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A SYNTACTIC APPROACH TO THE GRAMMATICALIZATION OF THE MODAL MARKERS IN MIDDLE CHINESE: THE MODAL *DĀNG* 當*

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Abstract The objective of this paper is to demonstrate that the grammaticalization of modals in Chinese provides cross-linguistic evidence for grammaticalization as an upward movement from the lexical layer to a functional category comparable to what has been proposed for Indo-European modals in Roberts & Roussou (e.g. 2002, 2003) and many others. To this purpose, we discuss the grammaticalization of the Chinese modal verb *dāng* 當 'should' from a lexical verb into a deontic modal marker and a future marker within the framework proposed in Roberts & Roussou (2002). Modals in Modern Chinese tend to be polysemous; Tsai (e.g. 2008, 2015) accounts for this polysemy by proposing the cartographic approach following Rizzi (1997) and Cinque (1999) for Chinese modals. He demonstrates that synchronically, the different modal readings are generated in different syntactic layers which roughly follow the hierarchy of functional projections proposed in Cinque (1999). In this discussion, we will show that evidence for the existence of a functional category outside *v*P hosting deontic modality comes from the deontic negative markers of Archaic Chinese, and additionally from the semantic scope of negation (following Cormack & Smith 2002). Evidence for a position for a marker of future tense comes from the existence of a temporal adverb in Late Archaic Chinese which is hosted in the TP layer. Based on the scope of negation, the syntax of *wh*-adverbials, and the relative order of necessity modals and possibility modals, we will show that the lexical verb *dāng* 'match, correspond' moves from the lexical layer to the functional layer in TP, which hosts deontic modality and/or future tense markers. It will be proposed that after *dāng* lost its argument structure and grammaticalized into a modal auxiliary, it was merged directly in its respective functional projection.

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1 Introduction

1.1 Modal markers in Chinese

The diachronic development of Chinese modals has gained considerable interest in recent years. Most of the studies on pre-Modern Chinese modality follow the categorization of modal verbs proposed in Palmer (2001) (see e.g. Liu 2000, Li Ming 2001, Li Renzhi 2004, Zhu 2008, Wu 2012, 2014). They focus on the grammaticalization of modal markers according to grammaticalization paths proposed e.g. in Bybee, Perkins & Pagliuca (1994), Traugott (2006), and Heine & Kuteva (e.g. 2002). The Chinese linguistic literature frequently focusses on a distinction between objective and subjective modality based on the analysis of the modal 'can-wish' verbs (Peyraube 1999). A more syntactic approach has been pursued in Wei Pei-chuan's (1999) study on the position of operators, many of which belong to the category of modal adverbs. The 'can-wish' verbs traditionally discussed in the Chinese literature on modality constitute the basis of the system of modal expressions in Late Archaic Chinese (5^{th} – 2^{nd} c. BCE). Of those, the 'can' verbs, the modal verbs of POSSIBILITY, are most relevant for the development of the modal system in Chinese; they express all notions of possibility including root and circumstantial possibility, ability and disposition. Depending on their syntactic structure, the thematic role of the subject and the aspectual features of the complement verb, but also on the employment of negative markers and *wh*-words, the verbs of POSSIBILITY can obtain different readings, including deontic ones (Meisterernst 2008a,b, 2011, Xiong & Meisterernst 2019).

Modal markers in Late Archaic Chinese are a clear instantiation of grammaticalization. The grammaticalization can range from lexical verb to dynamic modal auxiliary verb hosted in the lexical layer, to markers of deontic and/or epistemic modality and to future markers. The first modal verb that grammaticalizes from a lexical verb to a deontic marker in particular syntactic contexts is the verb *kě* 可 'possible, can' in example (1). In (1a) *kě* functions as a stative verb, an adjective, 'possible'. Adjectives are verbs in Late Archaic Chinese. In (1b) *kě* appears as a circumstantial modal auxiliary with an unaccusative/ergative complement. The circumstantial reading, i.e. a possibility induced by external circumstances, is the basic reading of *kě* in LAC (Meisterernst 2008a,b). *Kě* in its basic construction does not assign an argument; the subject of *kě* is always the internal argument of its complement verb. The fact that *kě* has a very reduced argument structure to begin with is certainly one of the factors which allow its grammaticalization as a deontic marker. In (1c) it appears in a double negation construction (Meisterernst 2008b, 2020a,b) expressing deontic modality.

(1) a. 有無父之國則可也。」

Yǒu wú fù zhī guó zé ***kě*** *yě*
have not.have father GEN state then possible SFP
'If there is a country without fathers, then it is **possible**.'
(*Zuozhuan*, *Huan* 16.5.3, LAC)

b. 匹夫猶未可動，而況諸侯乎！

Pǐfū yóu wèi ***kě*** ***dòng*** *ér kuàng*
commoner still NEG_{asp} MOD_{POSS} move CON rather
zhūhóu hū
feudal.lord SFP/Q
'If even a commoner **cannot** be moved, even less can a feudal lord!' (*Zhuangzi* 4.2.1, LAC)

c. 臣違君命者，亦不可不殺也。」

Chén wéi jūn mìng zhě yì ***bù*** ***kě*** ***bù***
subject oppose ruler order REL also NEG MOD_{POSS} NEG
shā yě
kill SFP
'A subject who opposes the order of his ruler **must** also be killed.' (*Guoyu*, *Luyu shang*, LAC)

Poly-functionality of modals is also attested in Modern Chinese (see Tsai, e.g. 2015). Tsai (2008, 2015, based on Rizzi 1997, Cinque 1999) proposes a cartographic analysis for modals in Modern Chinese, deriving the different modal readings in different syntactic positions: epistemic modality is derived in the CP layer, deontic modality is derived in the TP (IP) layer, and dynamic/circumstantial modality is derived in the *v*P layer.

In Late Archaic Chinese (LAC), modal verbs are almost exclusively confined to POSSIBILITY modals, i.e. to expressions of dynamic modality; deontic readings require a marked syntactic environment. A new system of deontic auxiliaries develops in (Early) Middle Chinese (EMC; 1st c. BCE – 6th c. CE), probably partly triggered by the loss of a former derivational morphology of the verb; this loss has also been proposed as a trigger for the change in Chinese from a more synthetic to an analytic language (see e.g. Feng 2014, Huang & Roberts 2017, Meisterernst 2019b, 2020a).[1] The modal *dāng*

1 Feng (2014) and Feng & Liu (2019) propose that the changes from synthetic to analytic and vice-versa in the diachrony and synchrony of Chinese are motivated by the language internal factor prosody. I am grateful to one of the anynonymous reviewers for drawing my attention to Feng & Liu (2019). We take the view that the loss of affixation, including the derivational affixes, which have been proposed for Chinese, is one of the most relevant causes for the changes in the prosodic features of the word in Chinese (see also Meisterernst (2019b).

belongs to the modal verbs, which newly emerge at the end of the LAC and the beginning of the Early Middle Chinese (EMC) period. Early Middle Chinese is one of the most important transitional periods in Chinese, during which synthetic features decrease and the more analytic features of Modern Mandarin (most recently Huang & Roberts 2017) start to develop.

1.2 A syntactic approach to grammaticalization

The theoretical approach taken in this discussion is based on Roberts and Roussou's (2002, 2003) syntactic approach to grammaticalization as the upward movement of a lexical item on the functional spine and its reanalysis as a functional category. Roberts and Roussou propose syntactic change as a change in the parametric values specified for the respective language, initiated by the change of at least one parameter value from one speaker generation to the next. According to them, the central issue diachronic syntax has to account for is how and why this can happen. They claim that learnability connects "to both language acquisition and language change, as there has to be some mechanism that allows the learner to set or reset parameters on the basis of the trigger experience" (Roberts & Roussou 2002: 23). This happens when the trigger is somehow obscure. A relevant aspect of their approach on grammaticalization is structural simplification, i.e. a simplification from move to merge. In the process of grammaticalization, an item changes from a lexical category (e.g. N or V) to a functional head. In contrast to lexical categories, functional categories are by definition not obligatorily PF-realized and they are subject to cross-linguistic variation. Another relevant difference between lexical and functional heads is that the latter are relatively impoverished semantically in comparison to lexical heads, e.g. they are lacking in argument structure (2002: 25); they are also frequently phonologically reduced. Roberts and Roussou follow the hypothesis that all languages have the same set of functional features without any parametric variation involved and that variation only exists in whether and how these features are realized in PF. The PF-realization of a functional feature F, i.e. F*, is achievable in two ways:[2] by Move or by Merge (lexical insertion), dependent on availability in the lexicon. The most economical option is always preferred, i.e. Merge is always preferred over Move. Move is unavailable if a morphophonological matrix for F* exists – this matrix will be F*'s realization. If the lexicon has no such matrix for F*, material from elsewhere must be made available; the least marked option is F, i.e. F is not realized overtly. The

2 The diacritic '*' is the expression of the relation between functional features and morphophonological matrices (Roberts & Roussou 2002: 25).

proposal is that language learners opt for less marked structures; accordingly, there are two possibilities: 1) a change from F*$_{Move}$ to F*$_{Merge}$; 2) a change from F*$_{Move}$ to simply F, i.e. the lack of any PF realization (Roberts & Roussou 2002: 26). Option 1) constitutes the typical case of grammaticalization, i.e. grammaticalization is formally captured as change in the PF-realization of a feature F. Grammaticalization always follows an upward movement on a spine of functional heads following Cinque (1999). The heads proposed as relevant for the grammaticalization of modals discussed in (Roberts & Roussou 2002) are shown in (2).

(2) $\text{Mod}_{\text{epistemic}}$ T(Past) T(Future) $\text{Mood}_{\text{irrealis}}$ $\text{Mod}_{\text{necessity}}$ $\text{Mod}_{\text{possibility}}$ ... Mod_{root} (cf. Roberts & Roussou 2002: 33)

In this analysis, we will provide evidence from the Chinese perspective for the syntax of grammaticalization proposed in Roberts and Roussou and others, in this case with respect to the categories deontic modality and future. The grammaticalization of the modal verb under investigation *dāng* 當 'should, will' from a lexical verb into a functional head is well attested in the Chinese literature (e.g. Meisterernst 2011, Wu 2014). Its diachronic development seems to follow both the proposed pre-theoretical paths of grammaticalization, but also the syntactic accounts of grammaticalization in an exemplary manner. The grammaticalization of *dāng* closely reflects the upward movement in the hierarchy of functional categories proposed in Cinque as in (2). Cinque's cartography of functional projections still needs some adjustment according to the Chinese data; this is not at issue in this paper. The general hierarchy of epistemic modality in the top-most layer, followed by future marking and deontic (necessity) modality in TP, and root possibility, i.e. circumstantial or dynamic possibility in the lexical layer, can be maintained (see also Tsai, e.g. 2008, 2015).[3] According to Tsai's analysis (2008, 2015), the different interpretations of Modern Chinese polysemous modals reflect Cinque's (1999) hierarchy in being generated in different syntactic positions in the lexical, the inflectional, and the CP layers. Diachronic studies of the respective modals provide evidence for the chronological development of these different readings and for the development from dynamic to epistemic modals.[4] Word order constraints in LAC and EMC

3 For a discussion of Cinque's proposal with regard to modals see also Butler (2003).

4 According to their syntactic constraints, Modern Mandarin modal markers, which all derive from pre-modal verbs in earlier stages of Chinese, have been analysed as either adverbs or as modal auxiliary verbs. In LAC and EMC, modal adverbs are confined to speaker oriented meanings such as epistemic and evidential modality, whereas deontic and dynamic modalities are expressed by modal auxiliary verbs, the verbal origin of which is still transparent.

are stricter than those in Modern Mandarin; accordingly, not all of the tests available in Modern Chinese can be conducted in LAC and EMC in order to provide evidence for the change of position, i.e. for the upward movement of modals from a lexical to a functional category. To argue for different syntactic realizations of the deontic and the circumstantial readings of MOD_{poss}, I resort to the scope of negation with respect to the modal, following a proposal in Cormack & Smith (2002). Cormack & Smith (2002) introduce a polarity head in the TP layer which divides modals into deontic (necessity) and circumstantial (possibility) modals: Mod_1 and Mod_2. The former are hosted in the CP/TP layer and the latter are hosted in the lexical layer. Importantly, deontic readings of the possibility modals in LAC are generally connected to polarity contexts, and the semantic scope of negation is a relevant feature when it comes to the distinction of necessity and possibility readings. Negators in Chinese can appear in different positions, but they are always preverbal, independent of their scope relations; thus, the semantic scope of negation is not necessarily reflected in its syntactic position at PF.

1.3 The hierarchy of modal markers

LAC has a great range of negators, morphologically distinguished into modal negators and modally neutral negators. Most of the negators probably grammaticalized from verbal heads historically, i.e. from defective VPs (this can be a defective aspectual or modal head, or a copula), which host a negative prefix in specifier position. These negators differ syntactically from the 'neutral' negative marker *bù* 不, which by default adjoins to the Spec of AuxP or the Spec of VP.[5] Ernst (1995: 684) analyzes *bù* in Modern Mandarin as a proclitic adverb which cliticizes to the following element.[6] Aldridge (2010, 2011) proposes an analysis of *bù* as adjunct of *v*P in LAC and not as projecting its own NegP. Syntactic tests provided in Zeijlstra (2004: 154f) for the adjunct status of negation in non-Negative-Concord languages provide evidence for the analysis of NEG *bù* in LAC and EMC as adjunct or specifier ('why not' test) (see ex. (3b). Although *bù* and VP can be separated by a number of *v*P-internal elements, *bù* has to attach directly to auxiliaries of verbal origin and modal verbs grammaticalized into a functional category. This might be due to a phonological rule which requires *bù* (or the negative

5 AuxP refers to an auxiliary phrase of verbal origin, e.g. a modal auxiliary verb or a light verb.

6 A detailed analysis of negation in Archaic and Early Middle Chinese is still a desideratum and is subject to a different study (Meisterernst 2019a). Modal negative markers, i.e. negators which grammaticalized from a modal verbal head and a negative prefix, are discussed in the next section.

prefix *m-*) always to attach directly to a defective V^0, whether it is a copula or an auxiliary including modals (see also Huang 1988: 287). The NEG-feature of the modal head may be parasitic on the modal functional head (this possibility has been proposed in Haegeman 1995: 127). Arguments for this analysis come from other allegedly contracted forms in AC (e.g. copulas) and from the fact that in Modern Sinitic varieties, negated modal auxiliaries tend to be contracted with a negation marking prefix, e.g., *bú yòng* 不用 > *béng* 甭 (Huang 1988, Ernst 1995) (see also Meisterernst 2020b). In (3a), *bù* attaches to the applicative head *yǐ* 以, which is both a defective verbal head and *v*P-internal (Aldridge 2012). In (3b) *bù* follows the *wh*-word 'why'; it is separated from V by the pronominal internal argument *wú* 吾 'me'. Pronouns are permitted to appear between NEG and V.

(3) a. 吾不以妾為姒。

Wú ***bù*** *yǐ* *qiè* *wéi* *sì*
1P NEG APPL concubine make sister.in.law
'I will not consider a concubine as my sister in law.' (*Zuozhuan*, *Cheng* 11, LAC)

b. 何不吾諫？」

Hé *bù* *wú* *jiàn*
why NEG me admonish
'Why did you not admonish me?' (*Zuozhuan*, *Ai* 11, LAC)

The possible scope relations of negation with respect to a MOD_{poss} are reflected in the following example, which is ambiguous between a deontic permissive and a circumstantial interpretation. The circumstantial reading is represented by the paraphrase in a), NEG has scope over the possibility modal NOT[POSSIBLE/CAN. The deontic reading is reflected in the paraphrase in b); NEG has narrow scope with respect to the necessity operator NECESSARY[NOT. Following the proposal in Cormack & Smith (2002) with respect to the categorization of modals in English, the modal *kě* is analyzed as a circumstantial Mod_2 in a) and as a deontic necessity Mod_1 in b). The syntactic position of Mod_1P and Mod_2P with respect to PolP is shown in (4b). Independent evidence for the existence of PolP comes from rhetorical *wh*-words, which appear in the specifier of PolP (see the examples in (9) and the discussion in Section 3.5).

(4) a. 臣聞敗軍之將，不可以言勇，亡國之大夫，不可以圖存.

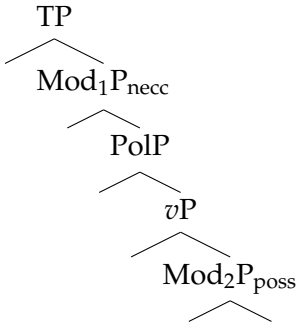
Chén wén bài jūn zhī jiàng ***bù kě*** *yǐ*
subject hear defeat army GEN general NEG can YI
yán yǒng, wáng guó zhī dàifū ***bù kě*** *yǐ*
speak bravery, perish land GEN dignitary NEG can YI
tú cún
plan exist
'I have heard that the general of a defeated army may not speak about bravery and the dignitaries of a perished country may not devise plans for maintenance.' (*Shǐjì*:92;2617, EMC)

Paraphrases:

a) 'it is not possible that the general of a defeated army speaks about ...' = 'a general of a defeated army is not able to speak about ...' >> NOT[POSSIBLE/CAN

b) 'it is not permitted that the general of a defeated army speaks about ...' = 'it is advisable that a general of a defeated army does not speak about ...' >> NECESSARY[NOT

b.



The semantic ambiguities of the construction in (4) pave the way for a grammaticalization of lexical pre-modal verbs into the functional category of $\text{Mod}_{1\text{deont}}$. The scope of negation provides evidence for a higher syntactic projection to which the possibility modal has to move in order to obtain a deontic reading. This will be discussed in the following section.

The paper is organized as follows: in section 2, the syntax of expressions of deontic modality and of future tense in LAC are discussed in order to provide evidence for functional projections hosting Mod_1 and a projection FUT, which hosts a future marking adverb in its specifier. On this basis, the diachronic syntax of *dāng* and its grammaticalization from a lexical verb into a functional head is analyzed in section 3. Section 4 concludes the paper.

The data analyzed is drawn from the Academia Sinica historical corpus. This corpus contains a comprehensive collection of texts dating from Early Archaic (10^{th} – 6^{th} c. BCE) to Middle Chinese, including non-Buddhist and Buddhist texts. Additionally, the CBETA corpus of Buddhist texts, a comprehensive electronic corpus of both transmitted and manuscript versions of the Chinese Tripitaka, has been consulted. These corpora are not tagged and parsed for syntactic structure.

2 Deontic modality in Late Archaic Chinese

2.1 Deontic negative markers

Negative deontic modality, prohibition, can be expressed in two ways in LAC: 1) by a class of synthetic deontic negative markers, or 2) by analytic modal negation, i.e. by a possibility modal + NEG. Obligation is expressed by the possibility modal *kě* with double negation NEG+*kě*+NEG 'cannot not ⟷ have to'. Chinese is not a Negative Concord language (Meisterernst 2020b).

Archaic Chinese has a wide variety of negators, which can be divided into two morphological classes according to their initial consonant; they have been comprehensively discussed in the literature on Archaic Chinese grammar. Deontic modal negators in Archaic Chinese are marked by the initial consonant *m-*, their non-modal counterparts are marked by the initial *p-*. The most relevant modal negators in this context are 1) *wú* (Archaic Chinese **ma*, Middle Chinese (7^{th} c.) *muə̆* 毋/無; and (2) *wù* (AC **mut*, MC *mut*) 勿.[7] Different proposals have been made to distinguish between the two negators. The latter typically serves to negate transitive verbs (Djamouri 1991, 2004).[8] Additionally, Djamouri (1991) proposes an epistemic reading for *wú* 毋; this is difficult to confirm at least for the LAC literature. The semantic function of both modal negative markers is NECESSARY NOT, the negator has narrow scope with respect to the necessity operator contrary to the surface order of NEG,AUX_{mod}. In Early Middle Chinese synthetic modal negation is gradually replaced by analytic modal negation: NEG+AUX_{mod},

7 Reconstructions are taken from Schuessler (2007) and Baxter & Sagart (2014) for Archaic Chinese, and from Pulleyblank (1991) for Middle Chinese.

8 Djamouri (1991) provides a comprehensive review of the different analyses and reconstructions proposed for the Archaic negators. According to Djamouri (1991), *wù* 勿 appears particularly in the negation of transitive verbs, whereas *wú* 毋 negates intransitive and stative verbs in the Oracle Bone and Bronze Inscriptions. This proposal has been challenged by numerous scholars. Wei (2004) is the most comprehensive discussion of this issue; he provides a number of arguments against this proposal and in favour of the predominant position that *wù* is a fusion of an *m*-negative marker and the object pronoun *zhī* 之 of LAC (see also Pulleyblank 1995).

probably triggered by a loss of transparency of the Archaic system. The examples in (5a) and (5b) show the modal negator *wù*; in (5b) it appears in the complement of a verb of prohibition and warning.[9] (5c) shows analytic modal negation with the negative marker *bù* 不, the regular non-aspectual negative marker also of Modern Chinese, negating the modal auxiliary of possibility *dé* 得 'can, manage to', which receives a deontic reading in this context.

(5) a. 先生置之，勿復言已。

Xiānshēng *zhì* *zhī* ***wù*** *fù* *yán* *yǐ*
sir put.aside 3OBJ NEG$_{mod}$ again speak SFP
'Put it aside, sir, and **do not** mention it again.'
(*Zhanguo ce* 17.12.12, 2nd c. BCE)

Paraphrase: it is NECESSARY NOT to mention it

b. 禁舊客勿出於宮。

Jìn *jiù* *kè* ***wù*** *chū* *yú* *gōng*
prohibit old guest NEG$_{mod}$ leave PREP palace
'he (forbade) **ordered** older visitors **not to** leave the palace.'
(*Zuozhuan Zhao* 18, LAC)

Paraphrase: it is NECESSARY that they NOT leave

c. 淨人益食不得相喚。但以手指麾。

Jìngrén *yì* *shí* ***bù*** ***dé*** *xiāng* *huàn* *dàn*
server add food NEG MOD$_{poss}$ mutual call.out only
yǐ *shǒu* *zhǐ* *huī*
with hand show wave
'If the servers are supposed to add food, one **must not call** them, only wave with the hands.'
(*Taishō* 51, 2085, 857b, 5th c. CE)

Paraphrase: it is NECESSARY/obligatory NOT to call (out loud) to them. NECESSARY[NOT = clear obligation, the theoretical possibility to call still exists.

Djamouri (2004) proposes that the modal *wù* in the earliest written documents, the Oracle Bone Inscriptions (14th – 11th c. BCE), has focalizing

9 A number of verbs in this category require modal negators in their complement, expressing subjunctive mood (Van Aucken 2004).

functions as in (6a). Meisterernst (2019a) proposes that the modal negative markers grammaticalize from a verbal modal head with a negative prefix *m-* in specifier position in correspondence to similar morphological derivations which have been proposed, e.g., for the copula, and to derivational processes in Modern Sinitic languages, which display fusional processes of a modal head with a negator.[10] The modal head and the *m-* negative prefix are in an agreement relation; the prefix *m-* specifies the modal head as [+NEG]. The analysis in (6b) reflects this proposal. According to this analysis, a negative modal verb takes a CP as its complement. The analysis in (6b) results in the translation 'It must not be that the king personally inspects and fights', different from the translation proposed in Djamouri (2004). In this analysis, the intial *m-* is analysed as a negative prefix in [Spec,V/ModP], and the modal head is still transparent as a verbal head.[11]

(6) a. 勿王自望戎

Wù	*wáng*	*zì*	*wàng*	*róng*
NEG_{MOD}	king	personally	inspect	fight

'it must not be the king who personally inspects and fights.'
(*Heji* 7, 218, from Djamouri 2004: 161)

10 An example for this kind of morphological process is the copula *wéi* 唯 (*ɢʷij (Baxter & Sagart 2014)) in Archaic Chinese for which different derivations involving affixation have been proposed: a) *wēi* 微 (*məj) '(if) it is not for' as a derivation with the negative prefix *m- (m+唯*ɢʷij), which allegedly is the *m*-variant of b) the negative copula *fēi* 非 (不*p(ə)+唯*ɢʷij) (e.g. Yen 1977). Yen (1977: 476) points to the marking of mood, realized in the contrast of *m-* and *p-* negation not only with regard to "adverbial" negation, but also to nominal and sentential negation. Another derivation of the copula *wéi* with an *s- prefix *swij (*s-qwij (Baxter & Sagart 2014)) has been proposed in Jacques (2019: 23f) for the concessive conjunction *suī* 雖 indicating a gerundial meaning 'while being xxx', which grammaticalized into a concessive conjunction. See also note 16.

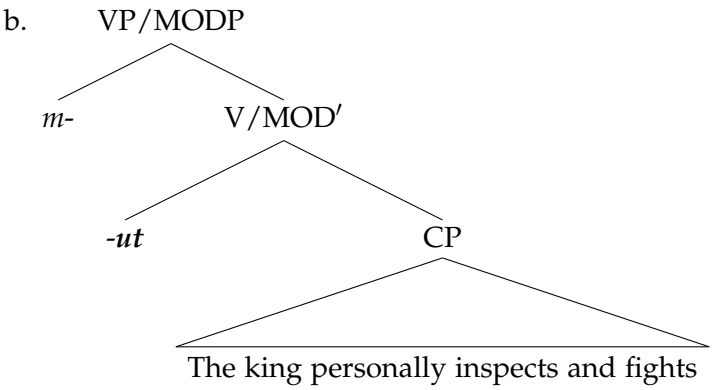
11 According to an emendation of this example discussed in Meisterernst (2020b), the negative modal is followed by the copula *wéi* discussed in footnote 10. This employment of *wù* would clearly suggest that *wù* negates the entire proposition following it and not merely the *v*P. More evidence for this function comes from the combination of *wù* with the existential verb *yǒu* 有 'have, there is', in which *wù* cannot convey a direct obligation on an agent; the latter function has been proposed as the defining feature of the modal negator *wù* in Djamouri (2004).

(i) 子産與宋人為成，曰，「勿有是」。

Zǐ	*Zhǎn*	*yǔ*	*Sòng*	*rén*	*wéi*	*chéng*	*yuē*	*wù*	*yǒu*	*shì*
Zi	Zhan	and	Song	people	make	agreement	say	MUST.NOT	have	this

'Zi Zhan and the people of Song made an agreement saying: "They should not have this/It should not be the case that they have this."'
(*Zuozhuan*, *Ai* 12, LAC; Meisterernst 2020b)

b.



This position of *wù* is not attested in the LAC literature, but some vestiges of this function in idiomatic combinations with high adverbials argue for a high position outside of *v*P for the modal negative markers *wú* and *wù*. This is shown in (7), in which the modal negator appears in a functional projection within CP: in (7a) *wù* precedes the high modal particle/adverb *yōng* 庸, a marker of rhetorical questions. The high position of *yōng* is shown in (7b) where it precedes the epistemic adverb *bì* 必 'certainly, necessarily' in a rhetorical question. *Bì* as an epistemic adverb appears by default in the CP layer; it precedes temporal and aspectual adverbs. The example in (7c) illustrates the regular position of deontic *wù* 勿 in the TP layer without any further marking. In this example, *wù* follows the epistemic adverb *bì*, arguing for a lower position in TP. The two different positions of deontic negative markers are represented in (7d). The grammaticalized combination of NEG_{MOD} with a CP adverbial is generated in a polarity phrase in CP (Pol_1P) (Meisterernst 2018); this is the result of the grammaticalization of a negative modal verbal head in combination with a CP adverbial, which is typical for rhetorical questions. For the deontic modal negator in TP, two different analyses are possible according to the supposed stage of grammaticalization: 1) The modal verbal head of NEG_{MOD} is still morphologically transparent, the negative prefix *m-* is the overt reflex of the covert NEG in [Spec,Pol_2P] at LF;[12] 2) NEG_{MOD} has already been fully grammaticalized and appears overtly in [Spec,Mod_1P], the modal head is covert (see also Meisterernst 2020b).[13] The introduction of the lower Pol head in the derivation is discussed more comprehensively in section 2.2.

(7) a. 不如聽之以卒秦，勿庸稱也以為天下。

12 This follows a proposal in Cormack & Smith (2002), which has been taken as a basis for a proposed analysis of the relation between modality and negation in Meisterernst (2020b).

13 The grammaticalization of the modal negators from verbal modal heads to simple negators eventually also triggers the development of analytic modal negation.

Bù rú tīng zhī yǐ zú Qín ***wù*** ***yōng***
NEG be.like listen 3OBJ CON finish Qin NEG_{mod} YONG
chēng yě yǐwéi tiānxià
mention NOM make empire
'It would be better to listen to them and let Qin succeed, but it **should not** be announced and made to [an affair of] the empire.' (*Zhangguo ce* 11.10.2, 2nd c. BCE)

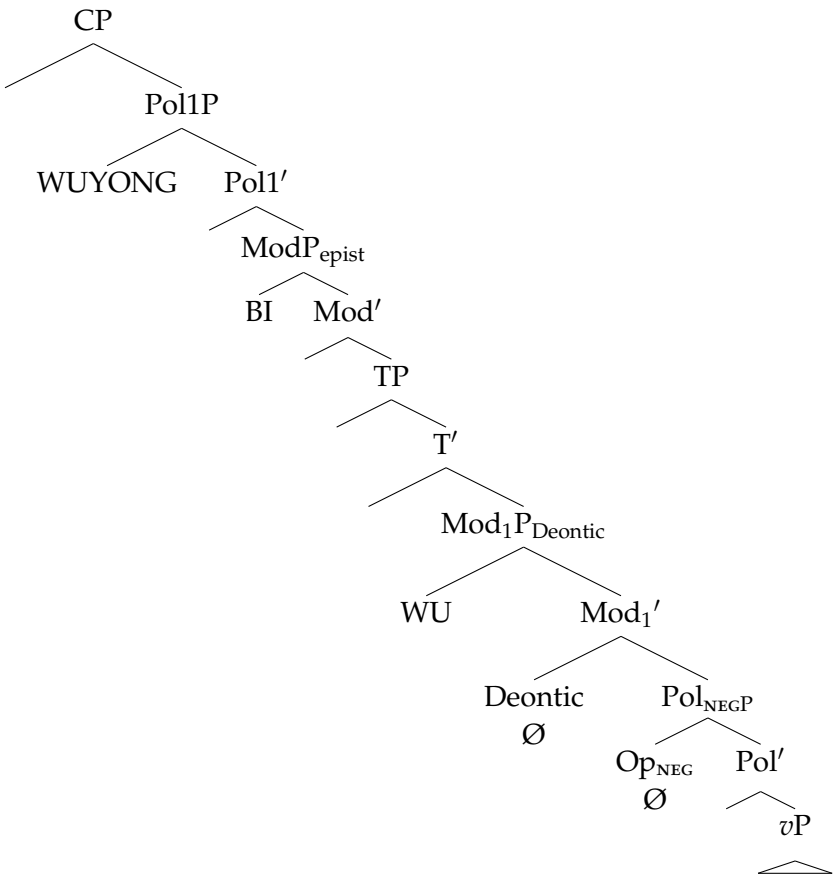
b. 所效者庸必得幸乎？

Suǒ xiào zhě ***yōng*** ***bì*** *dé xìng hū*
REL follow REL RHETQ necessarily obtain favor SFP/Q
'Is what follows that they are really **necessarily** obtaining favor?!' (*Zhangguo ce* 25.25.5, 2nd c. BCE)

c. 『毋或如東門遂不聽公命，殺適立庶』。

Wú ***huò*** *rú Dōngmén Suì bù tīng gōng*
NEG_{mod} someone be.like Dongmen Sui NEG listen duke
mìng shā dí lì shù
order kill heir enthrone son.of.concubine
'We **should not** be like Dongmen Sui not listening to the duke's order and killing the righteous heir and enthrone the son of a concubine.' (*Zuozhuan Xiang* 23, LAC)

d.



2.2 *Possibility modals as deontic markers*

Deontic modality, i.e. obligation, is expressed predominantly by the root possibility verb *kě* 可 'possible, can'.[14] The deontic interpretation of root possibility modals requires a particular syntactic context involving polarity: a) in combination with negation 1) NEG+*kě*; 2) *kě*+NEG; 3) NEG+*kě*+NEG; b) rhetorical questions, which by definition involve reverse polarity (Progovac 1994, Han 1998, citing Sadock 1974). But this syntactic environment does not necessarily lead to a deontic reading; the root possibility modals are polysemous with respect to a deontic necessity and a circumstantial possibility reading at least in some of the marked syntactic contexts involved. Example (8a),

14 *Kě* is the oldest of the possibility modals appearing in this construction and the one that grammaticalized furthest. Another modal verb *dé* 得 as a lexical verb meaning 'get, obtain' also functions as a (pre)modal in LAC with the reading 'can, manage to'. It has an implicative reading in past tense context and is the only modal verb that has developed from an achievement verb and not from a stative verb (Meisterernst 2017).

repeating (1a), represents the pre-modal verb of possibility 'possible' without a complement; this constitutes the basis from which the different modal readings evolve. In (8b), the modal appears in its circumstantial reading, and in (8c–8e) it appears as a deontic modal in combination with negation. In the examples (8b–8e), the complement of *kě* appears in its default construction, i.e. referring to a resultant state; the subject has to be the internal argument of the complement verb. To retain its original argument structure, i.e. to permit an external argument, the complement of *kě* needed to be introduced by the applicative head (light verb) *yǐ* 以 in LAC as in example (8f). Resultant states can be marked by derivational affixation in Archaic Chinese, similar to the Tibetan aspectual system (Jin 2006, Meisterernst 2019b). About one third of the complements of *kě* contain verbs for which a derivational morphology related to telicity has been reconstructed (Meisterernst 2019b). This corresponds roughly to the percentage of complements of modal verbs marked by the Germanic prefix *ge-* in Old English (McFadden 2015), which has been compared functionally to the derivational morphology of Chinese in Meisterernst (2019b). This function of the derivational morphology became opaque by the end of the LAC period and triggered changes in the aspectual system and presumably also in the modal system of Chinese. The analyses of the two different syntactic positions of the circumstantial and the deontic reading are in (8g) and in (8h) respectively.

(8) a. 有無父之國則可也。」

Yǒu *wú* *fù* *zhī* *guó* *zé* ***kě*** *yě*
have not.have father GEN state then possible SFP
'If there is a country without fathers, then it is **possible**.'
(*Zuozhuan*, *Huan* 16.5.3, LAC)

b. 勢治者，則不可亂；而勢亂者，則不可治也。

Shì *zhì* *zhě* *zé* *bù* *kě* *luàn* *ér*
situation ordered REL then NEG MOD_{POSS} chaotic CON
shì *luàn* *zhě* *zé* *bù* *kě* *zhì* *yě*
situation chaotic REL then NEG can ordered SFP
'If the political situation is ordered, then it cannot be put into chaos; if it is in chaos, it cannot be ordered.' (*Hanfei zi* 40.05.02, LAC)

Paraphrase: then it is NOT POSSIBLE ⟷ NOT[POSSIBLE

c. 仲山父諫曰：「民不可料也！

Zhòngshān fù jiàn yuē mín bù kě
Zhongsan father remonstrate say people NEG MOD_{POSS}
liào yě
counted SFP
'Father Zhongshan remonstrated and said, "The people may not be counted."' (*Guoyu, Zhouyu shang*, LAC)

Paraphrase: it is NECESSARY that the people are NOT counted ⟷ NECESSARY[NOT[15]

d. 勢之於人也，可不慎與？

shì zhī yú rén yě ***kě*** ***bù*** *shèn yú*
influence GEN at man SFP MOD_{POSS} NEG careful SFP/Q
'And in using one's power with regard to human beings, **must** one not be careful / one must (it is necessary to) be careful!?' (*Shiji*: 40;1737, EMC, 100 BCE)

Paraphrase: is it possible that one is not careful? it is NOT POSSIBLE that one is NOT careful ⟷ NECESSARY[THAT: reverse polarity.

e. 君子一言以為知，一言以為不知，言不可不慎也。

Jūnzǐ yī yán yǐ wéi zhī yī yán yǐ
gentleman one word APPL make know one word APPL
wéi bù zhī yán bù kě bù shèn yě
make NEG know word NEG MOD_{POSS} NEG careful SFP
'A gentleman will be considered wise according to one word, or he will be considered unwise according to one word, words **cannot not (=have to)** be treated with care!' (*Lunyu* 19.25, LAC)

Paraphrase: it is NOT POSSIBLE that NOT ⟷ NECESSARY[THAT

f. 臣聞敗軍之將，不可以言勇，

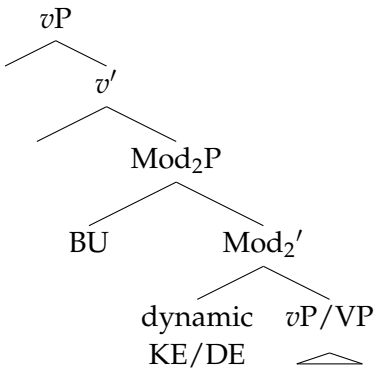
chén wén bài jūn zhī jiàng ***bù*** ***kě*** ***yǐ***
subject hear defeat army GEN general NEG MOD_{POSS} YI
yán yǒng
speak bravery

15 The verbs in (8a) and (8b) have been discussed in Meisterernst (2019b) as examples for verbs which display the derivational morphology reconstructed for Chinese, i.e. they are words which have a reading in the falling tone (*qùshēng*), which alternates with a variant in a non-*qùshēng* reading. The falling tone results from a former **s*-suffix, proposed to indicate notions such as telicity and resultativity in Meisterernst (2019b), or perfectivity in Jin (2006).

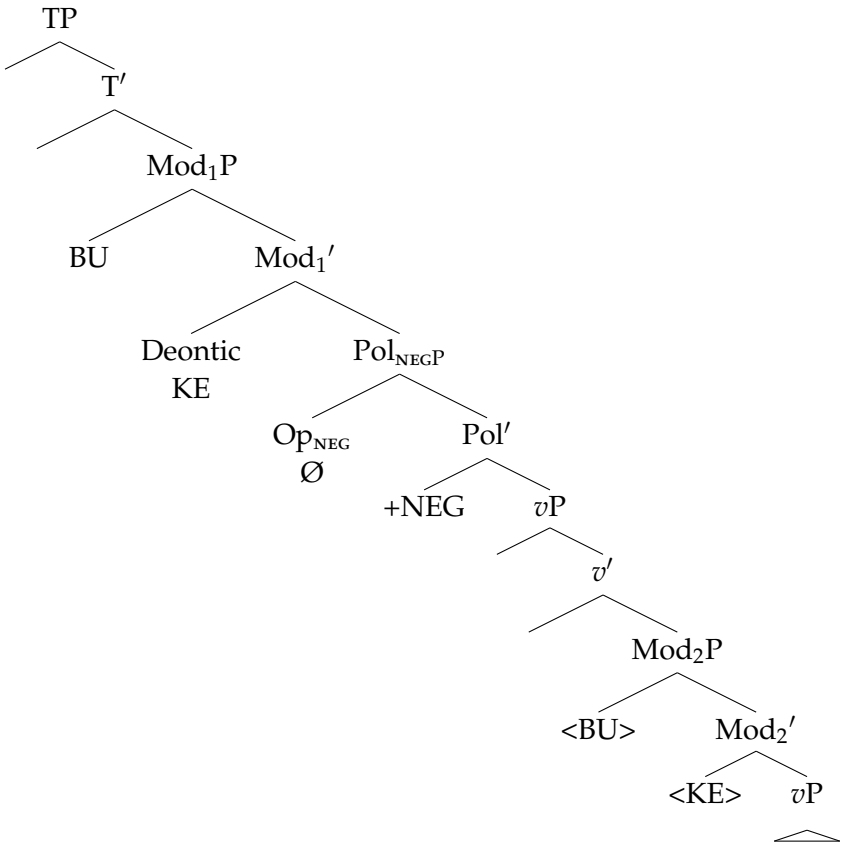
'I have heard that the general of a defeated army **may not** speak about bravery ...' (*Shiji*: 92;2617, EMC, 100 BCE)

NECESSARY[NOT

g.



h.



According to the analyses in (8g) and (8h), the circumstantial reading is

hosted in Mod_2 in the lexical layer, and NEG appears in [Spec,Mod_2]; the scope relations of the negator are reflected in its syntactic position NEG[POSSIBLE. Since *kě* is already grammaticalized as a circumstantial modal, no movement is involved in this process, and *kě* is directly merged in Mod_2. For the deontic reading with simple negation a different derivation, i.e. a movement analysis, is proposed to account for the polysemy of the modal. A negative operator is merged at LF in PolP, where negation is semantically interpreted; NEG has to be covert in order to return reverse polarity (see Meisterernst 2020b). The modal head moves out of *v*P through PolP, which is specified as [+NEG], up to the position of Mod_1. Post-syntactically, NEG is merged in [Spec,Mod_1] due to the phonological rule that NEG has to immediately precede a defective verbal head; this results in the correct PF order of NEG MOD. The semantic scope of negation interpreted in PolP implies the deontic reading of *kě*. The fact that the modal *kě* is characterized by a reduced argument structure may have facilitated this process. As example (8a) demonstrates, the pre-modal *kě* 'possible' assigns neither an external nor an internal argument in its basic structure. At this stage, the grammaticalization process from Move to Merge has not been completed yet (see Roberts and Roussou, particularly 2002, 2003). The result of this derivation is syntactically identical to synthetic negative modals, which have been proposed to consist of a modal (originally verbal) head and a prefixed negative element. According to the narrow scope of the negator with respect to Mod_1 NECESSARY[NOT, the negator has to be interpreted below Mod_1P, in PolP, at LF. The necessity reading is derived from the equivalence of the reading 'it is not possible that *p* $\neg\Diamond p$' of NEG+MOD_{poss} with 'it is necessary that not *p*: $\Box\neg p$', in terms of necessity: the deontic reading is logically implied with a negated possibility modal. This semantic equivalence may have been one of the triggers for the grammaticalization of possibility modals into deontic necessity modals. In LAC, the scope of negation is the only evidence for the two syntactic derivations proposed and for a possible movement analysis of the modal from the lexical to the functional layer. Additionally, possibility modals remain polysemous. Thus, there was no real syntactic cue to distinguish between the two readings for the language learner. This might have been one of the triggers for the emergence of a new system of unambiguously deontic modal markers in EMC.

2.3 Future marking in Late Archaic Chinese

LAC has two future marking adverbs *jiāng* 將 and *qiě* 且, which both occupy the same syntactic position; the most commonly used of the two is the adverb *jiāng* (e.g. Meisterernst 2015, Wei 2015). It has been proposed that *jiāng*

grammaticalized from a verb of moving (Wei 2015), but a precise relation between the verbs 將 *jiāng* 'take, bring, undertake, support' (Pulleyblank 1991: 149) and 將 *jiàng* 'lead (an army)' (Pulleyblank 1991: 150) and the future adverb *jiāng* could not be established so far (Wei 2015: 254). In LAC, *jiāng* is one of the most common temporal adverbs, referring to situations located at a reference time following speech time. It is clearly generated outside *v*P (Meisterernst 2015). Meisterernst (2015, 2016) proposes that aspectual and temporal adverbs occupy a position outside *v*P as specifiers of their respective functional projections. The syntactic position of *jiāng* is shown in the examples in (9): in (9a), *jiāng* precedes the *v*P-internal reflexive pronoun *zì* 自; in (9b), it precedes the negative marker *bù* 不; this argues against the proposed grammaticalization from a verbal head, which would seem to require NEG preceding *jiāng*.[16] In (9c), it precedes the *wh*-adverbial *yān* 焉 'how', located outside *v*P, always preceding the negative marker *bù*; in (9d), it precedes the adverbial *wh*-word *hé* 何 'how', also located outside *v*P, and the possibility modal *néng* 能 'able to'; in (9e), it precedes adverbial *héyǐ* 'how' (frequently rhetorical), outside *v*P; in (9f), it precedes the *wh*-adverbial *héyōng* 何庸 'why, what use', marking rhetorical questions; in (9g), it follows the epistemic modal *bì* 必, which appears in the CP layer. In ex. (7b) we had the order *yōng bì*, showing that *yōng* independently can occupy a different and higher position than in combination with a *wh*-word. The data provides evidence for a functional projection marking future within TP in LAC. At the same time, it provides independent evidence for the existence of a PolP within TP, which hosts rhetorical *wh*-words. The different instantiations of *wh*-adverbials are discussed in section 3.5.

(9) a. 莫敖狃於蒲騷之役，將自用也。

Mòáo *niǔ* *yú* *Púsāo* *zhī* *yì* ***jiāng*** ***zì***
moao confident PREP Pusao GEN expedition FUT self
yòng *yě*
employ SFP

'The *moao* has gained confidence due to the Pusao expedition, he will employ himself.' (*Zuozhuan Huan* 13, LAC)

b. 「人將不食吾餘。」

16 Many adverbs in Chinese apparently originate from verbs. Different processes have been proposed for the derivation of adverbs in Archaic Chinese, including derivation via affixation and grammaticalization processes. Particularly for adverbs which are already attested in the earliest written documents, paths of grammaticalization are difficult to establish; morphological derivation has only been reconstructed for a limited number of adverbs so far.

Rén ***jiāng*** ***bù*** *shí* *wú* *yú*
man FUT NEG eat my leftover
'The man will not eat my leftovers.' (*Zuozhuan Zhuang* 6, LAC)

c. 君失其官，帥師不威，將焉用之？

Jūn *shī* *qí* *guān* *shuài* *shī* *bù* *wēi* ***jiāng***
ruler lose POSS office lead army NEG authority FUT
yān *yòng* *zhī*
how employ 3OBJ
'If the ruler loses his office, when leading an army does not show authority, how will one employ him?' (*Zuozhuan Min* 2, LAC)

d. 不畏于天，將何能保？

Bù *wèi* *yú* *tiān* ***jiāng*** ***hé*** ***néng*** *bǎo*
NEG respect PREP heaven FUT how able protect.oneself
'Without respect towards heaven, how will he be able to protect himself?' (*Zuozhuan Wen* 15, LAC)

e. 民弗堪也，將何以終？

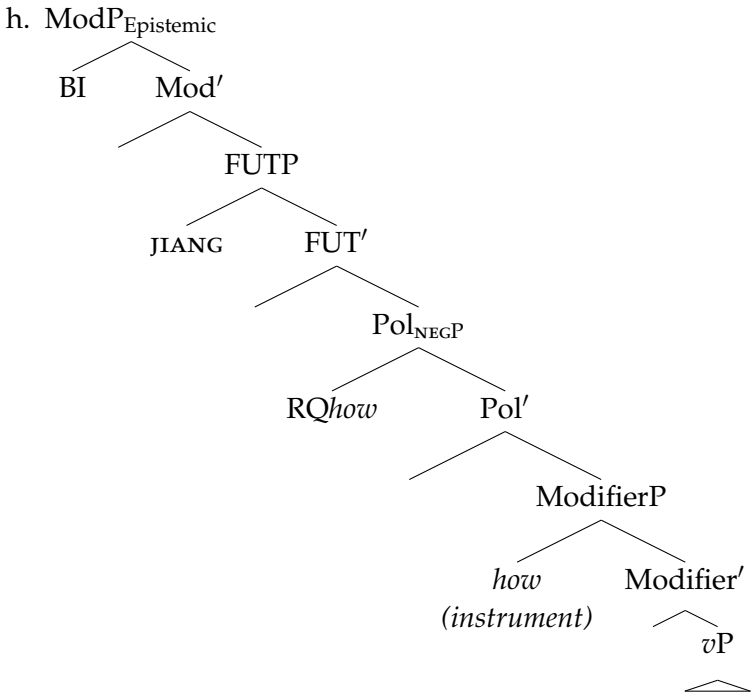
Mín *fú* *kān* *yě* ***jiāng*** ***héyǐ*** *zhōng*
people NEG_{tr} bear SFP FUT how finish
'The people will not bear it, how can he come to a natural end?' (*Zuozhuan Zhao* 1, LAC)

f. 將庸何歸？

Jiāng *yōnghé* *guī*
FUT RHETQ return
'What use will it be to return?!' (*Zuozhuan Xiang* 25, LAC)

g. 天未絶晉，必將有主。

Tiān *wèi* *jué* *Jìn* ***bì*** ***jiāng*** *yǒu* *zhǔ*
heaven NEG_{ASP} cut.off Jin EPIST FUT have ruler
'Heaven has not cut off Jin yet, it will certainly have a ruler.' (*Zuozhuan Xi* 24, LAC)

h. 

2.4 Intermediate conclusion

In this section we tried to provide some evidence for the presence of functional projections hosting deontic modality and future tense in Archaic Chinese. The projection hosting deontic modality has been labeled Mod_1P, following a proposal in Cormack & Smith (2002). In Archaic Chinese, this projection hosts synthetic deontic negative markers for which we propose that they grammaticalized from a defective modal verbal head with a prefixed negative element.[17] We propose that this projection is also targeted by possibility modals in polarity contexts, when the negator has narrow scope with respect to the modal. This triggers a deontic interpretation. To acquire a deontic interpretation in Mod_1P, the modal has to move up from

17 Arguments for this proposal come from the fact that in Chinese history, merger of a negator with a modal verbal head seems to be attested throughout; a modern example would be the merger of *búyòng* 不用 to *bēng* 甭 'need not, don't' (see also Lien 2015 for Southern Min). Archaic Chinese has a number of negators which obviously consist of a defective verbal head such as a copula, modal head, etc. and a negative prefix (see note 10 for an example). In Middle Chinese, during a process of analyticization, modal negation was more and more expressed by NEG+MOD. At the same time new fusion forms appeared e.g. in Buddhist Chinese texts (e.g. *pǒ* 叵 for *bùkě* 不可 'not possible'). The process from merged synthetic to analytic forms and back to more synthetic forms of negators is attested throughout the history of Chinese particularly in more vernacular contexts (see also Feng & Liu 2019).

Mod_2P to the higher functional projection through a polarity head in which negation is interpreted at LF, reflecting the semantic scope of negation. The overt negator has to be merged directly to ModP independently of its semantic scope, due to a morphophonological rule which requires negation to immediately precede defective verbal heads in Chinese. The interpretation of negation in PolP implies an interpretation of the modal in Mod_1P as a deontic marker. This process paves the way for a small number of lexical (pre-modal) verbs to grammaticalize into functional heads, first by moving up to Mod_1, where they are eventually reanalyzed and directly merged as deontic markers without any further syntactic requirements. This will be proposed for the modal *dāng* in section 3. We also showed that a functional projection in the TP layer existed in LAC hosting a future marking adverb and providing a functional category for the reanalysis of a modal auxiliary into the marker of future tense.

3 The diachronic development of modal *dāng* 當

3.1 From lexical verb to modal auxiliary

The modal *dāng* 'should' first emerged as a modal auxiliary at the end of the LAC period (Meisterernst 2011). One of the triggers for the emergence of new modal markers in Early Middle Chinese was possibly the loss of transparency of the former derivational aspectual morphology of the verb as one of a number of structural changes in Chinese at that time (Aldridge, e.g. 2013a, 2013b, Feng 2014, Aldridge & Meisterernst 2018, Meisterernst 2019b, 2020a). The aspectual morphology reconstructed for Chinese, especially the derivational suffix **-s* and an alternation between [+/−VOICE] initials, have been connected to Inner Aspect and resultativity (Aldridge & Meisterernst 2018, Meisterernst 2019b and references therein); resultative forms marked by the suffix **-s* could be reanalyzed as deverbal nouns (Jin 2006). This system has been connected to the Written Tibetan system (recently Jin 2006 and references therein), in which a cognate suffix *-s* indicates past/perfect and imperative readings. With the loss of this morphology, a new and more analytic system developed in Tibetan. With regard to the Germanic languages, Leiss (2008) claimed that the loss of aspectual morphology in Germanic led to the development of an intricate system of modal markers.[18] In Chinese the loss of transparency of the aspectual morphology coincides with the emergence of a system of new aspectual and modal markers as one

18 Leiss (2008: 16): "Languages which have lost an elaborate aspect system tend to develop articles ... as well as a class of modals with deontic and epistemic meanings ..." (see Meisterernst 2019b, 2020a for more detailed discussions).

of numerous changes in the grammar of Chinese. This leads to the proposal of a causal relationship between the two diachronic developments. The old system of morphological marking became opaque for the language learner, morphological distinctions between verbs and deverbal nouns ceased to be productive, and accordingly a new system had to develop (Meisterernst 2020a).

Dāng is attested in LAC as a lexical transitive verb 'match (← be opposite on two matching sides), correspond to, undertake, be in charge of, act as', and as an intransitive state verb in the meaning 'appropriate, adequate'. In this respect it resembles the modal *dé* 得 'can, manage to' (see e.g. example 5c), which also has a transitive and an intransitive variant as a lexical verb in LAC, more than it resembles the modal *kě* (see ex. 8), which is only attested as an intransitive state verb. But in contrast to *dé*, the transitive and the intransitive variants of *dāng* are distinguished morphologically; for the transitive variant, the reading **taŋ* has been reconstructed; the intransitive/resultative variant is marked by the suffix **-s*: **taŋ-s* (Jin 2006: 375).[19] The general assumption is that the transitive variant constitutes the basis for the development into a modal auxiliary 'ought, should', when it permits a VP complement instead of an NP complement (Meisterernst 2011, Wu 2014) 'be in charge of X → should do X'.[20] In its first instantiations as a modal verb *dāng* expressed circumstantial and weak deontic modality. With *dāng*, the deontic reading does not require an overt polarity context such as negation or rhetorical questions. In the early Buddhist Chinese literature (2nd – 6th c. CE), *dāng* also acquires functions as a future marker and as an epistemic modal. In EMC, *dāng* is attested as a poly-functional modal in addition to keeping its function as a lexical verb; a split between the functional and the lexical domain occurred. This is a scenario typical for Chinese.

The examples in (10) and (11) represent an overview of the grammaticalization of *dāng* from LAC to EMC.[21] The examples in (10a) and (10b) show *dāng* as a lexical transitive verb with a DP complement, with two different

19 Numerous verbs show a morphological distinction between transitive/causative and intransitive/unaccusative/resultative variants: one frequently discussed example is the verb 治 *chí* (*g-de) 'govern'/*zhì* (*g-de-s) (Jin 2006) 'be governed', which is a typical representative for 'derivation by tone change' (for a discussion and references see Aldridge & Meisterernst 2018, Meisterernst 2019b).

20 Wu (2014) comprehensively discusses the different meanings of *dāng* in LAC and the different proposals with respect to the grammaticalization of *dāng* from either the transitive or the intransitive variant. She argues in favor of the transitive variant as the source of grammaticalization of the modal and future marking auxiliary.

21 *Dāng* also develops into a functional head taking a temporal expression as its complement (Meisterernst 2015); these are usually analyzed as PPs; the diachronic development of *dāng* NP_{temp} is not discussed in this paper.

kinds of external arguments. (10c) exemplifies the intransitive employment of *dāng* with the meaning 'adequate, i.e. being matched/matching, corresponding'. The examples in (10d) and (10e) demonstrate how the ambiguity of *dāng* between an analysis as lexical and as modal verb arises. This ambiguity is caused by the fact that the respective complements can be analyzed as either NPs or as VPs. After the loss of productivity of the derivational morphology of Chinese, any productive distinction between the two categories ceased to exist (Aldridge & Meisterernst 2018). The two different analyses for an NP complement in (10d) and an NP or VP complement in (10e) are given in (10f).

(10) a. 於是子罕當國，子駟為政，子國為司馬。

Yúshì *Zǐ* *Hǎn* *dāng* *guó* *Zǐ* *Sì* *wéi*
therefore Zi Han take.charge state Zi Si do
zhèng *Zǐ* *Guó* *wéi* *sīmǎ*
government Zi Guo become marshal
'Therefore Zi Han took charge of the state, Zi Si regulated the government, and Zi Guo became marshal.' (*Zuozhuan, Xiang* 2, LAC)

b. 行爵出祿。必當其位

xíng *jué* *chū* *lù* *bì* ***dāng*** *qí* *wèi*
carry.out title issue salary must correspond its position
'The conferring of titles and the issuing of salaries must **be in accordance** with the position.' (*Liji*, *Yueling*, EMC)

c. 天地順而四時當。

tiān *dì* *shùn* *ér* *sì* *shí*
heaven earth follow CON four season
dàng (**taŋ-s*; Jin 2006: 375)
matched
'Heaven and earth are in tune and the four seasons are adequately matched.' (*Liji* 19.03.13, EMC)

d. 子夏之門人小子，當洒掃應對，進退則可矣。

Zǐ *Xià* *zhī* *mén rén* *xiǎo zǐ* *dāng* *xǐ* *sǎo*
Zi Xia GEN disciple pupil attend wash(N) sweep(N)
yīng *duì* *jìn* *tuī* *zé* *kě*
reaction answer(N) advancement retreat(N) then possible
yǐ
SFP

'Regarding zi Xia's disciples and little pupils, when it comes to taking charge of washing and sweeping, answering questions, advancing and retreating, they are alright.' (*Lunyu* 19.12, LAC)

e. 雖然則彼疾當養者。孰若妻與宰

Suī *rán* *zé* *bǐ* *jí* *dāng* *yǎng*
however be.like then that ill attend/should nourish
zhě *shú* *ruò* *qī* *yǔ* *zǎi*
NOM which be.like wife and steward
'However, if he is going to be ill, of those who attend to nourishing/should nourish him, who would be better than his wife and his steward?' (*Lǐjì*, *Tángōng xià*, EMC)

f. [$_{VP}$ *dāng* 'be in charge with' [$_{NP}$ *yǎng* 'nourishment']] → [*v*P [$_{VP/ModP}$ *dāng* 'should' [$_{VP}$ *yang* 'nourish']]]

The examples in (11) show *dāng* with a *v*P/VP complement; this is the precondition for its reanalysis as an auxiliary verb. This development is accompanied by a loss of argument structure of *dāng*. In the examples in (10d), and particularly in (10e), the respective complements are ambiguous between a nominal and a verbal analysis, but they clearly constitute the internal arguments of *dāng*. In the examples in (11), the respective complements of *dāng* are unambiguously verbal; in addition, with the exception of (11a), they do not constitute the internal argument of *dāng*. In (11a), the original argument structure is still intact, and the VP can be analyzed as the internal argument of a verb 'be in charge of'. In (11b) and (11c), the complement cannot be analyzed as an internal argument of *dāng* any more. In (11b) *dāng* functions as a deontic modal with an unaccusative telic verb as its complement; the structure is similar to the structure required by *kě* discussed in example (8). In contrast to *kě*, *dāng* as a deontic verb does not require an unaccusative/resultative verb in its complement *v*P; this can be seen in (11c) and (11d). In (11c), the verb in the complement of *dāng* is an unergative verb, and its original argument structure is retained. In (11d), *dāng* appears as a future marker. The examples also demonstrate that in EMC both the lexical verb *dāng* and the modal *dāng* are attested.

(11) a. 天子儀當獨奉酌祠始皇廟

Tiān *zǐ* *yí* ***dāng*** *dú* *fèngzhuó*
Heaven son ceremony MOD$_{DEONT}$ alone offer.wine
cí *Shǐ* *Huáng* *miào*
sacrifice Shǐ Huáng temple

'According to the rites of the Son of Heaven, You alone **should** (← **are in charge to**) offer wine as a sacrifice at the temple of Shǐ Huáng.' (*Shiji* 6,266, EMC)

b. 我真王嗣，當立，吾欲求之

wǒ *zhēn* *wáng* *sì* ***dāng*** ***lì*** *wú*
I true king successor MOD$_{\text{DEONT}}$ ENTHRONED I want
yù *qiú* *zhī*
require 3OBJ

'I am the true successor to the king; I **should** be enthroned, and I want to insist on it.' (*Shiji*: 31,1463, EMC)

c. 朱公長男以為赦，弟固當出也

Zhū *gōng* *zhǎng* *nán* *yǐwéi* *shè* *dì*
Zhū father older son think release younger.brother
gù ***dāng*** ***chū*** *yě*
certainly MOD$_{\text{DEONT}}$ go.out SFP

'The oldest son of father Zhū thought that since there was an amnesty, his younger brother **should certainly** get out.' (*Shiji* 41,1754, EMC)

d. 我所說經典無量千萬億，已說、今說、當說，而於其中

wǒ *suǒ* *shuō* *jīng* *diǎn* *wú* *liàng*
I REL tell classic scripture not-have measure
qiān *wàn* *yì* *yǐ* *shuō*
thousand ten-thousand hundred.thousand already tell,
jīn *shuō* ***dāng*** ***shuō*** *ér* *yú* *qí* *zhōng*
now tell FUT tell CON at its middle

'Of all the immeasurable thousands, ten-thousands, hundred thousands of sūtras I have recited, which have already been recited, are recited now, and **will be recited**, among all these, ...' (*Taishō*, 9, 262, 31b, 5$^{\text{th}}$ c. CE)

3.2 Scope of negation

In this subsection, the scope of negation with regard to deontic *dāng* will be analyzed. As has been shown in section 2.2, example (8), in LAC, deontic readings of the possibility modals have to be triggered by negation, i.e. a polarity head, which divides modals in Mod$_1$ and Mod$_2$, or by a rhetorical question operator in CP (Meisterernst 2018). For convenience, two more examples of this syntactic requirement are presented in (12); in (12a), NEG

scopes over the modal, and the modal belongs to Mod_2; in (12b), NEG has narrow scope with respect to the modal, and the modal belongs to category Mod_1 and has a deontic reading.

(12) a. 終不可就, 已而棄之.

Zhōng bù kě jiù yǐér qì zhī
finally NEG MOD_{POSS} finish then abandon 3OBJ
'... when eventually it **could not be** finished, they gave it up.'
(*Shiji*: 112; 2961, EMC 100 BCE)

NOT[POSSIBLE

b. 我今寧當捨此身命，不可毀破三世諸佛所制禁戒。

Wǒ jīn níng dāng shě cǐ shēn mìng
I now $MOD_{epistemic}$ MOD_{DEONT} abandon this body life
bù kě *huǐpò sān shì zhū fó suǒ*
NEG MOD_{POSS} destroy three period PL Buddha REL
zhì jīnjiè
determine precept
'I now should rather abandon this body and life; I **must not** destroy the precepts which the Buddhas of the three periods determined.' (*Xianyujing*, EMC 5th c. CE)

Paraphase: it is NECESSARY that I NOT destroy.
NOT POSSIBLE = NECESSARY[NOT

As already mentioned, with *dāng* there is no need for a trigger such as negation or a rhetorical question to obtain a deontic reading; it is the first modal with an unambiguous DEONTIC NECESSITY reading. If the lexical verb *dāng* is negated, the negator scopes over *dāng* and the entire *v*P as in (13a). As a necessity operator, *dāng* semantically scopes over negation: NECESSARY[NOT, similar to English 'should not'. However, according to the morpho-phonological rule that a negative marker always has to attach directly to a defective verbal head, the negative marker always precedes *dāng*.[22] This is shown in the examples (13b–13e). In (13b), in the translation by Hightower, *dāng* is analysed as the intransitive lexical verb 'appropriate', and the negator scopes over *dāng*; the complement of *dāng* does not constitute

22 *Dāng* is only very infrequently negated in the Buddhist literature (Zhu 2008, Meisterernst 2011), but it appears regularly with a negator in the transmitted Chinese literature (AS EMC corpus 1: http://hanji.sinica.edu.tw/ 中古漢語語料庫之一－東漢).

its internal argument; the structure is biclausal.[23] Similar to negation in combination with MOD_{poss}, this example is semantically ambiguous between the NOT[APPROPRIATE and the NECESSARY[NOT reading. A similar analysis can be proposed for (13c) in a rhetorical question with reverse polarity, one of the typical grammaticalization environments for possibility modals into deontic modals (Meisterernst 2020b). Both instances date from the end of the LAC period and may provide evidence for an intermediate stage in the grammaticalization process, where *dāng* is not fully grammaticalized as a deontic modal yet. In (13d–13f), the negative marker has narrow scope with respect to *dāng*, and the verbs following *dāng* can be unaccusative, unergative, or transitive. In (13d) the verb is negated by the aspectual negator *wèi* 未 'not yet'. In these examples, *dāng* is fully grammaticalized as a deontic modal; neither an analysis as a lexical transitive verb with an internal argument nor as an intransitive verb are semantically possible. In both examples NEG has narrow scope with respect to the necessity operator. Following the analysis presented in (8g), the negator is hosted covertly and interpreted in a PolNEGP, but is merged directly in [Spec,Mod_1P], which hosts *dāng*. Together with the loss of argument structure, the scope of negation argues for the grammaticalization of *dāng* from a lexical head to a functional head outside *v*P. The analysis of the two different stages is in (13g) and (13h). We propose that *dāng* moved out of the lexical layer to the layer of Mod_2P, which allowed a deontic interpretation in polarity contexts. Following this process, it could be reanalyzed as a deontic modal and merged directly in Mod_1P in analogy to already existing functional heads in this position. Apparently, the reanalysis of *dāng* as a deontic marker directly merged in the position of Mod_1P happened earlier than for any other modal auxiliary. A possible explanation for this is that it is semantically less ambiguous than the possibility modals.

(13) a. 雖不當事，苟有禮焉，書也

Suī ***bù*** ***dāng*** *shì* *gǒu* *yǒu* *lǐ*
although NEG correspond affair if.only have propriety
yán *shū* *yě*
in.it record SFP
'Even if they didn't correspond to the affair, if only they were appropriate, they were recorded.' (*Zuozhuan*, *Wen* 9, LAC)

b. 為人臣生不能進賢而退不肖，死不當治喪正堂，

23 A biclausal structure argues against an analysis of *dāng* as a fully grammaticalized functional head (see Roberts & Roussou 2002).

Wéi rén chén shēng bù néng jìn xián ér
be man minister life NEG able advance worthy CON
tuì bùxiào sǐ bù dāng zhì sàng
retreat non-worthy die NEG MOD conduct mourning
zhèng táng
correct hall
'Now if during his life a minister is unable to advance the worthy and retire the unworthy, it is not fitting that mourning should be conducted for him in the main hall after his death.'
(*Hanshi waizhuan* 2.21, 2nd c. BCE; Translation TLS, http://tls.uni-hd.de/main/basic_ch_text.lasso

Paraphrase: it is not appropriate, i.e. one should not conduct ...
NOT[APPROPRIATE ⟷ NECESSARY[NOT

c. 仲父不當盡語我昔者有道之君乎？

Zhòngfù bù dāng jìn yǔ wǒ xīzhě
u NEG $\text{MOD}_{\text{DEONT}}$ exhaustively tell I formerly
yǒu dào zhī jūn hū
have way GEN ruler SFP/Q
'Uncle, should you not tell me in detail about the rulers who possessed the right way?' (*Guan zi* 33.1, LAC–EMC)

Paraphrase: you should tell me ...
RHETQ NOT[APPROPRIATE → NECESSARY[THAT

d. 謂伯有命未當死而人殺之邪？

wèi Bó Yǒu mìng wèi dāng sǐ ér rén
mean Bo You destiny NEG_{Asp} $\text{MOD}_{\text{DEONT}}$ die CON man
shā zhī yé
kill 3OBJ SFP/Q
'Does it mean that Bo You according to his destiny should not have died yet, but someone killed him?'
(*Lunheng* 63.12.18, EMC, 1st c. CE)

NECESSARY/SHOULD[NOT YET

e. 孝子亦當先意承志，不當違親之欲。

*xiào zǐ yì **dāng** xiān yì chéng zhì*
pious son MOD $\text{MOD}_{\text{DEONT}}$ precede thought accept will
***bù dāng** wéi qīn zhī yù*
NEG $\text{MOD}_{\text{DEONT}}$ oppose relative GEN wish

'A pious son **should anticipate** their thoughts and accept their will, and he **should not** oppose the wishes of his parents.' (*Lunheng* 9.28, EMC)

NECESSARY/SHOULD[NOT

f. 五陰無常不當於中住，五陰有常不當於中住，

Wǔ yīn wúcháng ***bù dāng*** *yú*
five aggregate impermanence NEG $\text{MOD}_{\text{DEONT}}$ PREP
zhōng zhù wǔ yīn yǒucháng ***bù dāng***
middle stay five aggregate permanence NEG $\text{MOD}_{\text{DEONT}}$
yú zhōng zhù
PREP middle stay

'the impermanence of the five aggregates **should not** stay in the middle, the permanence of the five aggregates **should not** stay in the middle' (*Fangguang borejing*, EMC, end of 3rd c.)

NECESSARY/SHOULD[NOT

g. [*v*P [$_{\text{Mod2P}}$ NEG [$_{\text{Mod2}}$ *dāng* [*v*P [$_{\text{VP}}$ V]]]]]
→ [$_{\text{TP}}$ [$_{\text{Mod1P}}$ NEG [$_{\text{Mod1}}$ *dāng* [$_{\text{PolP}}$ Ø [*v*P [$_{\text{Mod2P}}$ <NEG> [$_{\text{Mod2}}$ < *dāng*> [*v*P [$_{\text{VP}}$ V]]]]]]]]]

h. [$_{\text{TP}}$ [$_{\text{Mod1P}}$ NEG [$_{\text{Mod1}}$ *dāng* [$_{\text{PolP}}$ Ø [*v*P [$_{\text{VP}}$ V]]]]]]

3.3 *The syntax of the complement of modal* dāng

The size of the complement of *dāng* does not seem to go beyond the size of *v*P; this includes applicative phrases, i.e. the ApplP with *yǐ* 以 and *yǔ* 與, and other *v*P-internal material, such as manner adverbs, aktionsart adverbs, etc.; i.e. it is non-finite. Applicative phrases have been analyzed as being generated within or at the edge of *v*P (see Aldridge 2012); the verb in LAC does not move out of *v*P. In LAC, an ApplP regularly follows the modal verbs of possibility, demonstrating that they have complex *v*P complements. According to the standard assumption, the verb moves from VP to a higher functional projection (Huang 1994, Lin 2001, Tang 2001). In the case of a light verb or a high applicative in this position the verb cannot be moved out of VP, because this would violate Travis' (1984) head movement constraint (cf. Aldridge 2012). The subject is always raised to a position preceding the modal verb, i.e. the matrix T/C. In LAC and EMC most modal verbs seem to be raising verbs according to e.g. the passivization test (Ademola-

Ademoye 2011);[24] they also show semantic sensitivity of the subject rather to the complement verb than to the modal (Lin 2011). The examples in (14) show the possible complexity of a *v*P in the complement of *dāng*. In (14a) a high applicative follows *dāng*; the analysis in (14b) follows the analysis of high applicatives in Aldridge (2012). The example in (14c) demonstrates the possible maximal complexity of a *v*P in the complement of *dāng*: the adverb *fù* 復 'again', which can adjoin at different positions within and outside *v*P, precedes the high applicative. The degree adverb *gēng* 'more' immediately precedes VP.

(14) a. 有愧於彼。於彼有畏。當以此答以為歸依·

Yǒu kuì yú bǐ yú bǐ yǒu wèi ***dāng***
have shame PREP that PREP that have fear $\text{MOD}_{\text{DEONT}}$
yǐ cǐ dá *yǐwéi guīyī*
APPL this answer consider trust

'There is shame in that, and in that there is fear, one **should consider** this answer as entirely trustworthy.' (*Taishō* 1, 1, 91c, EMC 5th c.)

b. *dāng* [$_{v\text{P}}$ [$_{v'}$ 以 *yǐ* [$_{\text{AppP}}$ 此答 *cǐ dá* [$_{\text{App}'}$ <以> [$_{\text{VP}}$ 以為歸依]]]]]
dāng [$_{v\text{P}}$ [$_{v'}$ YI [$_{\text{AppP}}$ this answer [$_{\text{App}'}$ <YI> [$_{\text{VP}}$ consider trust]]]]]

c. 今當復以譬喻更明此義，諸有智者以譬喻得解。

Jīn ***dāng*** ***fù*** ***yǐ*** *pìyù gēng míng cǐ*
now $\text{MOD}_{\text{DEONT}}$ again APPL simile more clarify this
yì zhū yǒu zhì zhě yǐ pìyù dé
meaning PL have wisdom NOM YI simile attain
jiě
understanding

'Now, you **should again clarify** this meaning even more with a simile, so that all those who know attain understanding with [the help of] this simile.' (*Taishō* 9, 262, 12b, EMC 5th c.)

The examples in (15) provide more evidence that the complement of *dāng* is non-finite. The scope of the sentence final particle *yǐ* 矣 serves as a test. In LAC, the SFP *yǐ* functions comparably to the SFP *le* 了 in Modern Mandarin (Pulleyblank 1995, Meisterernst 2015); both particles have been associated

24 An exception is volitional verbs. The modal verb of possibility/ability *néng* 能, expressing participant internal ability as its basic function (following the classification in van der Auwera & Plungian 1998), seems to be a control verb in Archaic Chinese. Its complement is never passivized.

with perfect/perfective aspect and a change of state reading. Following Lin (2011), who used the scope of *le* in Modern Mandarin as a test for the finiteness of the modal *huì* 會, the scope of *yǐ* will be employed to determine the finiteness features of the complement of modal *dāng*. A deontic modal has a non-finite complement; contrastingly, an epistemic modal has a finite complement, taking an entire proposition as its complement. The examples in (15a) and (15b) show that the modal *dāng* is always within the scope of *yǐ* 矣, 'the situation being the way it is, an obligation to act in a particular way has arisen *yǐ*'; the SFP *yǐ* has wide scope with respect to *dāng*. The example in (15b) additionally shows that it has narrow scope with respect to the epistemic adverb *bì* 必 'certainly', discussed above. This confirms Lin's (2011) analysis of the scope of *le* with respect to EMC epistemic and deontic modals.

(15) a. 至其年二月八日・忽告衆曰・吾[當[去]矣]・

Zhì *qí* *nián* *èr* *yuè* *bā* *rì* *hū* *gào*
at that year two month eight day suddenly tell
zhòng *yuē* *wú* *dāng* *qù* *yǐ*
multitude say I MOD$_{\text{DEONT}}$/FUT leave SFP
'In the second month on the eighth day he suddenly told the multitudes, "I will leave."' (*Taishō* 50, 2059, 351c, early 6$^{\text{th}}$ c.)

b. 「君若不得菴羅果，我必[當[死]矣]。

jūn *ruò* *bù* *dé* *ānluò* *guǒ* *wǒ* *bì*
you if NEG get mango fruit I certainly
dāng *sǐ* *yǐ*
MOD$_{\text{DEONT}}$/FUT die SFP
'If you, my husband, do not get the mango, I **will certainly die** → 'it is certain that the situation will arise that I die' ≠ 'it has become certain that I will die.' (*Taishō* 24, 1462,787b, 5$^{\text{th}}$ c.)

3.4 Relative order of modal auxiliaries

Some more evidence for the relatively high position of *dāng* comes from the fact that it always precedes possibility modals (*kě* 可 'possible, can', *néng* 能 'able, can', *dé* 得 'can, manage to') when they appear in combination – the stacking of modals is permitted in LAC and EMC; i.e. it appears higher in the functional hierarchy proposed in Cinque (1999) (Roberts & Roussou 2002) in (2), repeated here for convenience in (16).

(16) Mod$_{\text{epistemic}}$ T(Past) T(Future) Mood$_{\text{irrealis}}$ Mod$_{\text{necessity}}$ Mod$_{\text{possibility}}$ ... Mod$_{\text{root}}$

The reverse order POSSIBILITY > NECESSITY is not attested; unless *dāng* is a lexical verb, it does not follow a possibility modal. As the examples in (17) demonstrate, *dāng* precedes all the relevant possibility modals in LAC and EMC; i.e. it precedes *kě* in (17a), *néng* in (17b), and *dé* in (17c), which all clearly function as modal auxiliary verbs, i.e. as Mod_2, occupying the head of Mod_2P. Accordingly, *dāng* can only be analyzed as the head of Mod_1P.

(17) a. 舅姑之心，豈當可失哉？

Jiù *gù* *zhī* *xīn* *qǐ* ***dāng*** ***kě***
father.in.law mother.in.law GEN heart Q MOD_{DEONT} can
shī *zāi*
neglect SFP/Q
'The minds of father and mother in law, how **should** it be **possible** to neglect them?!' (*Hou Hanshu, nüliezhuan*, EMC)

b. 曉知其事，當能究達其義，通見其意否？」

xiǎo *zhī* *qí* *shì* *dāng* *néng* *jiū*
understand know POSS affair MOD_{DEONT} able pursue
dá *qí* *yì* *tōng* *jiàn* *qí* *yì* *fǒu*
reach POSS justice connect see POSS meaning NEG
'Do you understand and know the affairs, **should** you be **able** to pursue and reach their rightful end, do you see and connect their meanings, or don't you?' (*Lunheng* 12.36, EMC)

c. 宜以時廢退，不當得居位。

Yí *yǐ* *shí* *fèi* *tuì* *bù* *dāng* *dé*
appropriate YI time discard repress NEG MOD_{DEONT} can
jū *wèi*
dwell position
'They should be timely discarded and repressed, and they **should** not be **able** to remain in position.'
(*Hanshu* 75:3182, EMC)

3.5 Position of wh*-words*

In this section, three *wh*-words will be employed as additional tests for the position of *dāng*; these are 1) the adverbial *wh*-word *yúnhé* 云何 'how, in which way', 2) *yǐhé* 以何 'how, by which, in which way', and 3) the *wh*-word *héyǐ* 何以 'how, in which way', which to a certain extent contrasts with *yǐhé*

(see also Tsai 2008).[25] The default position of *wh*-words, both adverbial and object *wh*-words in LAC, is following aspectual and temporal adverbs (Aldridge 2010, Meisterernst 2015), but generally preceding modal auxiliary verbs. Adverbial *wh*-words are always in preverbal position, while object *wh*-words appear in preverbal position only in LAC, in a focus position at the edge of *v*P (Aldridge 2010). In early EMC, this syntactic constraint on *wh*-words referring to an internal argument weakens (Aldridge 2013b) and they occasionally appear between a modal verb and a matrix verb. Around the end of the 2nd century CE, object *wh*-words regularly appear *in-situ*, i.e. in postverbal position. During the intermediate stage, however, the medial position between modal and matrix verbs does not seem to be available for all modal verbs; it is apparently very infrequent with the dynamic modals *kě* and *dé*.[26] Accordingly, the position of *wh*-words with regard to *dāng* may in fact also constitute evidence for the upward movement of *dāng* out of the lexical and to the CP/TP layer as a deontic and/or future marker (see (18c) with LAC future marker *jiāng*). The reanalysis of *dāng* as a deontic marker and head of a functional projection is a condition for its development into a future marker; the grammaticalization from obligation to future is well attested in the literature (e.g. Bybee et al. 1994: 258). The grammaticalization into a functional head located in the CP/TP layer is confined to a very limited number of verbs in the history of Chinese. Generally, as already mentioned, verbs do not move out of *v*P. Whether particular syntactic features are required for a verb to grammaticalize into a functional head in Chinese, e.g. in contrast to the Germanic modals, has not been figured out so far.[27] As a deontic marker, *dāng* could be reanalyzed and directly merged in a higher functional projection in TP as a future marker, similar to the future marker *jiāng* of LAC, which – as demonstrated above – appears outside *v*P in the CP/TP layer.

The examples in (18) show the regular distribution of *wh*-words in LAC. In (18a), the adverbial *wh*-word *héyǐ* appears in its regular position preceding the dynamic modal *néng* 'able to, can'; in (18b), the *wh*-word *shuí* 誰 appears between *dāng* and the complement verb in a late LAC example; and in (18c), the adverbial *wh*-word *hé* 'how' is sandwiched between the future adverb

25 These *wh*-words represent only a few among a group of *wh*-expressions in LAC and EMC related to the meanings *how* and *why* in English.

26 The following attestations are found in the AC Archaic and Middle Chinese 1 corpus: *kěyǐ shuí* 'whom' V (3 identical instances), **kě*(*yǐ*) *hé* 'what' V, **dé shuí*/*hé* 'whom/what' V.

27 I am grateful to one of the anonymous reviewers for raising this question. Relatively little research has been conducted so far on the syntactic mechanisms of grammaticalization in the history of Chinese despite the considerable amount of literature discussing the grammaticalization of particular lexical items.

jiāng and the dynamic modal *néng*.

(18) a. 非禮也，何以能育？

Fēi *lǐ* *yě* ***héyǐ*** ***néng*** *yù*
NEG-COP rites SFP **how** **able** raise.children
'If they do not show propriety, **how are they able** to raise children.' (*Zuozhuan Yin* 8, LAC)

b. 今四者不足以使之，則望當誰為君乎？

Jīn *sì* *zhě* *bù* *zú* *yǐ* *shǐ* *zhī,* *zé*
now four NOM NEG suffice YI employ 3OBJ then
wàng ***dāng*** ***shuí*** *wéi* *jūn* *hū*
expect $\text{MOD}_{\text{DEONT}}$ WHOM be ruler SFP
'If these four are not good enough to employ them, **to whom should** I expect to be a ruler then?'
(*Han Feizi* 34.11.05, LAC, 3rd c. BCE)

c. 不畏于天，將何能保？

Bù *wèi* *yú* *tiān* ***jiāng*** ***hé*** ***néng*** *bǎo*
NEG respect PREP heaven FUT how able protect.oneself
'Without being afraid of heaven, **how will he be able** to protect himself?!' (*Zuozhuan Wen* 15, LAC)

In terms of Tsai's (2008) analysis of *how* and *why* in alternations in Chinese, the adverbial modifiers *yúnhé* 云何, *yǐhé* 以何, and *héyǐ* 何以 are most similar to instrumental *how* in Modern Mandarin, i.e. to inner adverbials in Tsai's framework.[28] According to Tsai (2008), instrumental *wh*-words in Modern Mandarin appear in the TP layer at the periphery of *v*P, following modals. Contrastingly, in EMC, two syntactic positions are available for *yúnhé* with respect to *dāng*, the pre-modal and the post-modal positions. The post-modal position is exemplified in (19). In both examples, the *wh*-word clearly introduces an instrument or possibly a manner adverbial; accordingly, they are inner *wh*-adverbials in Tsai's (2008: 93) terminology.

(19) a. 設有是問者。汝當云何答。

Shè *yǒu* *shì* *wèn* *zhě* *rǔ* ***dāng*** ***yúnhé*** *dá*
if have this question REL you $\text{MOD}_{\text{DEONT}}$ how answer

28 Inner adverbials are instrumental and purpose *why* adverbials following modals, and outer adverbials are causal and reason *why* adverbials preceding modals (Tsai 2008: 93).

'If there are any with these questions, **how should** you answer?'
→ You should answer with the following speech ...
(*Taishō* 1, 1, p. 112b, 5th c. CE)

b. 我當云何令諸衆生心歡喜耶？」

Wǒ ***dāng*** ***yúnhé*** *líng* *zhū* *zhòng* *shēng* *xīn*
I MOD$_{\text{DEONT}}$ how make PL multitude living heart
huānxǐ *yé*
happy SFP/Q
'**How should** I make all the living beings happy in their hearts?'
→ I should do the following ... (*Taishō* 3,153, p. 62c, 3rd c. CE)

This order is the exception in EMC and it is not attested in LAC. The reverse order is more frequent with *dāng*; it involves different semantics. The *wh*-word scopes over *dāng*, which expresses future irrealis in a rhetorical question with reverse polarity: HOW [COULD/WILL ... → NOT[COULD. This is probably functionally closest to the denial construal proposed in Tsai (2008: 84). The deontic reading of *dāng* is rather weak in this construal. Rhetorical markers in LAC can be very high in the sentence, preceding deontic and/or future markers.[29]

Contrastingly to *dāng*, which allows an adverbial *wh*-word following it, genuine circumstantial possibility modals by default follow *yúnhé* in EMC. The order *yúnhé dé* 云何得 is attested, but the order *dé yúnhé* is not (the same accounts for the possibility/ability modal *néng* 能).[30] This argues for a difference in position between deontic *dāng* and possibility modals. Deontic *dāng* was the first modal which underwent the full grammaticalization from a lexical verb to Mod$_1$ in the TP layer in Early Middle Chinese. The examples in (20) show the order *yúnhé* + Mod with *dāng* in (20a) and (20b) and with the dynamic circumstantial modal *dé* in (20c).

(20) a. 世尊制戒不得浴。我等云何當浴。佛言。從今日後聽雨時浴。

Shìzūn *zhìjiè* *bù* *dé* *yù.* *Wǒ* *děng* ***yúnhé***
Shizun prescription NEG DE bathe I PL how
dāng *yù.* *Fó* *yán* *cóng* *jīn* *rì* *hòu* *tīng*
MOD$_{\text{DEONT}}$ bathe Buddha say from today day after hear

29 In a denial construal the *wh*-adverbial would be expected to move up to a position in the left periphery, possibly [Spec,ForceP] or [Spec,Pol$_1$P] as in example (7d) at LF, in order to change the force of the proposition (see Tsai 2008: 107f.).

30 All instances in which these modals appear in linear order *dé yúnhé* with the *wh*-adverbial seemingly following the modal have to be analysed differently.

yǔ *shí* *yù*
rain time bathe
'Following the prescriptions of the World-Honored-One we are not allowed to bathe. **How could we** bathe then? The Buddha said, "From now on you bathe when you hear the rain."'
(*Taishō* 22, 1425, 372b, 4th/5th c.)

b. 此比丘唯知此一偈。云何當能教誡我等。

Cǐ *bǐqiū* *wéi* *zhī* *cǐ* *yī* *jì* ***yúnhé*** ***dāng***
this bhikṣu only know this one gatha how MOD$_{\text{DEONT}}$
néng *jiàojiè* *wǒ* *děng*
able teach I PL
'This bhikṣu knows only this one gatha, **how would he** be able to advise us?' → 'he will not be able to advise us'
(*Taishō* 22, 1421, 46a, 5th c.)

c. 如此衆生染著諸使。云何得免生死苦惱。

Rúcǐ *zhòng* *shēng* *rǎnzhuó*
such multitude being defiled.attachment
zhūshǐ ***yúnhé*** ***dé*** *miǎn* *shēng* *sǐ*
various.declivities how manage.to avoid life death
kǔ *nǎo*
pain distortion
'All those living beings have defiled attachments and various declivities; **how do they manage** to avoid the circle of life and death, pain and distortion?' → 'they will probably not be able to do that ...' (*Taishō* 4, 212, 633c, 4th c.)

The next section shows the syntactic distribution and the scope features of the *wh*-adverbials *yǐhé* 以何 'how, why', which are very similar to *yúnhé*, and *héyǐ* 何以 'how, why'; the latter is the regular *wh*-adverbial in LAC. According to Tsai's (2007: 205) diachronic sketch of *yǐhé* and *héyǐ*, in EMC *yǐhé* functions as an inner adverbial; *héyǐ* sometimes additionally functions as an outer adverbial. First, *yǐhé* will be discussed. By default *yǐhé* follows the LAC/EMC future marker *jiāng* 將. Contrastingly to *yúnhé*, *yǐhé* always follows *dāng*, similar to instrumental *how* in Modern Mandarin (Tsai 2007); this strongly argues for its function as an instrumental inner *wh*-adverbial. In contrast to *dāng*, *yǐhé* always precedes the possibility modals *dé* 得 and *néng* 能; instances of *dé/néng yǐhé* are not attested. This provides additional evidence for the higher position of *dāng* with respect to dynamic modals in EMC. In Modern Mandarin, only outer adverbials according to Tsai's (2008)

definition seem to precede modals as in (21a) from Tsai (2008: 95, ex. (41)); inner adverbials as in (21b) follow them.

(21) a. *tamen* *zhenme(*-yang)* ***hui/keyi*** *chuli* *zhejian* *shi?*
they how(-manner) will/can handle this-CL matter
'How come they will handle this matter?'

b. *tamen* ***hui/keyi*** *zhenme(-yang)* *chuli* *zhjian* *shi?*
they will/can how(-manner) handle this-CL matter
'By what means will/can they handle this matter?'
#'In what manner will/can they handle this matter?'

In the period under investigation, this is not the case, and instrumental and manner *wh*-adverbials still by default precede all circumstantial modals; *dāng* is the only modal which they follow.[31] The position of *yǐhé* argues for a syntactic distinction between *yǐhé* in EMC and the respective applicative phrase *yǐ* DP, e.g. introducing an instrument. AppP by default follows modals and appears within *v*P; this can be seen in (14c), repeated here as (22d) with *dāng*, and in (22f) with the possibility modal *néng*. The same distinction between the *wh*-adverbial and an ApplP also accounts for *héyǐ*, which survived from LAC to Modern Mandarin, in LAC always preceding modals, but following aspecto-temporal adverbs including *jiāng*. The examples in (22a) and (22b) show that *yǐhé* occupies the same position with respect to *dāng* as with respect to *jiāng*; (22d) shows the position of an ApplP with YI with respect to *dāng*; (22e) and (22f) show that *yǐhé* precedes a circumstantial modal, whereas the ApplP with *yǐ* follows it. In (22g) the *wh*-adverbial is sandwiched between *dāng* and *néng*, thus demonstrating again that the position of *dāng* is higher than the position of the circumstantial modal *néng*.

31 Tsai's outer adverbials exemplified in (21a) can be realized differently in LAC and still to a great extent in EMC, e.g. as predicates or in sentence-initial position, i.e. directly merged in CP position. In the following example *héwèi* 何為 'why, how come' appears in sentence-initial position. It evidently occupies a position different from the *wh*-adverbials discussed in this section.

(i) 何為其莫知子也

Héwèi *qí* *mò* *zhī* *zǐ* *yě*
why 3GEN no.one know you SFP
'How come that no one knows you?'
(*Lunyu* 14,35, LAC)

In LAC and EMC, *héwèi* never appears in a position following a modal. *Wh*-words of this kind are not included in this discussion. What is important here is the fact that there is an obvious positional shift with regard to modals and *wh*-adverbials in progress at the period at issue.

(22) a. 未曉輕侮之法將以何禁？

Wèi *xiǎo* *qīngwǔ* *zhī* *fǎ* ***jiāng*** ***yǐhé*** *jìn*
NEG$_{Asp}$ clarify insult GEN rule FUT how prevent
'If one has not clarified the rules of insult, **how will** one prevent it?' (*Hou Hanshu* 44: 2825, EMC)

b. 汝今日請二部僧。我等當以何報之。

Rǔ *jīn* *rì* *qǐng* *èr* *bù* *sēng* *wǒ* *děng*
you now day ask two section monk I PL
dāng ***yǐhé*** *bào* *zhī*
MOD$_{DEONT}$ how respond 3OBJ
'If you now ask the two kinds of monks, **how should** we respond to them?' → we should respond with ...
(*Taishō* 22, 1425, 531b, EMC, 5th c.)

c. 今為道，當以何為大戒而得長成乎？

Jīn *wéi* *dào* ***dāng*** ***yǐhé*** *wéi* *dàjiè*
now do way MOD$_{DEONT}$ how make full.set.of.precepts
ér *dé* *zhǎngchéng* *hū*
CON obtain mature.achievement SFP
'Now, in performing the DAO, **how should** one follow the full set of precepts and obtain maturity?' → It is not possible to give an answer to this question ... (*Taipingjing* 98: 156, EMC)

d. 今當復以譬喻更明此義，諸有智者以譬喻得解。

Jīn ***dāng*** ***fù*** ***yǐ*** *pìyù* *gēng* *míng* *cǐ*
now MOD$_{DEONT}$ again APPL simile more clarify this
yì *zhū* *yǒu* *zhì* *zhě* *yǐ* *pìyù* *dé*
meaning PL have wisdom NOM YI simile attain
jiě
understanding
'Now, you **should again clarify** this meaning even more with a simile, so that all those who know attain understanding with [the help of] this simile.' (*Taishō* 9, 262, 12b, EMC 5th c.)

e. 諸欲患如是，以何能捨之？

Zhū *yù* *huàn* *rú* *shì* ***yǐhé*** ***néng*** *shě* *zhī*
PL wish anxiety like this how able abandon 3OBJ
'If all wishes and anxieties are like that, **how can** one be able to abandon them?' → in doing ... (*Taishō* 46, 1915, 464a, 6th c.)

f. 今堯不能以德滅十日，而必射之，

Jīn *Yáo* *bù* ***néng*** ***yǐ*** ***dé*** *miè* *shí* *rì* *ér*
now Yao NEG able APPL virtue destroy ten sun CON
bì *shè* *zhī*
need shoot 3OBJ
'Now, Yao was not able to destroy the ten suns with his virtue, but needed to shoot them.' (*Lunheng* 5:19, EMC)

g. 不知可先後，當以何能正得此書實哉？」

bù *zhī* *kě* *xiān* *hòu* ***dāng*** ***yǐhé*** ***néng***
NEG know KE precede follow $\text{MOD}_{\text{DEONT}}$ how able
zhèng *dé* *cǐ* *shū* *shí* *zāi*
proper get this book reality SFP/Q
'I don't know what can be done; how should I be able to properly attain the reality of this writing?'
(*Taipingjing* 51: 78, EMC)

The following examples demonstrate that *héyǐ* can indeed have functions different from *yǐhé*. As already mentioned, *wh*-adverbials as a rule follow future *jiāng* as in (23a); *héyǐ* clearly functions as an instrumental *wh*-adverbial in this example. The situation is different in the examples (23b) to (23d); in all examples *héyǐ* appears as an outer adverbial in a rhetorical question, similar to the examples in (20) with *yúnhé*; it precedes the focus adverb *dú* 'alone' in (23b) and the circumstantial modals *néng* and *dé* in (23c) and (23d). This is however the regular position for *héyǐ* with regard to circumstantial Mod_2 at this time, the outer adverbial reading is not reflected in the position of the *wh*-adverbial at PF.

(23) a. 不遠千里而來，將何以利吾國乎？」

Bù *yuǎn* *qiān* *lǐ* *ér* *lái* ***jiāng*** ***héyǐ*** *lì*
NEG far thousand mile CON come FUT how profit
wú *guó* *hū*
I country SFP/Q
'Since you didn't find a thousand miles too far to come, how are you going to profit my country?' (*Lunheng* 10:30, EMC)

b. 俱賢所為，何以獨謂經傳是，他書記非？

jù *xián* *suǒ* *wéi* ***héyǐ*** ***dú*** *wèi* *jīng* *zhuàn*
altogether virtues REL do why alone call *Jing* *Zhuan*
shì *tuō* *shū* *jì* *fēi*
right other book record wrong
'Altogether with regard to what the virtuous scholars do, why

alone do they call the *jing* and the *zhuan* right, but the other books and records wrong?' (*Lunheng* 38: 82)

c. 何以能觸而折之？

héyǐ ***néng*** *zhù* *ér* *zhé* *zhī*
how **able** touch CON break 3OBJ
'Why would they (humans) be able to break them (mountains)?' (*Lunheng* 11: 31)

d. 日道長，去人遠，**何以得**見其出於寅、入於戌乎？」

rì *dào* *cháng* *qù* *rén* *yuǎn* ***héyǐ*** ***dé*** *jiàn* *qí*
sun way long distant man far **why** **can** see GEN
chū *yú* *yín* *rù* *yú* *xū* *hū*
go.out at *yin* enter at *xu* SFP/Q
'The route of the sun is long and very distant from human beings; how come they can see that it gets out at *yin* and enters again at *xu*?' (*Lunheng* 11: 32)

The situation is different again with regard to the modal *dāng*. First, instances of *héyǐ* preceding *dāng* are far less frequent than those of *héyǐ* following *dāng*.[32] Additionally, with *dāng*, the different positions actually seem to coincide with the reading of *héyǐ* as an outer *wh*-adverbial preceding *dāng* as in (24a), and as an inner adverbial following *dāng* as in (24b). (24a) again is a rhetorical question; the *wh*-operator marks a denial construal. Contrastingly, in (24b) *héyǐ* functions as a *wh*-adverbial, corresponding to instrumental *how*. A detailed syntactic analysis of adverbial *wh*-words is not at issue in this study, but it seems safe to say that different positions at PF reflecting the distinctions between inner and outer adverbials only become available after modals started to be merged directly in functional projections in the CP/TP layer. The first modal to do so independently from negation is the modal *dāng*.

(24) a. 舍利弗問尊者須菩提：「何以當知菩薩不離般若波羅蜜？」

Shèlìfú *wén* *zūn* *zhě* *Xūpútí* ***héyǐ*** ***dāng*** *zhī*
Shelifu hear honor NOM Xuputi why $\text{MOD}_{\text{DEONT}}$ know
púsà *bù* *lí* *bánruòbōluómì*
bodhisattva NEG separate utmost.wisdom
'Shelifu asked the honorable Xuputi: "Why would I know that

32 The ratio in the Middle Chinese corpus of the AS database is 12 (pre-*dāng*) to 49 (post- *dāng*) hits.

the bodhisattvas will not be separated from the utmost wisdom?"' (*Taishō* 8, n. 221, p. 15b, EMC)

b. 「阿惟越致菩薩當何以比？當何以觀其行？當何以相？當何從知是阿惟越致菩薩？」

āwéiyuèzhì *púsà* ***dāng*** ***héyǐ*** *bǐ*
Aweiyuezhi bodhisattva MOD$_{\text{DEONT}}$ how compare
dāng ***héyǐ*** *guàn* *qí* *xìng* ***dāng*** ***héyǐ***
MOD$_{\text{DEONT}}$ how watch his behavior MOD$_{\text{DEONT}}$ how
xiàng ***dāng*** *hécóng* *zhī* *shì* *āwéiyuèzhì*
resemble MOD$_{\text{DEONT}}$ from.where know COP Aweiyuezhi
púsà
bodhisattva

'The irreversible bodhisattva, how should he be matched, how should we watch his behavior, how should we resemble him, how should we know that he is the irreversible bodhisattva?' (*Taishō* 8, n. 224, p. 454b, EMC)

3.6 *Future* dāng

In the last section, the differences and similarities between the future marker *jiāng* 將 and *dāng* 當 will be summarized briefly. The most conspicuous difference is the position of a negator, which by default precedes *dāng*, but follows *jiāng*. In contrast to the surface position, the scope features of *dāng* and *jiāng* with respect to negation are identical: NEG has narrow scope with respect to both *dāng* and *jiāng*. Meisterernst (2019a) proposes that the position of NEG with respect to a defective verbal head, including modal verbal heads, is fixed independently of the scope of NEG involved; NEG always has to attach to the modal directly as a negative prefix in [Spec,ModP]. Since *jiāng* as an aspectual-temporal adverb does not constitute a head, NEG does not have to precede it. Already in the 1st c. CE in the *Lunheng*, about two centuries after its emergence as a deontic modal, *dāng* is occasionally attested as a future marker, as in (25a) and (25b). In the early Buddhist literature, *dāng* is fully established in this function besides its function as a deontic modal, as in the examples (25c) to (25e); note that in (25c) *dāng* follows the epistemic adverb *bì* 'certainly'. The examples show that *dāng* is already fully grammaticalized as a functional category. Due to the entire loss of its former argument structures, *dāng* is analysed as being directly merged in its respective functional projection in Mod$_1$P or FutP; both projections are

located in TP.[33]

(25) a. 周公治魯，太公知其後世當有削弱之患；太公治齊，周公睹其後世當有劫弒之禍

Zhōu gōng zhì Lǔ Tài gōng zhī qí hòu
Zhōu duke rule *Lǔ* *Tài* duke know his after
shì ***dāng*** *yǒu xiāo ruò zhī huàn Tài gōng*
generation FUT have pare weak GEN trouble *Tài* duke
zhì Qí Zhōu gōng dǔ qí hòu shì ***dāng*** *yǒu*
rule *Qí* *Zhōu* duke see his after generation FUT have
jié shì zhī huò
rob murder GEN calamity

'When Duke Zhōu was governing Lǔ, Duke Tài knew that his descendants **were having** the misfortune of being reduced and weakened; when Duke Tài ruled Qí, Duke Zhōu saw that his descendants **were going to endure** the calamity of being robbed and murdered.' (*Lunheng* 78.3.6, EMC 1st c. CE)

b. 命當溺死，故相聚於歷陽；命當壓死，故相積於長平

dāng *nì sǐ gù xiāng jù yú Lìyáng*
FUT drown die therefore mutually gather at *Lìyáng*
mìng ***dāng*** *yā sǐ gù xiāng jī yú*
destiny FUT crush die therefore mutually collect at
Chángpíng
Chángpíng

'If according to destiny they were **going to** drown and die, they would thus gather at Lìyáng; and if according to destiny they **were being** crushed and die, they thus came together at Chángpíng.' (*Lunheng* 6.1.30, EMC)

c. 彼必當作轉輪王也。我將無作轉輪王耶？』

bǐ ***bì*** ***dāng*** *zuò zhuǎnlún wáng yě wǒ*
that certainly FUT become turn.wheel king SFP I
jiāng wú zuò zhuànlún wáng yé
FUT NEG become turn.wheel king SFP/Q

'He **will certainly** become a wheel-turning king. And **will** I

33 Xiong & Meisterernst (2019) show that in the EMC period, *dāng* also occasionally appears as an epistemic modal. Many of the functions of *dāng* have later been replaced by newly emerging modals in Chinese. Probably due to the poly-functionality of *dāng*, deontic functions are frequently expressed by the modal *yīng* 應 'should, ought', and by the combination *yīngdāng* 應當 with the same meaning in the EMC literature.

not [also] become a wheel-turning king?' (*Taishō* 1, 26, 512a, 4th c., EMC)

d. 如其下此沙門。吾到漢地當向國王言汝也

rú *qí* *xià* *cǐ* *shāmén* *wú* *dào* *Hàn* *dì*
if MOD put.down this Shramana I arrive Hàn region
dāng *xiàng* *guó* *wáng* *yán* *rǔ* *yě*
FUT to country king tell you SFP
'If you throw this Shramana down [from the boat], I **will**, as soon as I arrive in Hàn, talk to the king of the country about you.' (*Taishō* 51, 2085, p.866a, 5th c. CE)

e. 問訊已佛語目連。吾卻後七日當下閻浮提

wènxùn *yǐ* *fó* *yǔ* *Mùlián* *wú* *quèhòu* *qī*
greet ASP Buddha talk *Mùlián* I hereafter seven
rì ***dāng*** *xià* *Yánfóutí*
day FUT descend *Yánfóutí*
'After they greeted each other, the Buddha said to Mùlián (Maudgalyāyana): "After seven days I **will** come down to Yánfóutí (Jambudvīpa) again."' (*Taishō* 51, 2085, 859c, EMC)

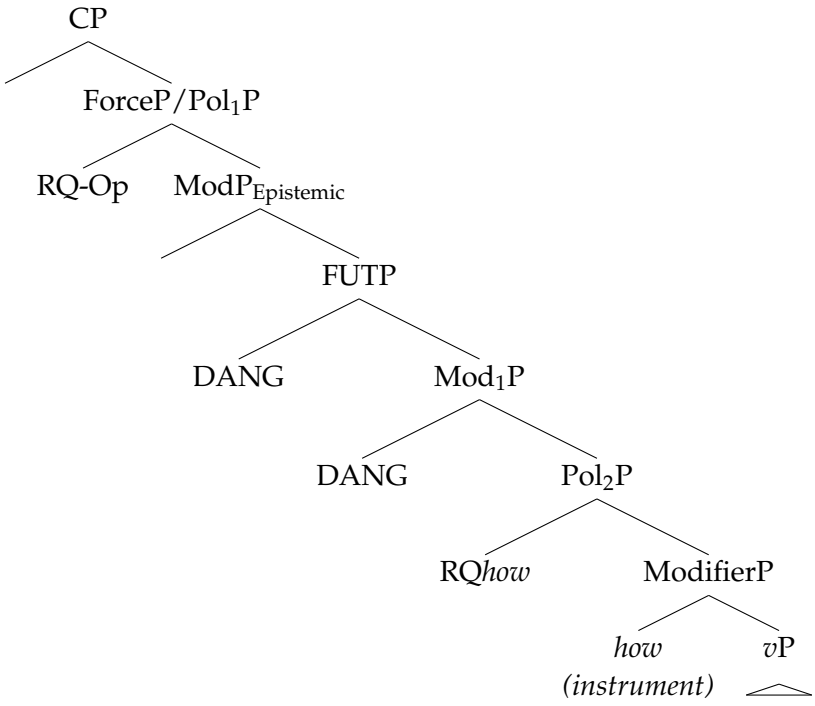
The grammaticalization of FUT and modal *dāng* in EMC is shown in (26); (26a) and (26b), repeating (13g) and (13h), show the grammaticalization of *dāng* from a modal verb in the lexical layer, which is ambiguous between a circumstantial and a deontic interpretation. Similarly to the possibility modals, the scope of negation is relevant for the respective interpretation; the analysis is identical to the analysis of *kě* in (8h). In contrast to the possibility modal *kě*, only few examples of *dāng* are available which actually show the intermediate stage in which the interpretation of *dāng* is ambiguous between Mod_2 and Mod_1. In (26c) we propose the analysis of future and modal *dāng* after it fully grammaticalized into a functional category; in this analysis Mod_2P in *v*P is not relevant any more. This proposal is based on the preceding discussion, which demonstrated that the syntax of *dāng* differs considerably from that of the possibility modals of LAC and EMC. The latter require polarity contexts in order to be interpreted as deontic markers, and they remain ambiguous between a possibility and a deontic interpretation in EMC. After *dāng* lost its former argument structure, it was apparently quickly reanalyzed as a deontic modal or a future marker, displaying evidence for the structural simplification process connected with grammaticalization (Roberts & Roussou 2003: 210, Feng 2016: 94f.). *Dāng* was the first modal that fully underwent this process already in Early Middle Chinese. In our analysis

we propose that *dāng* was directly merged in a position higher than Mod_2P, in either Mod_1P or in FutP; no movement from Mod_2P has to be assumed at this stage. This is evidenced by the scope of negation, by the position of *dāng* with respect to other modals in modal stacking, and by its position with respect to instrumental *wh*-words, which in Modern Mandarin regularly follow modals but in LAC regularly precede modals. *Dāng* is the first modal which precedes an instrumental *wh*-adverbial. Assuming the position for instrumental *wh*-adverbials proposed in Tsai (2008) in TP at the edge of *v*P, this clearly shows that *dāng* is hosted in a functional projection within TP; thus, it has grammaticalized from a lexical to a functional category. This is different from dynamic modals, Mod_2, which in EMC are still regularly preceded by an instrumental *wh*-adverbial. For the denial construction, i.e. the outer adverbial analysis, discussed in this paper, a position of the *wh*-adverbial in [Spec,Pol_2P] at PF is proposed; at LF the *wh*-adverbial has to move up to Pol_1P to check the Q-operator in [Spec,Pol_1P] in order to change the force of the proposition. This is discussed briefly in Meisterernst (2018).

(26) a. [*v*P [$_{Mod2P}$ NEG [$_{Mod2}$ *dāng* [$_{vP}$ [$_{VP}$ V]]]]]
→ [$_{TP}$ [$_{Mod1P}$ NEG [$_{Mod1}$ *dāng* [$_{PolP}$ Ø [*v*P [$_{Mod2P}$ <NEG> [$_{Mod2}$ < *dāng*> [$_{vP}$ [$_{VP}$ V]]]]]]]]]

b. [$_{TP}$ [$_{Mod1P}$ NEG [$_{Mod1}$ *dāng* [$_{PolP}$ Ø [*v*P [$_{VP}$ V]]]]]]

c.



4 Conclusion

In this paper, I have provided some evidence for the grammaticalization of the lexical verb *dāng* into a modal auxiliary and a future marker and its reanalysis in the respective functional projections within TP. Evidence for functional projections connected to modality and future marking outside *v*P comes 1) from two positions for synthetic modal negation in LAC, one in the CP layer (epistemic), one in the TP layer (deontic), and from 2) the syntax of the future adverb *jiāng* in LAC, which by default precedes negation, rhetorical *wh*-adverbials, and instrumental *wh*-adverbials. Besides synthetic modal negation, deontic modality is expressed by possibility modals MOD_{poss} in LAC, typically in contexts involving polarity, i.e. negation and rhetorical questions. The semantic scope of negation provides evidence for the deontic or the possibility readings of MOD_{poss}. The scope features of negation are accounted for by the introduction of a TP-internal polarity head following Cormack & Smith (2002), which distinguishes Mod_1, expressing deontic necessity, and Mod_2, expressing dynamic/circumstantial possibility. Independent evidence for the TP-internal PolP comes from rhetorical *wh*-adverbials. In order to obtain a deontic reading, MOD_{poss} has to move upward from the lexical to the functional domain in TP in LAC.

In EMC, new modal auxiliaries emerge, which express deontic modality independently of an overt trigger; this accounts for the modal *dāng*, discussed in this paper. The data discussed in the preceding section provides evidence for the high position of modal *dāng* with respect to circumstantial modals, arguing for its being merged directly in the position of Mod_1 or in FutP. Apart from the PF position of the negator with respect to *dāng*, the position of *dāng* is identical to the position of LAC future *jiāng*. Identical to *jiāng*, *dāng* appears in the same position as the modals in Modern Mandarin with respect to instrumental *how*; this provides evidence for a change of position in modals from LAC to EMC. The fact that *dāng* follows the epistemic modal adverb *bì* 'certainly' argues for its position in TP and not in CP; this position is also identical to the position of LAC future *jiāng*. More research is required on the position of rhetorical *wh*-words, but it seems safe to say that there is a TP-internal position, most probably in PolP, which hosts rhetorical *wh*-adverbials at PF; these have to move up at LF in order to check their features with the Q-operator in the CP layer.

Dāng is the first modal that is merged directly in a functional projection as Mod_1 or FUT in TP without any movement involved. Thus, the diachronic development of *dāng* provides some evidence for a cross-linguistic process of grammaticalization as a change from move to merge and for the reanalysis of a lexical item as functional. Both functional projections, Mod_1P and

FutP, are present in LAC; in its process of grammaticalization *dāng* becomes reanalyzed as a head of either of these two categories. According to the preceding discussion, the following hierarchy of functional categories can be proposed:

(27) Force/Pol RQ/M > $\text{Mod}_{\text{Epistemic}}$ BI > FUT JIANG/DANG > $\text{Mod}_{\text{deontic}}$ DANG > Pol RQ/Op_{NEG} > Modifier *how* > $\text{Mod}_{\text{circumstantial}}$

In Archaic Chinese, almost the only modals which were unambiguously identifiable as deontic for the language learner were the modal negative markers, which were morphologically marked by a *m*-prefix.[34] It cannot be excluded that additionally a combination of verbs marked for telicity and resultativity by derivational morphology in future and irrealis contexts or in combination with modals of possibility might have sufficed in Archaic Chinese to code non-negative deontic necessity (see Meisterernst 2019b). But this is subject to future research. In any case, the emergence of a new system of unambiguous deontic modal markers coincides with the loss of transparency of the former morphology of Chinese; this includes the loss of transparency of the precise function of the modal negative markers. This loss of transparency together with other factors, such as the ambiguity of possibility modals in negated contexts, might have necessitated the emergence of a new and less ambiguous system of modal markers in Early Middle Chinese.

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34 The modal *bì* 必 'need, must' is left out of the discussion. According to the scope of negation with respect to the modal it belongs to Modal_2.

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