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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‘Íπποι δ’ Αιακίδαο μάχης απάνευθεν εοντες
κλαιον, επεί δὴ πρώτα πυθέσθην ηνιόχοιο
εν κονίηισι πεσόντος υφ’ Έκτορος ανδροφόνοιο...δάκρυα δὲ σφι
θερμα κατα βλεφάρων χαμάδις ρέε μυρομενοιν
ηνιοχοιο πόθωι, θαλερη δ’ εμιαίνετο χαίτη
ζεύγης εξερηπουσα παρα ζυγον αμφοτέρωθε.’

fortunati ambo! si quid mea carmina possunt,
nulla dies umquam memori vos eximet aevō,
dum domus Aeneae Capitol immobile saxum
accolet imperiumque pater Romanus habebit.’

(Homer’s Iliad 17:426-440)

(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 acknowledged 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 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)). 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; 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. In order to achieve these aims, this dissertation will consist of six chapters:


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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) \( (V \rightarrow \text{Mod}_{\text{obligation/necessity}} \rightarrow T(\text{future})) \) (SG) and the grammaticalization of Chinese copula shi \( (D \rightarrow T) \) (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’ \( \rightarrow \text{Mod}, \text{Mod}_{\text{obligation/necessity}} \rightarrow T(\text{future}) \) and D \( \rightarrow T \) (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)). 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)).

1) \[ [XP \: Y+X \: [YP \: \ldots \: t \: Y \: \ldots ]] \: > \: [XP \: Y=X \: [YP \: \ldots \: Y \: \ldots ] ] \]
2) \[ [XP \: X \: [YP \: \ldots \: Y \: \ldots ]] \: > \: [XP \: X \: [YP \: \ldots \: Y \: \ldots ]] \]
3) \[ [XP \: YP \: X \: [ \ldots \: t \: Y \: \ldots ]] \: > \: [XP \: Y=X \: [ \ldots ]] \]


1) Trigger + genotype + extra-linguistic factors \[\rightarrow\] phenotype
2) PLD + UG + III \[\rightarrow\] Grammar


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)).

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)).

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...
Interestingly, 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)):

\[
4) \quad F^*_\text{Move/Move} > F^*_\text{MoveXP/Merge} > F^*_\text{MoveXP/Merge} > F^*_\text{MoveXP} > F^*_\text{MoveXP} > F^*_\text{Agree} > F^*_\text{Merge} > F^{11, 12}
\]

In 1) and 3), Move (Y+X… ty, YP X…ty) is lost and the grammaticalizing element (Y) is shifted upwards from its original base position (ty, ty) to a higher functional head via Merge (Y=X), while in 2), Agree (X…Yt) is lost and the grammaticalized element is shifted to a functional head via Merge (Xt). In all three types, syntactic dependencies (Move/Agree) are lost and the grammaticalizing element is shifted to its respective functional head (Merge). 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)):

\[
4) \quad F^*_\text{Move/Move} > F^*_\text{MoveXP/Merge} > F^*_\text{MoveXP/Merge} > F^*_\text{MoveXP} > F^*_\text{MoveXP} > F^*_\text{Agree} > F^*_\text{Merge} > F^{11, 12}
\]


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

i) ‘Merge as late (i.e. high) as possible’ (LMP)

ii) ‘Be a head, rather than a phrase (i.e. specifier)’ (HPP)

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 iwa > wα (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 that 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 > ∅

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:

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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\(_{\text{Merge}}\) is ‘simpler’ than F\(_{\text{Move/Agree}}\) since while F\(_{\text{Merge}}\) only merges the functional head (Merge), F\(_{\text{Move/Agree}}\) 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\(_{\text{Move}}\) 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\(_{\text{Merge}}\) (cf van Gelderen (2008a:296, 2011a:16)). F\(_{\text{Move/Agree}}\) > F\(_{\text{Merge}}\), 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.


\(^{14}\)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)).
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&amp;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&amp;R (2003:121-127)), cf van Gelderen (2004a:123, 2004b:71-78, 2009b:140ff)).

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&amp;R (2003:74-97), cf footnote 9)). Furthermore, M may host auxiliary verbs (T > M) (e.g. Greek θελω να > δα (R&amp;R (2003:58-71))).

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&amp;R (2003:36-48), cf van Gelderen (2004a:230-231)). T also triggers Move for external arguments (Specv &gt; SpecT), the loss of which leads to them being re-analysed as subject agreement markers (D &gt; T) (e.g. Northern Italian subject clitics (R&amp;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)). 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.

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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)):

\[ 7a) \]
\[ \begin{array}{c}
XP \\
X \ldots \ YP \\
[i-X] \quad Y \quad \ldots \\
[u-Y] \quad [i-Y] \\
[u-X]
\end{array} \]

\[ 7b) \]
\[ \begin{array}{c}
XP \\
Y=X \ldots \ YP \\
[i-X] \quad Y \quad \ldots \\
[u-Y] \quad [i-Y] \\
[u-X]
\end{array} \]

\[ 8a) \]
\[ \begin{array}{c}
XP \\
X \ldots \ YP \\
[i-X] \quad Y \quad \ldots \\
[u-Y] \quad [i-Y] \\
[u-X]
\end{array} \]

\[ 8b) \]
\[ \begin{array}{c}
XP \\
X \ldots \ YP \\
[i-X] \quad X=Y \quad \ldots \\
[u-Y] \quad [i-Y] \\
[u-X]
\end{array} \]

In both cases, \textit{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, piao t) (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)):
As sentence-final de tends to indicate past-time reference in the embedded clause, 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 piao t) (S&W (2002a:173-175, 190-193), Wu (2004:123-125, 141-146)): 

---

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) 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.

\[
\begin{array}{c}
\text{He BE tomorrow only-then will go Beijing DE}\\
\text{‘It is tomorrow that he will go to Beijing.’ (S&W (2002a:176), Wu (2004:126))}
\end{array}
\]

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/*dai) 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)). 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)) 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


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) 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}\text{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))}\n
\[^{34}\text{Technically, demonstratives have uninterpretable D and phi-features which are checked by D and N respectively (van Gelderen (2011d:3ff), cf footnotes 31 and 32). Nonetheless, as the re-analysis of *shi* as a copula verb eliminates the subject DP and its interpretable features, it conforms to van Gelderen’s ‘Feature Economy’ (cf footnote 27).}\]
the original structure where there is no verb (ex. 10a), see footnote 30, 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’).

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.

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]), nêj ([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] (Gilmert (1989)). More will be said about this in later chapters.

A closely related change is the re-analysis of subject determiners (D) as subject agreement markers (T), which is categorically 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 (2003:175-192), cf footnote 33) e.g. non-standard French subject-agreement markers:

1) 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), 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.

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)):

9a)

```
zuotian mai piao
```

9b)

```
zuotian mai-dei piao
```

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

10a)

```
shi
```

10b)

```
shi
```
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:

11a) \[
\begin{array}{c}
\text{XP} \\
\text{X} \\
\text{[i-X]} \\
\text{[u-Y]} \\
\text{[u-X]}
\end{array}
\]

11b) \[
\begin{array}{c}
\text{ZP} \\
\text{X=Z} \\
\text{[i-Z]} \\
\text{[u-X]}
\end{array}
\]

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)  
\[
\text{XP} \quad \text{XP} \\
\text{X} \quad \text{YP} \quad \text{Y \in X} \quad \text{YP} \\
[u-Y] \quad [i-Y] \quad [u-Y] \quad [i-Y] \\
[u-X]
\]

7b)  
\[
\text{XP} \\
\text{Y=X} \quad \text{YP} \\
[i-X] \quad [i-Y] \\
[u-Y] \quad [i-Y] \\
[u-X]
\]

8a)  
\[
\text{XP} \quad \text{XP} \\
\text{X} \quad \text{YP} \quad \text{X} \quad \text{YP} \\
[i-X] \quad [i-Y] \quad [u-Y] \quad [i-Y] \\
[u-X]
\]

8b)  
\[
\text{XP} \\
\text{X} \quad \text{YP} \\
[i-X] \quad [i-Y] \\
[u-Y] \quad [i-Y] \\
[u-X]
\]

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

11a)  
\[
\text{XP} \quad \text{ZP} \\
\text{X} \quad \text{YP} \quad \text{X} \quad \text{YP} \\
[i-X] \quad [i-Y] \quad [i-Z] \\
[u-Y] \quad [i-Y] \\
[u-X]
\]

11b)  
\[
\text{ZP} \\
\text{X=Z} \quad \text{...} \\
[i-Z] \\
[u-X]
\]

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. 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. ‘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, as are many cross-linguistic examples of copula verbs derived from subject determiners. 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. It can be

---


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 analyze 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:


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-

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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 \[\rightarrow\] phenotype

4) PLD + UG + III \[\rightarrow\] 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 schematized thus:

5) Trigger + extra-linguistic factors \[\rightarrow\] phenotype

6) PLD + III \[\rightarrow\] 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.
This is known as ‘ritualization’ (Haiman (1994:4ff)), 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)).

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

<table>
<thead>
<tr>
<th>No schwa</th>
<th>Syllabic [r]</th>
<th>Schwa + [r]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every (492)</td>
<td>Memory (91)</td>
<td>Mammary (0)</td>
</tr>
<tr>
<td>Salary (51)</td>
<td>Artillery (11)</td>
<td></td>
</tr>
<tr>
<td>Summary (21)</td>
<td>Summery (0)</td>
<td></td>
</tr>
<tr>
<td>Nursery (14)</td>
<td>Cursory (4)</td>
<td></td>
</tr>
<tr>
<td>Evening (149) (noun)</td>
<td>Evening (0) (verb + ing)</td>
<td></td>
</tr>
</tbody>
</table>

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)). 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)).

---

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) [spite]_v
   [spite]_n(defiance, contempt, scorn)
   [in]_p
   [spite]_n(in --- spite --- of) [of]_p

(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 ([gʊɪn tu] > [gana]) (Bybee (1998b:260-261, 2003b:146-147, 2006:719-22), cf Krug (2000)):

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

---

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)):

<table>
<thead>
<tr>
<th>Category</th>
<th>Inflectional</th>
<th>Lexical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valence</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Voice</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Aspect</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tense</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mood</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Number agreement</td>
<td>X</td>
<td>(X)</td>
</tr>
<tr>
<td>Person agreement</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Gender agreement</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

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)). 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. Xxix (Bybee (2003a:608))

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 dwelida 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 excluded.
7) No worldly 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)):

<table>
<thead>
<tr>
<th>Stage</th>
<th>Meaning</th>
<th>Subject</th>
<th>Main Verb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental Ability</td>
<td>Mental</td>
<td>Human agents</td>
<td>Intellectual states and activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Communicating Skills</td>
</tr>
<tr>
<td>Ability</td>
<td>-</td>
<td>Human agents</td>
<td>All of the above</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overt actions and activities</td>
</tr>
<tr>
<td>Root possibility</td>
<td>-</td>
<td>Human agents</td>
<td>All of the above</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>All of the above</td>
</tr>
</tbody>
</table>

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

8) **SUBJ** CAN **INFINITIVE**

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]) (Bybee (2003a:615-618)).

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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.

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 [araro] (Bybee (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 [amana] (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\textsubscript{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

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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 (iii) *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. 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):

<table>
<thead>
<tr>
<th>Stage</th>
<th>Meaning</th>
<th>Subject</th>
<th>Main Verb (complement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental Ability (V)</td>
<td>Mental ‘to know’</td>
<td>Human agents &lt;agent&gt;</td>
<td>Intellectual states and activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Communicating Skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;stimulus&gt;</td>
</tr>
<tr>
<td>Ability (V)</td>
<td>-</td>
<td>Human agents &lt;agent&gt;</td>
<td>All of the above</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overt actions and activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;-&gt;</td>
</tr>
<tr>
<td>Root possibility</td>
<td>Possibility</td>
<td>Human agents</td>
<td>All of the above</td>
</tr>
<tr>
<td>(Mod_{Possibility})</td>
<td></td>
<td>Passive subjects</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inanimate subjects</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;-&gt;</td>
<td></td>
</tr>
</tbody>
</table>

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) PP
   \[ P' \]
   \[ P \]
   \[ NP \]
   in \[ N' \]
   \[ N \]
   \[ PP \]
   spite \[ P' \]
   \[ P \]
   \[ NP \]
   of \[ \emptyset \]

10b) PP
   \[ P' \]
   \[ P \]
   \[ NP \]
   in spite of \[ \emptyset \]

11a) TP
   \[ T' \]
   \[ T^{61} \]
   \[ T(\text{future})P \]
   be \[ T(\text{future})' \]
   \[ T(\text{future}) \]
   AspP
   \[ \text{Asp}' \]
   \[ \text{Asp} \]
   \[ \text{VP} \]
   \[ \text{going-to} \]
   \[ \text{Asp}' \]
   \[ \text{Asp} \]
   \[ \text{VP} \]
   \[ \emptyset \]
   \[ \emptyset \]

11b) TP
   \[ T' \]
   \[ T \]
   \[ T(\text{future})P \]
   be \[ T(\text{future})' \]
   \[ T(\text{future}) \]
   AspP
   \[ \text{Asp}' \]
   \[ \text{Asp} \]
   \[ \text{VP} \]
   \[ \emptyset \]
   \[ \emptyset \]

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 \textit{is/was going to} + infinitive). Furthermore, as \textit{go-ing} inflects for progressive aspect, it undergoes \textit{Move to Asp} \textit{Progress} which is lost when \textit{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)):

<table>
<thead>
<tr>
<th>12) Mood_{speech act}</th>
<th>Mood_{evaluative}</th>
<th>Mood_{evidential}</th>
<th>Mood_{epistemic}</th>
<th>T(past)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T(future)</td>
<td>Mood_{irreals}</td>
<td>Mod_{necessity}</td>
<td>Mod_{possibility}</td>
<td>T(past)</td>
</tr>
<tr>
<td>Asp_{repetitive(I)}</td>
<td>Asp_{frequentative(I)}</td>
<td>Mod_{volitional}</td>
<td>Asp_{celerative(I)}</td>
<td>T(Anterior)</td>
</tr>
<tr>
<td>Asp_{terminative}</td>
<td>Asp_{continuative}</td>
<td>Asp_{perfect}</td>
<td>Asp_{retrospective}</td>
<td>Asp_{proximative}</td>
</tr>
<tr>
<td>Asp_{durative}</td>
<td>Asp_{generic/progressive}</td>
<td>Asp_{prospective}</td>
<td>Asp_{SgCompetive(I)}</td>
<td>Asp_{PlCompetive}</td>
</tr>
<tr>
<td>Voice</td>
<td>Asp_{celerative(II)}</td>
<td>Asp_{repetitive(II)}</td>
<td>Asp_{frequentative(II)}</td>
<td>Asp_{SgCompetive(II)}</td>
</tr>
</tbody>
</table>

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 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)
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)):
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
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)).

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.GEN COP.MASC.GEN present
   ‘The clock is a present.’

17b) ma hi Herut?
   What COP.FEM.GEN freedom.FEM.GEN
   ‘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.’
These copula forms, therefore, form subsets of copular constructions, which may be represented thus (cf chapter 1, footnotes 35 and 41):

65 In contrast to Hebrew and Panare copulas, Chinese *shí* does not show morphological distinctions of tense or subject agreement and is invariant in all its copular uses. Chinese *shí*, 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:

<table>
<thead>
<tr>
<th></th>
<th>Standard French</th>
<th></th>
<th>Non-standard French</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-consonantal</td>
<td>Pre-vocalic</td>
<td>Pre-consonantal</td>
<td>Pre-vocalic</td>
</tr>
<tr>
<td>MASC.SG</td>
<td>II</td>
<td>I</td>
<td>II</td>
<td>II</td>
</tr>
<tr>
<td>FEM.SG</td>
<td>El</td>
<td>E</td>
<td>El</td>
<td>El</td>
</tr>
<tr>
<td>MASC.PL</td>
<td>II</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>FEM.PL</td>
<td>El</td>
<td>Elz</td>
<td>E</td>
<td>Ez</td>
</tr>
</tbody>
</table>

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

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

2) 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):

<table>
<thead>
<tr>
<th>Stage</th>
<th>Meaning</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese de (D)</td>
<td>Determiner</td>
<td>All cleft-sentences</td>
</tr>
<tr>
<td>Chinese de (T)</td>
<td>Past tense marker</td>
<td>Cleft-sentences which refer to the past (see footnote 63)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Stage</th>
<th>Meaning</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hu (D)</td>
<td>Personal pronoun (masculine singular) ‘he’</td>
<td>Equational constructions with phi-agreeing topic (M.SG)</td>
</tr>
<tr>
<td>Hi (D)</td>
<td>Personal pronoun (feminine singular) ‘she’</td>
<td>Equational constructions with phi-agreeing topic (F.SG)</td>
</tr>
<tr>
<td>Hem (D)</td>
<td>Personal pronoun (masculine plural) ‘they’</td>
<td>Equational constructions with phi-agreeing topic (M.PL)</td>
</tr>
<tr>
<td>Hen (D)</td>
<td>Personal pronoun (feminine plural) ‘they’</td>
<td>Equational constructions with phi-agreeing topic (F.PL)</td>
</tr>
<tr>
<td>Hu (T)</td>
<td>Copula</td>
<td>Copular constructions with masculine singular subject</td>
</tr>
<tr>
<td>Hi (T)</td>
<td>Copula</td>
<td>Copular constructions with feminine singular subject</td>
</tr>
<tr>
<td>Hem (T)</td>
<td>Copula</td>
<td>Copular constructions with masculine plural subject</td>
</tr>
<tr>
<td>Hen (T)</td>
<td>Copula</td>
<td>Copular constructions with feminine plural subject</td>
</tr>
</tbody>
</table>

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 *kēj, nēj*):

<table>
<thead>
<tr>
<th>Stage</th>
<th>Meaning</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kēj (D)</td>
<td>Demonstrative (proximal)</td>
<td>Equational constructions with phi-agreeing topic (proximal)</td>
</tr>
<tr>
<td>Nēj (D)</td>
<td>Demonstrative (distal)</td>
<td>Equational constructions with phi-agreeing topic (distal)</td>
</tr>
<tr>
<td>Kēj (T)</td>
<td>Copula</td>
<td>Copula constructions with present time reference</td>
</tr>
<tr>
<td>Nēj (T)</td>
<td>Copula</td>
<td>Copula constructions with past time reference</td>
</tr>
</tbody>
</table>

‘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) \( \text{XP} \)
    \( X \ldots \text{YP} \)
    \( [i-X] \ Y \ldots \)
    \( [u-Y] \ [i-Y] \)

20b) \( \text{XP} \)
    \( Y=X \ldots \text{YP} \)
    \( [i-X] \ Y \ldots \)
    \( [u-Y] \ [i-Y] \)

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

21a) \( \text{XP} \)
    \( X \ldots \text{YP} \)
    \( [i-X] \ Y \ldots \)
    \( [u-Y] \ [i-Y] \)

21b) \( \text{XP} \)
    \( X \ldots \text{YP} \)
    \( [i-X] \ X=Y \ldots \)
    \( [i-Y] \)

22a) \( \text{XP} \)
    \( X \text{YP} \)
    \( [i-X] \ Y \ldots \)
    \( [u-Y] \ [i-Y] \)

22b) \( \text{ZP} \)
    \( X=Z \ldots \)
    \( [i-Z] \)

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).\textsuperscript{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 shì (LG).

\textsuperscript{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)). 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), Pinskyter (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)). 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)). 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.

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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)).


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)). 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 > 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-e-re 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)

---


<table>
<thead>
<tr>
<th>Latin</th>
<th>Italian</th>
<th>Spanish</th>
<th>Portuguese</th>
<th>Provençal</th>
<th>French</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Cantare habeo</em></td>
<td>Canterò</td>
<td>Cantaré</td>
<td>Cantarei</td>
<td>Chantarai</td>
<td>Chanterai</td>
</tr>
<tr>
<td>(present tense of <em>habere</em> &gt; I shall sing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cantare habebam</em></td>
<td>Canteria</td>
<td>Cantaria</td>
<td>Cantaria</td>
<td>Chantaria</td>
<td>Chanterais</td>
</tr>
<tr>
<td>(imperfect tense of <em>habere</em> &gt; I would sing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cantare habui</em></td>
<td>Canterei</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(perfect tense of <em>habere</em> &gt; I would sing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

57
As the object of habere, namely the antecedent of the relative pronoun (quem), is ellipsed,\(^{72}\) 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)

<table>
<thead>
<tr>
<th>aed-em</th>
<th>hab-ui-t</th>
<th>tu-end-am</th>
</tr>
</thead>
<tbody>
<tr>
<td>house-FEM.ACC.SG</td>
<td>have-PERF-3SG</td>
<td>guard-GERUNDIVE-FEM.ACC.SG</td>
</tr>
</tbody>
</table>

‘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

‘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) *dicere quem*... ‘I have (an example) to say, (namely the man) whom...’ > *habeo dicere quem*... ‘I have to say whom...’) (Coleman (1971:216)).

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)). The grammaticalization of Latin *habere*,

---

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*). 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 pollici-ri me tibi
    so.much HABERE-PRES-1SG promise-INF PRO.1SG.ACC.SG you-DAT.SG
    absent-DAT.SG your-DAT.PL and present-DAT.PL absolutely
    satis facturum 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).\textsuperscript{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) \textit{toll-i-que vicissim pont-us hab-e-t}

\textit{lift-INF.PASS-and repeatedly sea-NOM.SG HABERE-PRES.3SG}

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

\begin{center}
\begin{tikzpicture}
  \node (V) {V} child {node (Adv) {Adv} child {node (t) {t} edge from parent node [above left] {t\textsubscript{j}}} child {node (i) {i}}} child {node (Mod) {Mod} child {node (VP) {VP}}};
  \node (DP) {DP} child {node (T) {T} edge from parent node [left] {t\textsubscript{j}}} child {node (ModP) {ModP}};
  \node (TP) {TP} child {node (C) {C} child {node (CP) {CP}} child {node (C') {C'}}};
  \node (VP\_i) {VP\_i} child {node (V) {V}} child {node (toll\_i-que) {toll\_i-que}};
  \node (vicissim) {vicissim} child {node (i) {i} edge from parent node [above] {i}};
  \node (pont-us) {pont-us} child {node (i) {i} edge from parent node [above] {i}};
  \node (hab-e-t) {hab-e-t} child {node (i) {i} edge from parent node [above] {i}};
  \node (sea-NOM.SG) {sea-NOM.SG} child {node (i) {i} edge from parent node [above] {i}};
  \node (lift-INF.PASS-and) {lift-INF.PASS-and} child {node (i) {i} edge from parent node [above] {i}};
  \node (t) {t} child {node (i) {i} edge from parent node [above] {i}};
  \node (habet\_j) {habet\_j} child {node (i) {i} edge from parent node [above] {i}};
  \node (Mod) {Mod} child {node (i) {i} edge from parent node [above] {i}};
  \node (T) {T} child {node (i) {i} edge from parent node [above] {i}};
  \node (ModP) {ModP} child {node (i) {i} edge from parent node [above] {i}};
  \node (C) {C} child {node (i) {i} edge from parent node [above] {i}};
  \node (C') {C'} child {node (i) {i} edge from parent node [above] {i}};
  \node (VP) {VP} child {node (i) {i} edge from parent node [above] {i}};
  \node (Mod) {Mod} child {node (i) {i} edge from parent node [above] {i}};
  \node (VP) {VP} child {node (i) {i} edge from parent node [above] {i}};
\end{tikzpicture}
\end{center}

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 (\textit{quid in i}) or re-analysed (\textit{tantum in ii}), the object relation of habere is weakened, which yields the re-analysis of habere as a modal verb.

\textsuperscript{76} Two main types of modality have been proposed for Latin habere, namely possibility (Mod\textsubscript{Possibility}) and obligation/necessity (Mod\textsubscript{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\textsubscript{Possibility} (\textit{habeo etiam dicere quem... ‘I can even tell you an example...’}) (Pinkster (1987:206), Tara (2014:237-238)).
Table 8:

<table>
<thead>
<tr>
<th>Stage</th>
<th>Meaning</th>
<th>Infinitival complement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latin habere (V)</td>
<td>‘To have’</td>
<td>Two place predicates with direct object assumed</td>
</tr>
<tr>
<td>Latin habere (Mod)</td>
<td>Possibility or Obligation/Necessity (see footnote 76)</td>
<td>All infinitives, including one place predicates like passive and intransitive verbs</td>
</tr>
</tbody>
</table>

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)):

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.
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)
As ‘predestination’ implies no intention or volition on the subject (here *illa* ‘she’ in ex. 2a), *Nazareus* 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)), ‘Nazareus was to be called’ > ‘Nazareus 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    hominisbus
   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) 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)).

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).

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’

---

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)).
displays further ‘structural simplification’ and ‘F-attraction’ in the hierarchy of T elements (\(\text{Mod}_{\text{obligation/necessity}} > \text{T(future)}\)). 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 (suscip-i-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. 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).
The grammaticalisation of Latin *habere* as a future tense marker (ModObligation/Necessity $\Rightarrow$ 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)), 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:

<table>
<thead>
<tr>
<th>Stage (type frequency)</th>
<th>Meaning</th>
<th>Subject</th>
<th>Infinitival complement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latin <em>habere</em> (Mod)</td>
<td>Obligation/Necessity</td>
<td>Animate/human agents</td>
<td>All lexical verbs</td>
</tr>
<tr>
<td>Latin <em>habere</em> (T(future))</td>
<td>Future</td>
<td>All subjects</td>
<td>All verbs in certain morphosyntactic contexts (see footnote 83)</td>
</tr>
<tr>
<td>Medieval Romance (T(future))</td>
<td>Future</td>
<td>All subjects</td>
<td>All verbs</td>
</tr>
</tbody>
</table>

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)).
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). 4b)  

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

---

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).

---

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)

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:

<table>
<thead>
<tr>
<th>Stage (type frequency)</th>
<th>Meaning</th>
<th>Subject</th>
<th>Infinitival complement</th>
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<tr>
<td>Latin habere (V) (word)</td>
<td>‘To have’</td>
<td>Animate/human agents</td>
<td>Two place predicates with direct object assumed</td>
</tr>
<tr>
<td>Latin habere (Mod) (pre-infinitival auxiliary, post-infinitival clitic)</td>
<td>Possibility, Obligation/Necessity (see footnote 76)</td>
<td>Animate/human agents</td>
<td>All lexical verbs</td>
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<td>Future</td>
<td>All subjects</td>
<td>All verbs</td>
</tr>
</tbody>
</table>

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

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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 Alfonso
search-INF us HABERE.IMEPRF-3SG the king Alfonso
‘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)
The grammaticalization of Chinese \textit{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 \textit{shi} and analyse its frequency effects.

\textbf{Section 2.2: SpecPred > Pred:}

As Chinese \textit{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 3\textsuperscript{rd}-person reference.\footnote{The topics used with Chinese \textit{shi} in Old Chinese are invariably 3\textsuperscript{rd}-person but may vary in number (singular/plural), since both singular and plural topics are attested in equational constructions (Feng (1993, 2003)): i) \texttt{fu yu gui shi ren zhi suo yu ye} \texttt{we} \texttt{CONJ} \texttt{no} \texttt{bility} \texttt{SHI} \texttt{people} \texttt{POSSESSIVE.PARTICLE} \texttt{REL} \texttt{desire} \texttt{PRT} \texttt{‘Wealth and richness, these are what man desires.’} (Mencius, \textit{Lunyu}, 5\textsuperscript{th} century BC) In i), as there are more than one element in the topic (\texttt{fu yu gui} ‘wealth and nobility’), it must be analysed as plural (\textit{shi} ‘these (things)). This number distinction also applies to clausal topics, which can also be plural (Feng (1993:290, 2003:33)): ii) \texttt{shu ming xing yun shi ziran zhi bian ye} \texttt{tree} \texttt{rustle} \texttt{star} \texttt{fall} \texttt{SHI} \texttt{nature} \texttt{POSSESSIVE.PARTICLE} \texttt{change} \texttt{PRT} \texttt{‘Tree rustle, stars fall, these are natural phenomenon.’} (Xunzi, 3\textsuperscript{rd} century BC) Old Chinese \textit{shi}, therefore, shows number distinctions in its phi-agreement with its topic. More will be said about this below.}

\texttt{f) Qian li er jian wang ]} 
\texttt{SpecT} 
\texttt{TP} 
\texttt{T'} 
\texttt{vP} 
\texttt{v'} 
\texttt{T} 
\texttt{Specv} 
\texttt{t_j} 
\texttt{v} 
\texttt{NP} 
\texttt{[i-phi]} 
\texttt{[i-T]} 
\texttt{[i-pr]} 
\texttt{[i-D]} 
\texttt{wo suo yu ye} 

\texttt{87} Its re-analysis as a copula verb is argued to occur in examples where Chinese \textit{shi} is not
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)
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)). Furthermore, as Chinese *shi* is not clause-initial in ex. 6), it is better analysed as a copula verb in Pred (6b)). 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

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).

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)):

1) Xun wei fa yu tianxia ke chuan yu
   Xun use law in world can spread to
Houshi wo you weimian wei xiang ren ye
Posternity 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)

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).\footnote{It has been suggested that \textit{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)):

\begin{itemize}
    \item i) De xing Wu di, sheng zi yi ren, Obtain favour Wu emperor bear son one person
    Zhao di shi ye
    ‘She won the favour of the Wu emperor, and gave birth to a son, who is the Zhao emperor (\textit{Zhao di shi ye}).’ (\textit{Shi Ji} 1\textsuperscript{st} BC)
\end{itemize}

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

\begin{itemize}
    \item i) shi shi lie gui
    \textit{SHI} \textit{SHI} fierce ghost
    ‘This is a fierce ghost.’ \textit{(Shuihudi Qin my zhuian}, 180-170 BC)
\end{itemize}

As \textit{shi} selects itself as the subject, it must be analysed as a copula verb, which suggests that the grammaticalization of \textit{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 \textit{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.}

8a) \textit{Ci bi shi yu rang ye}

\hspace{1.5cm} 'This definitely \textit{SHI} Yu Rang \textit{DECLARATIVE.PARTICLE}’ (\textit{Shi Ji}: Ci Ke Liezhuan, Yu Rang, c. 1\textsuperscript{st} BC)

\begin{itemize}
    \item i) De xing Wu di, sheng zi yi ren, Obtain favour Wu emperor bear son one person
    Zhao di shi ye
    ‘She won the favour of the Wu emperor, and gave birth to a son, who is the Zhao emperor (\textit{Zhao di shi ye}).’ (\textit{Shi Ji} 1\textsuperscript{st} BC)
\end{itemize}

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

\begin{itemize}
    \item i) shi shi lie gui
    \textit{SHI} \textit{SHI} fierce ghost
    ‘This is a fierce ghost.’ \textit{(Shuihudi Qin my zhuian}, 180-170 BC)
\end{itemize}

As \textit{shi} selects itself as the subject, it must be analysed as a copula verb, which suggests that the grammaticalization of \textit{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 \textit{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  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)

\[
\begin{array}{c}
\text{TP} \\
\text{SpecT} \\
y u \, _i \\
\phi \text{T} \\
\text{PredP} \\
\text{Pred'} \\
[i-T] \ t \, _j \\
[u-\text{phi}] \ shi \\
[i-\text{Pr}] \ su o \ jia \ldots \ ye \\
[u-\text{phi}] \\
[u-T]
\end{array}
\]

‘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>
<thead>
<tr>
<th>Stage</th>
<th>Meaning</th>
<th>Complement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject determiner (D in SpecPred)</td>
<td>Demonstrative pronoun ‘this’ in subject position</td>
<td>Topics which show phi-agreement (3rd-person) (see footnote 88)</td>
</tr>
<tr>
<td>Copula verb (Pred)</td>
<td>Copula verb</td>
<td>All subjects</td>
</tr>
</tbody>
</table>
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 jiguann 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)

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:**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Meaning</th>
<th>Complement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copula verb (Pred)</td>
<td>Copula verb</td>
<td>All subjects</td>
</tr>
<tr>
<td>Subject agreement (T)</td>
<td>Copula verb</td>
<td>Subjects of different persons/number</td>
</tr>
<tr>
<td>Tense (T)</td>
<td>Copula verb</td>
<td>Tenses of copula verb</td>
</tr>
</tbody>
</table>

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

**Table 13:**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Meaning</th>
<th>Complement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject determiner (D in SpecPred)</td>
<td>Demonstrative pronoun ‘this’ in subject position</td>
<td>Topics which show phi-agreement (3rd-person)</td>
</tr>
<tr>
<td>Copula verb (Pred)</td>
<td>Copula verb</td>
<td>All subjects</td>
</tr>
<tr>
<td>Subject agreement (T)</td>
<td>Copula verb</td>
<td>Subjects of different persons/number</td>
</tr>
<tr>
<td>Tense (T)</td>
<td>Copula verb</td>
<td>Tenses of copula verb</td>
</tr>
</tbody>
</table>

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 > ModObligation/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.  

Section 1.1: V ‘to have’ > ModObligation/necessity > T(future):  

As the grammaticalization of Latin habere as the Romance future is analysed in two stages (V ‘to have’ > ModObligation/Necessity > T(future), see chapter 3, section 1), I propose to analyse these 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’ > ModObligation/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):

1) 

\[
\begin{align*}
&\text{TP} \\
&\quad T' \\
&\quad T \\
&\quad \text{ModP} \\
&\quad \text{habere}_i \\
&\quad \text{Mod}' \\
&\quad \text{Mod} \\
&\quad \text{VP} \\
&\quad \text{t_i V} \\
&\quad \text{t_i N'} \\
&\quad \text{NP} \\
&\quad \text{XP} \\
&\quad \text{infinitive} \\
\end{align*}
\]

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. AspPerfect (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 clæð 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.\textsuperscript{96}

4) Latin \textit{habere}:

Latin \textit{habere} ‘to have’ + infinitive originates from constructions where \textit{habere} selects an object modified by the infinitive implying modality, and re-analysis occurs when the object relation is either omitted or weakened and \textit{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 \textit{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)

\textsuperscript{96} I am grateful to one German native speaker for confirming the lack of morphophonological weakening in German \textit{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 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
cstrued 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.’

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)  
Pettens 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.SBJ-3SG

‘... asking him to explain in confidence what he had to add.’ (Fredegar, *Chronicle* 51)
Spanish *tener que* + infinitive:

7d) Niño tener mos pan que comer
Neither have-PRES-1PL bread COMP eat-INF

Niña otra cosa ninguna
Neither other-FEM.GEN things.FEM.Gen none-FEM.Gen

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

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

7e) Para descargar de su conciencia
For relief of POSS.3SG conscience

Tiene que hacer 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 hacerlo 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 *nì*:

In Yoruba, the lexical verb *nì* ‘to have’ is construed with the infinitive to express obligation and is 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_{obligation/necessity}), which may be summarised thus:
Table 14:

<table>
<thead>
<tr>
<th>Language</th>
<th>Pre-grammaticalized category</th>
<th>Post-grammaticalized category</th>
<th>Morphophonological weakening</th>
</tr>
</thead>
<tbody>
<tr>
<td>English <em>have to</em> + infinitive (ex. 2))</td>
<td>Lexical verb ‘to have’</td>
<td>Mod$_{obligation/necessity}$</td>
<td><em>Hafta</em> (&lt; have to) <em>Hasda</em> (&lt; has to)</td>
</tr>
<tr>
<td>German <em>haben zu</em> + infinitive (ex. 3))</td>
<td>Lexical verb ‘to have’</td>
<td>Mod$_{obligation/necessity}$</td>
<td>-</td>
</tr>
<tr>
<td>Latin <em>habere</em> + infinitive/infinitive + <em>habere</em> (ex. 4))</td>
<td>Lexical verb ‘to have’</td>
<td>Mod$<em>{Possibility/Mod}</em>{obligation/necessity}$</td>
<td>Infinitive + <em>habere</em> (clitic)</td>
</tr>
<tr>
<td>Negerholland <em>ha fo</em> + infinitive (ex. 5))</td>
<td>Lexical verb ‘to have’</td>
<td>Mod$_{obligation/necessity}$</td>
<td><em>Fo</em> + infinitive</td>
</tr>
<tr>
<td>Nyabo <em>ble</em> + infinitive (ex. 6))</td>
<td>Lexical verb ‘to have’</td>
<td>Mod$_{obligation/necessity}$</td>
<td>-</td>
</tr>
<tr>
<td>Romance <em>habere/tenere</em> + prepositional infinitive (ex. 7))</td>
<td>Lexical verb ‘to have’</td>
<td>Mod$_{obligation/necessity}$</td>
<td>-</td>
</tr>
<tr>
<td>Yoruba <em>ni</em> + infinitive (ex. 8))</td>
<td>Lexical verb ‘to have’</td>
<td>Mod$_{obligation/necessity}$</td>
<td>-</td>
</tr>
</tbody>
</table>

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$_{obligation/necessity}$ > 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)):

9a)
\[
\begin{array}{c}
\text{T} \\
\downarrow \\
\text{ModP} \\
\downarrow \\
\text{habere} \\
\downarrow \\
\text{Mod}_{\text{obligation/necessity}} \\
\end{array}
\]

9b)
\[
\begin{array}{c}
\text{T(future)} \\
\downarrow \\
\text{ModP} \\
\downarrow \\
\text{habere} \\
\downarrow \\
\text{Mod'} \\
\end{array}
\]

10a)
\[
\begin{array}{c}
\text{T} \\
\downarrow \\
\text{ModP} \\
\downarrow \\
\text{V}_i \\
\downarrow \\
\text{Mod}_{\text{obligation/necessity}} \\
\downarrow \\
\text{habere} \\
\end{array}
\]

10b)
\[
\begin{array}{c}
\text{T(future)} \\
\downarrow \\
\text{ModP} \\
\downarrow \\
\text{V}_i \text{-habere} \\
\downarrow \\
\text{Mod'} \\
\end{array}
\]

This re-analysis entails ‘context expansion’ and consequent rise in frequency, since Latin \textit{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)). Furthermore, in Romance reflexes of Latin \textit{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\text{ This re-analysis and ‘context expansion’ from an agent-oriented meaning (e.g. Mod}_{\text{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 *skål:


Danish skål:

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


Swedish skall:

11c) Vart ska du âka?

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 [ʃɘɭ] (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 *skål 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 obligatory
   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 obligatory 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))
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).

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:

<table>
<thead>
<tr>
<th>Language</th>
<th>Pre-grammaticalized category</th>
<th>Post-grammaticalized category</th>
<th>Morphophonological weakening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germanic *skal + infinitive (ex. 11))</td>
<td>Mod_obligation/necessity</td>
<td>T(future)</td>
<td>English shall [ʃəl] Swedish skall &gt; ska</td>
</tr>
<tr>
<td>Icelandic munu + infinitive (ex. 12))</td>
<td>Mod_obligation/necessity</td>
<td>T(future)</td>
<td>-</td>
</tr>
<tr>
<td>Italian dialects avere + a + infinitive (ex. 13))</td>
<td>Mod_obligation/necessity</td>
<td>T(future)</td>
<td>-</td>
</tr>
<tr>
<td>Latin habere + infinitive/infinitive + habere (ex. 14))</td>
<td>Mod_obligation/necessity</td>
<td>T(future)</td>
<td>Infinitive-habere (affix)</td>
</tr>
<tr>
<td>Slave go?o + infinitive</td>
<td>Mod_obligation/necessity</td>
<td>T(future)</td>
<td>-</td>
</tr>
</tbody>
</table>

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/κα*:

In Eastern Kru languages, the future tense marker is etymologically related to the lexical verb ‘to have’ (Marchese (1979, 1986:133ff)):

<table>
<thead>
<tr>
<th></th>
<th>Neyo</th>
<th>Godié</th>
<th>Lakota Dida</th>
<th>Vata</th>
<th>Bété</th>
<th>Koyo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lexical verb ‘to have’</td>
<td>Ka</td>
<td>κα</td>
<td>Kά</td>
<td>Kά</td>
<td>κα</td>
<td>Ka</td>
</tr>
<tr>
<td>Future tense marker</td>
<td>Ka</td>
<td>κα</td>
<td>Kά</td>
<td>Ka</td>
<td>κα</td>
<td>κα</td>
</tr>
</tbody>
</table>

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

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’ > (Modobligation/necessity) > future tense marker:
Table 16:

<table>
<thead>
<tr>
<th>Language</th>
<th>Pre-grammaticalized category (lexical verb (V) ‘to have’)</th>
<th>Post-grammaticalized category (future tense marker (T(future)))</th>
<th>Morphophonological weakening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgarian <em>ima da + infinitive (ex. 16)</em></td>
<td><em>ima da + infinitive</em></td>
<td><em>ima da + infinitive</em></td>
<td><em>Njama (&lt;njamam) da + infinitive</em></td>
</tr>
<tr>
<td>Kru *ka (ex. 17))</td>
<td>Lexical verb ‘to have’</td>
<td>Future tense marker</td>
<td><em>Ka</em> (tone change)</td>
</tr>
<tr>
<td>Ukrainian <em>imati</em> (ex. 18))</td>
<td>Lexical verb ‘to have’</td>
<td>Future tense marker</td>
<td><em>-im-</em></td>
</tr>
</tbody>
</table>

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:

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

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[^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* (Diesell (1999:145-147))). Also, there are copulas derived from subject determiners 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 shì, 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)): 
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.’
    (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)): 
The clock, it (MASC.SG), a present.’ > ‘The clock is a present.’

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

‘What are manners?’

‘Where are the girls?’

As far as I can find, no morphophonological weakening is attested.\textsuperscript{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:

\textsuperscript{104} I am grateful to several native Hebrew speakers for confirming this to me.
While Kenyan Luo `én 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-dáktał

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) ùsmán hābā ná

Usman Kilba COP.PRES

‘Usman is a Kilba.’

26f) ùsmán hābā ndá

Usman Kilba COP.PAST

‘Usman was a Kilba.’

26g) ùsmán hābā ngá

Usman Kilba COP.PAST

‘Usman was a Kilba.’

As far as I can find, there is no morphophonological weakening here.\textsuperscript{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.’ (Crazzolara (1933:89))

\textsuperscript{105} It has been suggested that the demonstrative copular forms may have undergone phonological weakening if they are derived from complex demonstratives (nà < nanànnà ‘this’ (proximal), ndà < nándàndà ‘that’ (distal), ngà < ngàngàngà ‘that’ (removed) (Diesel (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.’

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 nēj chu
Teacher ANIMATE.DISTAL 1SG
‘I (chu) was (nēj) a teacher.’

28g) Maestro nēj amēn
Teacher ANIMATE.DISTAL 2SG
‘You (amēn) were (nēj) 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) Granma da Kofi
Leader COP Kofi
‘The leader, that, Kofi’ > ‘The leader is Kofi.’ (McWhorter (1997:97))

29b) a de wan gaān 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 kēj differs phonologically from its original pronominal form kēn (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 *hetu* forms are derived from personal pronouns, and they show subject agreement
    with their respective subjects (Devitt (1994:39)):

30a) sab mansaʕ man badirom kastan 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?).

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)).

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:

<table>
<thead>
<tr>
<th>Language/example</th>
<th>Pre-grammaticalized category</th>
<th>Post-grammaticalized category</th>
<th>Morphophonological weakening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arabic huwwa / hiyye (ex. 19))</td>
<td>Personal pronoun in subject position (SpecPred) with phi-agreeing topics (huwwa ‘he’ (3SG.MASC)/hiyye ‘she’ (3SG.FEM))</td>
<td>Copula with phi-agreeing subjects (huwwa (3SG.MASC), hiyye (3SG.FEM); huwwa with all persons)</td>
<td>Huwwa &gt; hu (Hejazi Arabic)</td>
</tr>
<tr>
<td>Chinese shi (ex. 20))</td>
<td>Demonstrative pronoun in subject position (SpecPred) with phi-agreeing topics (3SG/3PL)</td>
<td>Copula with all subjects</td>
<td>-</td>
</tr>
<tr>
<td>Egyptian pw (ex. 21))</td>
<td>Demonstrative pronoun in subject position (SpecPred) with phi-agreeing topics (3SG/3PL)</td>
<td>Copula with all subjects</td>
<td>-</td>
</tr>
<tr>
<td>Finnish on (ex. 22))</td>
<td>Personal pronoun in subject position (SpecPred) with phi-agreeing topics (on (3SG.MASC))</td>
<td>Copula with phi-agreeing subjects (3SG.MASC)</td>
<td>-</td>
</tr>
<tr>
<td>Hausa ce/ne (ex. 23))</td>
<td>Personal pronouns in subject position (SpecPred) with phi-agreeing topics (ne (3SG.MASC), ce (3SG.FEM))</td>
<td>Copula with phi-agreeing subjects (ne (3SG.MASC), ce (3SG.FEM))</td>
<td>-</td>
</tr>
<tr>
<td>Hebrew hu/hi/hem/hen (ex.</td>
<td>Personal pronouns in subject position</td>
<td>Copula with phi-agreeing subjects (hu</td>
<td>-</td>
</tr>
<tr>
<td>Procedure</td>
<td>Language</td>
<td>Personal pronouns in subject position</td>
<td>Copula with phi-agreeing subjects</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>--------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>SpecPred</td>
<td>Kenyan en (ex. 25))</td>
<td>(SpecPred) with phi-agreeing topics ( hu ) (3SG.MASC), ( hi ) (3SG.FEM), ( hem ) (3PL.MASC), ( hen ) (3PL.FEM))</td>
<td>Copula with phi-agreeing subjects (Kenyan Luo ( en ) (3SG.FEM)); Lango ( en ) with all persons</td>
</tr>
<tr>
<td>SpecPred</td>
<td>Kilba ( yá/ká/cá/má, ná/ndá/ngá ) (ex. 26))</td>
<td>(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))</td>
<td>Copula with phi-agreeing subjects ( yá ) (1SG), ( ká ) (2SG), ( cá ) (3SG), ( má ) (1PL); copula with tense ( ná ) (present), ( ndá ) (past), ( ngá ) (past))</td>
</tr>
<tr>
<td>SpecPred</td>
<td>Nuer ( e/ke ) (ex. 27))</td>
<td>(SpecPred) with phi-agreeing topics ( e ) (3SG), ( ke ) (3PL))</td>
<td>Copula with phi-agreeing subjects ( e ) (3SG), ( ke ) (3PL))</td>
</tr>
<tr>
<td>SpecPred</td>
<td>Panare ( kēj, nēj, mēn ) (ex. 28))</td>
<td>Demonstrative pronouns in subject position (SpecPred) with phi-agreeing topics ( kēj ) (animate.proximal), ( nēj ) (animate.invisible), ( mēn ) (inanimate)); copula with tense ( kēj ) (present tense), ( nēj )</td>
<td>Copula with phi-agreeing subjects ( kēj ) (animate.proximal), ( nēj ) (animate.invisible), ( mēn ) (inanimate)); copula with tense ( kēj ) (present tense), ( nēj )</td>
</tr>
<tr>
<td>Language</td>
<td>Demonstrative pronouns in subject position (SpecPred) with phi-agreeing topics</td>
<td>Copula with all subjects</td>
<td>Other remarks</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>--------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Saramaccan da/de (ex. 29))</td>
<td>Demonstrative pronouns in subject position (SpecPred) with phi-agreeing topics (da (3SG), de (3SG))</td>
<td>Copula with all subjects</td>
<td></td>
</tr>
<tr>
<td>Tigre hetu (ex. 30))</td>
<td>Personal pronouns in subject position (SpecPred) with phi-agreeing topics</td>
<td>Copula with phi-agreeing subjects; hetu (3SG) with all persons</td>
<td>Hetu &gt; tu</td>
</tr>
<tr>
<td>Tok Pisin em (ex. 31))</td>
<td>Personal pronoun in subject position (SpecPred) with phi-agreeing topics</td>
<td>Copula with phi-agreeing subjects</td>
<td></td>
</tr>
<tr>
<td>Wappo ce? (ex. 32))</td>
<td>Demonstrative pronoun in subject position (SpecPred) with phi-agreeing topics</td>
<td>Copula with all subjects</td>
<td>Ce?e? &gt; ce?</td>
</tr>
<tr>
<td>West Greelandic Eskimo tassa (ex. 33))</td>
<td>Demonstrative pronoun in subject position (SpecPred) with phi-agreeing topics</td>
<td>Copula with phi-agreeing topics (3SG/3PL)</td>
<td></td>
</tr>
<tr>
<td>Zoque –te (ex. 34))</td>
<td>Demonstrative pronoun in subject position (SpecPred) with phi-agreeing topics</td>
<td>Copula with all subjects</td>
<td>Te &gt; -te</td>
</tr>
</tbody>
</table>
Of these examples, morphophonological weakening is only attested in Arabic (huwwa > 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 ‘Collostrucional 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 skal(l), 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. 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 \textit{habere}) (V > Mod\textsubscript{Obligation/necessity} > T(future)) (SG):

It has been pointed out that Latin \textit{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 \textit{habere} + infinitive in all the extant texts of Tertullian and Augustine.\footnote{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 \textit{habere} + infinitive in my Latin texts, I have processed all my texts in the concordance program using Antconc with the search term \textit{hab}-, which is an invariant morpheme in the verbal paradigm of Latin \textit{habere}. I thank Dr Ann Taylor for her advice on this.}\footnote{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 \textit{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)).} Furthermore, as reflexes of Latin \textit{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 \textit{habere} + infinitive in Medieval Spanish where modal uses of Latin \textit{habere} are retained (see chapter 3, sections 1.2-1.3).\footnote{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 \textit{Poema del Mio Cid}, el \textit{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 Laurenio, Loores de Nuestra Sennora, De los Signos que apracseran ante del Juicio, Milagros de Nuestra Senora, El Duelo que fizo la Virgen Maria el Dia de la Pasion de su Fijo Jesu Christo, Vida de Sancta Oria, Virgen), and La Primera Crónica General.} In this section, I compare the type and token frequencies of Latin \textit{habere} + infinitive in my Latin and Romance corpora and trace the diachronic frequencies of Latin \textit{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\textsubscript{Possibility}/Mod\textsubscript{Obligation/necessity}), and future tense (T(future)) (see chapter 3, section 1):
Table 19 (cf chapter 3, tables 8-10):

<table>
<thead>
<tr>
<th>Stage (type frequency)</th>
<th>Meaning</th>
<th>Subject</th>
<th>Infinitival complement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latin <em>habere</em> (V)</td>
<td>To have</td>
<td>Animate</td>
<td>Two place predicates</td>
</tr>
<tr>
<td>Latin <em>habere</em> (Mod&lt;sub&gt;possibility&lt;/sub&gt;/Mod&lt;sub&gt;obligation/necessity&lt;/sub&gt;)</td>
<td>Modal verb denoting possibility and obligation/necessity</td>
<td>Animate/human agents</td>
<td>All lexical verbs, including one place predicates like passive and intransitive verbs</td>
</tr>
<tr>
<td>Late Latin <em>habere</em> (T(future))</td>
<td>Future tense</td>
<td>All subjects, including inanimate subjects</td>
<td>All lexical verbs, mainly in certain morphosyntactic slots, namely passive infinitive and future-in-the-past</td>
</tr>
<tr>
<td>Medieval Romance (T(future))</td>
<td>Future tense</td>
<td>All subjects</td>
<td>All verbs</td>
</tr>
</tbody>
</table>

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<sub>possibility</sub>/Mod<sub>obligation/necessity</sub>), and future tense maker (T(future)) (cf Raiskila (1990)).

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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 hominibus

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 quae 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):

<table>
<thead>
<tr>
<th>habere (V)</th>
<th>Meaning</th>
<th>Token frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>habere (V)</td>
<td>To have</td>
<td>4</td>
</tr>
<tr>
<td>habere (ModPossibility)</td>
<td>Possibility</td>
<td>28</td>
</tr>
<tr>
<td>habere (ModObligation/necessity)</td>
<td>Obligation/necessity</td>
<td>39</td>
</tr>
<tr>
<td>habere (T(future))</td>
<td>Future tense</td>
<td>78</td>
</tr>
</tbody>
</table>

‘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 (ModPossibility/ModObligation/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 > ModObligation/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 (ModPossibility/ModObligation/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)
et post haec omni-a

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

fin-ire hab-e-s vitam

din-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):

<table>
<thead>
<tr>
<th>habere (V)</th>
<th>Meaning</th>
<th>Token frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>habere (V)</td>
<td>To have</td>
<td>8</td>
</tr>
<tr>
<td>habere (Mod_{Possibility})</td>
<td>Possibility</td>
<td>45</td>
</tr>
<tr>
<td>habere (Mod_{obligation/necessity})</td>
<td>Obligation/necessity</td>
<td>58</td>
</tr>
<tr>
<td>habere (T(future))</td>
<td>Future tense</td>
<td>105</td>
</tr>
</tbody>
</table>

‘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 aparezcan ante del Juicio 22)

3b) dexe-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):

<table>
<thead>
<tr>
<th>Meaning</th>
<th>Token frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obligation/Necessity</td>
<td>24</td>
</tr>
<tr>
<td>T(future)</td>
<td>198</td>
</tr>
</tbody>
</table>

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_{Obligation/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):

<table>
<thead>
<tr>
<th>Stage (type frequency)</th>
<th>Meaning</th>
<th>Complement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject determiner (D in SpecPred)</td>
<td>Demonstrative pronoun ‘this’ in subject position</td>
<td>Topics which show phi-agreement (3rd-person) with shi ‘this’</td>
</tr>
<tr>
<td>Copula verb (Pred)</td>
<td>Copula verb</td>
<td>All subjects</td>
</tr>
<tr>
<td>Subject agreement (AgrS)</td>
<td>Copula verb</td>
<td>Subjects of different persons and numbers</td>
</tr>
<tr>
<td>Tense (T)</td>
<td>Copula verb</td>
<td>Tenses of copula verb</td>
</tr>
</tbody>
</table>

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). 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)), 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)  de dao  sheng ren  shi  huang lao
  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)\textsuperscript{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)\textsuperscript{120}

\textsuperscript{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 topc. 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)).

\textsuperscript{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).

\textsuperscript{120} As shi is used with non-3\textsuperscript{rd} 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>
<thead>
<tr>
<th></th>
<th>Token frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shi (D in SpecPred)</td>
<td>101</td>
</tr>
<tr>
<td>Shi (Pred)</td>
<td>55</td>
</tr>
<tr>
<td>Shi (T:1(^{st}) singular)</td>
<td>8</td>
</tr>
<tr>
<td>Shi (T:1(^{st}) plural)</td>
<td>0</td>
</tr>
<tr>
<td>Shi (T:2(^{nd}) singular)</td>
<td>5</td>
</tr>
<tr>
<td>Shi (T:2(^{nd}) plural)</td>
<td>0</td>
</tr>
<tr>
<td>Shi (T:3(^{rd}) singular)</td>
<td>29</td>
</tr>
<tr>
<td>Shi (T:3(^{rd}) plural)</td>
<td>13</td>
</tr>
<tr>
<td>Shi (T:present tense)</td>
<td>48</td>
</tr>
<tr>
<td>Shi (T:past tense)</td>
<td>7</td>
</tr>
<tr>
<td>Shi (T:future tense)</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^{121}\) 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)

<table>
<thead>
<tr>
<th></th>
<th>Token frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shi (D in SpecPred)</td>
<td>89</td>
</tr>
<tr>
<td>Shi (Pred)</td>
<td>112</td>
</tr>
<tr>
<td>Shi (T:1st singular)</td>
<td>22</td>
</tr>
<tr>
<td>Shi (T:1st plural)</td>
<td>19</td>
</tr>
<tr>
<td>Shi (T:2nd singular)</td>
<td>18</td>
</tr>
<tr>
<td>Shi (T:2nd plural)</td>
<td>3</td>
</tr>
<tr>
<td>Shi (T:3rd singular)</td>
<td>30</td>
</tr>
<tr>
<td>Shi (T:3rd plural)</td>
<td>20</td>
</tr>
<tr>
<td>Shi (T:present tense)</td>
<td>80</td>
</tr>
<tr>
<td>Shi (T:past tense)</td>
<td>27</td>
</tr>
<tr>
<td>Shi (T:future tense)</td>
<td>5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Token frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shi (D in SpecPred)</td>
<td>76</td>
</tr>
<tr>
<td>Shi (Pred)</td>
<td>235</td>
</tr>
<tr>
<td>Shi (T:1st singular)</td>
<td>86</td>
</tr>
<tr>
<td>Shi (T:1st plural)</td>
<td>26</td>
</tr>
<tr>
<td>Shi (T:2nd singular)</td>
<td>46</td>
</tr>
<tr>
<td>Shi (T:2nd plural)</td>
<td>20</td>
</tr>
<tr>
<td>Shi (T:3rd singular)</td>
<td>41</td>
</tr>
<tr>
<td>Shi (T:3rd plural)</td>
<td>16</td>
</tr>
<tr>
<td>Shi (T:present tense)</td>
<td>162</td>
</tr>
<tr>
<td>Shi (T:past tense)</td>
<td>53</td>
</tr>
<tr>
<td>Shi (T:future tense)</td>
<td>20</td>
</tr>
</tbody>
</table>
Table 27: Modern period

<table>
<thead>
<tr>
<th>Token frequency</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shi (D in SpecPred)</td>
<td>72</td>
</tr>
<tr>
<td>Shi (Pred)</td>
<td>367</td>
</tr>
<tr>
<td>Shi (T:1\textsuperscript{st} singular)</td>
<td>92</td>
</tr>
<tr>
<td>Shi (T:1\textsuperscript{st} plural)</td>
<td>46</td>
</tr>
<tr>
<td>Shi (T:2\textsuperscript{nd} singular)</td>
<td>62</td>
</tr>
<tr>
<td>Shi (T:2\textsuperscript{nd} plural)</td>
<td>34</td>
</tr>
<tr>
<td>Shi (T:3\textsuperscript{rd} singular)</td>
<td>73</td>
</tr>
<tr>
<td>Shi (T:3\textsuperscript{rd} plural)</td>
<td>60</td>
</tr>
<tr>
<td>Shi (T:present tense)</td>
<td>162</td>
</tr>
<tr>
<td>Shi (T:past tense)</td>
<td>107</td>
</tr>
<tr>
<td>Shi (T:future tense)</td>
<td>98</td>
</tr>
</tbody>
</table>

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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