmatic implicature, namely the past-time interpretation of sentence-final de in shi-de constructions (see section 2.2, especially footnote 25) and the implication of identity in the original equational construction of shi (see section 2.3), which entails a gain of semantics in the grammaticalizing element.[39] 'Semantic bleaching' is hence justified for SG but not for LG.

Furthermore, while morphophonological weakening to grammaticalizing elements is commonplace in SG (R&R (2003:224-229)), it is conspicuously absent in LG as the two Chinese examples do not seem to display any weakening in morphophonology: Chinese *de* is pronounced exactly the same (toneless and unstressed) both as a sentence-final particle (D) and as a verbal suffix (T) (see sections 2.1-2.2, ex. 9a-b)), and Chinese copula *shi* is still fully toned (tone 4) and stressed in modern Mandarin,[40] as are many cross-linguistic examples of copula verbs derived from subject determiners.[41] Although *de* as a past tense suffix (T) (e.g. *mai-de* in section 2.2, ex. 9b)) is more univerbated than as a clausal clitic (D) (e.g. *zuotian mai piao-de* in section 2.2, ex. 9a)) (cf Zwicky (1985), Traugott et al (1993:7, 2003:7)), this seems to be a case of post-syntactic movement rather than verbal affixation, since it is argued that *de* raises from sentence-final position to the verb rather than the other way round (see footnote 26), which is better understood as post-syntactic movement (cf Embick and Noyer (2001)) rather than verbal affixation. There is, therefore, no weakening in morphology either in LG.

The empirical and interface effects of SG and LG are hence clear: weakening in phonology, morphology and semantics occurs to the grammaticalizing elements in SG but not in LG.[42] It can be

[38] Cf R&R (2003:218-224) who define 'semantic bleaching' as the loss of lexical/descriptive content and the retention of functional/logical content in the grammaticalizing element (cf Roberts (2010:66-68, 2012:363-365)).

[39] Although pragmatic inferencing is universal in grammaticalization (Eckhart (2006), cf Sweetser (1988), Traugott (1988, 1995:3-5), Traugott et al (1991, 1993:63-93, 2002, 2003:71-98)), it remains the case that 'L-shift' in LG creates a new functional category which, unlike 'F-attraction' in SG, is not in the original structure and hence entails a gain in semantic content (cf von Fintel (1995) who argues that functional categories do have semantic content, albeit of a different (higher) type from that of lexical categories). I am grateful to an anonymous reviewer of *Historical Syntax* for pointing this out to me.

[40] I am a native speaker of Mandarin Chinese and as far as I know *de* and *shi* have not undergone phonological weakening. I thank three speakers of northern dialects of Mandarin who inform me that *de* is pronounced the same both as a sentence-final particle (D) and as a past tense marker (T(past)).

[41] E.g. Hebrew *hu, hi, hem, hen* (Li and Thompson (1976:427-431)), Palestinian Arabic *huwwe, hiyye* (Li and Thompson (1976:431-433)), Panare *këj, nëj* (Gildea (1993)) (cf footnote 35), none of which are morphophonologically weakened as compared to their original determiner counterparts (Tse (2011:section 3.3, 2013a:111, 2013b:106-107)). A detailed typological survey will be conducted in chapter 4.

[42] It has been suggested to me that as Chinese *de* is already toneless and stressless as a determiner, it cannot undergo further morphophonological weakening (I am grateful to Dr Hendrik De Smet for this). However, the

tentatively and preliminarily argued that 'F-attraction' in SG gives rise to morphophonological and semantic weakening whereas 'L-shift' in LG does not (cf Tse (2011:section 4, 2013b:section 3)). Such is the relationship between SG and LG.

Conclusion:

In this chapter, I have provided the current Minimalist definitions of 'simplicity' and 'structural simplification' which have been argued to underlie grammaticalization (section 1). Furthermore, I have pointed out some formal (section 2) and empirical (section 3) differences between SG and LG which may be interrelated. In the next chapter, I analyse the mechanisms for weakening in grammaticalization and justify my claim that 'F-attraction', not 'L-shift', is the cause for weakening in grammaticalization.

lack of morphophonological weakening in copula verbs derived from subject determiners is certainly striking and needs to be accounted for, since many of them are morphophonologically strong as determiners yet none of them show morphophonological weakening as copula verbs (see previous footnote, cf Tse (2011:section 3.3.1, 2012:sections 3.6, 4)).

Chapter 2: Functional categories and weakening in grammaticalization:

Bybee (passim) argues that there is an inverse proportion between frequency and substance (cf Zipf's (1935, 1949)) and that when grammaticalizing elements gain frequency in grammaticalization, they can undergo morphophonological weakening (Bybee (2003a, 2011), Bybee et al (1994)). In this chapter, I analyse SG and LG in light of Bybee's arguments and propose refinements which can account for the differing weakening effects in SG and LG (see chapter 1, section 3).

Section 1.1: Emergent Grammar and Exemplar Theory:

In contrast to generative grammar, Bybee subscribes to a view of language which does not assume an innate component of grammar but argues that grammar is constantly emerging from language use (Bybee (1998a:421-424, 1998b, 2001a:1ff, 14-21, 2010:1-2), Bybee et al (1994:1-2, 2001:1ff), cf Lindenblom et al (1984), Kemmer and Barlow (2000)).[43] In this model, grammar consists of exemplars which are stored memory representations of linguistic structures and analogical networks of exemplars which constitute phonological, morphological and syntactic patterns (Bybee (1998a:422-425, 1999:214-220, 2001a:chapter 2, 2006:716-719, 2010:chapter 2), cf Langacker (1987:chapters 2-3, 1988:22ff, 1991:2ff, 2000:3-5)). Furthermore, as exemplars are argued to be rich in detail, they are highly sensitive to the frequencies and contexts from which they are derived (Bybee (1994:295-298, 1998a:421-423, 1998b:253ff, 2001a:chapter 3, 2002b:220ff, 2006:716-718, 2010:20-22), Bybee et al (2008:399-402)). In this section, I outline Bybee's frequency effects which are argued to underlie morphophonological weakening in grammaticalization.

Section 1.2: 'Ritualization':

It is commonly noted that repetition causes a loss of stimuli and hence an increase in the fluency of neuromotor mechanisms and a reduction of articulatory gestures (Bybee (2001a:8-10, 14-

[43] In chapter 1, section 1.1, footnote 5, the following schema is provided for generative models of language acquisition and change:

3) Trigger + genotype + extra-linguistic factors ⟶ phenotype
4) PLD + UG + III ⟶ Grammar

As Bybee rejects UG and relies solely on language use (PLD) and domain-general cognitive abilities (III) in accounting for the creation of grammar (Bybee (2001a:7, 2007:6-7, 2010:1-2, 6-8)), her model of language acquisition and change may be schematised thus:

5) Trigger + extra-linguistic factors ⟶ phenotype
6) PLD + III ⟶ Grammar

The key difference lies in the existence of UG and whether it plays a role in language acquisition and change (cf Hopper's (1987, 1988, 1998a) *a priori* grammar vs *a posteriori/emergent* grammar). Due to my lack of relevant expertise, I refrain from this debate (for which see Elman et al (1998)) and shall only note the empirical differences between these two theoretical alternatives.

16, 2006:723-726, 2010:20ff), Bybee et al (2008), cf Haiman (1994, 1998), Boyland (1996)). This is known as 'ritualization' (Haiman (1994:4ff)),[44] which accounts for the fact that frequently used words tend to be shorter than less frequent ones (cf Zipf (1935:chapters 2 and 3)) e.g. schwa deletion in American English (Bybee (2000:66ff, 2001a:40ff, 2007 [1976]:24-26)):[45]

Table 1 (from Bybee (2000:68), cf Bybee (2001:41), frequency figures from Francis and Kucera (1982)):

No schwa	Syllabic [r]	Schwa + [r]
Every (492)	Memory (91)	Mammary (0)
	Salary (51)	Artillery (11)
	Summary (21)	Summery (0)
	Nursery (14)	Cursory (4)
Evening (149) (noun)		Evening (0) (verb + ing)

There is phonetic gradience in schwa deletion here which seems to correlate with the frequency of the lexical items, since while it is most evident in the most frequent words (*every, evening* (noun)), it is less evident in less frequent words (*memory, salary, summary, nursery*) and unattested in the least frequent words (*mammary, artillery, summery, cursory, evening* (verb + *ing*)) (Bybee (2000:68-69)).[46] Frequency, therefore, does seem to have a catalytic effect on the reduction of lexical items, which attests to a slackening of articulatory gestures in frequently used elements (cf Pagliuca and Mowrey (1987, 1995), Browman and Goldstein (1990, 1992a, b)).[47]

[44] Similar terms such as 'habituation', 'automatization', 'emancipation', 'entrenchment' and 'conventionalization' refer to the same phenomenon, namely the morphophonological weakening of frequently used items (Haiman (1994:5-6), Langacker (1987:59, 100, 2000:5ff), cf Bybee (1998b:261-263, 2003b, 2006:)). In this paper, 'ritualization' will be used as a cover-term.

[45] This weakening effect has also been explained from the listener's perspective, since it has been argued that the high predictability of frequently used words/phrases entails that they do not need to be fully articulated in order to be understood (Gregory et al (1999), Jurafsky et al (2001, 2002), cf Lindblom (1990)). High frequency, therefore, has a weakening effect both from speaker's and from the listener's perspectives.

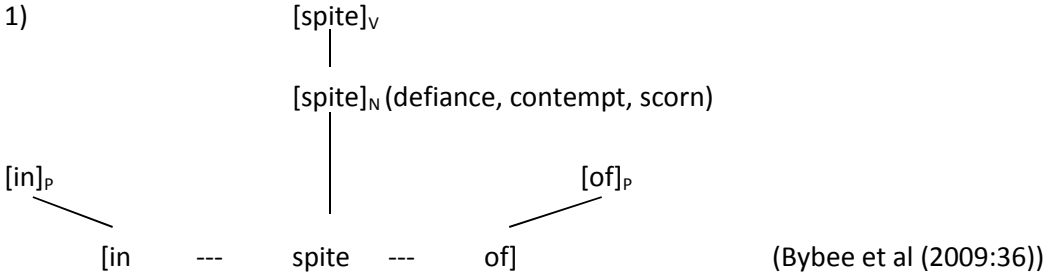
[46] Similar frequency effects are also attested in the deletion of intervocalic *d* in Mexican Spanish, which is more evident in frequent words (e.g. *nada* 'nothing') than in less frequent ones (e.g. *cada* 'each') (Bybee (2001a:42ff, 2002c:265ff), Bybee et al (2008:400ff)), and in the deletion of word-final *t/d* in American English, which is more evident in frequent words (e.g. *told, felt, left, kept, sent*) than in less frequent ones (e.g. *lent, found, lost, meant*) (Bybee (1999:220ff, 2000:69ff, 2002c:268ff)).

[47] Browman and Goldstein (1990:342, 1992a:27, 1992b:160) propose a model of articulatory phonology ('Gestural Computational Model' (GCM)) which mediates between the intended utterance and output speech and produces overlapping (i.e. weakened) articulatory gestures in fluent (e.g. casual) speech (Browman and Goldstein (1990:345, 1992a:36-37, 1992b:171ff)).

Section 1.3: 'Chunking':

Another effect of frequency is that frequently used word sequences may be processed as individual memory units (Bybee (1998a:424-426, 2002a:111-115, 2002b:215-219), cf Newell (1990), Boyland (1996), Ellis (1996), Ellis and Larsen-Freeman (2006)). This is known as 'chunking' (Bybee (2002a, 2010:chapter 3)), namely the creation of new constituents out of frequently used sequences of words ('chunks') e.g. English complex preposition in spite of, which has lost its original composite structure and come to be analysed as a single prepositional unit ([in [spite [of]]] > [in spite of]) (Bybee (2010:140ff, 2011:71-75), Bybee et al (2009:35-36), cf Hoffmann (2005)):

1)



(Bybee et al (2009:36))

Evidence for this 'chunking' is seen in examples where in spite of is co-ordinated with simple prepositions and hence functions as a single constituent (Bybee et al (2009:35-38), Bybee (2010:142, 2011:74)):

2) Scorcese's strongest works are fictions of formation, in which a religious conviction comes with or in spite of a vocation. (Corpus of Contemporary American English, in Bybee et al (2009:41))

As in spite of is co-ordinated with a single preposition with, it is argued that in spite of has been re-analysed as a single constituent (Bybee et al (2009:41), cf Huddleston et al (2002:617ff)). 'Chunking' can also cause morphophonological weakening to the previously separate component parts e.g. English *going to* + infinitive > *gonna* + infinitive, where going to is grammaticalized as a future tense marker and as it becomes a single constituent ([going [to]] > [gonna]), it undergoes morphophonological weakening ([gʊɪŋ tʊ] > [gənə]) (Bybee (1998b:260-261, 2003b:146-147, 2006:719-22), cf Krug (2000)):[48]

3) Bill's gonna (< going to) go to college after all.
(my brackets) (Hopper and Traugott (1993:1, 2003:1))

[48] This kind of 'chunking' is very prevalent in the grammaticalization of English semi-modals (Krug (1998, 2000)) e.g. *have to > hafta, got to > gotta, used to > useta, want to > wanna.*

Furthermore, Bybee (1985:13-19) proposes that semantic relevance and generality give rise to verbal affixation, and she proposes the following types of verbal affixes based on cross-linguistic data (Bybee (1985:20ff)):

Table 2 (from Bybee (1985:24)):

Category	Inflectional	Lexical
Valence	X	X
Voice	X	X
Aspect	X	X
Tense	X	
Mood	X	
Number agreement	X	(X)
Person agreement	X	
Gender agreement	X	

Furthermore, Bybee (1985:33-35) observes the following cross-linguistic ordering of verbal affixes (cf Bybee (1986:25)):

4) Verbal stem-aspect-tense-mood-person

As grammaticalizing elements undergo semantic weakening, therefore, they may become affixed to their respective lexical stems (Bybee et al (1985:70, 1991:34ff)).

High frequency, therefore, can also affect the morphological and constituent boundaries of linguistic elements. Such is Bybee's account of morphophonological weakening. In the next section, I examine her analysis of the frequency effects of grammaticalization.

Section 1.4: 'Context expansion':

In order to account for the rise of frequency of grammaticalizing elements in grammaticalization, Bybee (2003a) analyses the grammaticalization of Old English (OE) lexical verb *cunnan* 'to know' as Modern Day English (MDE) modal verb *can* and argues that as the grammaticalizing element undergoes semantic weakening, it becomes semantically general and undergoes an analogical expansion in its range of complementation which entails a rise in type and

token frequency (Bybee (2003a:611ff), cf Bybee (1988:254ff)).[49] [50] [51] As OE *cunnan* is originally a lexical verb meaning 'to know', it is only used with animate subjects and infinitival complements which denote intellectual states, activities, communication and skills (Bybee (2003a:607-608)):

5)	He	ne	con	ongitan	forhwy	swylc	God	gepafad
	He	NEG	CAN	understand	why	such	God	allows

'He does not understand why God allows such as that.'

(950 Alfred's Boeth. Xxxix (Bybee (2003a:608))[52]

In Chaucer, there are the first attestations of *cunnan* selecting infinitival complements which do not necessarily denote knowledge or skills, which leads to the re-analysis of cunnan as a modal auxiliary expressing possibility (Bybee (2003a:612-613)):

6)	Til	we	be	roten,	kan	we	nat	be	rype
	Until	we	be	rotten	can	we	NEG	be	ripe

'Until we are rotten, it is not possible for us to be ripe.' (Chaucer, A. Rv. 3875)

The re-analysis is complete when cunnan is used with inanimate subjects (Bybee (2003a:614), cf Bybee et al (1991:23-25)):

[49] Bybee (2001a:10-13, 2003a:604-605, 2007:9-14) makes a distinction between token and type frequency, the former referring to the total number of attestations of a particular linguistic element in a particular corpus while the latter to the total number of attestations of a particular grammatical pattern, which, in the case of OE *cunnan,* consists of the types of infinitives used with it. The fact that OE *cunnan* undergoes an expansion in its type frequency entails a rise in its token frequency (Bybee (2003a:605)).

[50] This form of 'context expansion' is very common in grammaticalization and has been classified as a diagnostic trait (Heine (2003:578-579), Himmelmann (2004:32-33), Brinton and Traugott (2005:99)).

[51] In this model, therefore, there is an intrinsic causal relationship between 'semantic bleaching' and 'phonological weakening'/'univerbation', as the former is prerequisite to the latter (cf Haspelmath (1999:1062), Campbell (2001:120-122) and semantics and morphophonology develop in parallel in grammaticalization ('Parallel Reduction Hypothesis'/'Co-evolution of Meaning and Form') (Bybee et al (1985:76, 1994:6, 19-21)).

[52] OE *cunnan* also takes nominal complements which denote mental stimulus (Bybee (2003a:606), cf Lightfoot (1979:101)) e.g.

i)	Ge	dweliaƌ	and	ne	cunnon	halige	gewritu
	You	mistaken	and	NEG	know	holy	writings

'You are led into error and do not know the holy writings.' (Ags Gospel of Matthew xxii)

However, as grammaticalization is construction-specific (Lehmann (1995:vii), Bybee et al (1994:11), Traugott (2003), Himmelmann (2004:31)), examples of *cunnan* selecting non-infinitival complements are irrelevant to the grammaticalization of *cunnan* as a modal auxiliary and are hence hence excluded.

7) No worldely thyng can be without styfe.
'No worldly thing can be without strife.' (1509 Hawes Past. Pleas. Xvi.xlix)

The 'context expansion' of OE *cunnan*, therefore, can be represented thus (cf Bybee (1988:255-256, 2003a:606)):

Table 3 (from Bybee (2003a:606)):

Stage	Meaning	Subject	Main Verb
Mental Ability	Mental	Human agents	Intellectual states and activities Communicating Skills
Ability	-	Human agents	All of the above Overt actions and activities
Root possibility	-	Human agents Passive subjects Inanimate subjects	All of the above

In the grammaticalization of OE *cunnan*, therefore, the following constructional schema is postulated (Bybee (2003a:613), cf Bybee (2010:128)):

8) SUBJ CAN INFINITIVE[53]

As there is an increase in the type and token frequency of the grammaticalizing element (here OE cunnan) (see footnote 53), the grammaticalizing element undergoes phonological weakening as MDE *can* ([kn])[54] [55] [56] (Bybee (2003a:615-618).

[53] As Bybee subscribes to Emergent Grammar (see section 1.1, especially footnote 43), syntactic patterns consist of constructional schemata derived from language use (cf footnote 52, Bybee (2006, 2010, 2012:529ff, 2013:51ff), cf Construction Grammar (CG) (Croft (2000, 2001), Goldberg (1995, 2006)). Syntactic change, therefore, lies in the changes in constructional schemata (Traugott and Trousdale (2013), Trousdale (2010, 2012, 2014)), which, in the case of OE *cunnan* (and English (pre-)modals in general (Bybee (2010:128ff)), give rise to 'context expansion'.

[54] The weakening of MDE *can* (and all modals) is subject to contextual factors, since they are only weakened when followed by a lexical verb and not elsewhere (Selkirk (1996:193-207, 2004:469-479), cf Anderson and Lightfoot (2002:18-19, 25-32)). Nonetheless, MDE modals are all morphophonologically weak under appropriate circumstances (R&R (2003:220-221)), and Bybee (2003a:615) notes that MDE *can* is further weakened as [n] when it is used in more frequent contexts like with the first person singular subject pronoun.

Such is Bybee's analysis of 'context expansion' in grammaticalization, which entails morphophonological weakening to the grammaticalizing element. In the next section, I examine Bybee's proposals in the context of Minimalism, which, despite some radical differences, need not be seen as mutually exclusive.

Section 2.1: Minimalism and weakening:

Although Bybee's arguments for weakening in grammaticalization are well made and highly influential (cf Haspelmath (1999:1054-1059), Campbell (2001:121-123)), her model is too unconstrained (if not dangerously circular) in that she merely observes the relative frequencies of discourse patterns but does not account for them.[57] Without an independent explanation for the distribution of discourse patterns in language use, there is nothing in Bybee's account which can account for the differing frequency and weakening effects in grammaticalization, as seen in LG (see chapter 1, section 3). Furthermore, although Bybee's model differs radically from generative grammar in not assuming a universal component of language (see section 1.1, especially footnote 43), her frequency effects are by no means mutually exclusive with Minimalism, since generative models of syntax do include interface components of morphophonology (and semantics) which may well be sensitive to usage frequency.[58] In this section, I maintain the formal differences between SG and LG and examine their frequency and weakening effects in terms of Bybee's proposals.

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[55] In certain dialects of English, the original lexical meaning of OE *cunnan* 'to know' is retained e.g. Scottish *ken* [kɛn], which is pronounced more strongly than MDE *can.* I am grateful to Drs Andrew Macfarlane and Marc Alexander for helping me on the Scottish data.

[56] Similar 'context expansion' has been argued for English *in spite of* and *going to* > *gonna* (see section 1.3): English *in spite of* is originally used with complements of the main noun *spite* which are compatible with its original lexical meaning 'defiance, contempt' and eventually *in spite of* comes to be used with a wider range of complements which are not necessarily compatible with the original meaning of *spite* (Bybee (2011:71-72), Bybee et al (2009:35-38)); English *going to* is originally used with animate subjects and infinitival complements that denote purpose of motion but eventually comes to be used with inanimate subjects and infinitival complements that do not denote purpose as well (Bybee (1988:254-256, 1998b:260-262, 2003b:147, 2006:719-721, 2010:30-31, 107-110)). Such 'context expansion' and consequent rise in frequency reinforce the effects of 'chunking' (see section 1.3).

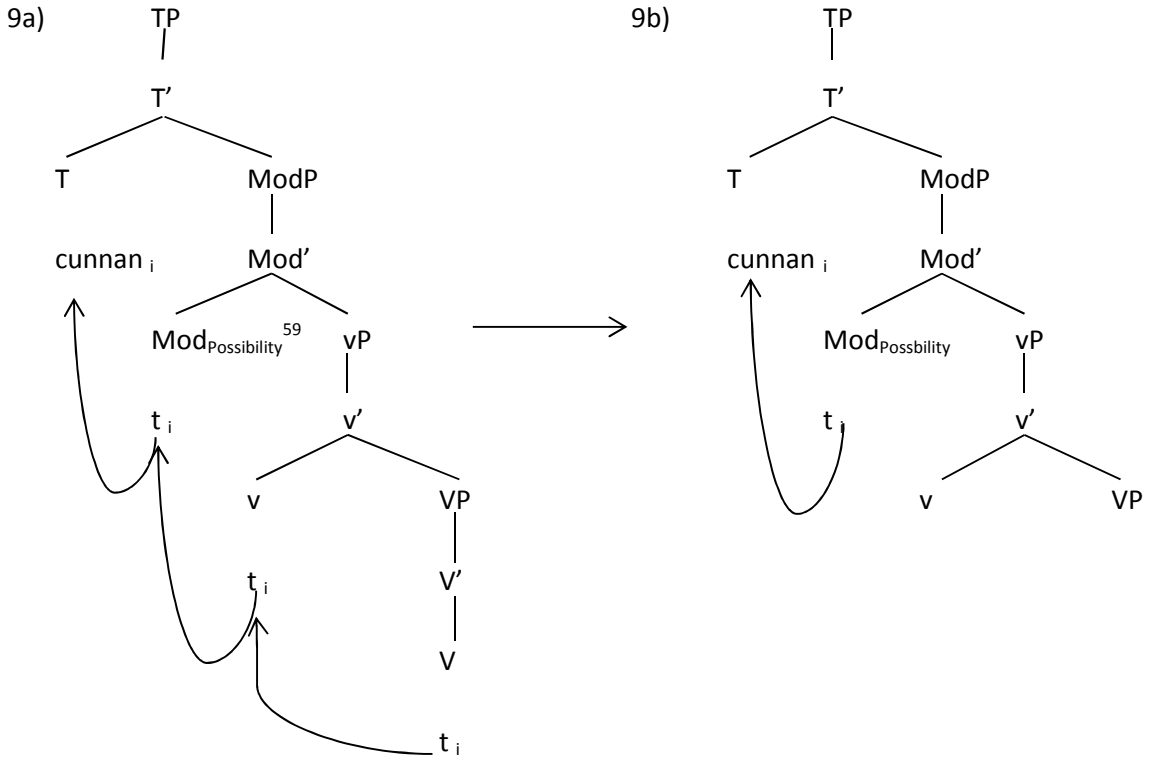
[57] To be fair, Bybee does mention some discourse factors which seem to have differing frequency and weakening effects e.g. English *don't,* which is pronounced weakest when it is used with the first person singular pronoun (*I*) and some common verbs e.g. *I don't know* [ɑɪrərо] (Bybee and Scheibman (1999), cf Scheibman (1997, 2000, 2001, 2002)); English *gonna,* which is further reduced when it is used with the first person singular pronoun e.g. *I'm gonna* [ɑɪmənə] (Bybee (1998b:260, 2003b:146, cf section 1.2, ex. 3)). However, these observations are sporadic and without a principled explanation for the general distribution/frequency of linguistic structures in discourse it is impossible to account for the creation of grammar via discourse. This criticism extends to models of CG (see footnote 53) which assume constructions to be units of form-meaning pairings but do not account for them. In the rest of this chapter, I propose to derive the frequency/structure of constructions from Minimalist parameters (cf Roberts (2010, 2012)).

[58] Traditionally, syntactic structures are sent to phonology (Phonetic Form (PF)) and semantics (Logical Form (LF)) at the end of the derivation for interpretation ('Spell-Out') (Chomsky (1965:15ff, 1981:54ff, 1993:1-4, 1995:22, 168-169, 219-221)). In recent Minimalism, Spell-Out, PF and LF are renamed Transfer, PHON and SEM

Section 2.2: 'Functional Attraction' and weakening (SG):

In the previous chapter, it is argued that the grammaticalizing element in SG loses its original *Agree/Move* relations and is shifted to its respective functional head via *Merge* ('F-attraction') (see chapter 1, section 1, exs. 6-8)). Functional categories play an important part in Minimalism, since they are assumed to be morphological and immune to theta-marking and argument structure (Ouhalla (1991:11ff), Chomsky (1993:6-10, 27-29, 1995:172ff, 192-199)). Moreover, recent research on cartography has established fixed universal orders of functional projections (Cinque (1999, 2001b), Rizzi (2004), Belletti (2004)). The grammaticalization of OE cunnan (V) as MDE *can* ($Mod_{Possibility}$), therefore, can be represented thus (cf section 1.4):

respectively and Transfer is now argued to take place at Phase boundaries where certain parts of the derivation (Narrow Syntax (NS)), namely the complement of the phase, are sent to PHON and SEM (Chomsky (2000:90-91, 2001:4), cf Seidl (2001), Dobashy (2003), Ishihara (2007), Samuels (2009, 2012)). Furthermore, models of Distributed Morphology (DM) have introduced a component called Morphological Structure (MS) which modifies the morphological structure of syntactic terminals prior to PHON/PF (Halle and Marantz (1993:114), Marantz (1997, 2001)). Although the exact nature and mechanisms of these interface options are notoriously mysterious (Chomsky (2000:90-91, 99-100), cf Scheer (2010:613ff)), it is uncontroversial that they should be sensitive to the frequency of the syntactic terminals and the constructions they entail (see footnotes 53 and 54, cf 'cues' in chapter 1, footnote 7). Frequency-induced articulatory weakening may hence be included as part of PF/PHON (cf Pak (2008:26ff) and Scheer (2010:621-622) who argue that PF/PHON includes phonetic processes which may well include Browman and Goldstein's GCM (see footnote 47)). There is, therefore, no incompatibility between the interface options of minimalist syntax and Bybee's frequency effects. Indeed, Bybee (2007:18-19) does recognise the possibility that frequency may be the effect, rather than the cause, of grammar, which may correspond to NS in Minimalism (see previous footnote, cf Bybee and McClelland (2005, 2007)).



As OE *cunnan* (and all English pre-modals) is a lexical verb (V) (Lightfoot (1979:98ff), Warner (1993:100-102)), it undergoes V-to-T *Move* (Roberts (1985:35ff, 1993b)), and when it is grammaticalized as a modal verb (Mod), V-to-Mod *Move* is lost and *cunnan* is merged directly in Mod (cf R&R (1999:1023, 2002:30-31, 2003:40-41), Roberts (2010:58)). The grammaticalization of OE cunnan (V) as MDE *can* (Mod), therefore, displays 'structural simplification' and 'F-attraction'. Furthermore, as lexical verbs have argument structure, OE *cunnan* 'to know' imposes selectional restrictions on its complements, namely animate subjects (<agent>) and objects denoting mental activity (<stimulus>). As a modal verb (Mod), MDE *can* has no such selectional restrictions and may hence be used with a wider range of complements, namely inanimate subjects and objects which do

[59] In Cinque's (1999) cartography of T elements, the various modal heads are merged lower than tense, since modal verbs are cross-linguistically placed lower than tense markers (Cinque (1999:89)):
Italian:

i)	Neanche	loro	sar-a-nno	allora	necessariamente	dalla	vostra	parte
	Not.even	they	be-FUT-3PL	then	necessarily	from	your	part
ii)	*Neanche	loro	saranno	necessariamente	allora	dalla	vostra	parte
	Not.even	they	be-FUT-3PL	necessarily	then	from	your	part

'Not even they will then necessarily be on your side.'

As it is argued that the temporal adverb *allora* 'then' is merged in SpecT(future) and the adverb (*non*) *necessariamente* '(not) necessarily' in SpecMod, the fact that *allora* can only precede (i)) and not come after (ii)) *necessariamente* entails that T(future) is merged higher than Mod. Assuming minimality in Head-to-Head *Move* (Travis (1984), Koopman (1984), Baker (1985, 1988), Rizzi (1990)), *cunnan* traverses all the functional heads in its V-to-T *Move.*

not necessarily denote mental activity.[60] The 'context expansion' of OE *cunnan* > MDE *can*, therefore, can be explained by the structural differences between lexical (e.g. V) and functional (e.g. Mod) categories, as represented below:

Table 4 (cf section 1.4, Table 3):

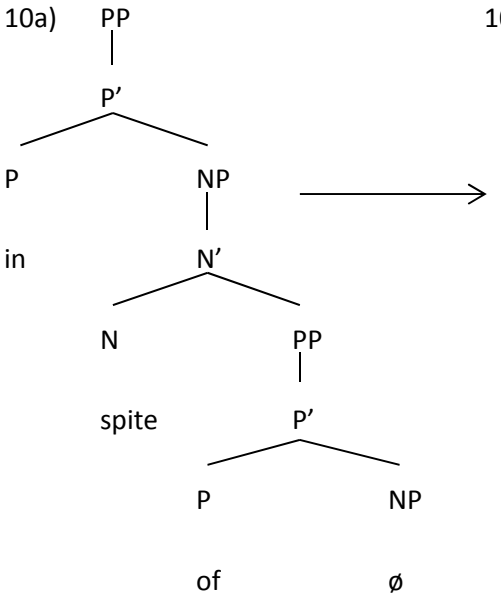
Stage	Meaning	Subject	Main Verb (complement)
Mental Ability (V)	Mental 'to know'	Human agents <agent>	Intellectual states and activities Communicating Skills <stimulus>
Ability (V)	-	Human agents <agent>	All of the above Overt actions and activities <->
Root possibility ($Mod_{Possibility}$)	Possibility	Human agents Passive subjects Inanimate subjects <->	All of the above <->

The rise in frequency and consequent morphophonological weakening of MDE *can* [kn] hence follow (see section 1.4).

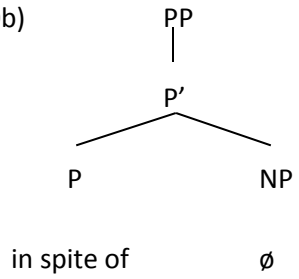
Similarly, 'chunking' in grammaticalization can be explained by readjustments in constituent boundaries e.g. English *in spite of*, *going to* > *gonna* (cf section 1.3, ex. 2-3)):

[60] This loss of argument structure can be accounted for structurally, since it has been argued that argument structure is configurationally determined, which, in the case of verbs, is projected within vP (Hale and Keyser (1993, 2002), cf Baker (1988)). When *cunnan* is merged in Mod, therefore, it is merged higher than little v and hence no longer possesses argument structure (cf R&R (2003:220)).

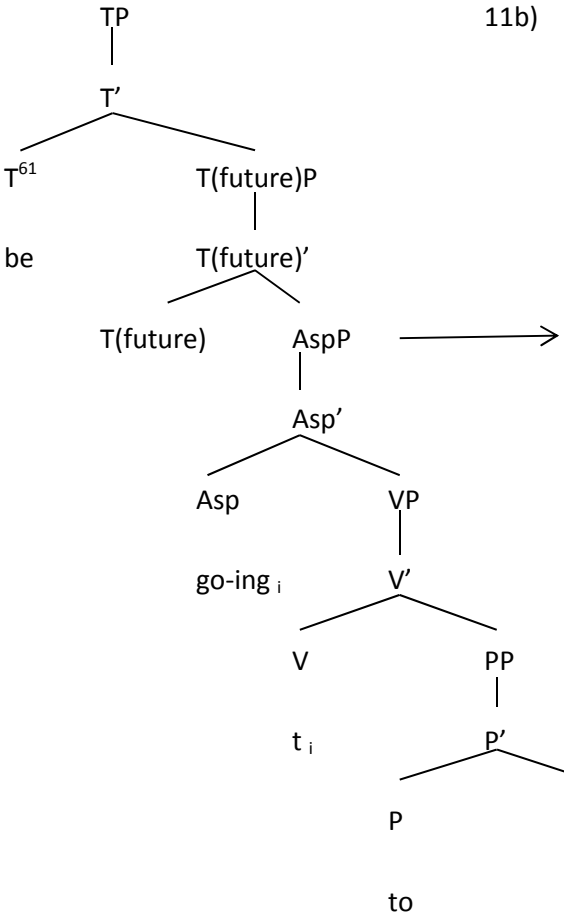
10a)



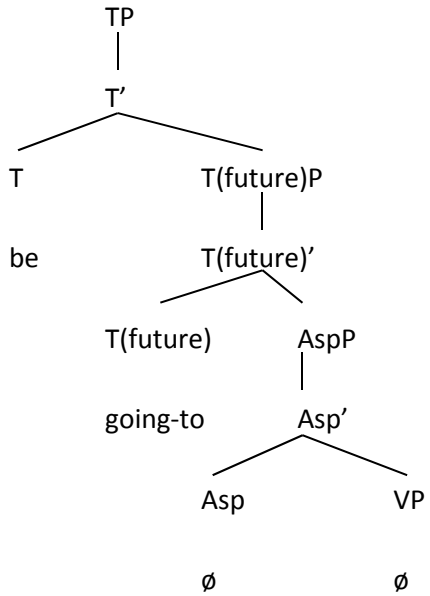
10b)



11a)



11b)



[61] In Cinque's (1999:87-88) hierarchy of T elements, T(past) is above T(future) which makes it possible to denote past tense within the future tense paradigm (e.g. English *is/was going to* + infinitive). Furthermore, as *go-ing* inflects for progressive aspect, it undergoes *Move* to $Asp_{Progressive}$ which is lost when *going to* is re-analysed as a future tense marker in (T(future)).

As English *in spite of* and going *to* are grammaticalized as a preposition (P) (ex. 10)) and future tense marker (T(future)) (ex. 11)) respectively, they display 'structural simplification' and 'F-attraction' as the grammaticalizing elements are shifted to a higher functional head (spite (N > P), going (V > T(future))). As they are no longer base-generated in their original lexical positions (N, V), they similarly lose their argument structure and hence no longer impose selectional restrictions on their complements (see footnote 56). 'Context expansion' and rise in frequency hence follow (see footnote 57), which reinforce the constituent readjustments in 'chunking' ([in [spite [of]]] > [in spite of], [going [to]] > [gonna], cf section 1.3).

Furthermore, as functional categories are assumed to be morphological, they enter into feature-checking (Move/Agree) relations with their lexical complements in forming morphologically complex words (Baker (1985, 1988), Pollock (1989), Ouhalla (1991), Chomsky (1993:6-10, 27-29, 1995:172ff, 192-199)). When grammaticalizing elements are merged in functional heads, therefore, they undergo morphological affixation with their lexical complements within the cartographic structure of functional heads e.g. T elements (Cinque (1999:106)):

12)

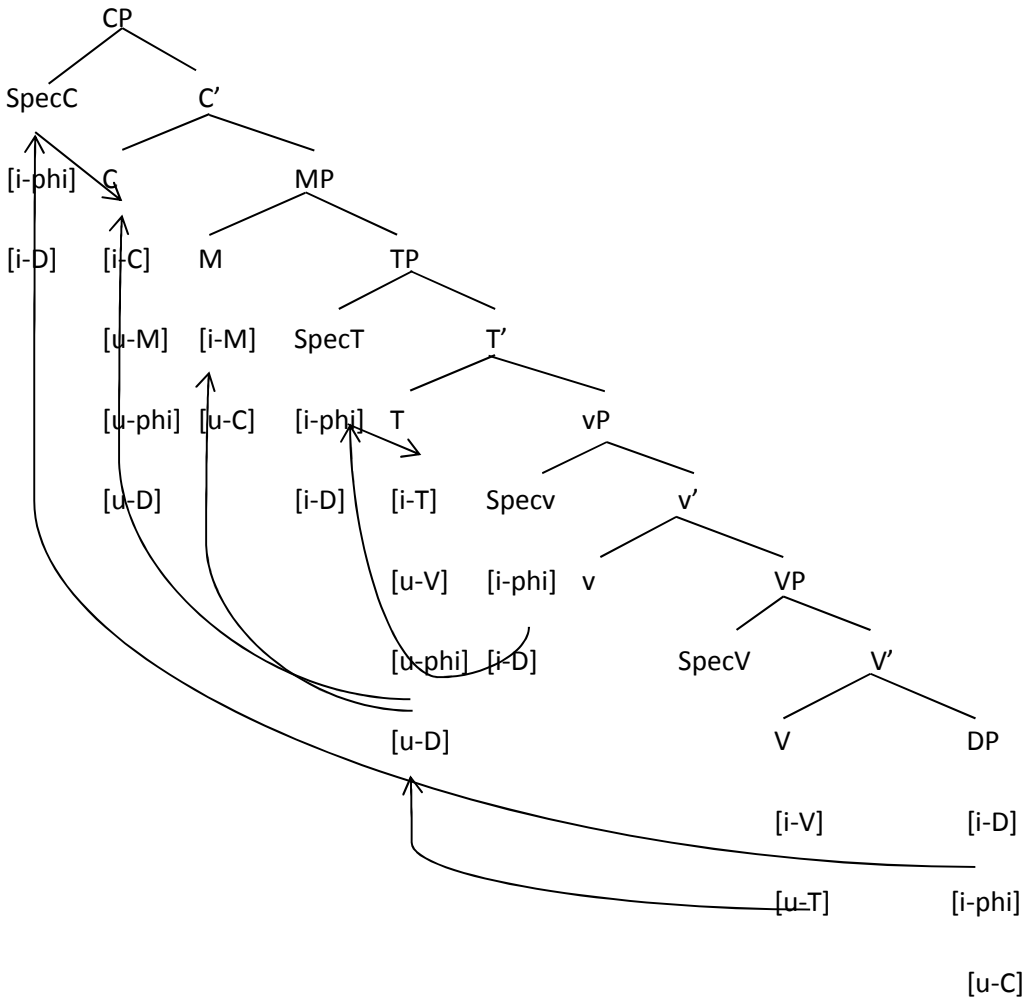
$Mood_{speech\ act}$	$Mood_{evaluative}$	$Mood_{evidential}$	$Mod_{epistemic}$	T(past)
T(future)	$Mood_{irrealis}$	$Mod_{necessity}$	$Mod_{possibility}$	$Asp_{habitual}$
$Asp_{repetitive(I)}$	$Asp_{frequentative(I)}$	$Mod_{volitional}$	$Asp_{celerative(I)}$	T(Anterior)
$Asp_{terminative}$	$Asp_{continuative}$	$Asp_{perfect}$	$Asp_{retrospective}$	$Asp_{proximative}$
$Asp_{durative}$	$Asp_{generic/progressive}$	$Asp_{prospective}$	$Asp_{SgCompetive(I)}$	$Asp_{PlCompletive}$
Voice	$Asp_{celerative(II)}$	$Asp_{repetitive(II)}$	$Asp_{frequentative(II)}$	$Asp_{SgCompletive(II)}$

As lexical verbs traverse all of these functional projections in V-to-T Move (Cinque (1999:58ff)), cf footnote 59), they display Bybee's cross-linguistic sequence of verbal affixes (aspect-tense-mood-person) (see section 1.3, ex. 4)).[62]

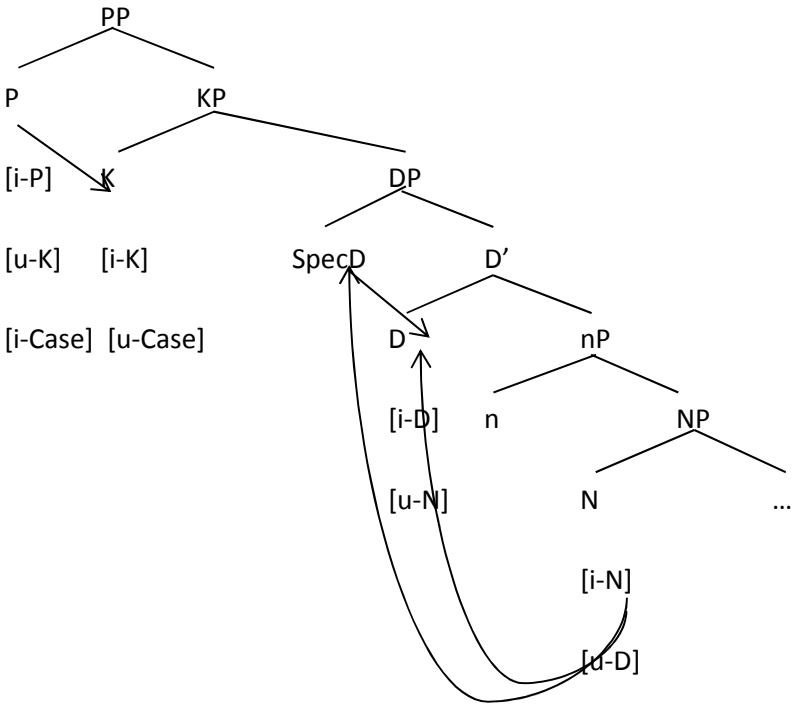
[62] Subject-agreement (Person) is not mentioned in Cinque's (1999) hierarchy but is commonly assumed to be higher than T (Chomsky (1991:434, 1993:7)), which explains why subject agreement markers tend to come last in the sequence of verbal affixes (Bybee (1985:35)).

The empirical properties of functional categories in SG can hence be represented thus:

13a) (=chapter 1, section 1.1, ex. 6a))



13b) (=chapter 1, section 1.1, ex. 6b))

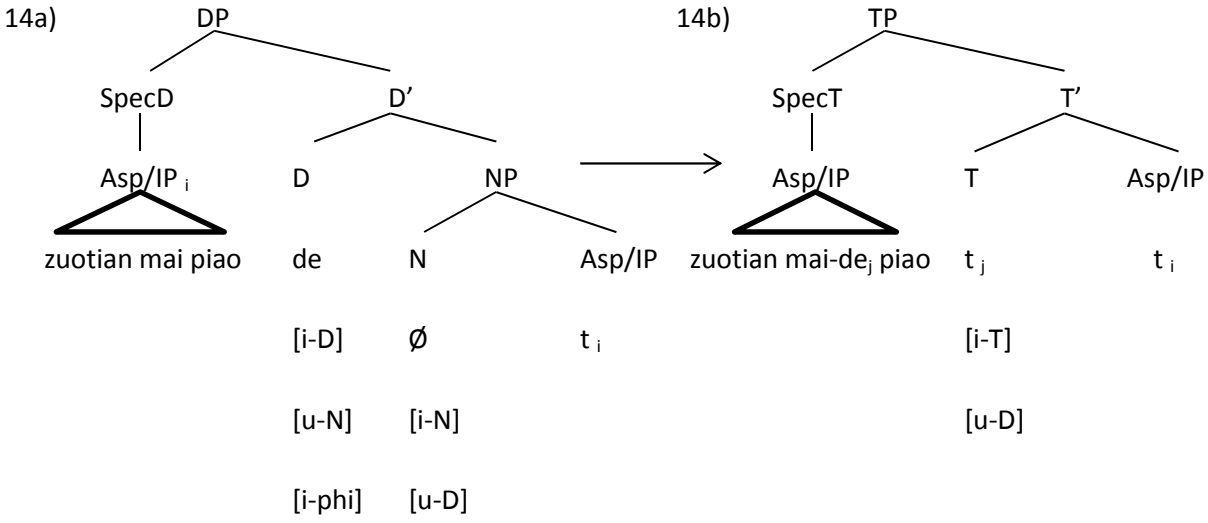


As functional categories (C, M, T in ex. 13a), K and D in ex. 13b)) are universally projected, morphological and lack argument structure, grammaticalizing elements which undergo 'F-attraction' in SG display 'context expansion', rise in frequency and morphophonological weakening. Such are the interface effects of 'F-attraction' (SG). In the next section, I examine those of 'L-shift' (LG).

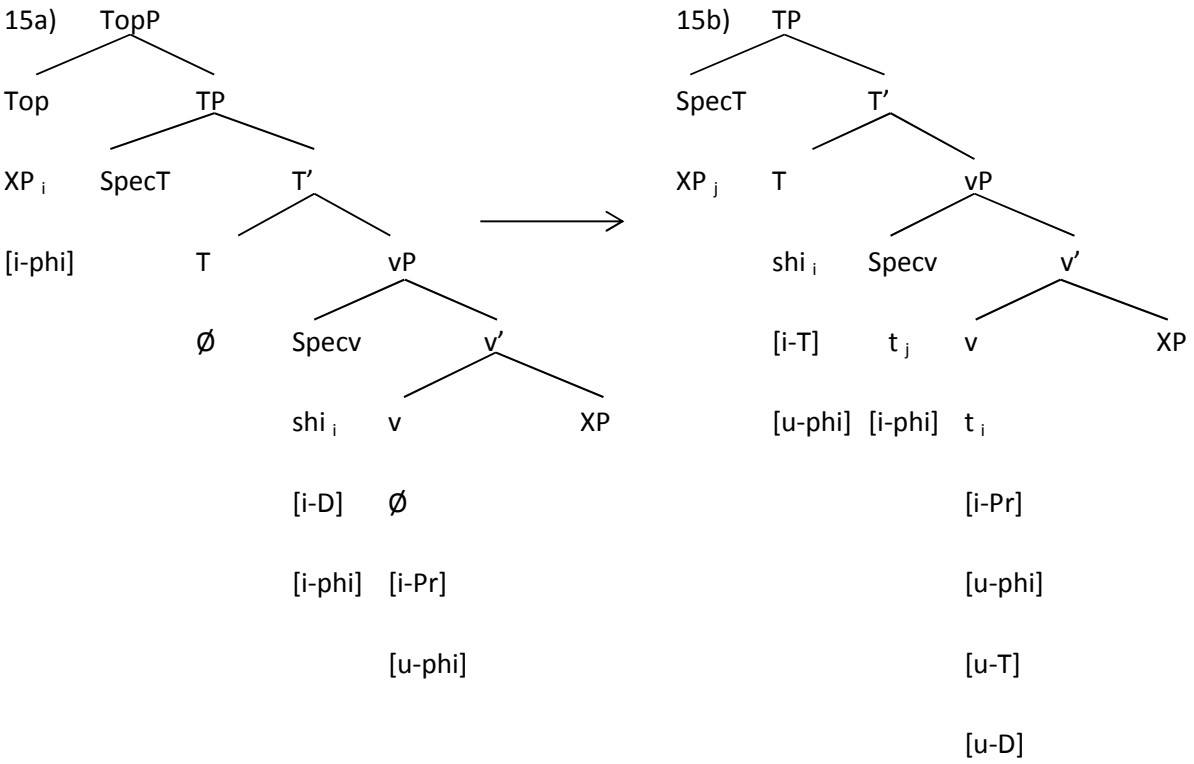
Section 2.3: 'Lateral shift' and weakening (LG):

In contrast to 'F-attraction' in SG, 'L-shift' in LG creates new functional categories which are not in the original structure:

Chinese *de* (=chapter 1, section 2.4, ex. 9)):



Chinese *shi* (=chapter 1, section 2.4, ex. 10)):



The new functional category (here T) is not part of the universal hierarchy of functional categories and hence imposes very strict restrictions on the distribution of the grammaticalizing elements, which can only be used in certain very specific contexts. In the case of Chinese *de* (ex. 14)), the fact that it is re-analysed as a past tense marker ([i-T:past]) entails that it can only be used in cleft sentences which describe past events:

16a)	wo	shi	zuotian	mai	de	piao
	I	be	yesterday	buy	DE	ticket

'It was yesterday that I bought the ticket.' (S&W (2002a:169), Wu (2004:120))

16b)	*Ta	shi	mingtian	cai	hui	qu	de	Beijing
	He	BE	tomorrow	only-then	will	go	DE	Beijing

'It is tomorrow that he will go to Beijing.'

(S&W (2002a:169, 176-177, 190), Wu (2004:126-128, 141))

As de can only be used as a verbal suffix (T(past)) in cleft sentences that denote past events (e.g. *zuotian mai-de piao* 'yesterday I bought ticket', ex. 16a)) and not otherwise (e.g. **mingtian cai hui*

qu de Beijing ‘tomorrow I go to Beijing’, ex. 16b), cf Hole (2011:1713)). There is, therefore, no rise in frequency, since de (T(past)) only occurs in a limited number of contexts and cannot be more frequent than the generalised sentence-final de (D).[63] [64]

Similarly, although copula verbs derived from subject determiners display ‘F-attraction’ (SpecPred > Pred, ex. 15)), the new T features which are the results of ‘L-shift’ creates subsets of copular constructions which may be morphologically distinct for tense and/or subject agreement (see chapter 1, section 2.3, especially footnote 35) e.g. Hebrew *hu* ‘he’ (i-phi: MASC.3rd.SG) > (u-phi:MASC.3rd.SG), *hi* ‘she’ (i-phi: FEM.3RD.SG) > (u-phi: FEM.3rd.SG), *hem* ‘they’ (i-phi:MASC.3RD.PL) > (u-phi:MASC.3RD.PL), *hen* ‘they’ (i-phi:FEM.3rd.PL) > (u-phi:FEM.3rd.PL), which show subject-agreement with their respective subjects and are hence only used with the relevant subjects (Gilnert (1989:188-189)):

[63] Lee (2005a, 2005b) points out some further constraints, namely the fact that *de* (T(past)) can only be used with common compound verbs (ia-b)), indefinite objects (iia-b)), and prosodically ‘simple’ objects (iiia-b)):

ia) Ta shi zuowan da de jia
He SHI last.night beat DE fight
‘It was last night that he got into a fight.’

ib) Ta shi zuowan da de ren
He SHI last.night beat DE person
‘It was last night that he beat someone.’

ic) *Ta shi zuowan da de gou
He SHI last.night beat DE dog
‘It was last night that he beat a dog.’

iia) Ta shi zuowan mai de shu
He SHI last.night buy DE book
‘It was last night that he bought a book.’

iib) *Ta shi zuowan mai de na ben yuyanxue gailun
He SHI last.night buy DE that CL linguistics introduction
‘It was last night that he bought the book ‘Introduction to Linguistics’.’

iiia) Ta shi zai yushi li chang de ge
He SHI in shower LOC sing DE song
‘It was in the shower that he sang songs.’

iiib) *Ta shi zai yushi li chang de yi shou ge
It was in the shower that he sang a song.’

iiic) *Ta shi zai yushi li chang de liuxing ge
He SHI in shower LOC sing DE popular song
‘It was in the shower that he sang popular songs.’

iiid) *Ta shi zai yushi li chang de ABBA de dancing queen
It was in the shower that he sang ABBA’s ‘Dancing Queen’.

Chinese *de* (T(past)), therefore, has a very limited distribution and is only used in a very small subset of cleft sentences, which severely restricts its frequency (cf Hole (2011:1710-1714)).

[64] Although it has been noted that sentence-final *de* (D) is omissible (Lee (2005a:132-138, 2005b:136-137), cf Teng (1979), Tang (1983), Chiu (1993)), it remains the case that *de* (T(past)) is only used in a very small subset of cleft sentences (see previous footnote) and is very unlikely to be more frequent than the generalised *de* (D).

17a) ha-sha'on hu matana

clock.MASC.SG COP.MASC.SG present

'The clock is a present.'

17b) ma hi Herut?

What COP.FEM.SG freedom.FEM.SG

'What is freedom?'

17c) ma hem nimusim?

What COP.MASC.PL manner.MASC.PL

'What are manners?'

17d) éyfo hen ha-bahurot?

Where COP.FEM.PL girl.FEM.PL

'Where are the girls?'

In addition to subject agreement (ex. 18a-b)), Panare copula forms *këj, nëj* also denote tense which correlates with their original deixis as determiners (proximal > present, distal > past, ex. 18c-d)) (Gildea (1993:56-60)):

18a) maestro këj mëj

Teacher COP.ANIMATE.PROXIMAL PRO.ANIMATE.PROXIMAL

'He (animate/proximal) is a teacher.'

18b) maestro nëj kën

Teacher COP.ANIMATE.DISTAL PRO.ANIMATE.DISTAL

'He (animate/distal) is a teacher.'

18c) maestro nëj mëj

Teacher COP.ANIMATE.DISTAL PRO.ANIMATE.PROXIMAL

'He (animate/proximal) was a teacher.'

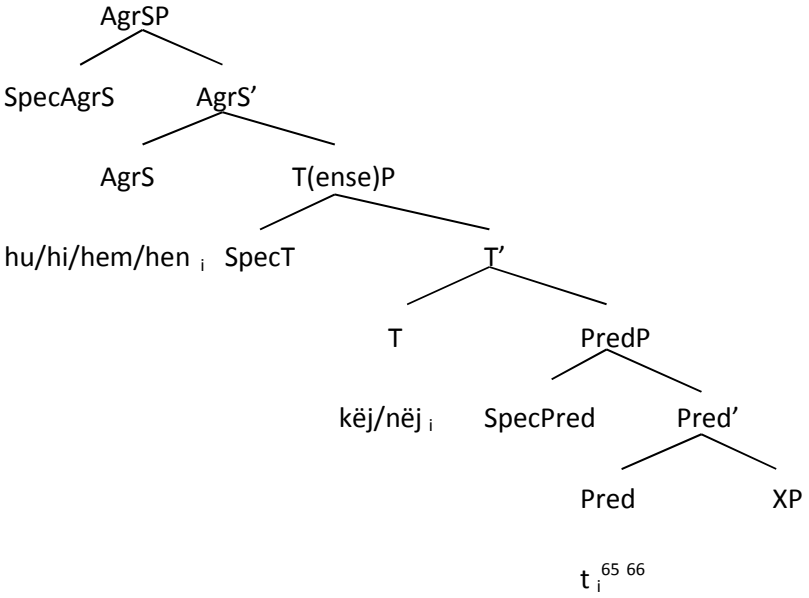
18d) maestro këj kën

Teacher COP.ANIMATE.PROXIMAL PRO.ANIMATE.DISTAL

'He (animate/distal) is being a teacher right now.'

These copula forms, therefore, form subsets of copular constructions, which may be represented thus (cf chapter 1, footnotes 35 and 41):

19)



[65] In contrast to Hebrew and Panare copulas, Chinese *shi* does not show morphological distinctions of tense or subject agreement and is invariant in all its copular uses. Chinese *shi,* therefore, does undergo 'context expansion' in that it is generalised to all copular constructions, which reflects 'F-attraction' (SpecPred > Pred). This typology of copula verbs derived from subject determiners will be explored in future chapters.

[66] In contrast to copula verbs derived from subject determiners, subject agreement markers derived from subject determiners display 'F-attraction' as they are re-analysed as T (AgrS) elements and hence coalesce with the main finite verb which is already present in the original construction (see chapter 1, section 2.2, footnote 37). They hence undergo 'context expansion', since they are generalised to all finite verbs rather than just to copula verbs (Fuss (2005:chapter 6), and display morphophonological weakening as well e.g. non-standard French subject-agreement markers:

	Standard French		Non-standard French	
	Pre-consonantal	Pre-vocalic	Pre-consonantal	Pre-vocalic
MASC.SG	Il	Il	I	Il
FEM.SG	El	El	E	El
MASC.PL	Il	Ilz	I	Iz
FEM.PL	El	Elz	E	Ez

(Lambrecht (1981:19), cf Ashby (1977:70ff))

i) Il mang-e et boi-t comme un cochon (standard Fr)
PRO-3SG eat-PRES.3SG and drink-PRES.3SG like a pig

ii) I-mange et i-boit comme un cochon (Non-standard French)
3SG-eat and 3SG-drink like a pig
'He eats and drinks like a pig.' (Lambrecht (1981:24))

The contexts in which the grammaticalizing elements can occur in LG can be represented thus:

Table 5 (Chinese *de*):

Stage	Meaning	Occurrences
Chinese de (D)	Determiner	All cleft-sentences
Chinese de (T)	Past tense marker	Cleft-sentences which refer to the past (see footnote 63)

Table 6 (Hebrew copulas *hu, hi, hem, hen*):

Stage	Meaning	Occurrences
Hu (D)	Personal pronoun (masculine singular) 'he'	Equational constructions with phi-agreeing topic (M.SG)
Hi (D)	Personal pronoun (feminine singular) 'she'	Equational constructions with phi-agreeing topic (F.SG)
Hem (D)	Personal pronoun (masculine plural) 'they'	Equational constructions with phi-agreeing topic (M.PL)
Hen (D)	Personal pronoun (feminine plural) 'they'	Equational constructions with phi-agreeing topic (F.PL)
Hu (T)	Copula	Copular constructions with masculine singular subject
Hi (T)	Copula	Copular constructions with feminine singular subject
Hem (T)	Copula	Copular constructions with masculine plural subject
Hen (T)	Copula	Copular constructions with feminine plural subject

In ii), the subject-agreement marker is morphophonologically weakened as a prefix to the main verbs (*i-mange et i-boit*), which differs from copula verbs derived from subject determiners.

Table 7 (Panare copulas *këj, nëj*):

Stage	Meaning	Occurrences
Këj (D)	Demonstrative (proximal)	Equational constructions with phi-agreeing topic (proximal)
Nëj (D)	Demonstrative (distal)	Equational constructions with phi-agreeing topic (distal)
Këj (T)	Copula	Copula constructions with present time reference
Nëj (T)	Copula	Copula constructions with past time reference

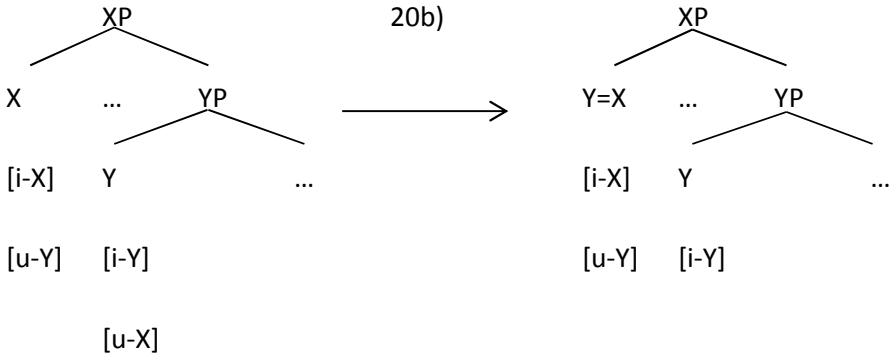
'L-shift' in LG, therefore, creates subsets of the original constructions and thereby restricts the number of contexts in which the grammaticalizing element may occur and hence lowers its frequency, which is a sharp contrast to 'context expansion' in SG (see previous section). This will be known as 'context reduction'.

Section 2.4: 'Functional Spell-Out':

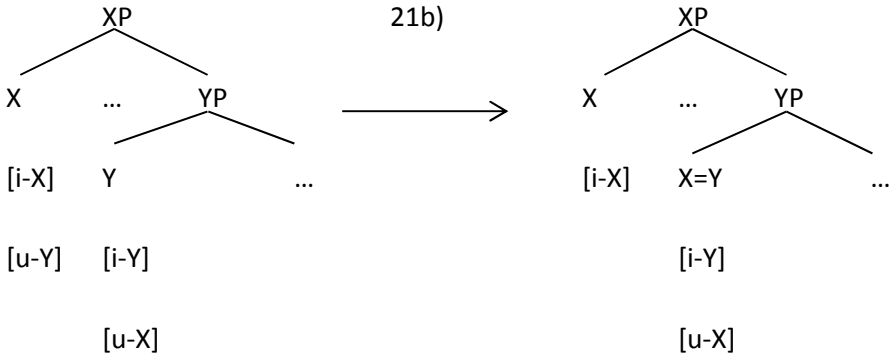
The differences between SG and LG may hence be outlined thus:

SG (=chapter 1, section 1.2, ex. 7-8)):

20a) 20b)

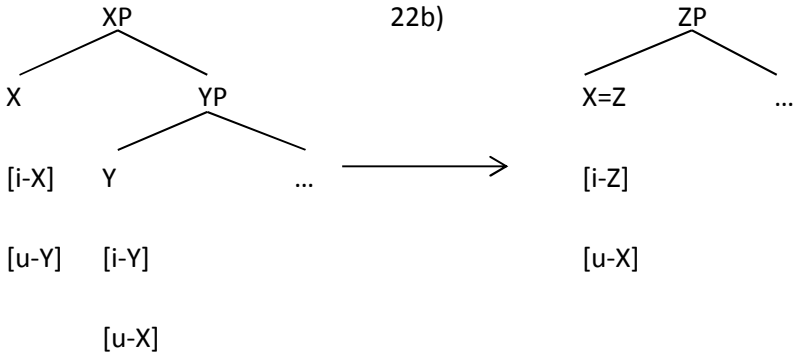


21a) 21b)



LG (=chapter 1, section 2.4, ex. 11))

22a) 22b)



As 'F-attraction' in SG (X=Y in ex. 20b), Y=X in ex. 21b)) entails 'context expansion' (section 2.2) while 'L-shift' in LG (X=Z in ex. 22b)) entails 'context reduction' (section 2.3), the grammaticalizing element can conceivably undergo rise in frequency in the former but not in the latter. Assuming that the interface options of generative syntax are sensitive to usage frequencies (see footnote 58), 'F-attraction' in SG can hence entail morphophonological weakening to the grammaticalizing element whereas 'L-shift' in LG cannot. This will be known as 'Functional Spell-Out',

which derives the different frequency and weakening effects of functional categories from their grammaticalization processes (SG/LG).[67] These differences will be explored in later chapters.

Conclusion:

Bybee's influential theory of weakening in grammaticalization takes frequency to be the underlying cause (section 1), and under her assumptions the formal differences between SG and LG do seem to entail different frequency effects, since while 'F-attraction' in SG entails 'context expansion' (section 2.2), 'L-shift' in LG entails 'context reduction' (section 2.3), which may explain why morphophonological weakening occurs in SG but not in LG (see chapter 1, section 3). The correlation between 'semantic bleaching' and 'phonological weakening'/'univerbation' is hence explained (see footnote 51), and a new model of syntax-phonology interface ('Functional Spell-Out') is proposed (see section 3). In the next chapter, I explore the different frequency and weakening effects of SG and LG by comparing two case studies, namely the grammaticalization of Latin *habere* as the Romance future tense marker (SG) and the grammaticalization of Chinese copula *shi* (LG).

[67] This is a significant improvement over generalizing simplistic assumptions that functional categories are necessarily weak at the interfaces (Selkirk and Kratzer (2007:125), cf introduction, footnote 2).

Chapter 3: SG vs LG: the creation of T elements:

As LG (D > T) creates T elements (e.g. Chinese *de* and *shi*, see chapter 1, section 2), I propose to compare it with the grammaticalization of Latin *habere* (V) as the Romance future tense marker (T(future)), which is an example of SG (Roberts (1993a, 2010, 2012), R&R (2002, 2003:chapter 2), cf Tse (2011:introduction, section 3, 2013a:sections 1 and 3)).[68] Furthermore, as the grammaticalization of Latin *habere* goes through an intermediate stage of being a modal verb (V > Mod > T(future)) (Coleman (1971), Fleischman (1982), Pinskter (1985, 1987)), this is a good illustration of 'primary' grammaticalization (lexical > functional) and 'secondary' grammaticalization (functional > more functional), both of which have been shown to entail rise in frequency and morphophonological weakening to the grammaticalizing element (lexical and functional respectively) (Breban (2014a, 2014b)).[69] LG, in contrast, does not cause any significant rise in frequency or morphophonological weakening to the grammaticalizing element (see chapter 2, section 2.3), and I propose to analyse the grammaticalization of Chinese copula *shi* (D > T), which is a historically well documented change with many cross-linguistic parallels (see e.g. Li and Thompson (1976)).[70] In this chapter, I propose to compare the grammaticalization of Latin habere as the Romance future tense marker (SG) and the grammaticalization of Chinese shi as a copula verb (LG) with close attention paid to their frequency and weakening effects.

[68] Indeed, the grammaticalization of Latin *habere* as the Romance future is a famous and well-cited example of grammaticalization (see e.g. Traugott et al (1993:42-44, 2003:42-44)).

[69] Breban (2014a, 2014b) surveys all the definitions of 'secondary' grammaticalization and concludes that it, like 'primary' grammaticalization', entails (further) rise in frequency and (increased) morphophonological weakening to the (already functional) grammaticalizing element (Breban (2014a:493-498), cf Traugott (2010)). Indeed, formal analyses of 'secondary' grammaticalization reveal that the original functional element does undergo 'F-attraction' and is shifted to its associated functional head e.g. French negator *pas* (D > Neg) (R&R (2003:154-161), van Gelderen (2008b:197ff), cf Detges and Waltereit (2002)), English *be*-progressives (Pred > Asp_{Prog}) (Kranich (2008, 2010a, b)), English determiners (*several* (Adj > Quant), *some* (Adj > Det) (Breban (2008, 2010a, 2010b, 2012)). 'Primary' and 'secondary' grammaticalization, therefore, can be unified as subtypes of SG, and degrees of functionality can be correlated with the relative levels of frequency and morphophonological weakening of functional elements (cf Kurylowicz (1965:52), Lehmann (1985:305ff, 1995:chapter 4), Hopper and Traugott (1993:7, 2003:7), Traugott and Brinton (2005:99), Norde (2009:20-21, 54-55, 2011:477, 2012:76)).

[70] The historical origins of Chinese *shi-de* constructions, in contrast, are still a matter of debate and the mechanisms which have led to the re-positioning of *de* are as yet unknown (see e.g. Liu (2008), Long (2013), Zhang (2015)). Furthermore, as Chinese *de* is already morphophonologically weak as a determiner (see chapter 1, footnote 42), it may be unable to undergo further morphophonological weakening, even if it displays 'context reduction' (see chapter 2, section 2.3). Moreover, although the grammaticalization of copula verbs as focus markers is cross-linguistically attested (Heine and Kuteva (2002:95-96, 111-112), cf chapter 1, section 2.2), the categorial re-analysis of Chinese *de* in *shi-de* constructions (D > T, see chapter 1, section 2.2) seems to be a language-specific development, as I have yet found no cross-linguistic parallels. In the rest of this dissertation, Chinese copula *shi* will be taken as the representative example of LG, while the grammaticalization of Chinese *de* in *shi-de* constructions will be left for future research.

Section 1.1: Romance future (SG):

Latin *habere* 'to have' is originally a lexical verb which has been re-analysed as a future tense suffix to infinitival stems in Romance (Harris (1978:136ff), Vincent (1988:57)).[71] Furthermore, as there is evidence that the Romance future is derived from certain modal uses of Latin *habere* (Benveniste (1968), Fleischman (1982), Raiskila (1990), Adams (1991)), this is a two-stage process (V > $Mod_{obligation/necessity}$ > T(future)) which will be analysed in turn.

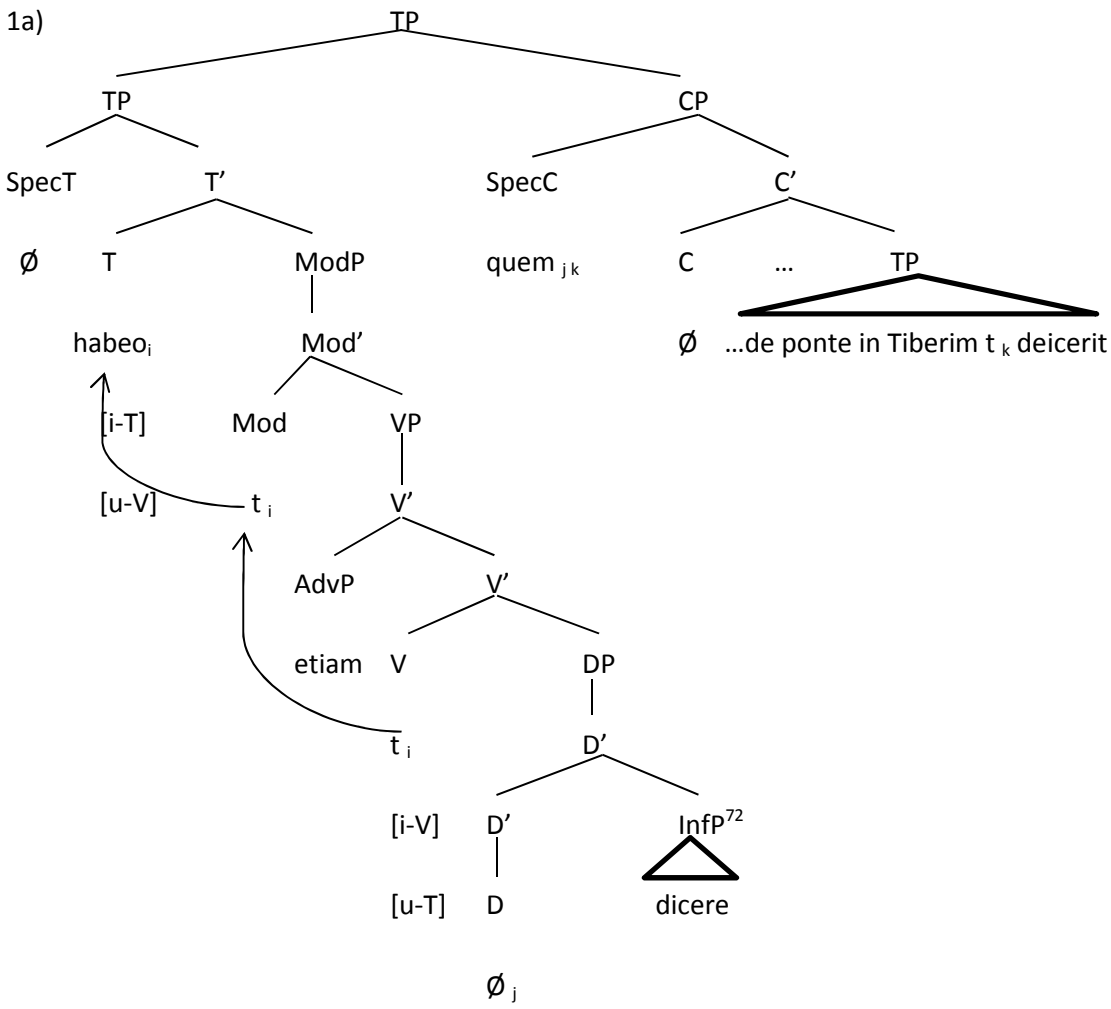
Section 1.2: V 'to have' > Mod:

The earliest example of Latin *habere* being construed with the infinitive occurs in late Republican Latin (1st century BC) where the object of *habere* 'to have' is modified by the infinitive denoting modality (Coleman (1971:215), Fleischman (1982:52), Pinkster (1987:205-206)):

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

[71] The affixal endings of the Romance future tense paradigm are etymologically related to Latin *habere,* as the Romance future tense endings correspond to the present tense of Latin *habere* and the Romance conditional (future-in-the-past) to the perfect/imperfect tenses of Latin *habere* (Tara (2014:25), cf Coleman (1971:215), Ledgeway (2012:135)):

Latin	Italian	Spanish	Portuguese	Provencal	French
Cantare habeo (present tense of *habere* > I shall sing)	*Canterò*	*Cantaré*	*Cantarei*	*Chantarai*	*Chanterai*
Cantare habebam (imperfect tense of *habere* > I would sing)	*Canteria*	*Cantaría*	*Cantaria*	*Chantaria*	*Chanterais*
Cantare habui (perfect tense of *habere* > I would sing)	*Canterei*	-	-	-	-



As the object of *habere*, namely the antecedent of the relative pronoun (*quem*), is ellipsed,[73] this can be re-analysed as an indirect question instead with *habere* re-analysed as a modal verb (i.e. *habeo*

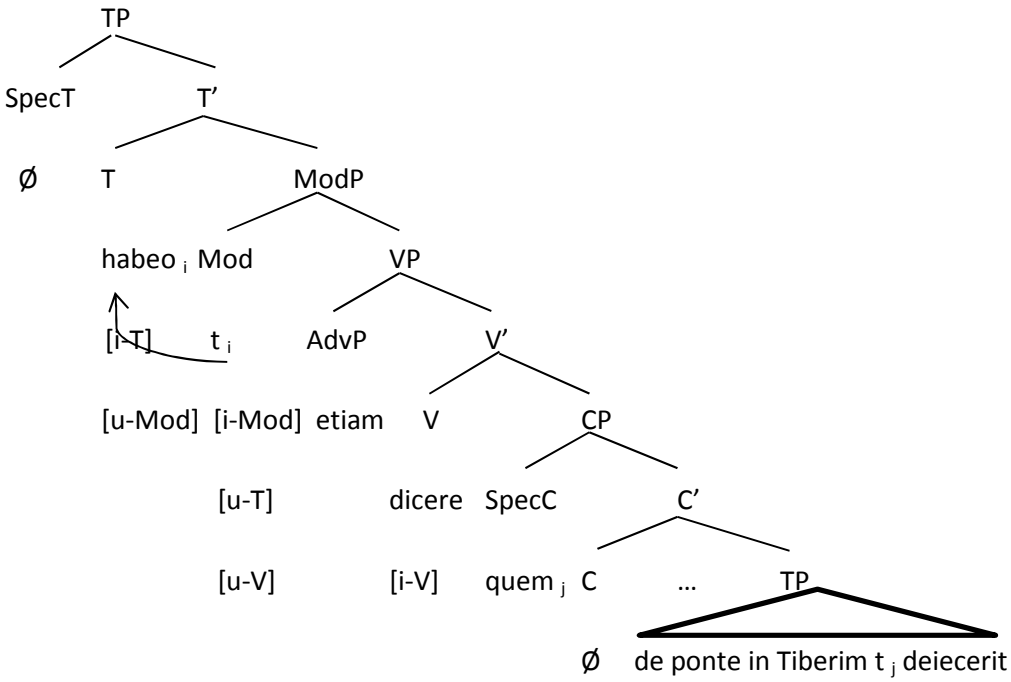
[72] Pinkster (1985:202, 1987:204-208) derives this construction (*habere* + object + infinitive) from *habere* + object + gerundive (ex. i)) on the model of *dare* 'to give' + object + infinitive/gerundive (ex. iia-b)):

i)	aed-em	hab-ui-t	tu-end-am
	house-FEM.ACC.SG	have-PERF-3SG	guard-GERUNDIVE-FEM.ACC.SG
	'He had a house to guard.' (Cicero *Verrines* 2.1.130) (Pinkster (1987:209-210))		
iia)	d-are	aqu-am	bib-end-am
	give-INF	water-FEM.ACC.SG	drink-GERUNDIVE-FEM.ACC.SG
iib)	d-are	aqu-am	bib-ere
	give-INF	water-FEM.ACC.SG	drink-INF
	'to give water to drink.' (Pinkster (1985:202, 1987:210))		

As the Latin gerundive is adjectival, the Latin infinitive (*dicere* in ex. 1a)) is analysed as an adjunct to the object of *habere*. Furthermore, as Latin gerundive denotes obligation/necessity (Woodcock (1958:158-159, 163), Sihler (1995:626), Weiss (2009:460 fn 43)), modality is implied and *habere* is hence reanalysable as a modal verb. Moreover, as the Latin gerundive is adjectival and is hence incompatible with clausal complements of Latin *habere* (e.g. *quem… de ponte in Tiberim deicerit* 'whom he threw from the bridge into the River Tiber' in ex. 1a)), it is replaced by the infinitive, which explains why the earliest examples of *habere* + infinitive are attested with infinitives of communication (*verba dicendi et scribendi*) (Pinkster (1985:198-200, 1987:207-209), Fruyt (1996:60-61), cf Tara (2014:231ff)).

(eum$_j$) dicere quem$_j$ ... 'I have (an example$_j$) to say, (namely the man) whom$_j$ …' > *habeo dicere quem*… 'I have to say whom…') (Coleman (1971:216)):[74]

1b)



1b) is 'simpler' than 1a), since V-to-Mod *Move* is lost and *habere* is shifted upwards from V to Mod via *Merge* (Roberts (1993a:228-229), R&R (2002, 2003:53), cf chapter 2, section 2.1, ex. 9), especially footnote 59). Furthermore, as *habere* is re-analysed as a modal auxiliary verb, its interpretable verbal features become uninterpretable ([i-V] > [u-V]) which hence select the infinitive (*dicere*) as its complement (cf van Gelderen (2011a:chapter 7)).[75] The grammaticalization of Latin *habere*,

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[73] In classical Latin, it is permissible to omit the antecedent of relative pronouns if they are in the same case (Woodcock (1958:189), Ernout and Thomas (1951:283)), as in this example (*habeo* (*eum*) *dicere*… *quem* 'I have an example (accusative) to say, namely whom (accusative)…').

[74] This re-analysis is supported by the fact that Latin indirect questions require verbs in the subjunctive (Woodcock (1958:133-140), Ernout and Thomas (1951:266-267)), as is the case here (*deicerit* in ex. 1)).

[75] Similar weakening of the object relation of *habere* is attested in the following examples (cf Coleman (1967:216)):

i) De… somni-is quid hab-e-mus dic-ere?
About dream-ABL.PL what HABERE-PRES-1PL say-INF
'Regarding dreams, what do we have to say? > 'Regarding dreams, what can we say?'
(Cicero *Academia* 2.136)

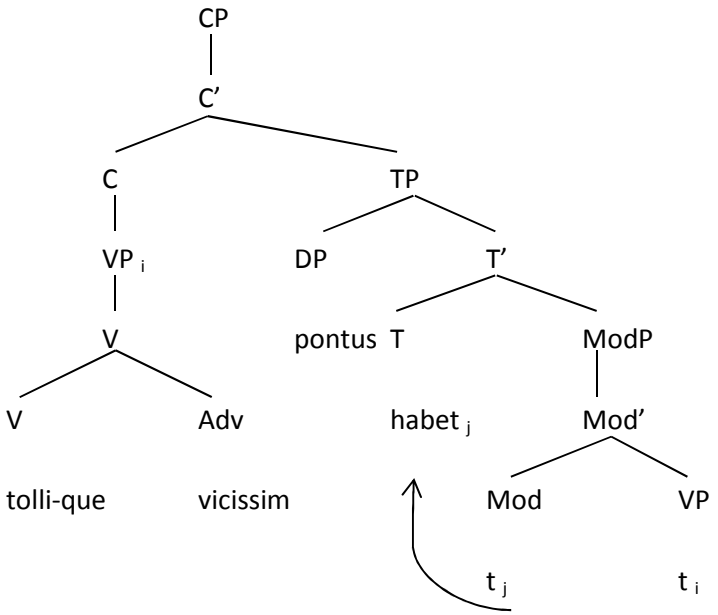
ii) Tantum hab-e-o pollice-ri me tibi
so.much HABERE-PRES-1SG promise-INF PRO.1SG.ACC.SG you-DAT.SG
absenti tu-is-que praesentibus cumulate
absent-DAT.SG your-DAT.PL-and present-DAT.PL absolutely
satis facturum
enough do- FUT.PART-ACC.SG
'I have so much to promise, namely that I shall do absolutely enough for you in your absence and for your people in their presence.' > 'I can so much promise that I shall do absolutely enough for you in your absence and for your people in their presence.' (Cicero *Ad familiares* 1.5.3.1)

therefore, displays 'structural simplification' and 'F-attraction' (V > Mod).[76] As Latin *habere* is grammaticalized as a modal verb, it can hence select a wider range of infinitival complements, some of which are previously impossible, namely intransitive and passive infinitives which are first attested in late classical Latin (Coleman (1971:217), Pinkster (1985:198, 1987:207)):

1c)	toll-i-que	vicissim	pont-us	hab-e-t
	lift-INF.PASS-and	repeatedly	sea-NOM.SG	HABERE-PRES.3SG

'… and the sea has to be lifted repeatedly.' (Valerius Flaccus 1.671-2)

1c)



The grammaticalization of Latin habere (V > Mod), therefore, can be represented thus (cf chapter 2, tables 3 and 4):

As the object of *habere* is either fronted (*quid* in i)) or re-analysed (*tantum* in ii)), the object relation of *habere* is weakened, which yields the re-analysis of *habere* as a modal verb.

[76] Two main types of modality have been proposed for Latin *habere*, namely possibility ($Mod_{Possibility}$) and obligation/necessity ($Mod_{obligation/necessity}$) (Thielmann (1885), Bulhart (1926), Coleman (1967:217ff), Pinkster (1985:198-199)). In main text, ex. 1), it is likely that Latin *habere* denotes $Mod_{Possibility}$ (*habeo etiam dicere quem…* 'I can even tell you an example…') (Pinkster (1987:206), Tara (2014:237-238)).

Table 8:

Stage	Meaning	Infinitival complement
Latin *habere* (V)	'To have'	Two place predicates with direct object assumed
Latin *habere* (Mod)	Possibility or Obligation/Necessity (see footnote 76)	All infinitives, including one place predicates like passive and intransitive verbs

Such is the first stage in the grammaticalization of Latin *habere* (V > Mod), which involves 'structural simplification', 'F-attraction' and 'context expansion'. This lays the background for the grammaticalization of Latin *habere* as a future tense marker ($Mod_{obligation/necessity}$ > T(future)), as will be explored in the next section.

Section 1.3: $Mod_{obligation/necessity}$ > T(future):

The first attestations of Latin *habere* displaying meanings of futurity occur in Tertullian (160-220AD) (Thielmann (1885), Bulhart (1926)) where there are two variants, namely pre-infinitival *habere* (*habere* + infinitive) and post-infinitival *habere* (infinitive + *habere*), and futurity is most evident in examples where *habere* denotes a particular type of obligation/necessity (see footnote 76), namely 'predestination' in (Christian) prophecy (Benveniste (1968:89-90), Fleischman (1982:57-58), Raiskila (1990:213)):[77]

2a) et ill-a nup-tur-a in domin-o

and DEM.PRO-FEM.SG marry-FUT.PART-FEM.SG in lord-ABL.SG

hab-e-t nubere

have-PRES-3SG marry-INF

'and she who is about to marry is to marry in the lord.' (Tertullian, *De monogamia* 7.5)

[77] It has been argued that post-infinitival *habere* (infinitive + *habere*) is the direct precursor of the Romance future, not only because reflexes of Latin *habere* become verbal suffixes in the Romance future paradigm (see footnote 71), but also because post-infinitival *habere* is particularly associated with 'predestination' (Thielmann (1885), Raiskila (1990:213), cf Adams (1991)). Nonetheless, as pre-infinitival *habere* does express futurity in late Latin and medieval Romance, it will be included in my analysis as well.

2b) Nazaraeus voca-r-i habe-ba-t

Nazaraeus.NOM summon-INF-PASS have-IMPERF-3SG

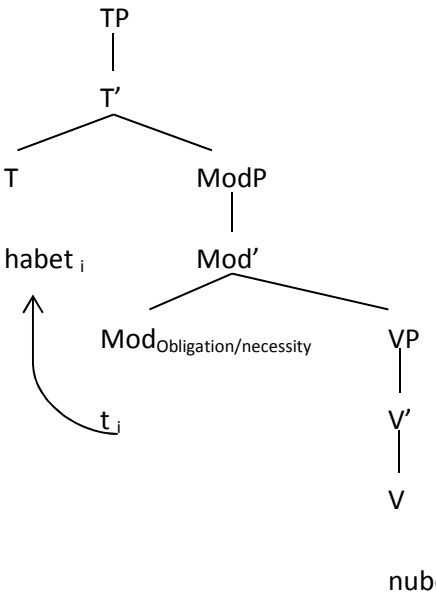
secundum prophetia-m Christus creator-is.

According prophesy-ACC Christ creator-GEN.SG

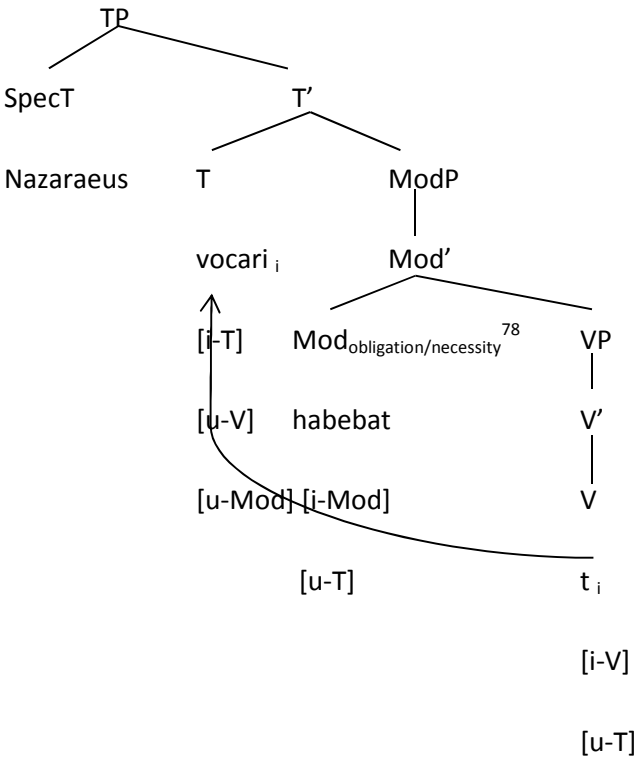
'Nazaraeus was to be summoned, according to the prophesy of Christ the creator.'

(Tertullian, *ad Marcionem* 4.8.1)

2ai)



2bi)



As 'predestination' implies no intention or volition on the subject (here *illa* 'she' in ex. 2a), *Nazaraeus* in ex. 2b)) and 'obligation/necessity' is often predicated on animate/wilful subjects (Fleischman (1982:57-58), cf Bybee et al (1985:63ff)), it is possible to re-analyse these as future tense constructions i.e. 'she is to marry' > 'she will marry' (ex. 2a)), 'Nazaraeus was to be called' > 'Nazaraeus would be called' (ex. 2b)):[79]

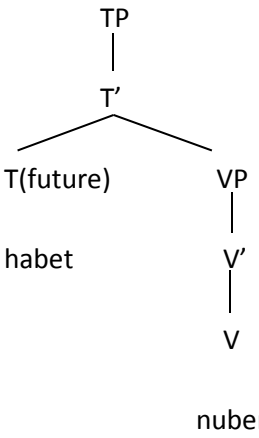
[78] In deriving post-infinitival *habere,* I follow R&R (2002:2003:54-55) in postulating V-to-T *Move* for the infinitive (*vocari* 'to be called' in ex. 2b)) which bypasses *habere* in Mod via Long Head Movement (cf Lema and Rivero (1991)). This is supported by the fact that from Tertullian onwards post-infinitival *habere* seems to be a verbal clitic as it is more than often adjacent to the preceding infinitive and is only separated from it by unstressed words (Raiskila (1990:213), cf Adams (1991:161-162)), which suggests that the infinitive is already re-analysed as the main verb and hence undergoes V-to-T *Move*.

[79] This re-analysis can be seen most clearly in examples where *habere* is used in sentences with strict temporal sequences:

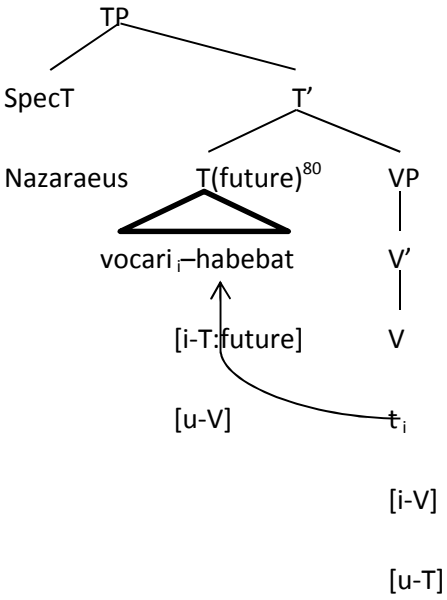
i) qu-i confite-bu-ntur autem in Christ-o
REL.PRO-NOM.PL trust-FUT-3PL however in Christ-ABL.SG
occid-i habe-bu-nt coram hominibus
Kill-PASS.INF HABERE-FUT-3PL in.the.presence.of man-ABL.PL
'Those who confide in Christ, however, will be killed openly in the presence of men.' (Tertullian, *ad Marcionem* 4.28.4)

As the verb in the relative clause has future reference (*confitebuntur* in ex. i)), the verb in the main clause (*occidi-habebunt* in ex. i)) must be interpreted as future (cf Adams (1991:162-163)).

2aii)



2bii)



2aii) and 2bii) are ‘simpler’ than 2ai) and 2bi) respectively, since while modal habere holds an *Agree/Move* relation with T (ex. 2ai), ex. 2bi)), this relation is lost when *habere* is merged in T(future) (ex. 2aii), ex. 2bii)) (R&R (2003:50, 210-211), Roberts (1993a:233-235, 2010:59, 2012)). $Mod_{obligation/necessity}$ is hence eliminated and habere is shifted upwards to T(future) where it either becomes a future tense auxiliary verb (ex. 2aii)) or it becomes part of V-to-T Move and is hence suffixed onto the main infinitival stem as a future tense ending (ex. 2bii)).[81] [82] Latin *habere*, therefore,

[80] As the Romance conditional (future-in-the-past) also denotes futurity (see footnote 71), past tense reflexes of Latin *habere* are also base-generated in T(future)) and move to a higher functional head (T(past)) where they check past tense features (cf English *is/was going to* + infinitive in chapter 2, ex. 11), especially footnote 61). In my analysis, all reflexes of *habere* as a future tense marker are base-generated in T(future).

[81] Technically, post-infinitival *habere* is the subject agreement marker (AgrS) for the Romance future tense paradigm, since it marks person endings rather than the tense ending of the Romance future (Fleischman (1982:71), cf Belletti and Rizzi (1996:6), R&R (2002:42, 2003:52)):

French:

i) chante-r-ai
sing-FUT-HABERE.1SG
‘I shall sing’

displays further 'structural simplification' and 'F-attraction' in the hierarchy of T elements ($Mod_{obligation/necessity}$ > T(future)). As 'predestination' does not imply volition or intention on the subject, Latin habere can hence be used with a wider range of subjects, including inanimate ones:

3a)	ad	futur-am	gloria-m	qu-ae	in	nos
	to	future-FEM.ACC.SG	glory-FEM.ACC.SG	REL.PRO-NOM.SG	into	PRO.1PL
	hab-e-t	revel-ar-i				
	have-PRES-3SG	reveal-INF-PASS				

'to the future glory which will be revealed (habet revelari) to us.'

(Tertullian, de resurrectione carnis 40.86.16)

3b)	in	nation-ibus	a	qui-bus	magis
	in	nation-ABL.PL	by	REL.PRO-ABL.PL	most
	suscip-i		habe-bat		
	accept-INF.PASS		HABERE-IMPF.3SG		

'Among the nations by which most would be accepted (suscipi-habebat).'

(Tertullian Adversus Marcionem 9.9)

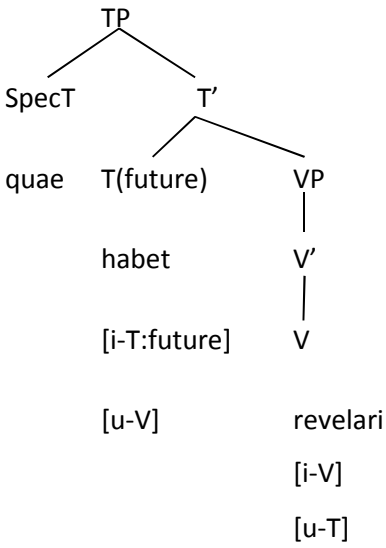
Italian:

ii) ame-r-ò
love-FUT-HABERE.1SG
'I shall love'

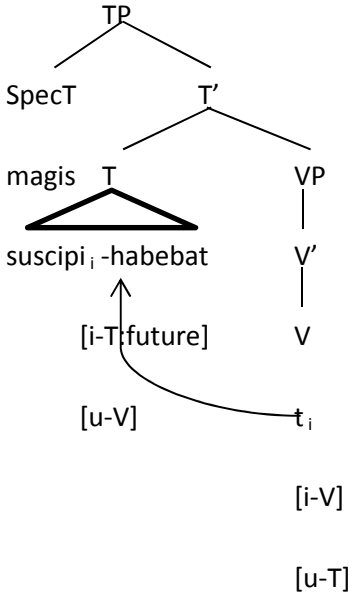
Nonetheless, as *habere* is part of the Romance future tense paradigm, it is marked as T(future) here for clarity.

[82] As *habere* as a future tense marker can be used with modal verbs, its original interpretable Mod features may have become uninterpretable ([i-Mod] > [u-Mod]), which conforms to van Gelderen's 'Feature Economy' (cf chapter 1, section 1.1, ex. 5)). As there is no modal verb in ex. 2), [u-Mod] is subsumed within [u-V] as part of the selectional property of *habere* in T(future).

3a)



3b)



The grammaticaliation of Latin *habere* as a future tense marker ($Mod_{Obligation/Necessity}$ > T(future)), therefore, entails further 'context expansion' as it is used with a wider range of subjects. Furthermore, while the use of Latin *habere* as a future tense marker has a limited distribution in late Latin (Coleman (1967:222)),[83] it becomes fully generalised in Romance as the default future tense paradigm:

[83] It has been observed that the use of Latin *habere* as a future tense marker is mainly restricted to morphosyntactic contexts where the classical Latin tense paradigm is defective, namely passive infinitives and future-in-the-past (Coleman (1971:221-224), Fleischman (1982:36-40, 55-56)). Latin *habere* is hence not fully generalised as the default future tense marker until medieval Romance where the Latin morphological future becomes obsolete (Fleischman (1982:40-43)).

Medieval Spanish:

3c)	yr-emos	a	Valencia,	ser-emos	a	las	bodas
	Go-FUT.1PL	to	Valencia	be-FUT.1PL	at	the	wedding

'We shall go to Valencia and we shall be at the wedding.' (El Poema del Mio Cid 2161)

The final stages in the grammaticalization of Latin *habere* ($Mod_{obligation/necessity}$ > T(future)), therefore, can be represented thus:

Table 9:

Stage (type frequency)	Meaning	Subject	Infinitival complement
Latin *habere* (Mod)	Obligation/Necessity	Animate/human agents	All lexical verbs
Latin *habere* (T(future))	Future	All subjects	All verbs in certain morphosyntactic contexts (see footnote 83)
Medieval Romance (T(future))	Future	All subjects	All verbs

The grammaticalization of Latin *habere* as the Romance future, therefore, shows successive instances of 'structural simplification' and 'F-attraction' in the cartographic hierarchy of T elements (V > $Mod_{Obligation/Necessity}$ > T(future)), which has given rise to progressive 'context expansion' and rise in frequency to the grammaticalizing element (Latin *habere*) (see tables 8 and 9). This entails morphophonological weakening to Latin habere, which will be explored in the next section.

Section 1.4: morphophonological weakening of Latin *habere*:

Morphophonological weakening is apparent in the grammaticalization of Latin *habere* as the Romance future, since while Latin *habere* (V) 'to have' is an autonomous word, it becomes a verbal suffix in the Romance future tense paradigm (see footnote 71), the earliest evidence for which is attested in the 7th century AD (Fleischman (1982:68)):

4a) ill-e responde-ba-t: non da-b-o

PRO-MASC.SG.NOM reply-IMPERF-3SG NEG give-FUT-1SG

Iustinian-us dice-ba-t: dar-a-s

Iustinianus-NOM.SG say-IMPERF-3SG give-FUT-2SG

'He used to reply: I shan't give it. Iustinianus used to say: you will give it.'

(Fredegar's Chronicle, c. 613 AD).

Latin *habere* is here fused with the infinitival stem in forming the future tense (*dar-as* 'you will give') and is used in correspondence with the Latin morphological future (*dabo* 'I shall give') (Coleman (1971:230), Fleischman (1982:68), Adams (1991:160-161)). Furthermore, there is evidence for an intermediate stage where *habere* is a post-infinitival clitic, since from Tertullian onwards post-infinitival *habere* is more than often adjacent to the preceding infinitive and is only separated from it by unstressed words (Raiskila (1990:213), cf footnote 78):[84] [85]

4b) dar-i enim ha-be-bat circumcisio

Give-PASS.INF for HABERE-IMPERF-3SG circumcision

'For circumcision would be given…' (Tertullian *Adversus Iudaeos* 3.4)

The various stages in the grammaticalization of Latin habere as the Romance future can, therefore, be summarised thus:

[84] This anticipates 'mesocliticization' in medieval Romance and contemporary European Portuguese where reflexes of Latin *habere* are also only separated from the main infinitival stem by unstressed pronouns (Beardsley (1921:26ff)):
Medieval Spanish:

i) el rey quere-r-me-ha por amigo
the king want-INF-me-HABERE for friend
'The king will want me for a friend.' (*El Poema del Mio Cid* 76)

[85] Cf Hopper and Traugott (1993:7, 2003:7) and Norde (2009:8, 2011:477, 2012:76) who postulate the following morphological cline for the grammaticalization of verbs (cf Zwicky (1985), Zwicky and Pullum (1983), Ramat (1987:8-13)):

i) lexical verb > grammatical auxiliary > clitic auxiliary > inflectional tense affix

It is a cross-linguistic trend that tense markers tend to be affixal while modal auxiliaries periphrastic (Bybee et al (1987, 1989, 1991, 1994)). More will be said about this in the next chapter.

Table 10:

Stage (type frequency)	Meaning	Subject	Infinitival complement
Latin *habere* (V) (word)	'To have'	Animate/human agents	Two place predicates with direct object assumed
Latin *habere* (Mod) (pre-infinitival auxiliary, post-infinitival clitic)[86]	Possibility, Obligation/Necessity (see footnote 76)	Animate/human agents	All lexical verbs
Latin *habere* (T(future)) (verbal suffix)	Future	All subjects	All verbs in certain morphosyntactic contexts (see footnote 83)
Medieval Romance (T(future)) (verbal suffix)	Future	All subjects	All verbs

Such is the grammaticalization of Latin *habere* as the Romance future (SG), which shows a gradual increase of frequency and morphophonological weakening. In the next section, I analyse the grammaticalization of Chinese copula *shi* (LG).

Section 2.1: Chinese *shi* (LG):

In chapter 1, section 2.3, I argue that the grammaticalization of Chinese copula *shi* displays 'structural simplification' and 'F-attraction' in that the *Agree* relation between the subject determiner *shi* in SpecPred and Pred is lost and the subject determiner is re-analysed as a copula in Pred (see chapter 1, section 2.3, especially footnote 29). Furthermore, it is argued that as Chinese *shi*

[86] There is evidence from Ibero-Romance that post-infinitival *habere* is morphophonologically weakened whereas pre-infinitival *habere* is not:

i) quando Coymbria a-v-ie se-er presa
when Coimbra HABERE-IMPERF-3SG be-INF taken
'When Coimbra was about to be taken…' (*La Primera Crónica General* 487b47)

ii) busca-r nos ie el rey Alfonsso
search-INF us HABERE.IMPERF-3SG the king Alfonsso
'King Alfonso would look for us.' (*El Poema del Mio Cid* 528)

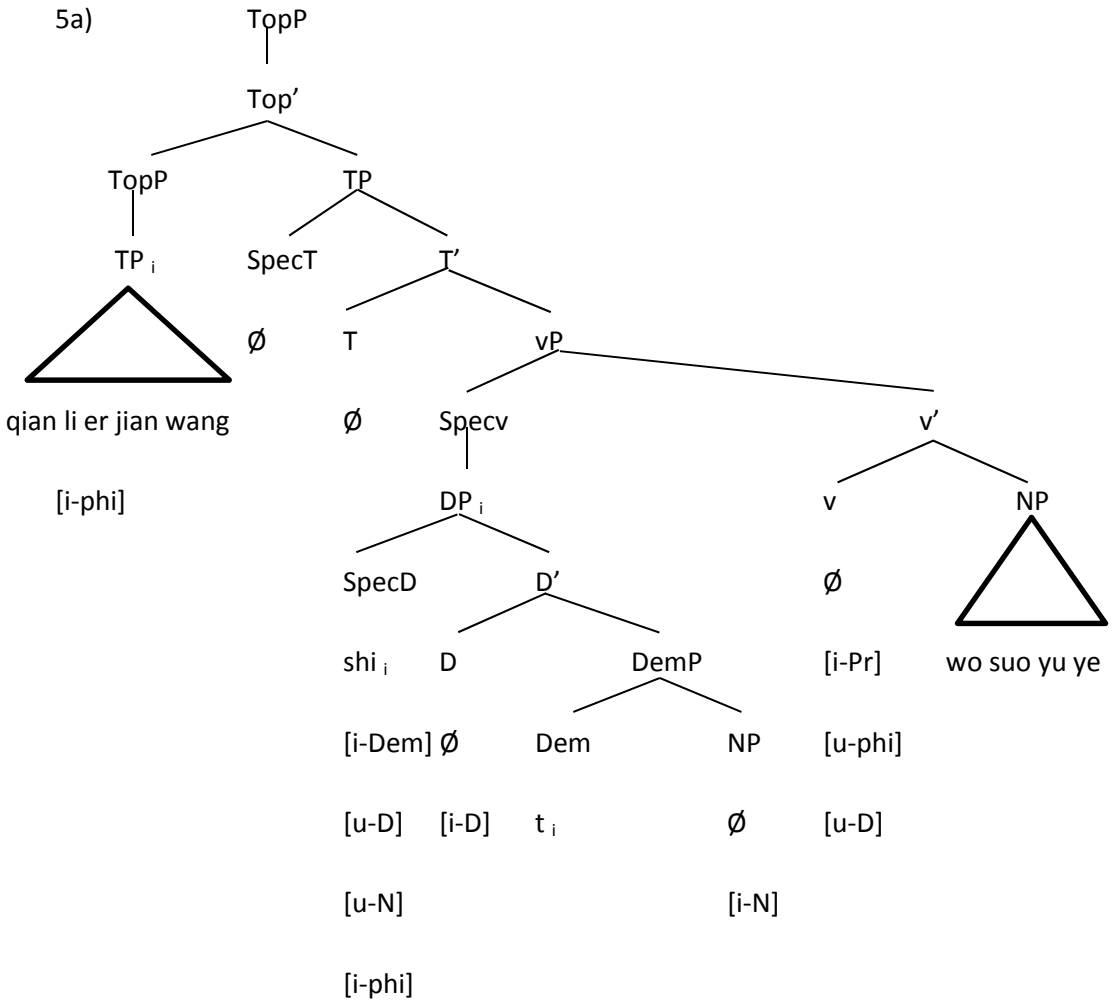
is grammaticalized as a copula verb, it gains new T features which are previously absent and hence qualify as 'L-shift' (see chapter 1, section 2.3, especially footnotes 28 and 35):

5)	qian	li	er	jian	wang
	thousand	mile	then	see	king
	shi	wo	suo	yu	ye
	this	I	NOMINALISER	desire	DECLARATIVE.PARTICLE

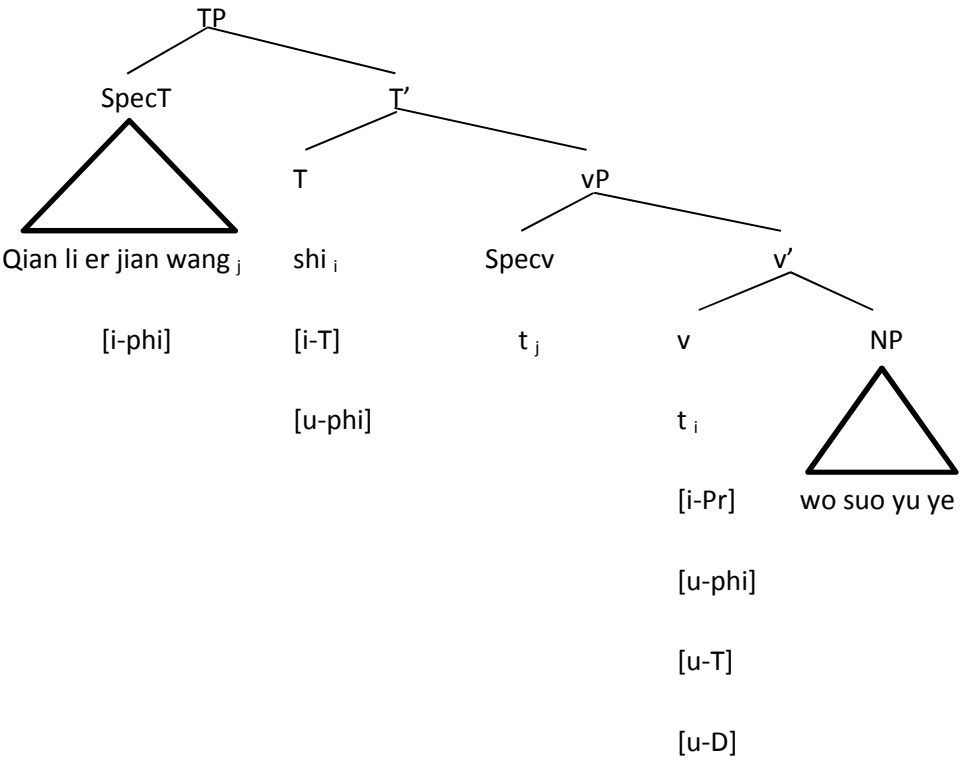
'To see the king after travelling a thousand miles, this (is) what I want.' (5a)) > 'To see the king after travelling a thousand miles is what I want.' (5b))

(Mencius, 4th century BC) (=chapter 1, section 2.3, ex.10)

5a)



5b)



The grammaticalization of Chinese *shi* is hence a mixture of SG ('F-attraction') and LG ('L-shift') (see chapter 1, section 2.3, especially footnote 37), which entails 'context expansion' and 'context reduction' respectively (see chapter 2, section 2.3, especially footnote 65). In this section, I analyse the grammaticalization of Chinese copula *shi* and analyse its frequency effects.

Section 2.2: SpecPred > Pred:

As Chinese *shi* is originally used as the subject in equational constructions with a co-referring (i.e. phi-agreeing) topic (cf previous section, ex. 5)), it is only used with topics of 3rd-person reference.[87] Its re-analysis as a copula verb is argued to occur in examples where Chinese *shi* is not

[87] The topics used with Chinese *shi* in Old Chinese are invariably 3rd-person but may vary in number (singular/plural), since both singular and plural topics are attested in equational constructions (Feng (1993, 2003)):

i)	fu	yu	gui	shi	ren	zhi	suo	yu	ye
	wealth	CONJ	nobility	SHI	people	POSSESSIVE.PARTICLE	REL	desire	PRT

'Wealth and richness, these are what man desires.' (Mencius, *Lunyu* , 5th century BC)

In i), as there are more than one element in the topic (*fu yu gui* 'wealth and nobility'), it must be analysed as plural (*shi* 'these (things)). This number distinction also applies to clausal topics, which can also be plural (Feng (1993:290, 2003:33)):

ii)	shu	ming	xing	yun	shi	ziran	zhi	bian	ye
	tree	rustle	star	fall	SHI	nature	POSSESSIVE.PARTICLE	change	PRT

'Tree rustle, stars fall, these are natural phenomenon.' (Xunzi, 3rd century BC)

Old Chinese *shi,* therefore, shows number distinctions in its phi-agreement with its topic. More will be said about this below.

clause-initial but preceded by adverbs, the earliest of which is *ze* 'indeed', which weakens its analysis as a subject determiner (Feng (1993, 2003:31)):

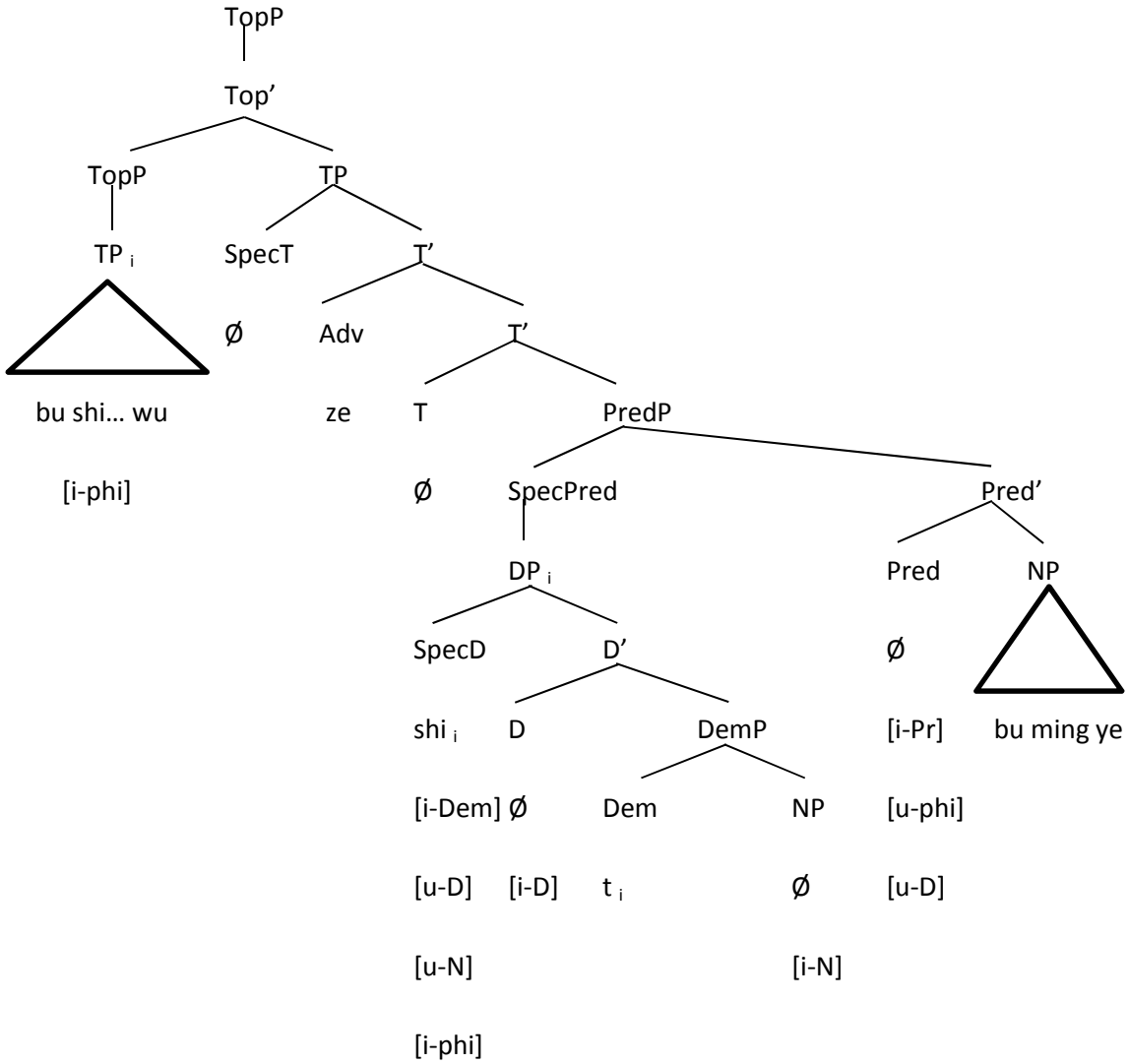
6)	bu	shi	wang	zhi	bu	keyi	wei	tang	wu
	NEG	know	king	DET	NEG	can	with	Tang	fight
	Ze	shi	bu	ming	ye				
	ADV	this	NEG	clear	DECLARATIVE.PARTICLE				

'Not knowing the king and so not being able to fight with Tang, this (is) not clear indeed.' (6a))

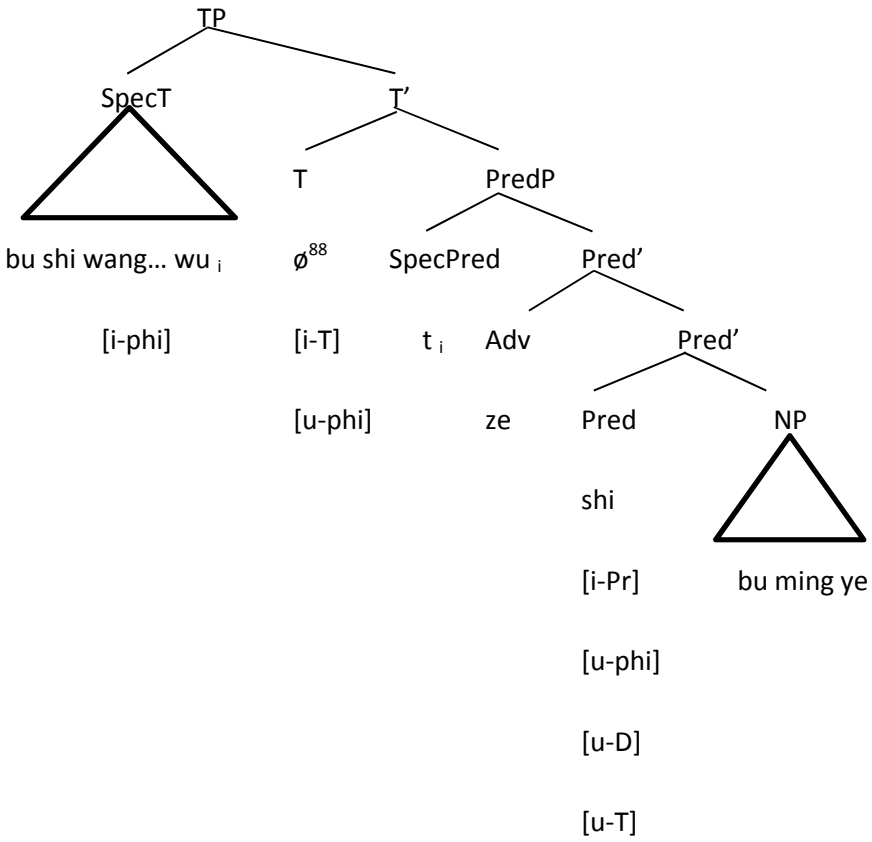
>

'Not knowing the king and so not being able to fight with Tang is not clear indeed.' (6b)) (Mencius)

6a)



6b)



As Old Chinese *ze* is ambiguous between being a conjunction (6a)) and an adverb (6b)) (Feng (1993:282-283, 2003:31)), Chinese *shi* can either be analysed as a subject (6a)) or a copula verb (6b)).[89] Furthermore, as Chinese *shi* is not clause-initial in ex. 6), it is better analysed as a copula verb in Pred (6b)).[90] As Chinese shi is re-analysed as a copula verb (Pred), it selects a wider range of subjects, some of which are previously impossible, namely demonstrative pronouns and non-3rd

[88] As the adverb *ze* precedes *shi, shi* should not undergo overt movement to T but remain in Pred. Nonetheless, the *Agree* relation between *shi* in Pred and T remains undisputed (cf chapter 1, section 2.3, footnote 35).

[89] Indeed, Ancient Chinese *shi* can precede *ze*, in which case *shi* must be analysed as the subject in SpecPred and *ze* an adverb within PredP (Feng (1993:283, 2003:28-29)):

i)	Xun	wei	fa	yu	tianxia	ke	chuan	yu
	Xun	use	law	in	world	can	spread	to
	Houshi	wo	you	weimian		wei	xiang	ren	ye
	Posterity	I	but	unfortunately		be	country	man	DECLARATIVE.PARTICLE
	Shi	ze	ke	you		ye			
	This	ADV	can	worrying		DECLARATIVE.PARTICLE			

'The fact that Xun is imposing the law on the world, it can spread to posterity, but I am lamentably still a countryman, this (is) worrying indeed.' (Mencius, 5th century BC)

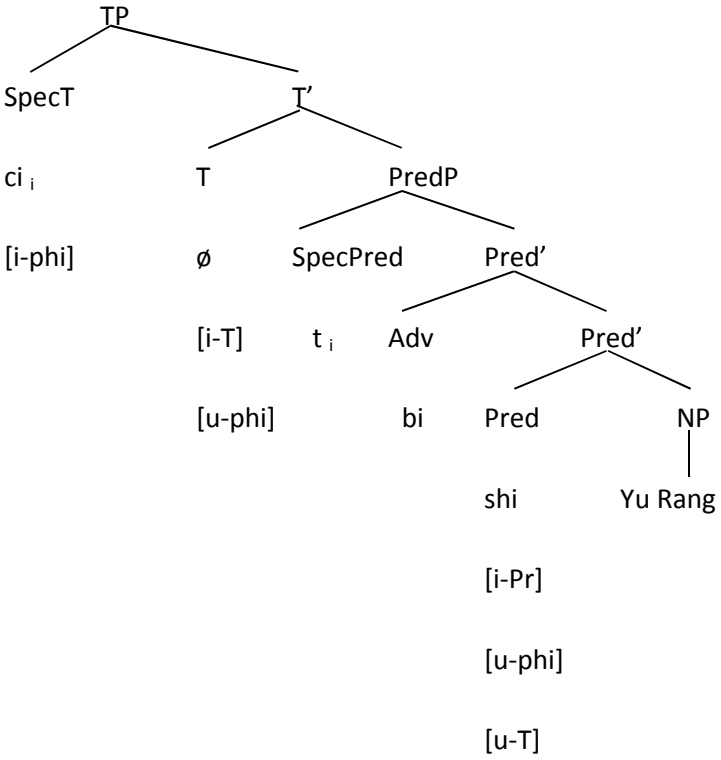
[90] This analysis is supported by the fact that in later Chinese Adv-*shi*-Predicate order becomes increasingly frequent and eventually ousts *shi*-Adv-Predicate order entirely (Feng (1993:283ff, 2003:31ff), Peyraube and Wiebusch (1996:397), cf previous footnote).

person subjects (Li and Thompson (1976:425-426), Peyraube and Wiebusch (1994:396-397), Feng (1993:, 2003:31-35), see footnote 88)):[91]

8a)	Ci	bi	shi	yu	rang	ye
	This	definitely	SHI	Yu	Rang	DECLARATIVE.PARTICLE

'This must be YuRang.' (Shi Ji: Ci Ke Liezhuan, Yu Rang, c. 1st BC)

8a)



[91] It has been suggested that *shi* has already been grammaticalized as a copula verb by the time of Mencius, since it already shows predicate inversion and hence must be analysed as copula verbs (Chang (2006:148ff)):

i)	De	xing	Wu	di,	sheng	zi	yi	ren,
	Obtain	favour	Wu	emperor	bear	son	one	person
	Zhao	di		shi	ye			
	Zhao	emperor		SHI	PRT			

'She won the favour of the Wu emperor, and gave birth to a son, who is the Zhao emperor (*Zhao di shi ye*).' (*Shi Ji* 1st BC)

In fact, the *terminus ante quem* may even be pushed back to the pre-Qin Dynasty (3rd century BC), since there are non-literary examples of *shi* that are unambiguously copular (Peyraube and Wiesbusch (1996:397-398), Feng (2003:35), cf Xi (1978), Qiu (1979)):

i)	shi	shi	lie	gui
	SHI	SHI	fierce	ghost

'This is a fierce ghost.' (*Shuihudi Qin my zhujian,* 180-170 BC)

As *shi* selects itself as the subject, it must be analysed as a copula verb, which suggests that the grammaticalization of *shi* has already happened by the end of the Warring States, at least in the contemporary vernacular (Peyraube and Wiebusch (1994:398)). The retention of clause-initial *shi* in later literary texts is hence argued to be literary conservatism (Feng (2003:35 footnote 1)). The co-existence of old and new forms in grammaticalization will be discussed in future chapters.

8b) yu shi suo jia fu ren

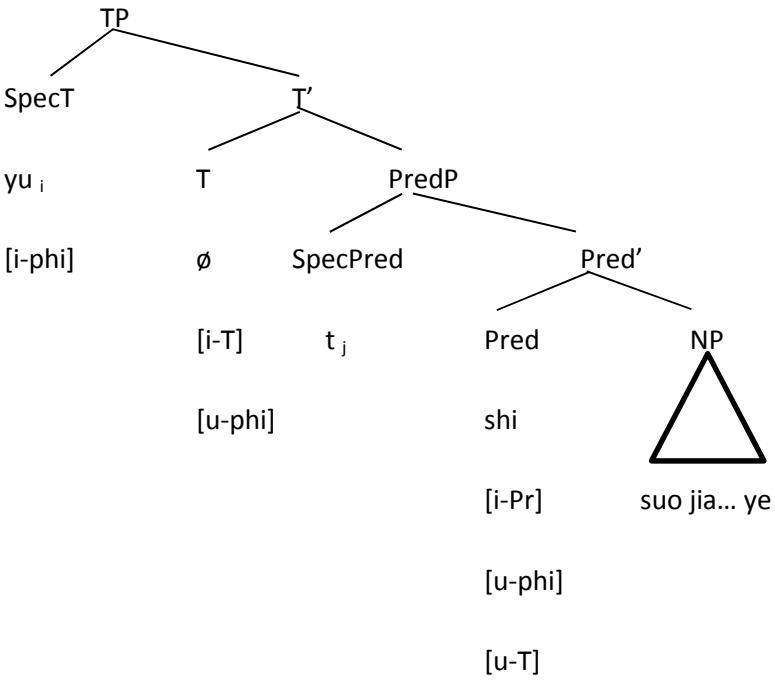
I SHI RELATIVISER marry female person

zhi fu ye

POSSESSIVE.PARTICLE father DECLARATIVE.PARTLCE

'I am the father of the bride to be.' (Lunheng, p. 427, c. 100 AD)

8b)



'F-attraction' in the grammaticalization of Chinese copula *shi* (SpecPred > Pred), therefore, entails 'context expansion', since shi comes to be used with a wider range of subjects (ex. 12)), which can be represented thus:

Table 11:

Stage	Meaning	Complement
Subject determiner (D in SpecPred)	Demonstrative pronoun 'this' in subject position	Topics which show phi-agreement (3rd-person) (see footnote 88)
Copula verb (Pred)	Copula verb	All subjects

As Chinese copula *shi* shows movement/agreement with T (see chapter 1, section 2.3, especially footnote 35), it displays 'L-shift' and is hence used with different types of subjects and tenses, which creates subsets of copular constructions, as will be seen in the next section.

Section 2.3: Pred > T:

The uses of Chinese *shi* as a copula verb is most evident in Medieval Chinese where it becomes increasingly obligatory in copular constructions and begins to show tense and subject-agreement distinctions (cf Wang (1958:35, 347ff)), as it is used with subjects of different persons and different temporal adverbs which denote different tenses:

9a)	wo	shi	ni	de	fang	zhuren
	I	SHI	you	POSSESSIVE.MARKER	room	master

'I am your housemaster.'

(Yulin waishi, Bing jiaren qinglou suanming dai mingshi jiguan xianshi)

9b)	ci	yu	shi	xiri	xia	he
	this	jade	SHI	formerly	name	CONJ
	yu	jingshang		zhi		xia
	at	mountain.jing		POSSESSIVE.MARKER		below
	Jian	fenghuang	qi	yu	shi	shang,
	See	phoenix	rest	at	rock	above
	Dai	er	jin	zhi	zhuwenwang	
	Bring	CONJ	bestow	PRO	name	

'This jake is the thing which formerly Xia, when he, below the Mountain Jing, saw a phoenix on a rock, and brought it as a gift for Zhuwenwang.' (Sanguo yanyi)[92]

These tense/subject-agreement distinctions denote T features which are new to the construction and hence qualify for 'L-shift' (see chapter 1, section 2.3), and since these denote subsets of all copular constructions, they restrict the distribution of the copula verb, which, in other languages,

[92] As Chinese has very few tense markers, tense is pragmatically inferred from context, which, in the case of main text, ex. 9b), is indicated by the adverb *xiri* 'formerly' (T(past)).

shows morphological distinctions of subject-agreement and tense (e.g. Panare and Hebrew, see chapter 2, section 2.3, exs. 17-19)). 'L-shift', therefore, creates subsets of copular constructions and hence entails 'context reduction', which may be represented thus:

Table 12:

Stage	Meaning	Complement
Copula verb (Pred)	Copula verb	All subjects
Subject agreement (T)	Copula verb	Subjects of different persons/number
Tense (T)	Copula verb	Tenses of copula verb

The diachronic distribution of Chinese *shi*, therefore, can be represented thus (cf Tables 11 and 12):

Table 13:

Stage	Meaning	Complement
Subject determiner (D in SpecPred)	Demonstrative pronoun 'this' in subject position	Topics which show phi-agreement (3rd-person)
Copula verb (Pred)	Copula verb	All subjects
Subject agreement (T)	Copula verb	Subjects of different persons/number
Tense (T)	Copula verb	Tenses of copula verb

The grammaticalization of Chinese copula *shi*, therefore, entails both 'context expansion' (table 11) and 'context reduction' (table 12), since although 'F-attraction' (SpecPred > Pred) entails that shi is used with a wider range of subjects and hence raises its frequency (section 2.2), 'L-shift' (Pred > T) creates subsets of copular constructions (subject-agreement and/or tense) (section 2.3), which are morphological distinguished in numerous languages(see chapter 2, section 2.3). 'F-attraction' (SpecPred > Pred), therefore, raises the frequency of Chinese *shi*, whereas 'L-shift' lowers its frequency in various subsets of copular constructions, which show morphological distinctions in other copula verbs and may hence have prevented the morphophonological weakening of the various copula forms in question. These frequency effects will be explored in later chapters.

Conclusion:

The differences between the grammaticalization of Latin *habere* as the Romance future (SG) and Chinese *shi* as a copula verb (LG), therefore, are that while 'F-attraction' in SG gives rise to 'context expansion', rise in frequency and morphophonological weakening to the grammaticalizing element (section 1), 'L-shift' in LG creates subsets of the original construction and hence gives rise to 'context reduction', lowering of frequency, and no morphophonological weakening to the grammaticalizing element (section 2.3). 'Secondary' grammaticalization and 'lateral' grammaticalization hence form minimal pairs (see introduction, especially footnote 69), since while the former involves 'F-attraction' and raises the frequency of an already functional element, the latter involves 'L-shift' and lowers it. In the next chapter, I shall analyse the cross-linguistic parallels to these two case-studies, since they both constitute strong cross-linguistic trends (see e.g. Heine and Kuteva (2002:108-109, 116, 218, 235, 242-244)).

Chapter 4: typological patterns of morphophonological weakening in SG and LG:

As morphophonological weakening in grammaticalization is noted to be probabilistic rather than absolute (Campbell (2001:121-122), cf Lessau (1994:263), Heine (1994:109)), it is important to analyse all the attested cross-linguistic examples of SG and LG and examine their typological patterns of morphophonological weakening statistically (cf Tse (2011:conclusion, 2012:conclusion)). As my case studies of SG (Latin *habere* as the Romance future (V > $Mod_{Obligation/Necessity}$ > T(future), see chapter 3, section 1) and LG (Chinese copula *shi* (D > Pred/T), see chapter 3, section 2) constitute cross-linguistically robust trends (Tse (2011:section 3.2, 2013a:104-110, 2013b:102-106)), I propose to present all the attested cross-linguistic parallels and analyse their degrees of morphophonological weakening individually.[93]

Section 1.1: V 'to have' > $Mod_{obligation/necessity}$ > T(future):[94]

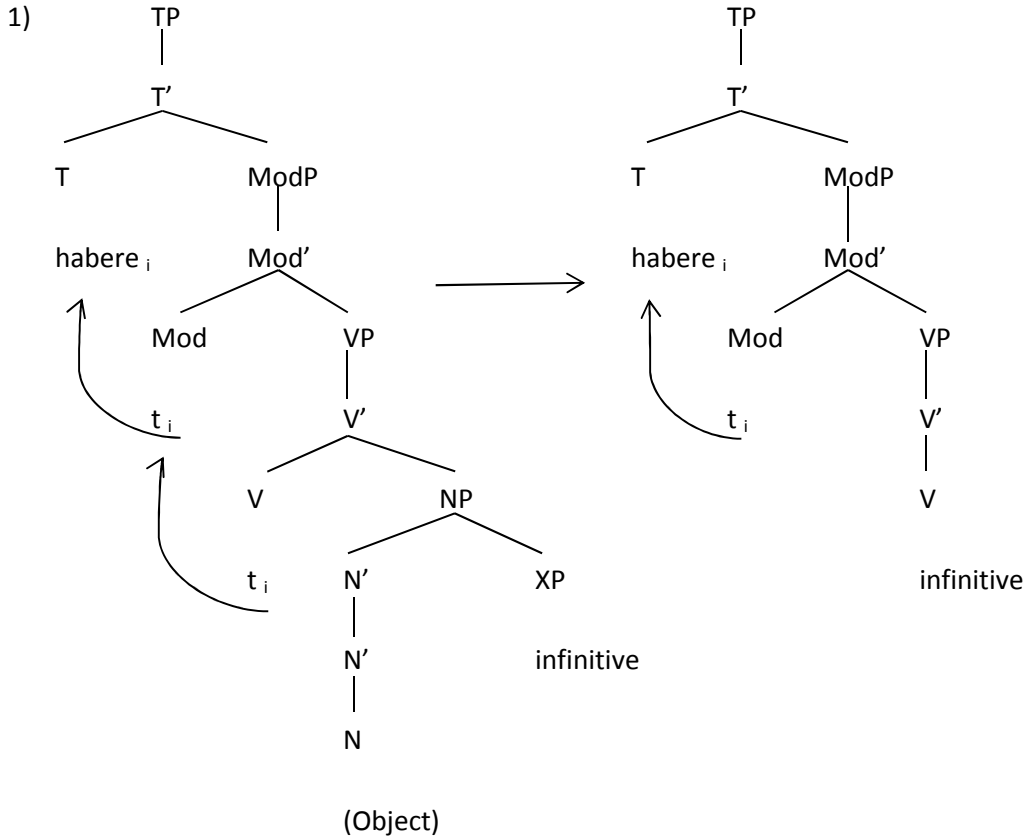
As the grammaticalization of Latin *habere* as the Romance future is analysed in two stages (V 'to have' > $Mod_{Obligation/Necessity}$ > T(future), see chapter 3, section 1), I propose to analyse them separately and present cross-linguistic examples for each stage.

[93] In Tse (2011:section 5.2, 2012:section 2.4, 2013a:113-114, 2014:96-97), I argue that while cross-linguistic examples of grammaticalization undergo 'structural simplification' (cf chapter 1, footnote 5), their discourse and communicative patterns (i.e. 'cues', see chapter 1, footnote 7) are also strikingly similar, which leads to the conclusion that formalism ('structural simplification') and functionalism ('discourse/communicative patterns') are not only not mutually exclusive but also mutually complementary in the cross-linguistic distribution of grammaticalization (Tse (2011:section 5.2, 2013a:113-114, 2014:96-97)). In analyzing cross-linguistic parallels of SG and LG, therefore, I propose to present typological examples that can be shown to have undergone the same mechanisms of re-analysis as my case-studies. This is important, since it has been argued that the same categorial changes in syntactic change need not involve the same mechanisms of re-analysis (van Kemenade and Vincent (1997:20)) e.g. Germanic demonstratives (Dem) > articles (D) (Philippi (1997)), which have been argued to involve different mechanisms of re-analysis from the grammaticalization of Latin demonstratives (Dem) as Romance articles (D) (Vincent (1997)), despite being categorically the same (Dem > D) (cf Tse (2011:section 2.8) where I similarly argue that the grammaticalization of prepositional complementisers can involve different mechanisms of re-analysis). It is hence important to even out the differences between my cross-linguistic parallels by ensuring that they have undergone the same mechanisms of re-analysis and are hence likely to display similar frequency and weakening effects. Furthermore, in my collection of cross-linguistic examples, I have followed Bybee's methodology of using reference grammars and published sources and have communicated with native speakers wherever possible (Bybee et al (1989:54, 1990:4, 1994:27ff)). Moreover, as it has been argued that in order to be typologically significant and representative, cross-linguistic surveys should be typologically and phylogenetically unbiased (cf Perkins (1980), who collects an unbiased cross-linguistic sample of fifty languages (cf Voegelin and Voegelin (1966)), I have endeavoured to present as many cross-linguistic examples as possible, though given the nature of the cross-linguistic trends, it is not always possible to present more than a handful (see sections 2-3 below).

[94] This is by no means the only cross-linguistic pathway which leads to the genesis of future tense markers, as there are other well-attested cross-linguistic pathways as well e.g. verb 'to go' (Bybee et al (1987:110ff, 1991:29ff, 1994:266-268)), verb 'to want' (Bybee et al (1987:110ff, 1994:254-257)), temporal adverbs (Bybee et al (1994:270-271), Heine and Kuteva (2002:299)). In this section, I focus solely on cross-linguistic examples which directly parallel the grammaticalization of Latin *habere* as the Romance future, namely V 'to have' > $Mod_{obligation/necessity}$ > T(future) (see chapter 3, section 1), which is a cross-linguistically robust trend (Bybee et al (1987:110-112, 114-116, 1991:22-29, 1994:181-187, 258-264))

Section 1.2.1: V 'to have' > Mod:[95]

In chapter 3, section 1.2, I argue that the grammaticalization of Latin *habere* 'to have' (V) as a modal verb (Mod) originates from constructions where habere selects an object modified by an infinitive implying modality (see chapter 3, section 1.2, ex. 1a), especially footnote 72), and *habere* is re-analysed as a modal verb when its object relation is omitted/weakened and it comes to select the infinitive as its complement (see chapter 3, section 1.2, ex. 1b), especially footnotes 73-75):



This re-analysis entails 'context expansion' and consequent rise in frequency, since Latin habere comes to select a wider range of infinitives which are previously impossible, namely passive/intransitive infinitives (see chapter 3, section 1.3, ex. 1c)). In this section, I present cross-linguistic examples which have undergone the same re-analysis and analyse their patterns of morphophonological weakening.

[95] Lexical verb 'to have' is not the only lexical source for the grammaticalization of modal verbs, as there are other lexical sources as well (e.g. lexical verb 'to owe' (Bybee et al (1994:181-187)), and modal verbs are not the only outcome of the grammaticalization of lexical verb 'to have' (e.g. $Asp_{Perfect}$ (Heine and Kuteva (2002:245)). In this section, I focus solely on this particular cross-linguistic pathway (V 'to have' > Mod), which directly parallels the first stage in the grammaticalization of Latin *habere* as the Romance future (cf chapter 3, section 1.2).

Section 1.2.2: cross-linguistic examples (V ‘to have’ > Mod):

2) English *have to* + infinitive:

English *have to* + infinitive originates from constructions where *have* selects an object modified by the *to*-infinitive implying modality (Denison (1993:316-317), Fischer (1994:140ff, 1997), in Fischer (1994:142)):

2a)	Þu	hefdest	clað	to	weri-en
	You	had	clothes	to	wear.INF

‘You had clothes to wear.’ (Lamb. Hom. 33)

Re-analysis occurs when the object of the verb ‘to have’ is postposed to after the infinitive, which gives rise to modal interpretations of *have to*, namely obligation/necessity (Fisher (1994:146ff)):

2b)	Þat	he	hefde	to	iwiten;	seouen	hundred	scipen
	So.that	he	had	to	guard-INF	seven	hundred	ships

‘… so that he had to guard seven hundred ships.’ (M1 NN HIST LAYBR I, in Fischer (1994:149))

Re-analysis is confirmed by examples where *have to* selects an intransitive/passive infinitive (Denison (1993:317)), which entails ‘context expansion’:

2c)	Gramaire	ferste	hath	forto	teche	to	speke	upon	congruite
	Grammar	first	has	to	teach	to	speak	about	congruity

‘Grammar has first to teach how to speak about congruity.’

(Gower, CA 7.1530, in Denison (1993:317))

In modern English, *have to* is primarily used forms of *have to* + infinitive are morphophonologically weakened as *hafta, hasda* (Fleischman (1982:58-59), Krug (2000:53ff)).

3) German *haben zu*:

German *haben zu* ‘have to’ + infinitive has been reanalysed as a modal periphrasis expressing obligation and is compatible with all verbs, including intransitive and passive ones (Heine and Kuteva (2002:244), cf Jager (2010)):

3a) er hat ein Auto.

He has one car

'He has a car.'

3b) er hat zu gehorchen

He has to obey

'He has to obey.' (Heine and Kuteva (2002:244))

As far as I can find, there is no morphophonological weakening.[96]

4) Latin *habere*:

Latin *habere* 'to have' + infinitive originates from constructions where *habere* selects an object modified by the infinitive implying modality, and re-analysis occurs when the object relation is either omitted or weakened and habere denotes either possibility or obligation/necessity (see chapter 3, section 1.2, especially footnotes 73-76):

4a) hab-eo etiam dic-ere qu-em... de pont-e in

have-1SG.PRES even tell-INF REL.PRO-ACC.SG from bridge.ABL.SG into

Tiber-im deic-erit.

Tiber-ACC.SG throw.down-3SG.PERF.SUBJ

'I even have an example to say, namely the man whom he threw from the bridge into the Tiber. > 'I even have to say whom he threw from the bridge into the Tiber.' (Cicero Pro S. Roscio Amerino 100, 80 BC)

Re-analysis is confirmed when habere selects intransitive/passive infinitives, which entails 'context expansion' (see chapter 3, section 1.2, ex. 1c)):

4b) toll-i-que vicissim pont-us hab-e-t

lift-INF.PASS-and repeatedly sea-NOM.SG HABERE-PRES-3SG

'… and the sea has to be lifted repeatedly.' (Valerius Flaccus 1.671-2)

[96] I am grateful to one German native speaker for confirming the lack of morphophonological weakening in German *haben zu* + infinitive.

There is morphophonological weakening here, as Latin *habere* is a clitic in post-infinitival contexts (infinitive + *habere*) and continues to be so in Medieval Ibero-Romance and modern European Portuguese (see chapter 3, section 1.4, especially footnotes 78 and 84):

Medieval Spanish:

4c)	dez-ir	vos	he	la	verdad
	tell-INF	you.PL	HABERE.PRES.1SG	the	truth

'I shall tell you the truth.' (El Poema del Mio Cid 947)

Modern European Portuguese:

4d)	dar-me-as	
	give-me-have.PRES.2SG	

'You will give it to me.' (Modern European Portuguese, in Adams (1991:163))

5) Negerhollands CD ha fo:

Negerhollands CD *ha fo* 'have' + infinitive is re-analysed as a modal periphrasis expressing obligation and is compatible with all verbs, including intransitive and passive ones (Stolz (1987:175)):

5a)	Mi	sa	ha	fo	loo
	I	FUT	have	PART	go

'I will have to go.' (Stolz (1987:175))

There is morphophonological weakening here, as in the present tense Negerhollands CD *ha fo* + infinitive can be shortened as *fo* + infinitive (Stolz (1987:175)).

6) Nyabo *ble*:

Nyabo *ble* 'to have' also expresses obligation (Marchese (1986:138-140)):

6a)	ɔ	ble	ye	bo	tɔɔ	ni
	He	have	?	COMP	buy	fish

'He must buy fish.' (Marchese (1986:140))

As far as I can find, no morphophonological weakening is attested.

7) Romance *habere/tenere*:

In Western Romance languages, the lexical verb 'to have' (< Latin *habere* 'to have') is construed with prepositional infinitives to express obligation and is compatible with all lexical verbs, including intransitive and passive ones (Fleischman (1982:73)):

French *avoir a* + infinitive:

7a)	J'ai	a	travaill-er
	I-have.1GS	AD	work-INF
	'I have to work.'		

Italian *avere da* + infinitive:

7b)	H-o	da	cant-are
	have-PRES.1SG	DA	sing-INF
	'I have to sing.'		

Spanish *haber de* + infinitive:

7c)	H-e	de	cant-ar
	Have-PRES.1SG	DE	sing-INF
	'I have to sing.'[97]		

Furthermore, in Ibero-Romance, the two lexical verbs 'to have' (< Latin *tenere* 'to hold', *habere* 'to have') can also be construed with a complementiser + infinitive in denoting obligation:

[97] Such a wide geographical distribution suggests proto-Romance origins, and Tara (2014:345-346)) proposes an example in late Latin of *habere* + *ad* + gerundive:

i)	Pet-ens	ut	sigrecius	quod	
	Beg-PRES.PART	COMP	in.confidence	REL.PRO.N.SG	
	Ad sugger-end-um		habe-ba-t		expon-ere-t
	AD add-GERUNDIVE-N.SG		HABERE-IMPERF-3SG		explain-IMPERF.SUBJ-3SG

'… asking him to explain in confidence what he had to add.' (Fredegar, *Chronicle* 51)

Spanish *tener que* + infinitive:

7d)	Nin	ten-e-mos	pan	que	com-er
	Neither	have-PRES-1PL	bread	COMP	eat-INF
	Njn	otr-a	cosa		njngun-a
	Neither	other-FEM.SG	thing.FEM.SG		none-FEM.SG

'We do not have bread or any other thing to eat.'

(12th century Spanish, in General estoria, Primera Parte)

7e)	Para	descargo	de	su	conciencia
	For	relief	of	POSS.3SG	conscience
	Tien-e	que	haz-er	una	denuncia
	Has-PRES.3SG	COMP	do-INF	a	report

'To relieve his conscience he has to make a report.'

(18th century Spanish, Documentos Linguísticos de la Nueva España, Altiplano central)

Spanish *hay que* + infinitive:

7f)	Hay	que	hac-er-lo	mañana
	HABERE	COMP	do-INF-it	tomorrow

'We have to do it tomorrow.' (Batllori et al (2009:445)).

As far as I can find, there is no morphophonological weakening here.

8) Yoruba *ní*:

In Yoruba, the lexical verb *ní* 'to have' is construed with the infinitive to express obligation andis compatible with all lexical verbs, including intransitive and passive ones (Welmers (1973:341-342)):

8a) Mo ni bata

I have shoes

'I have shoes.'

8b) Mo ni l'ati lo

I have to.go

'I have to go.' (Welmers (1973:341-342))

As far as I can find, there is no morphophonological weakening here.

Such is the grammaticalization of lexical verb 'to have' (V) > obligative modal ($Mod_{obligatioin/necessity}$), which may be summarised thus:

Table 14:

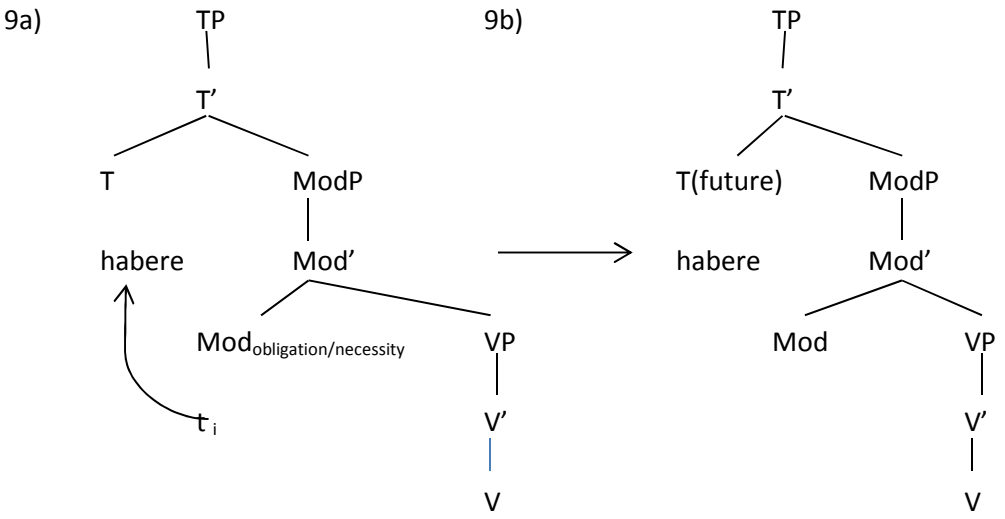
Language	Pre-grammaticalized category	Post-grammaticalized category	Morphophonological weakening
English *have to* + infinitive (ex. 2))	Lexical verb 'to have'	$Mod_{obligation/necessity}$	*Hafta* (< have to) *Hasda* (< has to)
German *haben zu* + infinitive (ex. 3))	Lexical verb 'to have'	$Mod_{obligation/necessity}$	-
Latin *habere* + infinitive/infinitive + *habere* (ex. 4))	Lexical verb 'to have'	$Mod_{Possibility}$/$Mod_{obligation/necessity}$	Infinitive + *habere* (clitic)
Negerholland *ha fo* + infinitive (ex. 5))	Lexical verb 'to have'	$Mod_{obligation/necessity}$	*Fo* + infinitive
Nyabo *ble* + infinitive (ex. 6))	Lexical verb 'to have'	$Mod_{obligation/necessity}$	-
Romance *habere/tenere* + prepositional infinitive (ex. 7))	Lexical verb 'to have'	$Mod_{obligation/necessity}$	-
Yoruba *ni* + infinitive (ex. 8))	Lexical verb 'to have'	$Mod_{obligation/necessity}$	-

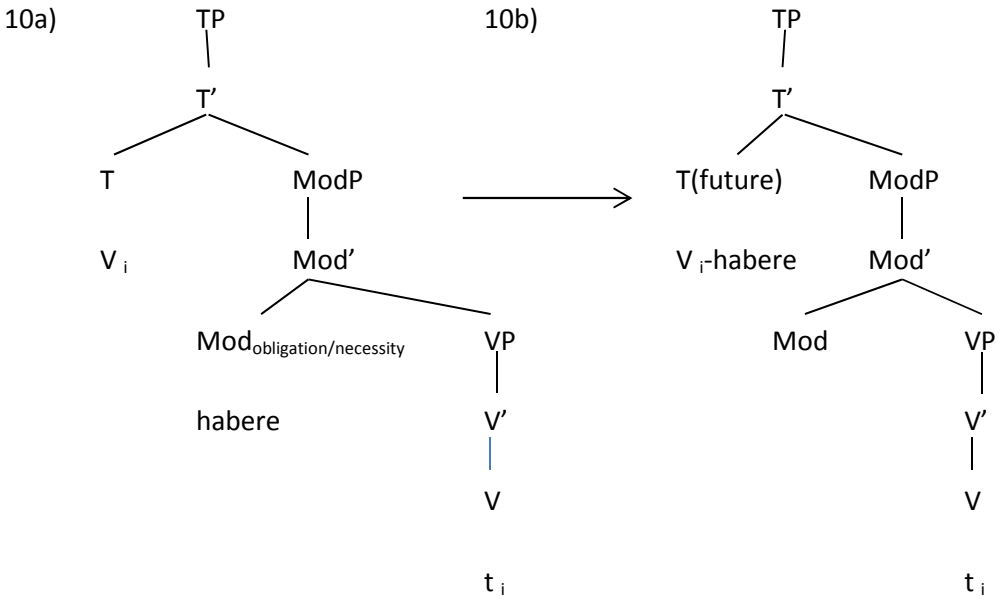
Of all the cross-linguistic examples, the following show morphophonological weakening: English *hafta/hasda* + infinitive (ex. 1)), Latin *habere* (ex. 3)), and Negerholland CD (*ho*) *fa* + infinitive (ex. 4)). Such is the cross-linguistic distribution of verb 'to have' > $Mod_{obligation/necessity}$. In the next section, I analyse the cross-linguistic distribution of $Mod_{obligation/necessity}$ > T(future).

Section 1.3.1: $Mod_{obligationve/necessity}$ > T(future):

In chapter 3, section 1.3, I argue that the grammaticalization of Latin habere as a future tense marker originates from its use as a modal verb denoting a particular type of obligative modality, namely 'predestination'/'prediction', and there are two variants of this construction, namely pre-infinitival habere (*habere* + infinitive, see chapter 3, section 1.3, ex. 2ai)) and post-infinitival habere (infinitive + *habere*, see chapter 3, section 1.3, ex. 2bi)), the former of which

becomes an auxiliary verb (see chapter 3, section 1.3, ex. 2aii)) while the latter becomes a verbal affix (see chapter 3, section 1.3, ex. 2bii)):





This re-analysis entails 'context expansion' and consequent rise in frequency, since Latin *habere* as a future tense marker selects a wider range of subjects, some of which are previously impossible, namely inanimate subjects (chapter 3, section 1.3, ex. 3)).[98] Furthermore, in Romance reflexes of Latin habere become the default future marker of the future tense paradigm (chapter 3, section 1.3, ex. 3c)). In this section, I present cross-linguistic examples which have undergone the same re-analysis and analyse their morphophonological weakening.

[98] This re-analysis and 'context expansion' from an agent-oriented meaning (e.g. $Mod_{Obligation/Necessity}$) to a non-agentive meaning (e.g. T(future)) is indeed a cross-linguistic trend (Bybee et al (1985:66ff, 1987:109ff, 1991:19ff)).

Section 1.3.2: cross-linguistic examples ($Mod_{obligation/necessity}$ > T(future)):

11) Germanic *_skal_*:

In Germanic languages, the proto-Germanic obligative modal *_skal_* has been grammaticalized as future tense markers in modern Scandinavian and Germanic languages via an intermediate stage of 'prediction' (Bybee et al (1987:114-, 1991:26-27, 1994:258-259), Dahl (2000:319-320)):[99]

Danish *_skal_*:

11a) Du skal gå nu

you AUX go now

'You must go now.' (Bybee et al (1994:259))

English *_shall_*:

11b) … and I shall get to London as soon as I can

(Bybee et al (1987:114-1991:26-27), cf Visser (1969:1581-1582, 1601ff))

Swedish *_skall_*:

11c) Vart ska du åka?

whither shal you.SG go.INF

'Where will you go?' (Dahl (2000:313))

Morphophonological weakening is attested, namely in Swedish *_ska_* (*_skall_* > *_ska_*) and English shall, which is often pronounced as [ʃəl] (R&R (2003:226)).

12) Icelandic *_munu_*:

Icelandic future tense marker *_munu_* is derived from an originally obligative modal verb *_mun_* (Thrainsson (2007:15-17)):

[99] In contrast to Latin *_habere,_* Germanic obligative modal *_skal_* is derived from a lexical verb 'to owe', which is another common lexical source for obligative modals (Bybee (1994:182-187)).

12a) María mun koma

Mary FUT come.INF

'Mary will come.' (Thrainsson (2007:15))

As far as I can find, there is no morphophonological weakening here.

13) Italian dialects:

In certain southern Italian dialects and Sardinian, *avere* 'to have' is construed with a prepositional infinitive to express future tense, which can be seen as an extension of the obligative use of this construction (Dahl (2000:325), cf section 2.1, ex. 6)):

13a) av-em a cantà

HABERE-PRES.1PL AD sing

'We shall sing.' (Abruzzesse, in Ledgeway (2012:135))

As far as I can find, there is no morphophonological weakening here.

14) Latin *habere*:

Latin habere expresses futurity in (proto-)Romance and it originates from a modal periphrasis which expresses obligative modality via an intermediary stage of 'prediction' (cf section 2.2.1, ex. 4)):

14a) ad futur-am gloria-m qu-ae in nos

to future-FEM.ACC.SG glory-FEM.ACC.SG REL.PRO-NOM.SG into PRO.1PL

hab-e-t revel-ar-i

have-PRES-3SG reveal-INF-PASS

'to the future glory which will be revealed (habet revelari) to us.'

(Tertullian, de resurrectione carnis 40.86.16) (cf chapter 3, section 1.2, ex. 3a))

14b) in nation-ibus a qui-bus magis

in nation-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 > would be accepted (suscipi-habebat).' (Tertullian Adversus Marcionem 9.9) (cf chapter 3, section 1.2, ex. 3b)):

In all modern Romance languages, post-infinitival habere is morphophonologically weakened as a verbal suffix (see chapter 3, section 1, especially footnotes 72 and 87):[100]

Italian:

14c) cante-r-ò

Sing-FUT-1SG

'I shall sing.'

French:

14d) chante-r-ai

Sing-FUT-1SG

'I shall sing.'

Spanish:

14e) canta-r-é

Sing-FUT-1SG

'I shall sing.'

15) Slave góʔo:

Slave future tense marker *góʔo* is derived from its use as an obligative modal auxiliary (Bybee et al (1994:259)):

[100] In contrast, pre-infinitival *habere* does not show any morphophonological weakening (see chapter 3, section 1.4, footnote 86).

15a) kie ráyehdi go?o

shoes buy must

'I must buy shoes.'

15b) wohje go?o

sing will

'I will sing.'

As far as I can see, there is no morphophonological weakening here.

Such is the cross-linguistic distribution of the grammaticalization of modal auxiliaries as future tense markers, which may be tabulated thus:

Table 15:

Language	Pre-grammaticalized category	Post-grammaticalized category	Morphophonological weakening
Germanic **skal* + infinitive (ex. 11))	$Mod_{obligation/necessity}$	T(future)	English *shall* [ʃəl] Swedish *skall* > *ska*
Icelandic *munu* + infinitive (ex. 12))	$Mod_{obligation/necessity}$	T(future)	-
Italian dialects *avere* + *a* + infinitive (ex. 13))	$Mod_{obligation/necessity}$	T(future)	-
Latin *habere* + infinitive/infinitive + habere (ex. 14))	$Mod_{obligation/necessity}$	T(future)	Infinitive-*habere* (affix)
Slave *go?o* + infinitive	$Mod_{obligation/necessity}$	T(future)	-

Morphophonological weakening is hence attested in the following examples: English *shall*, Swedish *ska* and Latin *habere* (ex. 12)).

Section 1.3.3: cross-linguistic examples (V > (Mod) > T(future)):

In addition to the examples in the previous sections, there are various cross-linguistic examples where the future tense marker is etymologically related to the lexical verb 'to have' and the intermediate stage of modality has been putatively reconstructed:

16) Bulgarian *ima da* + infinitive:

Bulgarian future tense marker *ima da* + infinitive is etymological related to *ima* 'to have' (Heine and Kuteva (2002:243)):

16a) toj ima kniga

He have.PRES.3SG book

'He has a book.'

16b) ima da xodja

Have.PRES/3SG PART go.IMPERF.PRES.1SG

'I will go.' (Heine and Kuteva (2002:243))

There is morphophonological weakening in the negative *njamam* 'have not' + da > *njama da*:

16c) njama da dades

Have.not PART give.PERF.PRES.2SG

'You will not give.' (Heine and Kuteva (2002:243))

17) Kru *ka/kʌ*:

In Eastern Kru languages, the future tense marker is etymologically related to the lexical verb 'to have' (Marchese (1979, 1986:133ff)):[101] [102]

[101] A list of such etymological correspondences is given as such (Marchese (1986:76, 133)):

	Neyo	Godié	Lakota Dida	Vata	Bété	Koyo
Lexical verb 'to have'	Ka	kʌ	Ká	Ká	kʌ	Ka
Future tense marker	Ka	kʌ	Ká	Ka	kʌ	ka

[102] An intermediate obligative stage is reconstructed since in one particular language (Neyo), *ka* can be used to denote obligation, as is the case in numerous other Kru languages (Marchese (1986:76)):

Godié:

17a) ɔ kʌ monfi

He have money

‘He has money.’ (Marchese (1986:76))

17b) ɔ kʌ sʌ pi

He have down lie

‘He will lie down.’ (Marchese (1986:76))

There is morphophonological weakening here, as these future auxiliary forms all undergo tone change (Marchese (1986:141-142)).

18) Ukrainian *–im-*:

The Ukrainian future tense inflection *–im-* is etymologically related to *imati* ‘to have’ (Dahl (2000:319)):

18a) pisatime

write.FUT.3SG

‘He will write.’ (Dahl (2000:319))

There is morphophonological weakening here, as reflexes of imati are suffixed onto the main verbal stem.

Such is the cross-linguistic distribution of lexical verb ‘to have’ > ($Mod_{obligation/necessity}$) > future tense marker:

Table 16:

Language	Pre-grammaticalized category (lexical verb (V) 'to have')	Post-grammaticalized category (future tense marker (T(future))	Morphophonological weakening
Bulgarian *ima da* + infinitive (ex. 16))	*ima da* + infinitive	*ima da* + infinitive	Njama (<*njamam*) *da* + infinitive
Kru **ka* (ex. 17))	Lexical verb 'to have'	Future tense marker	*Ka* (tone change)
Ukrainian *imati* (ex. 18))	Lexical verb 'to have'	Future tense marker	*-im-*

Morphophonological weakening is attested in Bulgarian *njama da* (14)) and Ukranian *–im-* (15)).

Section 1.4: V 'to have' > $Mod_{obligation/necessity}$ > T(future):

In sum, all the cross-linguistic examples of V 'to have' > $Mod_{obligation/necessity}$ > T(future) surveyed in this section can be summarised thus (cf Tables 14, 15, 16):

Table 17:

Language/example	Lexical verb (V) 'to have'	Modal verb (Mod)	Future tense marker (T(future))	Morphophonological weakening
English *have to* + infinitive (ex. 2))	*Have*	*Have to* + infinitive	-	*Hafta/hasda* + infinitive
German *haben zu* + infinitive (ex. 3))	*Haben*	*Haben zu* + infinitive	-	-
Latin *habere* + infinitive/infinitive + *habere* (exs. 4, 14))	*Habere*	*Habere* + infinitive/infinitive + *habere*	*Habere* + infinitive/infinitive + *habere*	Infinitive + *habere* (modal clitic) Infinitive + *habere* (future affix)
Negerholland *ha fo* + infinitive (ex. 5))	*Ha*	*Ha fo* + infinitive	-	*Fo* + infinitive
Nyabo *ble* + infinitive (ex. 6))	*Ble*	*Ble* + infinitive	-	-
Romance *habere/tenere* + prepositional infinitive (ex. 7))	French *avoir* Italian *avere* Spanish *tener, hay* Portuguese *ter*	*Avoir* + *a* + infinitive *Avere* + *da* + infinitive *Tener/hay* + *que* + infinitve	-	-
Yoruba *ni* (ex. 8))	*Ni*	*Ni* + infinitive	-	-
Germanic **skal* (ex. 11))	-	English *shall* + infinitive Danish *skol* + infinitive Swedish *skall* + infinitive	English *shall* + infinitive Danish *skol* + infinitive Swedish *skall* + infinitive	English *shall* [ʃəl] Swedish *ska*
Icelandic *munu* (ex. 12))	-	*Munu* + infinitive	*Munu* + infinitive	-
Italian dialects (ex. 13))	-	*Avere* + *a* + infinitive	*Avere* + *a* + infinitive	-

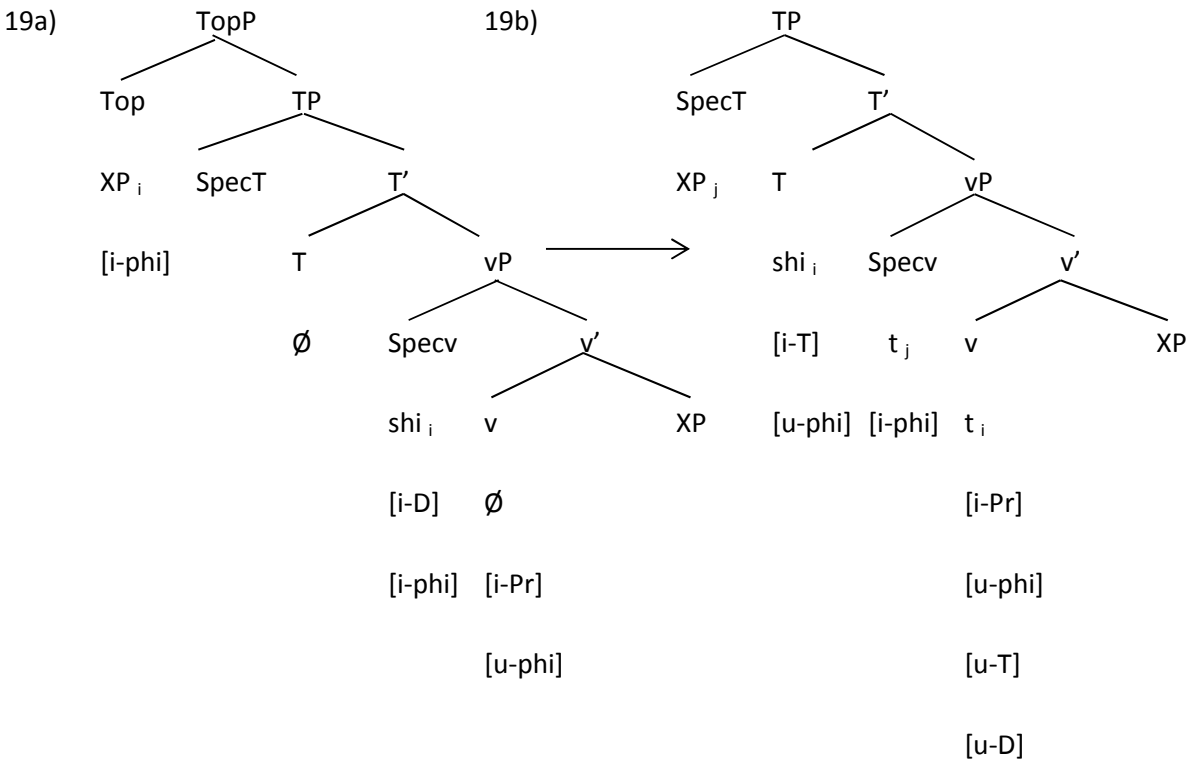
Slave (ex. 15))	-	*Go?o* + infinitive	*Go?o* + infinitive	-
Bulgarian *ima da* + infinitive (ex. 16))	*ima*	-	*Ima da* + infinitive	*Njama* (<*njamam*) *da* + infinitive
Kru **ka* (ex. 17))	*Ka/kʌ*	-	*Ka/kʌ* + infinitive	*Ka/kʌ* (tone change)
Ukrainian –*im*- (ex. 18))	*Imati*	-	infinitive-*im*-	-*im*- (< *imati*)

Of all the examples, morphophonological weakening is attested in English *hafta/hasda* (ex. 2)), Latin *habere* (exs. 4, 14)), Negerholland *fo* (ex. 5)), English *shall*/Swedish *ska* (ex. 11)), Bulgarian *njama da* (ex. 16)), Kru *ka/kʌ* (ex. 17)), Ukrainian –*im*- (ex. 18)). Such is the typological distribution of morphophonological weakening in this cross-linguistic pathway (lexical verb (V) 'to have' > modal verb (Mod) > future tense marker (T(future)). In this next section, I analyse the typological distribution of morphophonological weakening of copula verbs.

Section 2.1: determiner (D) > copula verbs (Pred/T): [103]

In chapter 3, section 2, I argue that the grammaticalization of Chinese *shi* as a copula verb originates from equational constructions in which shi is the subject determiner (SpecPred) and has an anaphoric phi-agreeing relation with the topic (see chapter 3, section 2, ex. 7a)), and when it is re-analysed as a copula verb (Pred), it selects the former topic as its subject and undergoes Pred-to-T Move/Agree (see chapter 3, section 2, ex. 7b)):

[103] Subject determiners are by no means the only lexical source for copula verbs, as stative lexical verbs are also grammaticalized as copula verbs (Devitt (1990, 1994:), Stassen (1997), Pustet (2003:54)). Even among copulas that are derived from subject determiners, there are subject determiners which show cataphoric relation with the predicate rather than anaphoric relation with the topic (e.g. Hebrew *ze, zot* (Diessel (1999:145-147)). Also, there are copulas derived from subject deterimners which select locative complements rather than predicational ones (e.g. Bari *lu* (Devitt (1994:55)). In this section, I focus solely on anaphoric subject determiners which are re-analysed as copula verbs and select predicational complements, which directly parallel Chinese *shi* (cf Li and Thompson (1976), van Gelderen (2011a:chapter 4, 2015)).



There is a typology of such copula verbs, since while some show morphological distinctions of tense/subject-agreement (i.e. T features), others, like Chinese *shi,* do not (see chapter 2, section 2.3, especially footnote 65). There is, therefore, 'context reduction' in the former but 'context expansion' in the latter (see chapter 3, section 2). In this section, I present all such copula verbs and analyse their morphophonological weakening accordingly.

Section 2.2: cross-linguistic examples (SpecPred > Pred/T):

19) Arabic *huwwa/hiyye*:

Arabic copulas *huwwa/hiyye* are derived from personal pronouns *huwwa* 'he' and *hiyye* 'she' respectively and show subject-agreement of gender and number with their respective subjects (Li and Thompson (1976:431-433), Eid (1983), Alsaeedi (2015)):

19a)	Il	rozzal	huwwe	il	usta:z
	DEF.ART	man	MASC.SG.PRO	DEF.ART	teacher.MASC

'The man, he, the teacher.' > 'The man is the teacher.'

(Palestinian Arabic, in Li and Thompson (1976:432))

19b)	il	bint	hiyye	le	mʕalme
	DEF.ART	girl	FEM.SG.PRO	DEF.ART	teacher.FEM

'The girl, she, the teacher.' OR 'The girl is the teacher.'

(Palestinian Arabic, in Li and Thompson (1976:431))

Furthermore, Arabic *huwwe* is also generalised with non-3rd person subjects in certain dialects too (Li and Thompson (1976:432-433)):

19c)	Ana/inta	huwwe	il	usta:z	alli	Far:d	ʕallak	ʕanno
	I/you	COP	DEF.ART	teacher	REL.PRO	Fari:d	talk.PAST	about.him

'I am/you are the teacher that Fareed talked about.'

(Palestinian Arabic, in Li and Thompson (1976:432))

Morphophonological weakening is attested in Hejazi Arabic where *huwa* is often shortened as *hu* and *ma* (negator) + *huwa/hiya* is shortened as *mu/mi* respectively (Alsaeedi (2015)).

20) Chinese *shi*:

Chinese copula *shi* is derived from Ancient Chinese demonstrative pronoun *shi* 'this' (cf chapter 1, section 2.3, chapter 3, section 2)):

20a) qian li er jian wang

thousand mile then see king

shi wo suo yu ye

SHI I NOMINALISER desire DECLARATIVE.PARTICLE

'To see the king after travelling a thousand miles, this (is) what I want.' 22a)) >

To see the king after travelling a thousand miles is what I want.' (22b))

(Mencius, 4th century BC) (=chapter 1, section 2.3, ex.10)

As a copula verb, *shi* is generalised to all subjects in all tenses (cf chapter 3, section 2):

20b) yu shi suo jia fu-ren zhi fu ye

I SHI RELATIVISER marry woman POSSESSIVE.MARKER father PARTICLE

'I am the father of the married woman.' (Li and Thompson (1976:426))

As far as I can find, no morphophonological weakening is attested.

21) Egyptian *pw*:

Old Egyptian copula *pw* is derived from the demonstrative pronoun *pw* 'that' and is used with a wide range of subjects (Stassen (1997:30-35), Heine and Kuteva (2002:46)):

21a) tmjt pw jmnt

City that west

'The West, that, a city' > 'The west is a city.' (Stassen (1997:31)).

As far as I can find, no morphophonological weakening is attested.

22) Finnish *on*:

Finnish copula *on* is derived from the third person pronominal form *on* 'he' and it shows subject-agreement as it is only used with third person singular subjects (Katz (1996:105)):

22a) Ivan on bolen

Ivan he sick

'Ivan, he, sick' > 'Ivan is sick.' (Katz (1996:105))

As far as I can see, no morphophonological weakening is attested.

23) Hausa *ne/ce*:

Hausa copulas *ne* and *ce* are derived from personal pronouns *ne* and *ce* respectively and show subject-agreement of gender and number with their respective subjects (Schuh (1983:312-313)):

23a) Audu manomi ne

Audu.MASC.SG farmer COP.MASC.SG

'Audu is a farmer.'

23b) tunkiya ce

sheep.FEM.SG COP.FEM.SG

'It is a sheep.'

23c) tumaki ne

sheep.PLURAL COP.PLURAL

'They are sheep.'

As far as I can find, no morphophonological weakening is attested.

24) Hebrew *hu/hi/hem/hen*:

Hebrew copulas are derived from personal pronouns (*hu* 'he', *hi* 'she', *hem* 'they (masculine plural), *hen* 'they' (feminine plural)) and show subject-agreement of gender and number with their respective subjects (Li and Thompson (1976:427-431), Berman and Grosu (1976:270-271), Doron (1986), Gilnert (1989:188-189)):

24a) Ha-sha'on hu matana

The-clock.MASC.SG PRO.MASC.SG clock

'The clock, it (MASC.SG), a present.' > 'The clock is a present.'

24b) Hevrat bóing hi taagid anaki

Company.FEM.SG Boeing PRO.FEM.SG corporation giant

'The Boeing company, it (FEM.SG), a giant corporation.' > 'The Boeing company is a giant corporation.'

24c) ma hem nimusim?

What COP.MASC.PL manner.MASC.PL

'What are manners?'

24d) éyfo hen ha-bahurot?

Where COP.FEM.PL girl.FEM.PL

'Where are the girls?'

Hebrew *hu* has also been generalised to other persons (Berman and Grosu (1976:271), Li and Thompson (1976:430)):

24e) Ani/ata/hu hu hasoter

I/you/he COP.MASC.SG the.policeman

'I am/you are/he is the policeman.'

As far as I can find, no morphophonolgical weakening is attested.[104]

25) Kenya Luo *e'n*:

Kenya Luo copula *e'n* is derived from the third person pronoun *e'n* 'she' and shows subject-agreement of gender and number with the subject:

[104] I am grateful to several native Hebrew speakers for confirming this to me.

25a) dhákó en bé^r

Woman COP.3SG.FEM goodness

'Woman, she, goodness' > 'Woman is goodness.'

While Kenyan Luo *e'n* is only used with third person subjects (Tucker (1993:308)), Lango *én*, which is a closely related dialect (Putset (2003:56)), is generalised to all subjects (Noonan (1982:45)):

25b) án én a-dáktal

I.SG COP 1SG-doctor.HAB

'I am the doctor.' (Noonan (1992:146))

As far as I can see, no morphophonological weakening is observed.

26) Kilba *yá/ká/cá/má*

Kilba copulas *yá/ká/cá/má* are derived from personal pronouns *yá/ká/cá/má* respectively and show subject-agreement with their respective subjects (Schuh (1983:314ff)):

26a) həbà yá

Kilba COP.1SG

'I am a Kilba.'

26b) həbà ká

Kilba COP.2SG

'You are a Kilba.'

26c) həbà cá

Kilba COP.3SG

'He is a farmer.'

26d) həbà má

Kilba COP.1PL

'We are Kilbas.'

Furthermore, demonstrative pronouns with different deixes are grammaticalized as copula forms which denote tense (*nà* (proximal > present), *ndà, ngà* (distal > past)) (Schuh (1983:319ff)):

26e) ùsmân həbà ná

Usman Kilba COP.PRES

'Usman is a Kilba.'

26f) ùsmân həbà ndá

Usman Kilba COP.PAST

'Usman was a Kilba.'

26g) ùsmân həbà ngá

Usman Kilba COP.PAST

'Usman was a Kilba.'

As far as I can find, there is no morphophonological weakening here. [105]

27) Nuer *e/ke*:

Nuer copulas *e* and *ke* are derived from personal pronouns *en* 'he' and *ken* 'they' respectively (Crazzolara (1933:89)):

27a) jen e kaal

He COP.3SG farmer

'He is a farmer.' (Crazzolara (1933:89))

27b) ke haki

COP.3PL cups

'They are cups.' (Crazolara (1933:89))

[105] It has been suggested that the demonstrative copular forms may have undergone phonological weakening if they are derived from complex demonstratives (*ná* < *nənənnà* 'this' (proximal), *ndá* < *nàndándà* 'that' (distal), *ŋgá* < *ŋgəŋgəŋgà* 'that' (removed) (Diessel (1999:147)), but this is far from certain, since there exists a set of simple demonstratives which may well be the origins of these copular forms (*nà* 'this' (proximal)*, ndà* 'that' (distal)*, ngà* 'that' (removed) (Schuh (1983:315)).

There is morphophonological weakening here (*en* > *e*, *ken* > *ke*) (Crazzolara (1933:89)).

28) Panare *këj, nëj, mën*:

Panare copulas *këj, nëj* and *mën* are derived from demonstrative pronouns *kën* (animate/proximal), *nëj* (animate/distal) and *mën* (inanimate/distal) respectively (Gildea (1993:54-56)), and they show subject-agreement of deixis and animacy with their respective subjects:

28a)	Maestro	këj	mëj
	Teacher	ANIMATE.PROXIMAL	ANIMATE.VISIBLE
	'This guy here (mëj), he here (këj), a teacher.' > 'This guy here is (këj) a teacher.'		
28b)	Maestro	nëj	kën
	Teacher	ANIMATE.DISTAL	ANIMATE.INVISIBLE
	'That guy there (kën), he there (nëj), a teacher.' > 'That guy there is (nëj) a teacher.'		
28c)	E'chipen	mën	manko
	Fruit	INAN	mango.INANIMATE
	'Mango, this, a fruit.' > 'Mango is a fruit.'[106]		

Furthermore, these copulas denote tense when they do not show subject-agreement (Gildea (1993:59-61)):

28d)	Maestro	nëj	mëj
	Teacher	ANIMATE.DISTAL	ANIMATE.VISIBLE
	'This guy here (mëj) was (nëj) a teacher.'		
28e)	Maestro	këj	kën
	Teacher	ANIMATE.PROXIMAL	ANIMATE.INVISIBLE
	'That guy there (kën) is being (këj) a teacher right now.'		

[106] As Panare is head-final, Gildea (1993:56-60) argues for a right-dislocated Topic (e.g. *mëj* in *kën* in)and subjects (e.g. *këj* in *nëj* in) that occur to the right of the predicate (*maestro*).

28f) Maestro nëj chu

Teacher ANIMATE.DISTAL 1SG

'I (chu) was (nëj) a teacher.'

28g) Maestro nëj amën

Teacher ANIMATE.DISTAL 2SG

'You (amën) were (nëj) a teacher.'

As far as I can find, no morphophonological weakening is attested.[107]

29) Saramaccan *da/de*:

Saramaccan copular forms *da* and *de* are derived from the demonstrative pronouns *da* 'that' and *de* 'there' respectively (McWhorter (1997:93ff)):[108]

29a) Granman da Kofi

Leader COP Kofi

'The leader, that, Kofi' > 'The leader is Kofi.' (McWhorter (1997:97))

29b) a de wan gaán dágu

It COP a big dog

'It, there', a big dog' > 'It is a big dog.' (McWhorter (1997:87))

These copular forms are also generalised to all persons:

29c) mi da i tatá

I COP your father

'I am your father.' (McWhorter (1997:87))

[107] Although the copula form *këj* differs phonologically from its original pronominal form *kën* (Gildea (1993:56)), there is no loss of phoneme and so this cannot be qualified as phonological weakening.

[108] There is a rough division of labor between *da* and *de* in that while the former is used mainly for equative predicates, the latter is used for locative ones (McWhorter (1997:86)), though this is far from clear as *de* is used in equative sentences too (see ex. 26b)).

29d) mi de wan muffin

I COP a wretch

'I am a wretch.' (McWhorter (1997:108))

As far as I can find, no morphophonological weakening is attested.

30) Tigre *hetu*:

Tigre copula forms are derived from personal pronouns, and they show subject agreement with their respective subjects (Devitt (1994:39)):

30a) sab mansaʕ mən badirom kəstan tom

People Mansa from long.ago Christians are

'The people of Mansa are Christians from long ago.' (Devitt (1994:39))

The third person copula forms can be used with non-third persons as well (Devitt (1994:39)). Morphophonological weakening is attested, as the third person copula forms are shorter than their original pronominal forms (*hetu* 3SG.MASC > *tu*) (Devitt (1994:39)).

31) Tok Pisin *em*:

Tok Pisin copula *em* is derived from the personal pronoun *em* 'he' and shows subject-agreement (Verhaar (1995:81-83)):

31a) em Praim Minista

COP Prime Minister

'That is the Prime Minister.' (Verhaar (1995:83))

As far as I can find, there is no morphophonological weakening here.

32) Wappo *ce?*:

Wappo copula *ce?* is derived from the demonstrative pronoun *ce?e?* 'that' (Li and Thompson (1976: 433-434)):

32a) Ce?e? teme? ?eka

This his child

'This, his child' > 'This is (ce?e?) his child.'

Furthermore, the use of copula *ce?e?* is generalised to all persons (Li and Thompson (1976:433-434)):

32b) ?i ce?e? teme? ?eka

I COP his child

'I am his child.'

32c) Te ce?e? kanitucma

He COP chief

'He is the/a chief.'

32d) Mi ce?e? ?i-nokh

You COP my-friend

'You are my friend.'

Morphophonological weakening is attested, since the second syllable of the original copula *ce?e?* is optional (> *ce?*).[109]

33) West Greenlandic Eskimo *tassa*:

The West Greenlandic Eskimo copula *tassa* is derived from the demonstrative pronoun *tassa* 'that' (Devitt (1994:38)):

33a) Hansi tassa pisurtaq

Hansi that the.leader

'Hansi, that, the leader.' > 'Hansi is the leader.'

As far as I can find, no morphophonological weakening is attested.

[109] Although Li and Thompson (1976:434) argue that *ce?e?* is an amalgam of *ce* and an original copula form *e?* and the Wappo demonstrative is actually *ce* ,it remains the case that the original form *ce?e?* is shortened as *ce*.

34) Zoque *–te*:

The Zoque copula *–te* is etymologically related to the demonstrative pronoun *te* (Faarlund (2007)):[110]

34a) te xka;e che'bü te'

The girl small she

'The girl, that, small' > 'The girl is small.' (Faarlund (2007:233))

As a copula, *-te* is also generalised to all persons:

34b) y-'anmayobyabü-te

2SG-teacher-COP

'You are a teacher.' (Faarlund (2007:233))

34c) ø-anmayobyabü-'tsi-te

1SG-teacher-1ABS-COP

'I am a teacher.' (Faarlund (2007:233))

34d) ø-anmayabyabü-te

3SG-teacher-COP

'S/he is a teacher.' (Faarlund (2007:233))

There is morphophonological weakening here, as the original demonstrative pronoun is weakened as a clitic (Faarlund (2012:233-234)).

The grammaticalization of subject determiners (D) as copula verbs (Pred/T), therefore, can be represented thus:

[110] I am grateful to Professor Jan Terje Faarlund for pointing this example out to me.

Table 18:

Language/example	Pre-grammaticalized category	Post-grammaticalized category	Morphophonological weakening
Arabic *huwwa / hiyye* (ex. 19))	Personal pronoun in subject position (SpecPred) with phi-agreeing topics (*huwwa* 'he' (3SG.MASC)/*hiyye* 'she' (3SG.FEM))	Copula with phi-agreeing subjects (*huwwa* (3SG.MASC), *hiyye* (3SG.FEM); *huwwe* with all persons	*Huwwe* > *hu* (Hejazi Arabic)
Chinese *shi* (ex. 20))	Demonstrative pronoun in subject position (SpecPred) with phi-agreeing topics (3SG/3PL)	Copula with all subjects	-
Egyptian *pw* (ex. 21))	Demonstrative pronoun in subject position (SpecPred) with phi-agreeing topics (3SG/3PL)	Copula with all subjects	-
Finnish *on* (ex. 22))	Personal pronoun in subject position (SpecPred) with phi-agreeing topics (on (3SG.MASC)	Copula with phi-agreeing subjects (3SG.MASC)	-
Hausa *ce/ne* (ex. 23))	Personal pronouns in subject position (SpecPred) with phi-agreeing topics (*ne* (3SG.MASC), *ce* (3SG.FEM)	Copula with phi-agreeing subjects (*ne* (3SG.MASC), *ce* (3SG.FEM))	-
Hebrew *hu/hi/hem/hen* (ex.	Personal pronouns in subject position	Copula with phi-agreeing subjects (*hu*	-

24))	(SpecPred) with phi-agreeing topics (*hu* (3SG.MASC), *hi* (3SG.FEM), *hem* (3PL.MASC), *hen* (3PL.FEM))	(3SG.MASC), *hi* (3SG.FEM), *hem* (3PL.MASC), *hen* (3PL.FEM)); *hu* with all persons	
Kenyan *en* (ex. 25))	Personal pronoun in subject position (SpecPred) with phi-agreeing topics (*en* (3SG.FEM))	Copula with phi-agreeing subjects (Kenyan Luo *en* (3SG.FEM)); Lango *en* with all persons	-
Kilba *yá/ká/cá/má, ná/ndá/ngá* (ex. 26))	Personal pronouns in subject position (SpecPred) with phi-agreeing topics (*yá* (1SG), *ká* (2SG), *cá* (3SG), *má* (1PL); demonstrative pronouns with phi-agreeing topics (*ná* (proximal), *ndá* (distal), *ngá* (distal))	Copula with phi-agreeing subjects (*yá* (1SG), *ká* (2SG), *cá* (3SG), *má* (1PL); copula with tense (*ná* (present), *ndá* (past), *ngá* (past))	-
Nuer *e/ke* (ex. 27))	Personal pronouns in subject position (SpecPred) with phi-agreeing topics (*e* (3SG), *ke* (3PL))	Copula with phi-agreeing subjects (*e* (3SG), *ke* (3PL))	*En* > *e, ken* > *ke*
Panare *këj, nëj, mën* (ex. 28))	Demonstrative pronouns in subject position (SpecPred) with phi-agreeing topics (*këj* (animate.proximal), *nëj* (animate.invisible),	Copula with phi-agreeing subjects (*këj* (animate.proximal) , *nëj* (animate.invisible), *mën* (inanimate)); copula with tense (*këj* (present tense), *nëj*	-

	mën (inanimate))	(past))	
Saramaccan *da/de* (ex. 29))	Demonstrative pronouns in subject position (SpecPred) with phi-agreeing topics (*da* (3SG), *de* (3SG))	Copula with all subjects	-
Tigre *hetu* (ex. 30))	Personal pronouns in subject position (SpecPred) with phi-agreeing topics	Copula with phi-agreeing subjects; *hetu* (3SG) with all persons	*Hetu* > *tu*
Tok Pisin *em* (ex. 31))	Personal pronoun in subject position (SpecPred) with phi-agreeing topics	Copula with phi-agreeing subjects	-
Wappo *ce?* (ex. 32))	Demonstrative pronoun in subject position (SpecPred) with phi-agreeing topics	Copula with all subjects	*Ce?e?* > *ce?*
West Greelandic Eskimo *tassa* (ex. 33))	Demonstrative pronoun in subject position (SpecPred) with phi-agreeing topics	Copula with phi-agreeing topics (3SG/3PL)	-
Zoque *–te* (ex. 34))	Demonstrative pronoun in subject position (SpecPred) with phi-agreeing topics	Copula with all subjects	*Te* > *-te*

Of these examples, morphophonological weakening is only attested in Arabic (*huwwe* > *hu* (ex. 19)), Nuer (*en* > *e, ken* > *ke* (ex. 27)), Tigre (*hetu* > *tu* (ex. 30)), Wappo (*ce?e?* > *ce?* (ex. 32)), Zoque (*te* > *-te* (ex. 34)), of which all apart from Nuer *e/ke* (ex. 27)), undergo 'context expansion' as these originally 3rd person pronouns are generalised to all persons (exs. 19c), 30), 32b-d), 34b-d)). The only exception is Nuer copulas *e/ke* which are only used with phi-agreeing subjects (i.e. 'context reduction') but show morphophonological weakening nonetheless (*en* > *e, ken* > *ke*), but the fact that this is the only exception shows that there is very weak evidence for morphophonological weakening in 'L-shift'. It seems to be the case that 'L-shift', which entails 'context reduction' (in this case, tense and/or subject-agreement features (T)) severely restricts the frequency of the grammaticalizing element and hence prevents morphophonological weakening. The frequency effects will be explored in the next chapter.

Conclusion:

A comparison between the grammaticalizing elements in SG (V > $Mod_{Obligation/Necessity}$ > T(future)) and LG (D > Pred/T) does indeed show that since while morphophonological weakening is common in the former (see section 2), it is much less so in the latter (see section 3), which speaks for a real empirical difference between SG and LG (see chapter 1, section 3, chapter 2, section 2). It now remains to analyse the diachronic frequencies of the grammaticalizing elements in my case studies of SG (e.g. Latin *habere* in the grammaticalization of the Romance future, see chapter 3, section 1) and LG (e.g. Chinese copula *shi*, see chapter 3, section 2) and correlate them with the degrees of morphophonological weakening in their cross-linguistic counterparts (see tables 17 and 18).

Chapter 5: diachronic frequencies of SG and LG:

As SG and LG display 'context expansion' and 'context reduction' respectively (see chapters 2 and 3), they entail different frequency effects which seem to produce different degrees of morphophonological weakening in the grammaticalizing elements (see chapter 4). In this chapter, I propose to compare the diachronic frequencies of Latin *habere* in its grammaticalization as the Romance future (V > $Mod_{Obligation/Necessity}$ > T(future)) (SG) (see chapter 3, section 1) and those of Chinese copula *shi* (D > Pred/T) (LG) (see chapter 3, section 2) and correlate them with the degrees of morphophonological weakening in my cross-examples of SG (V 'to have' > $Mod_{Obligation/Necessity}$ > T(future)) and LG (D > Pred/T) (see chapter 4). In my analysis of the diachronic frequencies of the grammaticalizing elements, I propose to employ 'Collostructional Analysis' (CA) as proposed by Stefanowitsch and Gries (2003, 2004) and Hilpert (2008).

Section 1: 'Collostructional Analysis':

Stefanowitsch and Gries (2003) introduce a new method of counting the frequencies of linguistic elements by analysing their statistical affinities within a particular construction. Within a construction, therefore, there are 'collexemes', namely the lexical items which occupy the various slots of the construction in question. This analysis has been applied to the grammaticalization of Germanic future tense markers by Hilpert (2008), who examines the diachrony frequencies of the grammaticalizing elements (English *shall*, Swedish *ska*(*ll*), Danish *skol*, cf chapter 4, section 1.3.2, ex. 11)) in relation to the number of 'collexemes' they are attested with. With these assumptions, I propose to analyse the frequencies of Latin *habere* + infinitive in the grammaticalization of the Romance future and Chinese *shi* in the grammaticalization of the Chinese copula. As grammaticalization often retains the original category of the grammaticalizing element, it creates a synchronic 'layering' between the original pre-grammaticalized category of the grammaticalizing element and its new grammaticalized category (Hopper (1991:22-31), Bybee et al (1994:19-22)), which makes it possible to compare directly the relative frequencies of the original pre-grammaticalized category and the new grammaticalized category of the grammaticalizing element.[111] In this chapter, I apply CA to Latin habere in its grammaticalization as the Romance

[111] This 'layering' is widely known as a diagnostic trait of grammaticalization (Hopper (1991:22-31), Bybee et al (1994:19-22)). Roberts (2010, 2012) accounts for 'layering' in grammaticalization by postulating 'lexical splits', namely the synchronic co-existence of multiple syntactic categories for the grammaticalizing element e.g. English modals, some of which retain their original lexical verbal properties in certain dialects and are hence classified as V and T elements synchronically (cf chapter 2, sections 1.4, 2.2, especially footnote 55). This synchronic distribution of old and new forms in grammaticalization sets it apart from other types of syntactic change where the new forms are shown to displace the old form gradually (cf Kroch's (1989) S-curve)).

future and Chinese shi in its grammaticalization as a copula verb and calculate their increase/decrease in frequency during their respective grammaticalization.

Section 2.1: Romance future (Latin *habere*) (V > $Mod_{Obligation/necessity}$ > T(future)) (SG):

It has been pointed out that Latin *habere* + infinitive is only attested in significant quantities in Tertullian (140-220 AD) and Augustine (354-430 AD) (Tara (2014:268), cf Coleman (1971:226)). I have, therefore, collected examples of habere + infinitive in all the extant texts of Tertullian and Augustine.[112] [113] Furthermore, as reflexes of Latin *habere* do not become fully generalised as the default future tense paradigm until Medieval Romance (see chapter 3, section 1.2), I have also collected examples of *habere* + infinitive in Medieval Spanish where modal uses of Latin *habere* are retained (see chapter 3, sections 1.2-1.3).[114] In this section, I compare the type and token frequencies of Latin *habere* + infinitive in my Latin and Romance corpora and trace the diachronic frequencies of Latin *habere* in its grammaticalization as the Romance future, which consist of the following stages: lexical verb 'to have' (V), modal verb denoting possibility and obligation/necessity ($Mod_{Possibility}$/$Mod_{Obligation/necessity}$), and future tense (T(future)) (see chapter 3, section 1):

[112] All my Latin texts are extracted from online sources (http://www.tertullian.org/latin/latin.htm for Tertullian and http://www.augustinus.it/latino/ for Augustine). In discovering all the attested examples of Latin *habere* + infinitive in my Latin texts, I have processed all my texts in the concordance program using Antconc with the search term *hab-,* which is an invariant morpheme in the verbal paradigm of Latin *habere*. I thank Dr Ann Taylor for her advice on this.

[113] It is conjectured that as Christian fathers had a propensity to use spoken forms in their writings/speeches in order to be as comprehensible and accessible as possible to their vulgar audience, proto-Romance forms which have evolved from Latin speech are more richly attested in certain registers like Christian writings. In the case of the grammaticalization of Latin *habere* as the Romance future, it has been argued that its use as a future tense marker is particularly obvious in certain Christian authors like Tertullian and Augustine (Tara (2014)).

[114] For Medieval Spanish, I have utilised Beardsley's (1921) classic corpus of Medieval Spanish texts, a full list of which consists of the following: *el Poema del Mio Cid, el Libro de Alexandre,* the complete works of Gonzalo de Berceo (*Vida de Santo Domingo de Silos, El sacrificio de la Misa, La Vida del Sancto Domingo de Silos, Del Sacrificio de la Missa, La Estoria de Sennor Santo Millan, El Martyrio de Sant Laurencio, Loores de Nuestra Sennora, De los Signos que apresceran ante del Juicio, Milagros de Nuestra Senora, El Duelo que fizo la Virgen Maria el Dia de la Pasión de su Fijo Jesu Christo, Vida de Sancta Oria, Virgen*), and *La Primera Crónica General.*

Table 19 (cf chapter 3, tables 8-10):

Stage (type frequency)	Meaning	Subject	Infinitival complement
Latin *habere* (V)	To have	Animate	Two place predicates
Latin *habere* ($Mod_{Possiblity}$/$Mod_{obligation/necessity}$)	Modal verb denoting possibility and obligation/necessity	Animate/human agents	All lexical verbs, including one place predicates like passive and intransitive verbs
Late Latin *habere* (T(future))	Future tense	All subjects, including inanimate subjects	All lexical verbs, mainly in certain morphosyntactic slots, namely passive infinitive and future-in-the-past
Medieval Romance (T(future))	Future tense	All subjects	All verbs

Throughout the grammaticalization process, therefore, there is a gradual 'context expansion' of Latin habere in its infinitival complements and subjects. The number of attestations for each stage of grammaticalization is given in the following sub-sections.

Section 2.2: Tertullian (160-220 AD):

In Tertullian, the first three stages in the grammaticalization of Latin *habere* as the Romance future are attested, namely lexical verb 'to have' (V), modal verb denoting possibility and obligation/necessity ($Mod_{Possibility}$/$Mod_{obligation/necessity}$), and future tense maker (T(future)) (cf Raiskila (1990)):[115]

[115] The classification of Latin *habere*, especially of its modal nuances, is not always easy and clear-cut and may be subject to personal opinion (cf Raiskila (1990)).

habere (V) ‘to have’:

1a)	adhuc	mult-a	hab-e-o	loqu-i	ad	vos
	still	many-N.PL	have-PRES-1SG	say-INF	to	you

‘I still have (habeo) many things to say to you…’ (De virginibus velandis 1.5)

habere ($Mod_{Possibility}$):

1b)	corpus,	quod	solum	ab	homin-ibus
	body.N.SG	REL.PRO.N.SG	only	by	men-ABL.PL
	habet	occid-i			
	HABERE-PRES.3SG	kill-PASS.INF			

‘his body, which can only be killed by men.’ (de pudicitia 9.10)

habere ($Mod_{Obligation/Necessity}$):

1c)	etiam	fili-us	dei	mor-I	hab-ui-t
	Even	son-NOM.SG	God-GEN.SG	die-INF	HABERE-PERF-3SG

‘Even the son of God had to die.’ (de feminarum cultu 1.1.2)

habere (T(future)):

1di)	ad	futur-am	gloria-m	qu-ae	in	nos
	to	future-FEM.ACC.SG	glory-FEM.ACC.SG	REL.PRO-NOM.SG	into	us
	hab-e-t	revel-ar-i				
	have-PRES-3SG	reveal-INF-PASS				

‘to the future glory which will be revealed (habet revelari) to us.’

(De resurrectione carnis 40.86.16)

1dii) in nation-ibus a qui-bus magis

in nation-ABL.PL by REL.PRO-ABL.PL most

suscip-i habe-bat

accept-INF.PASS HABERE-IMPF.3SG

'Among the nations by which most would be accepted (suscipi-habebat).'

(Adversus Marcionem 9.9)

The following collocations, therefore, have been collected:

Table 20 (Latin *habere* + infinitive in Tertullian):

	Meaning	Token frequency
habere (V)	To have	4
habere ($Mod_{Possibility}$)	Possibility	28
habere ($Mod_{Obligation/necessity)}$	Obligation/necessity	39
habere (T(future))	Future tense	78

'Context expansion' has given rise to an increase in the number of Latin *habere* + infinitive, since while *habere* as a lexical verb (V) is only used with two place predicates and is only attested four times, as a modal verb ($Mod_{Possibility}$/$Mod_{Obligation/necessity}$), *habere* is attested 67 (28 + 39) times and as a future tense marker *habere* is attested 78 times. In Tertullian, therefore, there is a clear rise in frequency in the use of *habere* + infinitive which correlates the stages of its grammaticalization (V > $Mod_{Obligation/necessity}$ > T(future)). More will be said about this below.

Section 2.3: Augustine (354-430 AD):

In Augustine, the same three stages of *habere* + infinitive are likewise attested, namely lexical verb 'to have' (V), modal verb denoting possibility and obligation/necessity ($Mod_{Possibility}$/$Mod_{obligation/necessity}$), and future tense marker (T(future))):

habere ‘to have’ (V):

2a) Adhuc mult-a hab-e-o vobis dic-ere

Still many-N.PL have-PRES-1SG PRO.2PL.DAT say-INF

‘I still have many things to say to you.’ (Sermon 362)

habere ($Mod_{Possibility}$):

2b) quid enim voluptat-is habet vid-ere

INTERROGATIVE.PRONOUN for pleasure-GEN.SG HABERE-PRES.SG see-INF

in lani-at-o cadaver-e quod exhorreas?

In slaughter-PERF.PART-ABL.SG corpse-ABL.SG REL.PRO fear-PRES.SUBJ-2SG

‘For what pleasure can he see in a slaughtered corpse which you abhor?’

(Confessiones 10.35.55)

habere ($Mod_{Obligation/necessity}$):

2c) qui-d hab-e-mus ador-are?

INTERROGATIVE.PRO-N.SG HABERE-PRES-1PL adore-INF

‘What must we adore?’ (Psalm 98.9.2)

habere (T(future)):

2di) Hab-e-s erubesc-ere,

Have-PRES-2SG blush-INF

cum ven-eri-t in glory-a su-a

when come-FUT.PERF-3SG in glory-FEM.SG.ABL POSS.ADJ-FEM.SG.ABL

‘You will blush when he comes in his glory’ (Sermon 279)

2dii) et post haec omni-a

and after this.N.PL all-N.PL

fin-ire hab-e-s vitam

end-INF have-PRES.2SG life-ACC.SG

'and after all these things you will end your life.' (Sermon 84)

The following collocations have been collected:

Table 21 (Latin *habere* + infinitive in Augustine):

	Meaning	Token frequency
habere (V)	To have	8
habere ($Mod_{Possibility}$)	Possibility	45
habere ($Mod_{obligation/necessity}$)	Obligation/necessity	58
habere (T(future))	Future tense	105

'Context expansion' has given rise to a rise in frequency to *habere* + infinitive, since while *habere* as a lexical verb (V) is only attested with two place predicates In Augustine, the number of future tense markers (105) also outnumbers the number of modal uses (58), which in turn outnumbers the number of lexical uses (8). 'Context expansion', therefore, has given rise to rise in frequency.

Section 2.4: Medieval Ibero-Romance:

In Medieval Ibero-Romance, only the final two stages are attested, namely modal verb denoting obligation/necessity ($Mod_{Obligation/Necessity}$) and future tense marker (T(future)):

3a) oyr-lo-an los muertos

Hear-PRO-HABERE.3PL the dead

'The dead must hear it.' (De Los signos que aparesceran ante del Juicio 22)

3b) dexa-r-emos Burgos, i-r-lo-hemos busca-r

Leave-INF-HABERE.1PL Burgos go-INF-it-HABERE.1PL search-INF

'We shall leave Burgos, we shall look for him.' (El Poema del Mio Cid 1438)

The following collocations have been collected:

Table 22 (Medieval Spanish *habere* + infinitive):

	Meaning	Token frequency
$Mod_{Obligation/Necessity}$	Obligation/necessity	24
T(future)	Future	198

In Medieval Ibero-Romance, the number of T(future) (198) far outnumbers the number of modal uses ($Mod_{Obligation/Necessity}$) (24), which attests to the 'context expansion' in the final stage of the grammaticalization of Latin habere as a future tense marker ($Mod_{Obliation/necessity}$ > T(future)).

It is hence possible to trace the diachronic frequencies of Latin habere in the grammaticalization of the Romance future, which will be outlined in the next section.

Section 2.5: diachronic frequencies of Latin *habere* as the Romance future (V > $Mod_{obligation/necessity.}$ > T(future)):

In Tertullian and Augustine, the number of modal habere (Mod) outnumbers lexical habere (V), while the number of future habere (T(future)) outnumbers the former even more (see sections 1.2-1.3). Furthermore, in Romance the number of future tense markers outnumbers that of modal uses of Latin habere even more, which accounts for the 'context expansion' of habere in its grammaticalization as the Romance future tense marker. Such rise in frequency correlates with the morphophonological weakening of V 'to have' > Mod > T(future) (see chapter 4, section 1).

Section 3.1: Chinese copula *shi*:

In chapter 3, section 2, I argued that Chinese copula *shi* undergo 'context expansion' and 'context reduction' simultaneously, since while its grammaticalization as a copular verb entails a wider range of subjects (see chapter 3, section 2.1), its subsequent tense/subject-agreement features (i.e. T features) creates subsets of copular constructions (see chapter 3, section 2.2), which are morphologically distinct in numerous cross-linguistic examples (see chapter 4, section 3). The diachronic frequencies of Chinese *shi*, therefore, may be represented thus:

Table 23 (cf chapter 3, section 2, tables 11-13):

Stage (type frequency)	Meaning	Complement
Subject determiner (D in SpecPred)	Demonstrative pronoun 'this' in subject position	Topics which show phi-agreement (3rd-person) with shi 'this'
Copula verb (Pred)	Copula verb	All subjects
Subject agreement (AgrS)	Copula verb	Subjects of different persons and numbers
Tense (T)	Copula verb	Tenses of copula verb

There are, therefore, four stages in the grammaticalization of Chinese copula *shi*, namely subject determiner (D in SpecPred), copula verb (Pred), copula verb with subject agreement (AgrS) and copula verb with tense distinctions (T).[116] The frequency of the various constructions will be given in the next section.

Section 2.2: diachronic frequencies of Chinese copula *shi*:

As copular uses of Chinese *shi* become generalised and are hence statistically significant from Medieval Chinese onwards, I have collected examples of Chinese *shi* from the Tang Dynasty (7th-10th century AD) onwards (cf Wang (1958:35, 347ff)),[117] which display all four stages:

4a) feng shi suo gui, shi

Historical age RELATIVISER expensive SHI

sai lu meng long jun zhi jia

carriage camel name dragon horse POSSESSIVE.MARKER price

'Historically expensive, this (is) the price for the dragon carriage horses.'

(Babuzi sishi juan)[118]

[116] Technically, subject-agreement (AgrS) and tense (T) are sub-types of the copular functions of *shi* (Pred), as they are part of the Pred-to-T *Move/Agree* relation (cf chapter 2, section 2.3).

[117] I have utilized the online corpus of Chinese literary (mainly philosophical) texts (ctext.org), which consists of major authors in each dynasty. Furthermore, I have supplemented my historical corpus with the corpus of modern Chinese corpus compiled by the Peking University (CCL 2009). As these corpora are equipped with their own online search engines, I have entered the Chinese morpheme *shi* on them, which have automatically generated all the occurrences of *shi* in the online corpus.

4b) dedao sheng ren shi huanglao

Enlightened holy person SHI old.huang

zhi shi sheng ren Shi zhou kong er ren

heal world world person SHI Zhou Kong two people

'The enlightened saint is Old Huang, while the healing saint is Zhou and Kong.'

(Babuzi sishi juan)[119]

4c) wo shi ni de fang zhuren

I SHI you POSSESSIVE.MARKER room master

'I am your housemaster.'

(Yulin waishi, Bing jiaren qinglou suanming dai mingshi jiguan xianshi)[120]

[118] Topicalisation is clearly seen in Chinese where punctuation is used to separate the fronted topic (e.g. *feng shi suo gui* in ex. 4a)) and the main clause (e.g. *shi sail u meng long jun zhi jia* in ex. 4a)) (cf chapter 3, section 2.1). In these examples, *shi* has to be analysed as the subject of the main clause with an anaphoric binding relation with the topic. There are also examples where *shi* is used with a copular linking element (e.g. *wei*) which also forces *shi* to be analysed as a subject rather than copula (cf Peyraube and Wiebusch (1996)).

[119] Copula uses of *shi* are seen most clearly in examples where *shi* is not used with a topic and is hence not clause-initial (cf previous footnote). In such circumstances, *shi* is either preceded by a subject (e.g. *dedao shengren, zhishi shengren* in ex. 4a)) or an adverb (cf chapter 3, section 2.1). There are also examples where the copula *shi* and the predicate is inverted and *shi* must hence be analysed as a copula verb (cf chapter 3, section 2.1, footnote 91).

[120] As *shi* is used with non-3rd person subjects, there is no longer an anaphoric binding relation between them and *shi* must be analysed as a copular verb (cf chapter 3, section 2.1)). *Shi* is hence used with subjects of different persons here, which will be subdivided in my numerical analysis.

4d) ci yu shi xiri xia he

this jade SHI formerly name CONJ

yu jingshang zhi xia

at mountain.jing POSSESSIVE.MARKER below

Jian fenghuang qi yu shi shang,

See phoenix rest at rock above

Dai er jin zhi zhuwenwang

Bring CONJ bestow PRO name

'This jade is the thing which formerly Xia, when he, below the Mountain Jing, saw a phoenix on a rock, and brought it as a gift for Zhuwenwang.' (Sanguo yanyi)[121]

The following figures have been collected:

Table 24: Sui/Tang dynasties (6th-10th century AD)

	Token frequency
Shi (D in SpecPred)	101
Shi (Pred)	55
Shi (T:1st singular)	8
Shi (T:1st plural)	0
Shi (T:2nd singular)	5
Shi (T:2nd plural)	0
Shi (T:3rd singular)	29
Shi (T:3rd plural)	13
Shi (T:present tense)	48
Shi (T:past tense)	7
Shi (T:future tense)	0

[121] As Chinese has very few tense markers, tense is pragmatically inferred from context, which, in the case of ex. 4d), is indicated by the adverb *xiri* 'formerly' (T(past)) (see chapter 3, footnote 93).

Table 25: Song/Yuan/Ming dynasties (10th-17th century AD)

	Token frequency
Shi (D in SpecPred)	89
Shi (Pred)	112
Shi (T:1st singular)	22
Shi (T:1st plural)	19
Shi (T:2nd singular)	18
Shi (T:2nd plural)	3
Shi (T:3rd singular)	30
Shi (T:3rd plural)	20
Shi (T:present tense)	80
Shi (T:past tense)	27
Shi (T:future tense)	5

Table 26: Qing dynasty (17th-20th century AD)

	Token frequency
Shi (D in SpecPred)	76
Shi (Pred)	235
Shi (T:1st singular)	86
Shi (T:1st plural)	26
Shi (T:2nd singular)	46
Shi (T:2nd plural)	20
Shi (T:3rd singular)	41
Shi (T:3rd plural)	16
Shi (T:present tense)	162
Shi (T:past tense)	53
Shi (T:future tense)	20

Table 27: Modern period

	Token frequency
Shi (D in SpecPred)	72
Shi (Pred)	367
Shi (T:1st singular)	92
Shi (T:1st plural)	46
Shi (T:2nd singular)	62
Shi (T:2nd plural)	34
Shi (T:3rd singular)	73
Shi (T:3rd plural)	60
Shi (T:present tense)	162
Shi (T:past tense)	107
Shi (T:future tense)	98

In the grammaticalization of Chinese copula *shi*, therefore, there is 'context expansion' in its use as a copula verb in that as it is generalised to all subjects, its frequency rises. However, the individual T features which represent tense and/or subject-agreement form subsets of copula constructions which lower the frequencies of copula verbs, the result of which is 'context reduction' in that the individual subject types and tenses do not outnumber the original use of shi as a subject determiner significantly. The lack of morphophonological weakening in cross-linguistic examples which show morphological distinction of tense/subject-agreement is hence explained (see chapter 4, section 2).

Conclusion:

The diachronic frequencies between Latin *habere* (SG) and Chinese *shi* (LG) are, therefore, clear: while the former undergoes 'context expansion' and rises in frequency (see section 2), the latter does not (see section 3), which hence explains morphophonological weakening in the former (see chapter 4, section 1) and the lack of it in the latter (see chapter 4, section 2).

Chapter 6: concluding remarks:

In this dissertation, it is proposed that formal analyses of grammaticalization distinguish between two types of grammaticalization, SG and LG, the former of which gives rise to a diachronic shift of grammaticalizing elements to their respective functional heads ('F-attraction') (see chapter 1, section 1) while the latter gives rise to a 'lateral' shift from one functional head to another ('L-shift') (see chapter 1, section 2). These formal differences seem to entail and correlate with their empirical differences, since while morphophonological and semantic weakening is common in SG, they are conspicuously absent in LG (see chapter 1, section 3), which receives a natural explanation under Bybee's model of weakening in grammaticalization (see chapter 2), which assumes an inverse proportion between frequency and morphophonological substance in grammaticalization (see chapter 2, section 1), since while 'F-attraction' (SG) gives rise to 'context expansion' and hence a rise in frequency to the grammaticalizing element (see chapter 2, section 2.2), 'L-shift' (LG) gives rise to 'context reduction' and hence a lowering of frequency to the grammaticalizing element (see chapter 2, section 2.3). I have, therefore, compared two famous case studies of SG and LG (see chapter 3), namely the grammaticalization of Latin *habere* as the Romance future tense marker (see chapter 3, section 1) and the grammaticalization of Chinese *shi* as a copula verb (see chapter 3, section 2), which displays 'context expansion' and 'context reduction' respectively (see chapter 3) and corresponding morphophonological weakening cross-linguistically (see chapter 4). The numerical analysis of the diachronic frequencies of the grammaticalizing element (Latin *habere* + infinitive, see chapter 5, section 1, and Chinese *shi,* see chapter 5, section 2) indeed shows a rise in frequency of the grammaticalizing element in SG, which corresponds to 'context expansion' (see chapter 5, section 1), and a drop in frequency of the grammaticalizing element in LG, which corresponds to 'context reduction' (see chapter 5, section 2), all of which corresponds to morphophonological weakening in SG (see chapter 4, section 1) and the lack of it in LG (see chapter 4, section 2). There is, therefore, a correlation between the frequency of the grammaticalizing element in SG and LG and their morphophonological weakening, which supports a new mechanism of syntax-phonology interface known as 'Functional Spell-Out' (see chapter 2, section 2.4). Minimalism is hence an elegant model for analysing historical syntax, since not only does it distinguish between two types of grammaticalization, it also makes seemingly correct predictions regarding their interface and empirical effects (see introduction). Much more evidence is needed to support 'Functional Spell-Out', which will be left for future research.

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