Modal raising and focus marking in Chinese[1]

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This paper presents several new empirical observations regarding some interpretive effects and structural restrictions of modals that occur in sentence-initial positions in Chinese. It provides a new analysis of sentence-initial modal sentences in terms of the overt head-movement of a modal to the sentence periphery to value strong focus features and to focus-mark either the proposition or the subject of a sentence. This new proposal helps explain the markedness exhibited by such sentences, correctly predicts the structural and semantic restrictions of modal sentences, and directly explains the scopal interactions observed between modals and various types of focus constructions. It also shows that changes in word order in Chinese are not ascribable simply to an optional or free derivation in syntax but are related to an understudied mechanism in that language, i.e. T-to-C movement, and that the roles of information structure are represented as formal features in syntax. The results shed new light on how Chinese – though profoundly different from Germanic and Romance languages typologically – exemplifies a similarly fine structure in the sentence-internal domain, parallel associations of scope-bearing units with sentences' left peripheries, and a neat interaction of syntax with discourse configurations.

KEYWORDS: sentence-initial modal, focus, intervention effects, internal merge, T-to-C movement, Mandarin Chinese

1. INTRODUCTION

A recurrent quest in linguistic research is for an overarching analysis that will account for the semantic and syntactic characteristics of modality-bearing items. Chinese *nengyuan zhu-dongci* 'modal auxiliaries', such as *yinggai* 'should' and *keyi* 'can' (henceforth referred to as modals), are – like modals in English – typically located between a subject and its predicate. Hereafter, modals in this position are termed sentence-internal modals. Semantically, modality is generally categorized into three major types: EPISTEMIC modality, which expresses a speaker's knowledge, assumptions, and estimations; DEONTIC modality, which denotes permission,

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obligation, or rules involving prioritization; and DYNAMIC modality, which denotes ability, volition, or circumstances (for an overview, see Portner 2009).

Modals can express many possible readings depending the choice of conversational backgrounds (Kratzer 2012), and Chinese modals in their canonical position express the same range of modality as modals in other languages do (Li & Thompson 1981: 182–183). For example, the words *yinggai* and *keyi* each express two types, with *yinggai* being either epistemic, as in (1a), or deontic, as in (1b), and with *keyi* being either deontic (2a) or dynamic (2b).[2]

(1) *Zhangsan   yinggai   shuijiao   le.*
     Zhangsan   should   sleep   SFP
     (a) 'It is a necessary assumption that Zhangsan is asleep.' →Epistemic
     (b) 'It is required that Zhangsan be in bed.' →Deontic

(2) *Zhangsan   keyi   changge.*
     Zhangsan   can   sing
     (a) 'Zhangsan is allowed to sing.' →Deontic
     (b) 'Zhangsan is able to sing.' →Dynamic

The same type of multiplicity of meanings is also found in English modals:

(3) John must be in bed.
     (a) It is an inescapable assumption that John is in bed. →Epistemic
     (b) It is required that John be in bed. →Deontic

(4) John can sing.
     (a) John is allowed to sing. →Deontic
     (b) John is able to sing. →Dynamic

However, unlike in English, some epistemic and deontic modals in Chinese may occur before the subject of a sentence. These henceforth are referred to as sentence-initial modals. In one early Chinese-grammar manual (Lü [1980] 1999), most uses of sentence-initial modals were assigned to the category *zhu-dong* 'auxiliary', and some of its examples of such sentence-initial modal sentences are shown in (5), with my glosses and translations.[3]

(5) (a) *yinggai* 'should'
          Dajia-de   shiqing, yinggai dajia   ban.
          everyone's   matter   should   everyone   handle
          'As it is a matter concerning everyone, everyone should [make efforts to] handle it.'

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[2] The following abbreviations are used in the glosses of examples for specific linguistic items: ASP, aspect; BA, causative marker; COP, copula verb; CL, classifier; -*de*, marker of possession and adjectives; De, verbal resultative marker; DE, sentence final particle in cleft sentences; EMP, cleft-focus marker; Foc, focus; Op, operator; LF, logical form; Q-PART, interrogative particle; RE, relative clause; SFP, sentence final particle.

[3] Square brackets in the English translations indicate words not uttered in Chinese.

(b) *dei* 'must'
    Bie.ren   qu bu xing. Dei ni   qin.zi   qu.
    Other.person go not allow must you person.self go
    'It can't be done by proxy. You must go there in person.'

(c) *keyi* 'can'
    Keyi ta   qu, ye keyi ni   qu.
    can (s)he go, also can you go
    'It is allowed for him to go, [and] it is also allowed for you to go.'

Sentences as in (5) have been understudied. The current consensus among scholars of Chinese syntax is that the two above-mentioned modal positions are associated through some version(s) of optional subject-raising (e.g. Lin & Tang 1995; Tsai 2010, 2015; Lin 2011, 2012; Chou 2013): i.e. that such modals are raising verbs. However, that idea should be reconsidered, because sentences like (5) exhibit syntactic restrictions and semantic functions that are very different from sentences like (1) and (2). This paper presents new evidence that the distribution of modals is constrained by their designated positions (contra the subject-raising proposals) and that sentences like (5) express focus readings, whereas those like (1) and (2) do not.

    Native Mandarin speakers exhibit a keen sense of when sentences featuring the two modal positions should and should not be used. Consider a scenario in which two friends, *A* and *B*, are chatting in *B*'s house. Speaker *A* hears the doorbell ring and asks *B* about it, as in (6A). If speaker *B* wants to answer the question with a sentence containing an epistemic modal to express their own epistemic estimation based on the doorbell ringing, the answer with a sentence-initial modal (6B) is felicitous, whereas (6B') with a sentence-internal modal is not.

(6) A: *Zenme   le*?
       what/how   SFP
       'What happened?'

    B: *Yinggai Zhangsan mai pisa   huilai-le.*
       should   Zhangsan buy pizza return-ASP
       'It should be the case that Zhangsan has bought a pizza and returned home.'

    B': #*Zhangsan   yinggai   mai pisa   huilai-le.*
        Zhangsan   should   buy pizza return-ASP
       'Zhangsan should have bought a pizza and returned home.'

Answers to an out-of-the-blue question such as 'What happened?' have been referred to as broad focus or sentence focus, indicating that the span of focus involves a proposition, thus is different from the span of a predicate focus or constituent focus (cf. Lambrecht 1994; LaPolla 1995). In a sentence like (6B), having considered why the doorbell is ringing, speaker *B* uses the sentence-initial modal *yinggai* 'should' to assert an epistemic judgment on a modalized proposition: i.e. *B*'s epistemic judgment that after hearing the doorbell ring that 'Zhangsan

should have bought a pizza and returned home, which is what *B* believes to be the most likely explanation of the ringing that is relevant to the common ground (cf. Stalnaker 2002). Another key characteristic of this type of propositional focus is that it does not require a presupposition that a proposition is already at issue (i.e. a prejacent). That is, speaker *B* does not have to know with certainty that Zhangsan is arriving with a pizza at the time of this conversation. Thus, the focus at issue is different from *verum* focus, which requires a prejacent (Höhle 1992).[4]

In this paper, the crucial characteristic that I try to account for is that (6B), with its sentence-initial modal, exhibits a strong sense of assertion on the modalized proposition that (6B') does not share and that such a sense of modal assertion is obtained syntactically.[5,6] Hereafter, the type of sentence focus expressed in (6B), not requiring a prejacent, is labeled a PROPOSITIONAL FOCUS, to distinguish it 1) from *verum* focus, 2) from broad sentence focus that does not express assertion, and 3) from constituent focus, whose span is smaller than a proposition. Specifically, this paper presents new empirical evidence that sentence-initial modals are moved to the complementizer domain (CP) (Section 4), associated with a focus operator, marking the focus denotation of its c-commanding associates (Section 5), whereas sentence-internal modals form the canonical modalized sentences. As such, the analysis presented here assumes that the focus c-commanding association (Jackendoff 1972)

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[4] As an anonymous reviewer points out, *verum* focus – another type of proposition-related focus – typically needs an accent in German and English. How focus is prosodically marked, especially in a tone language, is indeed an interesting and important question (see Xu 1999; Hsu & Xu 2017), but, due to the scope of the current study, only the semantics and syntax of the phenomenon at issue can be discussed. Some further examples of modal and *verum* focus are presented in Section 6.1.

[5] It has been brought to my attention (Thomas Grano, personal communication) that different epistemic modals in English seem to show gradients of acceptability, in a context similar to (6). In the English examples in (i), below, placing stress on *may* and *should* is acceptable, whereas placing it on *must* is not. The acceptability of using stressed *may* and *should* in such contexts suggests that conveying an assertion of uncertainty may not require a presupposition that a proposition is already at issue (i.e. a prejacent); this is similar to the Chinese use of focused *yinggai* in (6). The infelicity of using a stressed *must* could be because *must* has universal force and cannot be used to emphasize uncertainty.

   (i)   A: (hearing the doorbell ringing) What's happening?
           B: Someone MAY be delivering a pizza.
           B': Someone SHOULD be delivering a pizza.
           B": # Someone MUST be delivering a pizza.

[6] I am grateful to an anonymous reviewer for the comments about the thetic/categorical distinction. In Chinese, both modal-subject orders can be used to answer questions related to thetic judgments. Moreover, given that indefinite and generic subjects exist in Chinese (Li 1998) and that definite nominals do not always represent topics in Chinese, the structural thetic/categorical distinction in the sense of Kuroda (1972) is not attested in Chinese. As part of a consideration of raising predicates in Chinese, Li (1990: 128) showed that an overt subject cannot stay in the complement of a raising predicate. Related issues about the inner subject also are discussed in Section 2.

is critical in Chinese, whereas the specifier-head association happens covertly, as in Chinese *wh*-question formation (Huang 1982; Tsai 1994).

This new proposal not only accounts for native speakers' intuition and choices of modal sentences but also is important theoretically. Previously, based on an assumption that modals are lexical verbs, many researchers have relied on subject-raising to account for Chinese's two modal positions. However, as shown in Section 2, several contrasts cannot be explained by such an approach, and an internal merge of modals may better account for the phenomenon at issue. Therefore, Section 3 presents this paper's adoption of, first, a cartographic approach to deriving both sentence-internal modals (cf. Cinque 1999) and sentence-initial modals (cf. Rizzi 1997) and, second, Rooth's (1985) alternative-semantics framework for expressing two different types of interpretations associated with modal sentences in Chinese. The remainder of this section reveals that Mandarin Chinese, although profoundly different from Germanic and Romance languages typologically, presents a neat example of the interplay of these syntactic-semantic mechanisms. Two main theoretical implications of this paper's central proposal include, first, that features of information structure (such as focus) are formal features in syntactic derivation (cf. Rizzi 1997; Miyagawa 2010) and, second, that identifying Chinese modals as distinct functional categories in the tense phrase (TP) domain (cf. Pollock 1989) provides an important new perspective from which to reconsider a current consensus in Chinese syntax: that the absence of V-to-T raising (Huang 1993; Tsai 1994) subsumes the absence of T-to-C raising. New data presented in Section 4 show how modal raising interacts with scope-bearing heads in the TP domain. As such, with regard to the Move and Agree mechanism (Chomsky 2001), this study supports the view that a probe's strong features trigger the head-movement of its c-commanding goal.

New evidence presented in Section 5 shows that, in both the matrix and embedded clauses, sentence-initial modals are relevant to the valuation of focus features in CP and that this covert association interacts with *wh*-constituents, resulting in focus-intervention effects, just like other focus constituents do with *wh*-constituents (cf. Beck 1996). Sentence-internal, canonical modals, in contrast, do not trigger such focus-induced interactions. Section 6 then elaborates types of focus that sentence-initial modals can express; and Section 7 presents this paper's conclusions.

2. EXTERNAL OR INTERNAL MERGE?

The existing literature on modal syntax does not consider differences in focus interpretation between sentences with sentence-internal modals, e.g. (1) and (2), and those with sentence-initial modals, e.g. (5). Instead, these two modal distributions are claimed to be derived by optional subject-raising in a biclausal structure, such as a vacuous structural alteration resulting from optional subject-to-subject raising in TP (Lin & Tang 1995; Lin 2011, 2012; Tsai 2010, 2015); optional topic A-movement in TP (Chou 2013); or optional topicalization of a subject from the

matrix-subject position (Specifier of TP) to the domain of the CP (Tsai 2010, 2015). Each of these three proposals has some theoretical merit. However, empirical examination suggests that all three are ripe for reconsideration.

Proceeding from an assumption that null expletives in Chinese can be freely inserted when the subject is not raised to the matrix-subject position, Lin & Tang (1995) offered two accounts of the derivation` of the raising type of modals.[7] The first was that such modals are subcategorized as having a finite or non-finite complement, with the subject raising only when the complement is non-finite (7). But this would mean that the less commonly used sentence-initial modal (<3% in corpus[8]) would be the only method of deriving Chinese modal sentences, which is contrary to observations.

(7) [$_{TP}$ Zhangsan$_i$ yinggai [$_{CP}$ [$_{TP}$ t$_i$ chi-guo fan le]]]].
      Zhangsan   should   eat-ASP   rice SFP
      'Zhangsan should have eaten his meal.'

Lin & Tang's (1995) second account posits that the raising type of modal in Chinese is obligatorily subcategorized for a finite complement and that the Infl(ection) head of this finite clause optionally assigns the nominative Case. As such, the subject rises when the embedded finite Infl does not assign a nominative Case, and the subject does not rise when it receives the Case from the embedded finite Infl. Accepting this biclausal mechanism for the raising of subjects out of a finite clause, Lin (2011, 2012) and Chou (2013) both claimed that the subject optionally rises from an embedded finite clause, either for special extended projection principle (EPP) features or topic features.[9] Another challenge to the subject-raising account arises if one accepts either of two claims: 1) that a null expletive can be freely inserted as the matrix subject or 2) that an embedded TP can optionally assign Case. Although optional Case assignment may be useful for explaining other phenomena (cf. Bošković 2011),[10] the raising-verb account of epistemic and deontic modals results in incorrect predictions. That is, if modals took a raising structure and were initially merged in the sentence-initial position, sentences like (8) could further derive sentences like (9) after subject-raising. But, assuming that the same mechanism generates sentences like (9a) and (9b), it is unclear what

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[7] Although raising and control structures were proposed for Chinese modals by Lin & Tang (1995), their study did not indicate what they assumed to be the typical Chinese raising and control verbs.

[8] A corpus search was conducted in a balanced corpus, CCL (Zhan, Guo & Chen 2003), among 277,786 retrieved sentences containing *keyi* ('can/may'), and only 5,922 sentences (2%) had *keyi* in the sentence-initial position. Among 92,099 retrieved sentences containing *yinggai* ('should'), 2,549 (2.7%) had it in the sentence-initial position. An anonymous reviewer has helpfully pointed out that frequency differences may be due to potential mismatches between linguistic competence and performance and not entirely due to derivational complexity. While this point is worth considering, some evidence presented in the following sections show that the modal-raising account is better than the alternatives.

[9] Lin (2011, 2012) and Chou (2013) adopt Lin & Tang's (1995) biclausal analysis but assume that such raising and control verbs take TP complements rather than CP complements.

[10] I am grateful to one of the anonymous reviewers for this point.

prevents the construal of sentences like (9a). These observations also weigh against the idea that sentence-initial modals are sentential adverbs. Again, why adjunction is allowed in one, but not the other, is not immediately apparent.

(8) (a) *Yinggai Zhangsan si. dian zou*
     should Zhangsan four O'clock leave
     'It is the case that Zhangsan should leave at 4 p.m.'

   (b) *Keyi Zhangsan si. dian zou.*
     may Zhangsan four O'clock leave
     'It is the case that Zhangsan may leave at 4 p.m.'

(9) (a) **Keyi* [*Zhangsan yinggai si. dian zou*].
     may Zhangsan should four o'clock leave
     'It is permitted that Zhangsan should leave at 4 p.m. (So that he has enough time to pick up his children.)'

   (b) *Yinggai* [*Zhangsan keyi si. dian zou*].
     should Zhangsan may four o'clock leave
     'It is probably the case that Zhangsan may leave at 4 p.m. (I know he's not at work today.)'

Implicitly rejecting the lexical(-verb) analyses, Tsai (2010, 2015) argued that modals expressing different types of modality are realized in different syntactic domains. As shown in (10), epistemic modals (MP^{Epi}) are in the CP domain, deontic modals (MP^{Deo}) are in the Infl domain, and dynamic modals (MP^{Dyn}) are under vP.

(10)   Tsai's (2010, 2015) Three-domain Analysis
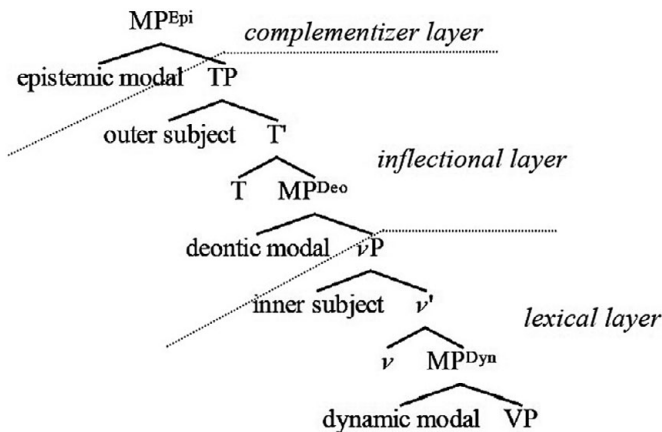
As such, Tsai's (2010, 2015) proposal neatly incorporates both the traditional functional Infl and lexical-verb analyses for Chinese modals. For the present purposes, one of Tsai's claims is of particular concern. Following Diesing (1992), it is proposed that a subject preceding a deontic modal is a definite outer

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subject, while a subject following such a modal is a nonspecific inner subject. Nonetheless, it should be noted that the subject following a deontic modal can often be a pronoun or proper name, such as in (5b) and (5c); and, being definite and referential, these conflict with what is required for an inner subject. Additionally, according to Li (1998), a quantity-denoting nominal that is not referential can be a matrix subject – e.g. the nonspecific quantity phrase 'two people' in (11) – potentially occupying the outer subject position in (10).

(11) *Liang   ge   ren   keyi   baoming   bisai.*
      two   CL   person may   register   game
      'Two people [as a team] may register for the game.'

Another phenomenon that has been reported in the literature, but has yet to be accounted for, is that Chinese modals with different types of modality can co-occur but only in a fixed order.

(12) (a) *Zhangsan   yinggai keyi   si.   dian   zou.*
           Zhangsan   should may   four o'clock leave
           'Zhangsan should be allowed to leave at 4 p.m.'
      (b) **Zhangsan keyi   yinggai si.   dian   zou.*
            Zhangsan   may   should 4.o'clock leave
           'Zhangsan should be allowed to leave at 4 p.m.' (*yinggai > keyi*)
           'Zhangsan is probably allowed to leave at 4 p.m.' (*keyi > yinggai*)

The contrasts illustrated in (12) reflect the semantic order of modals reported in prior literature, i.e. epistemic scopes over deontic (for a review, see Portner 2009). The present study proposes that syntactically expressing such a modal order through functional projections of modals in the TP domain (cf. Cinque 1999) not only captures the modal hierarchy shown in (12) but also provides a unified structural explanation for data like (8) and (9). Section 3 presents this proposal: a modal-raising mechanism, and in Sections 4 and 5, new evidence of syntactic head-movement intervention and of semantic focus intervention effects highlights how the current proposal provides a better and unified explanation of these data.

3. THE PROPOSAL: MODAL RAISING FOR FOCUS

This paper proposes that changes in word order in Chinese are not ascribable to an optional or free derivation in syntax but are required by syntactic-feature computations to express specific information structures, that is, modal raising for focus.

Based on the similarities in the typical use of English and Chinese modals, the canonical position of Chinese ones – i.e. between a subject and its predicate – is here assumed to be generated in the split-Infl domain à la Pollock (1989). This is in accordance with the traditional view of modals as functional categories in Chinese (Huang 1988; Hsu 2005, 2015; Hsu & Ting 2008; Tang 1990; Tsai 2010, 2015; for English, see Chomsky 1957; Roberts 1985). The tree diagram in (13) summarizes

this proposal. Three structural assumptions are as follows. First, if one accepts that there is a c-command requirement for focus association (Jackendoff 1972), focus-marking modals occur in the sentence-initial position to c-command its focus associate (e.g. TP, for propositional focus). Second, if one accepts the split-CP hypothesis (Rizzi 1997), then sentence-initial modals can be derived by internal merge to the Focus Phrase (henceforth, FocusP) in the CP domain.

(13)   Sentence-initial Modal Internally Merged at FocusP
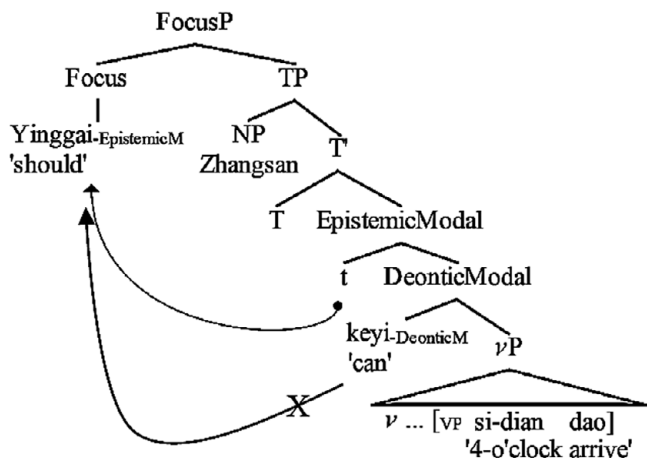
And third, proceeding from the assumption of Agree (Chomsky 2001) – i.e. that an Agree relation should be established between a PROBE category that carries an uninterpretable feature, and a GOAL category (c-commanded by the probe) with a corresponding feature (Pesetsky and Torrego 2004) – it is proposed that the head of the FocusP bears a strong, uninterpretable focus feature, uFocus (Miyagawa 2010); probes a goal (in this case, a modal) with corresponding interpretable features; and triggers the head movement of the modal for feature valuation.

Given that head movement would be blocked by intervening (c-commanding) heads of the feature-relevant type (Rivero 1994; Li, Shields & Lin 2012), this analysis gains initial support from the order-restriction on double-modal sentences that is discussed in Section 2. That is, based on the structure in (13), to fulfill Agree as required by the Focus head, a goal (*keyi*) moves from its canonical position to a surface position, crossing another modal (*yinggai*) that counts as an intervening head containing the same type of feature, i.e. head-movement constraint. In contrast, moving the higher modal *yinggai* 'should' does not violate the constraint, because no intervening head blocks the movement. The following sections show that the head-movement mechanism is entertained in this proposal because interpretations of the two types of Chinese modal sentences differ only in one respect: that sentence-initial modals emphasize a modalized proposition, while typical modalized sentences do not carry such emphasis; moreover, this word-order

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difference triggers syntactic head-movement constraints with respect to other scope-bearing heads (Section 4) as well as semantic intervention effects with respect to focus elements (Section 5).

To account for various modal interpretations, Kratzer (1981, 2012) proposes that modal sentences are inherently relational – combining the *modal base* and the *modal background* (proposition) – and assuming a set *W* of possible worlds, one can view propositions as subsets of *W*, and the selection of the modal base determines the modal flavor. For example, a deontic modal like *can* will return true if and only if all the worlds in the set arrived at by taking the intersection of modal base applied to the evaluation world are worlds in which the proposition is true, as in (14a) (Kratzer 2013: 192), and the same applies to an epistemic modal like *must* except that it expresses epistemic quantification, as in (14b).

(14) (a) $[\![can]\!] = \lambda p \lambda s \exists w \left(w \in f_{fact}(s) \& p(w) \right).$

    (b) $[\![must]\!] = \lambda p \lambda s \forall w \left(w \in f_{fact}(s) \rightarrow p(w) \right).$

The same range of modal readings are available and expressed by modals in the post-subject positions in Chinese, just as their English counterparts; however, such standard semantic mechanism that derives modal interpretations, although important, is insufficient in expressing that both types of Chinese sentences at issue involved modality but differ in terms of their focus denotation. Therefore, the framework of Focus Alternative Semantics is adopted to present my analysis of propositional focus. According to Rooth (1985: 14), a focused constituent (*a*) contains an ordinary semantic value $[\![a]\!]^o$ and a focus semantic value $[\![a]\!]^f$, which is involved with a set of alternative denotations that include $[\![a]\!]^o$ as a member. For example, a focus-sensitive operator like *only* marks a focused constituent, quantifies over its associated alternatives, and results in a set of alternative propositions. Therefore, a focused constituent like *John* in (15a) is associated with a set of alternatives, such as {John, Bill, Ken, …}, resulting in alternative propositions (15b). Among such alternatives, only one – 'John saw a man' – is relevant, and the focus operator *only* excludes the others.

(15) *Only [John] saw a man.*
    (a) LF: *only* [[John]_{Foc} saw a man]
    (b) $[\![John]\!]^f$ = {John saw a man, Bill saw a man, Ken saw a man, …}

Applying this framework of alternative semantics to the phenomenon at issue, and assuming Kratzer's (1981, 2012) semantic account to modality, I propose that modals in the TP domain express typical modalized sentences and that when a modal occurs in the sentence-initial position, it is associated with the focus operator in FocusP, marking its c-commanding modalized TP as focus. For example, the pre-subject modal *yinggai* in (16) marks a TP (*β*) as focus – the assumed LF is shown in (16b) – and asserts that this proposition is the most likely among the alternatives (16c). Below, for ease of discussion, modalized sentences involved with

propositional focus are translated with the frame 'It is the case that…' to distinguish them from typical modalized sentences.

(16) *Yinggai   Zhangsan   si.   dian   dao.*
        should   Zhangsan   four o'clock   arrive
        'It is the case that Zhangsan should arrive at 4 p.m.'
        (a) $[\![\beta]\!]^o$: Zhangsan should arrive at 4 p.m.
        (b)   LF: *should* [$_{TP}$ Zhangsan should arrive at 4 p.m.]$_{Foc}$
        (c) $[\![\beta]\!]^f$ = {Zhangsan should arrive at 4 p.m, Bill can go by himself…}[11]

   The next question to be asked under the current proposal is how to account for sentences such as (17), in which another phrase is located before the sentence-initial modal. According to Rizzi (1997), a topic projection may dominate FocusP in the split-CP domain; therefore, the phrase before the sentence-initial modal – e.g. *wancan* 'dinner' in (17) – can be analyzed as a topic of the sentence.

(17) *Wancan   yinggai   Yuehan   zhunbei.hao   le.*
        dinner   should   Yuehan   prepare.done   SFP
        '[As for] dinner, it is the case that Yuehan should have prepared it.'

   This was also claimed by Lin (2011: 63), who noted that speaker-oriented adverbs in Chinese – such as *tanbai-shuo* 'frankly speaking' – do not occur between a subject and its predicate and only occur outside of TP, for example (18). Therefore, if an adverb test is applied to (17), then (19) can support the CP-topic status of *wancan* proposed here. While the current proposal naturally accounts for examples (17) through (19), it is worth noting that the ungrammaticality of (18a) argues against proposals that epistemic modals initially merge at CP and derive the subject-modal order through subject raising (e.g. Tsai 2015).

(18) (a)   **Zhangsan   tanbai-shuo   keneng   zhunbei   wancan.*
              Zhangsan   frankly-speaking   be-likely-to   prepare   dinner
              Intended: 'Zhangsan frankly speaking is likely to prepare the dinner.'
        (b)   *Tanbai-shuo,   Zhangsan   keneng   zhunbei   wancan.*
              frankly-speaking   Zhangsan   be-likely-to   prepare   dinner
              'Frankly speaking, Zhangsan is likely to prepare the dinner.'

(19) *Wancan,   tanbai-shuo,   yinggai   Yuehan   zhunbei.hao   le.*
        dinner   frankly-speaking   should   Yuehan   prepare.done   SFP
        '[As for] dinner, frankly speaking, it is the case that Yuehan should have prepared it.'

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   [11] According to Partee (2009), the alternative set of focus may or may not already be in the context, and the presence of focus itself can cause the hearer to search for a proper set of alternatives to accommodate into the context. In line with Partee's analysis, I assume that a speaker need not have prior knowledge of all the possible alternatives upon uttering a sentence with a pre-subject modal; rather, the fact that the speaker has picked this form of modalized sentence serves to indicate the focus status of the proposition and causes the hearer to search for a proper set that accommodates it into the current common ground.

4. OTHER SYNTACTIC INTERVENING HEADS

If the current proposal is tenable, other TP-internal scope-bearing heads, and not just the modals, can be expected to block the proposed head-movement. Two pieces of evidence for this are presented in this subsection: negation, and emphatic *shi* in cleft.

4.1 *Negation*

The first piece of evidence involves the interaction of the scope of modals with the sentential negation *bu* 'not'.[12] The examples in (20) show that an ambiguous modal *yinggai* expresses an epistemic reading if it occurs before the sentential negation *bu* but a deontic reading if it occurs after the sentential negation *bu*.

(20) (a) *Zhangsan   yinggai$_{Epistemic}$ bu   zhidao zhe-jian-shi.*
          Zhangsan   should   not   know   this-CL-matter.
          'It is likely that Zhangsan does not know about this matter.' [epistemic > *not*]

      (b) *Zhangsan   bu   yinggai$_{Deontic}$ zhidao   zhe-jian-shi.*
          Zhangsan   not   should   know   this-CL-matter.
          'Zhangsan is not allowed to know about this matter.' [*not* > deontic]

When a sentence-initial modal expresses propositional focus, the sentence with an epistemic modal properly contains the sentential negation in its epistemic interpretation; see examples (20a) and (21). However, a similar attempt fails with a deontic modal, because the original scope of (20b) does not hold, as in (22).

(21) *Yinggai$_{Epistemic}$ Zhangsan   bu zhidao   zhe-jian-shi.*
      should   Zhangsan   not know   this-CL-matter.
      'It is the case that Zhangsan should not know about this matter. (Everyone keeps it a secret.)' (*yinggai* > *not*)

(22) **Yinggai$_{Deontic}$ Zhangsan   bu zhidao   zhe-jian-shi.*
      should   Zhangsan   not know   this-CL-matter.
      'It is the case that Zhangsan is not allowed to know about this matter. (The boss demanded it.)' (*not* > *yinggai*)

If it is assumed that sentential negation is a propositional scope-bearing head (Jackendoff 1969) in the TP domain (Haegeman 1995), then the different modal interpretations in (21) and (22) can be accounted for by the proposed head-movement constraint. In other words, raising the deontic modal to the sentence-initial position for focus scope is blocked by the sentential negation, whereas the epistemic modal – being located higher than the sentential negation – is free to raise.

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[12] I am grateful to one of the anonymous reviewers for this insight.

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4.2 *Emphatic* shi *in cleft construction*

The second piece of evidence for the proposed head-movement of modals involves emphatic *shi* (glossed as EMP) in Chinese cleft construction. Existing research on this construction has concentrated on sentences containing emphatic *shi* and sentence-final *de* (DE)[13] (Simpson & Wu 2002; Lee 2005; Cheng 2008; Paul & Whitman 2008). Hole (2011), based on a review of prior studies of Chinese cleft, suggested that true cleft construction in Chinese exhibits an exhaustiveness reading, like English cleft (Paul & Whitman 2008; Hsu 2019). In other words, while *shi…de* sentences, as in (23a), exhibit an exhaustiveness requirement similar to the exhaustivity associated with cleft constructions in other languages (Szabolcsi 1981; Kiss 1998; Hedberg 2000), bare *shi* sentences, as in (23b), do not.

(23) (a) **Ta* **shi** *zai Beijing xue yuyanxue* ***de,*** *dan ye* **shi**
    (s)he EMP at Beijing study linguistics DE but also EMP
    zai Shanghai xue (yuyanxue) ***de.***
    at Shanghai study linguistics DE
    '*It was in Beijing that (s)he studied linguistics, but also in Shanghai.'

    (b) *Ta* **shi** *zai Beijing xue-guo yuyanxue, dan ye*
    (s)he EMP at Beijing study-ASP linguistics but also
    shi *zai Shanghai xue-guo.*
    EMP at Shanghai study-ASP
    '(S)he studied linguistics in Beijing, but also in Shanghai.'

I follow Lee (2005) (in the spirit of Teng 1979 and Huang 1988) regarding this emphatic *shi* as a focus-sensitive marker syntactically realized in the TP domain, c-commanding its focus associate,[14] and assume that – like another focus-sensitive operator, *only* – the exhaustive feature is valued at FocusP in CP in LF.

This TP-internal functional head *shi* serves as another diagnosis for the head movement proposed in this study. When the modal *yinggai* – which can express either deontic or epistemic modality – occurs in a cleft sentence, it carries a strong suggestive deontic sense if it follows *shi*, as in example (24b), but an epistemic one if it precedes *shi*, as in example (24c).

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[13] Some Mandarin speakers in the northern provinces of China allow an alternative form of cleft, in which the *de* occurs before the direct object; this is labeled 'V de O cleft' in Hole (2011). However, alternative positions of *de* in cleft construction are beyond the scope of this study. Readers may refer to Hole (2011) and the references therein for more information.

[14] A sentence-internal FocusP is assumed for Chinese, due to the fact that focalized direct objects (e.g. *only*- or *even*-objects) have to occur in this preverbal position and cannot be focus-marked inside of VP (for more details, see Shyu 1995; Paul 2002; and Hsu 2012).

(24) (a) ***Zhangsan shi yinggai zai Meiguo xue yuyanxue de***.
Zhangsan EMP should at USA study linguistics DE
Lit: 'It is in the USA that Zhangsan should study linguistics. (So that he can receive a better education.)' [EMP > deontic]
*Lit: 'It was in the USA that Zhangsan should have studied linguistics. (That was what he told me.)' [unavailable reading: EMP > epistemic]

(b) ***Zhangsan yinggai shi zai Meiguo xue yuyanxue de***.
Zhangsan should EMP at USA study linguistics DE
Lit: 'It was in the USA that Zhangsan should have studied linguistics. (That was what he told me.)' [epistemic > EMP]
*Lit: 'It is in the USA that Zhangsan should study linguistics. (So that he can receive a better education.)' [unavailable reading: deontic > EMP]

Sentences like (24) illustrate two important points. The first is that a sentence-internal modal can be a part of the background of a cleft construction. The second is that, in a cleft construction, modals with different types of modality co-occur with *shi* in a fixed order: i.e. epistemic modals before *shi* and non-epistemic ones after it. This ordering restriction is not likely to be due to semantic, scope-related reasoning, given that both deontic and epistemic modalities can be expressed either in the background clause of the cleft focus, as in (25), or inside the clefted unit, as in the English examples in (26).

(25) (a) It is a project that we should have been working on since last week.
(b) It is the project that we should focus on.

(26) (a) It must have been the president who undertook the task.
(b) It should be the general who leads the army.

Interestingly, with respect to sentence-initial modals, a contrast is observed between epistemic and deontic modals in cleft construction. That is, epistemic modals can occur in a sentence-initial position but deontic modals cannot, as shown in (27).

(27) (a) ***Yinggai Zhangsan shi zai Ouzhou xue yuyanxue de***.
should Zhangsan EMP at Europe study linguistics DE
'It is the case that it was in Europe that Zhangsan should have studied linguistics. (That was what he told me.)'
(b) ****Keyi Zhangsan shi zai Ouzhou xue yuyanxue de***.
can Zhangsan EMP at Europe study linguistics DE
'It is the case that it is in Europe that Zhangsan can study linguistics. (He has obtained the scholarship.)'

If one adopts the subject-raising viewpoint, however, it remains unclear why modals can directly merge sentence-initially in one of these cases (27a) but not in the other (27b). Thus, reconsidering (24), a simple explanation for the contrast

illustrated in (27) could be that raising a deontic modal to the sentence-initial position for focus requires passing emphatic *shi*, which counts as an intervening head that blocks the movement. On the other hand, raising an epistemic modal is acceptable because no intervening head is involved, as shown in (28).

(28) Modal Raising and Emphatic *Shi*
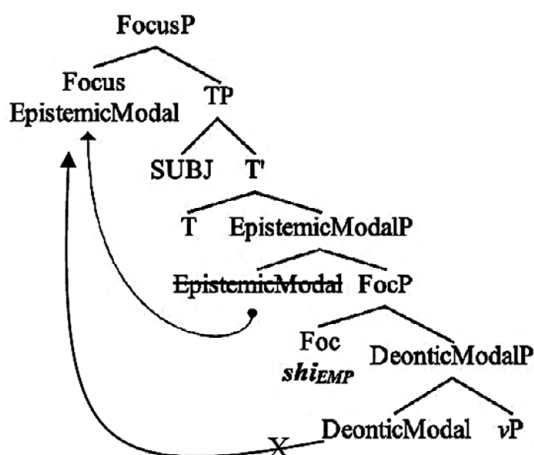
Before concluding this section, it is worth pointing out that unlike cleft sentences, modals – even deontic ones – located in TP must precede the copula use of *shi* (which is assumed to be a two-place predicate, see Mendez Vallejo & Hsu, in press) (29a, b) and that a deontic modal can occur at the sentence-initial position (29c), in contrast to (27b), in which a deontic modal follows emphatic *shi*.

(29) (a) *Zhangsan   keyi   shi   wo-de   laoshi.*
          Zhangsan   can   COP   I-de   teacher
          'Zhangsan can be my teacher.'
     (b) **Zhangsan   shi   keyi   wo-de   laoshi.*
          Zhangsan   COP   can   I-de   teacher
          'Zhangsan can be my teacher.'
     (c) *Keyi   Zhangsan   shi   wo-de   laoshi.*
          can   Zhangsan   COP   I-de   teacher
          'It is the case that Zhangsan can be my teacher.'

   Though the structural restriction of modals in the cleft construction has already been carefully considered, the information packaging of sentences like (27a) should be approached cautiously. If the cleft focus *zai Ouzhou* 'in Europe' is prosodically emphasized, as it usually is, then (27a) is infelicitous as a direct response to a prior discourse, due to a conflict between different types and spans of foci co-occurring in it: specifically, the propositional focus marked by the sentence-initial modal and the

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cleft constituent. Nonetheless, because information structure dynamically reflects the updated common ground as a conversation proceeds (Stalnaker 2002), such sentences can be accommodated as involving a second-occurrence focus (cf. Büring 2015), as shown in a mini-discourse like (30A, B) (more examples are discussed in Section 5). A similar situation has been reported for English (Hole 2011). In a mini-discourse like (30C, D), the cleft focus unit *in Paris* in speaker *A*'s utterance may later occur in a context where a new focus is updated in the conversation: e.g. *Paul split up* in (30D) as a corrective focus used to reject the presupposition provided in (30C). Therefore, the cleft focus in (30D) is considered a second-occurrence focus and does not attract the same level of acoustic prominence as the major focus does (Büring 2015).

(30) A: *Zhangsan yinggai **shi** zai Ouzhou xue yuyanxue **de**.*
Zhangsan should EMP at Europe study linguistics DE
Lit: 'It was in Europe that Zhangsan should have studied linguistics.'

B: Dui! *Yinggai Zhangsan shi zai Ouzhou xue yuyanxue*
yes should Zhangsan EMP at Europe study linguistics
de. [(27a)]
DE
'Yes, it is the case that it was in Europe that Zhangsan should have studied linguistics. (I am sure; that was what he told me.)'

C: It was in Paris that Paul fell in love.

D: No, it was in Paris that Paul split up!

For purposes of the current study, it is important that – while the second-occurrence focus is allowed – the derivation of focus-marking must still respect structural restrictions, as indicated by the contrast shown in (28).

In summary, the examples in this section have shown that TP-internal, scope-bearing, functional heads impose the same head-movement constraints as those observed in double-modal sentences. Section 5 demonstrates that sentence-initial modals are focus-sensitive, whereas TP-internal modals are not.

5. SENTENCE-INITIAL MODALS AND FOCUS INTERVENTION EFFECTS

This section's discussion is centered on focus-intervention effects (Beck 1996), especially as a means of diagnosing covert feature associations. It presents evidence that sentence-initial modals marking a propositional focus intervene in the construal of a constituent focus (e.g. *wh*-questions and *only*-focus) and that TP modals do not.

Chinese *wh*-phrases are known to stay in situ, and *wh*-features are valued at CP in LF (Huang 1982; Tsai 1994). When modals occur at the beginning of a *wh*-question, the resulting sentences are ungrammatical, as can be seen from example (31).

(31) (a) *Yinggai Zhangsan xihuan-guo shei ne?
      should Zhangsan like-EXP who Q-PART
      'Lit.: Whom$_{-Focus}$ should it be the case that [Zhangsan liked]$_{-Focus}$?'
   (b) *Keyi Zhangsan xihuan shei?
      can Zhangsan like who
      'Lit.: Whom$_{-Focus}$ is it allowed for [Zhangsan to like]$_{-Focus}$?'
   (c) ?*Yinggai shei renshi Lisi?
      should who know Lisi
      'Lit.: Who$_{-Focus}$ should it be the case that [knows Lisi]$_{-Focus}$?'
   (d) ?*Keyi shei renshi Lisi?
      can who know Lisi
      'Lit.: Who$_{-Focus}$ is it allowed [to know Lisi]$_{-Focus}$?'

However, the occurrence of sentence-internal modals does not influence the grammaticality of the construal of a *wh*-question, as shown in example (32).

(32) (a) Zhangsan yinggai xihuan-guo shei ne?
      Zhangsan should like-EXP who Q-PART
      'Whom should Zhangsan have liked?'
   (b) Zhangsan keyi xihuan shei ne?
      Zhangsan can like who Q-PART
      'Whom can Zhangsan like?'
   (c) Shei yinggai renshi Lisi?
      who should know Lisi
      'Who should know Lisi?'
   (d) Shei keyi renshi Lisi?
      who can know Lisi
      'Who can know Lisi?'

The contrast shown between (31) and (32) suggests that the sentence-initial and -internal modals may have different functions, as the former block *wh*-interrogative readings, whereas the latter do not, just as would be expected from the typical use of modals. The same contrast of grammaticality in matrix clauses between the examples in (31) and those in (32) can be found within an interrogative CP complement. According to Huang (1982), verbs such as *xiangzhidao* 'wonder' take an interrogative CP that licenses *wh*-questions inside that interrogative CP. With a neutral intonation, typical *wh*-questions with clause-internal modals, such as (32a) and (32b), can be embedded under *xiangzhidao*, such as (33), whereas sentences, such as (31a) and (31b), having sentence-initial modals, cannot, such as (34).[15]

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[15] Applying a specific intonation to parts of constituents in sentences like (34) might improve their acceptability, but this is because they are interpreted as different constructions. For example, if the speaker places an emphasis on the *wh*-word – e.g. *shei* 'who' – the sentence can be conceived of as an echo question. To further verify the contrasts presented in examples (31)–(34), a context-free acceptability-judgment task was carried out by 96 native speakers of Chinese. Based on a

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(33) (a) *Lisi   xiangzhidao* [CP-Q *Zhangsan   yinggai   xihuan-guo   shei*].
        Lisi   wonder   Zhangsan   would   like-EXP   who
        'Lisi wondered whom Zhangsan would have liked.'

     (b) *Lisi   xiangzhidao* [CP-Q *Zhangsan   keyi   xihuan   shei*].
        Lisi   wonder   Zhangsan   can   like   who
        'Lisi wondered whom Zhangsan can like.'

(34) (a) **Lisi   xiangzhidao* [CP-Q *yinggai Zhangsan   xihuan-guo shei*].
        Lisi   wonder   would Zhangsan   like-EXP   who
        'Lisi wondered whom as it would be in the case that Zhangsan liked.'

     (b) **Lisi   xiangzhidao* [CP-Q *keyi   Zhangsan   xihuan   shei*].
        Lisi   wonder   can   Zhangsan   like   who
   'Lisi wondered whom as it is allowed for Zhangsan to like.'

These comparisons of the clause-initial and clause-internal modals interacting with *wh*-questions show that such contrasts would remain mysterious if the modals were raising verbs and if modal constructions allowed an optional subject raising (e.g. Lin & Tang 1995; Lin 2011, 2012; Chou 2013; Tsai 2015). In other words, these examples highlight the mystery of why *wh*-phrases are NOT compatible with modals in a structure BEFORE the alleged subject-to-subject raising occurs but then BECOME acceptable after raising. This set of data also challenges Tsai's (2010, 2015) analysis of epistemic and deontic modals: for it is reasonable to wonder why the alleged outer subject (preceding a deontic modal) and the topic (preceding an epistemic modal) can co-occur with an in situ *wh*-expression, as in (32) and (33), whereas the same outer subject (following an epistemic modal and, presumably, preceding a deontic modal) and inner subject (following a deontic modal) cannot, as in (31) and (34).

  In the current analysis, sentence-initial modals are associated with a focus operator in CP that focus-marks the entire proposition. Therefore, when a *wh*-phrase is independent of the intended propositional focus marked by the sentence-initial modal, the sentence can be expected to be ungrammatical. This is probably due to the intervention effects of focus that have been proposed by Beck (1996, 2006) and Kim (2002).

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six-point rating scale (6 = very natural and 1 = not acceptable at all), I obtained the average ratings for each type of sentence, as shown below. These data – specifically ii and v – make it clear that sentence-initial modals are not deemed compatible with *wh*-questions.

  i   Basic matrix *wh*-questions: 5.7/6 points
  ii   Basic matrix wh-questions with a CP modal, e.g. (31): 1.3/6 points
  iii Basic matrix *wh*-questions with a TP modal, e.g. (32): 4/6 points
  iv   Embedded *wh*-questions with a TP modal, e.g. (33): 5.75/6 points
  v   Embedded *wh*-questions with a CP modal, e.g. (34): 1.5/6 points

(35) Intervention Effect: An INTERVENTION EFFECT arises when a *wh*-question contains a focus item valuated in the scope of the *wh*-question operator.

$$*[Q_{Op} \ldots \text{Focus}_{Op} [_{\Phi} \ldots \text{XP}_{\text{Focus}} \ldots wh \ldots]]$$
X
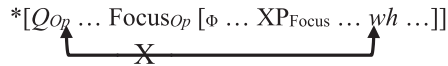
For example, Korean *wh*-phrases stay in situ – e.g. *nuku* 'who' in (36a). When another argument, such as the subject *Minsu* in the same example, is marked with a focus operator, -*man* 'only', the sentence becomes ungrammatical, as in (36b). It has been argued that this results from an intervention effect whereby a *wh*-phrase in situ cannot be c-commanded by a focus operator, as schematized in (35).

(36) (a) *Minsu-num   nuku-lûl po-ass-ni?*   (Korean; Beck & Kim 1997)
           Minsu-TOP   who-ACC see-PAST-Q
           'Whom did Minsu see?'
      (b) **Minsu-man   nuku-lûl   po-ass-ni?*
            Minsu-only   who-ACC   see-PAST-Q
           'Whom did only Minsu see?'

The intervention effects of focus can be remedied when the *wh*-phrase is moved out of the evaluation domain of a focus or a quantificational phrase (e.g. Hoji 1985; Takahashi 1990; Beck & Kim 1997; Tanaka 1997; Tomioka 2007). This scenario is exemplified by the contrast between (36b) and (37): the sentence is improved after the *wh*-phrase *nuku-lûl* 'who-ACC' is moved outside the valuation domain of the focused subject *Minsu-man* 'Minsu-only'.

(37) *Nuku-lûl Minsu-man   po-ass-ni?*   (Korean; Beck & Kim 1997)
      who-ACC Minsu-only see-PAST-Q
      'Whom did only Minsu see?'

   This type of focus-intervention effect is observed in Chinese as well (Yang 2012). If the subject focus *zhiyou Zhangsan* occurs in the same sentence as the question about the *wh*-object *shenme-dongxi* 'what-thing', the sentence is ungrammatical because of the intervention effect of focus, as schematized in (39).

(38) ** Zhiyou   Zhangsan   mai   shenme-dongxi?*
      only   Zhangsan   buy   what-thing
      'What did only Zhangsan buy?'

(39) $*[Q_{Op} \text{Focus}_{Op} [only\text{-Focus} \ldots wh \ldots]]$
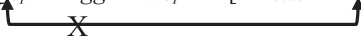   X
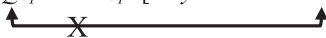
Much as in the Korean examples given above, the acceptability of sentences such as (38) is greatly improved after the *wh*-phrase leaves the valuation domain of the FocusP (40).

(40) *Shenme-dongxi,   zhiyou   Zhangsan   mai?*
      what   only   Zhangsan   buy
      'What is the thing that only Zhangsan bought?'

The current study proposes that the ungrammaticality of modal sentences like (41) can be accounted for in the same way. In other words, the propositional focus (i.e. TP_{Focus}), as in example (42), marked by a sentence-initial modal (with *FocOp*) and the *wh*-phrase (as an unrelated quantificational element) co-occur in the same valuation domain of focus.

(41) **Yinggai*   Zhangsan   xihuan-guo   shei   ne?*
      should   Zhangsan   like-EXP   who   Q-PART
      Lit: 'Who is it the case that Zhangsan should have liked?'

(42) *$*[_{QOp}$ *Yinggai-$_{FocOp}$* … $[_{TP\text{-}Focus}$ … *wh* …]]
              X

On this basis, one can predict that sentences like (41) will be improved significantly after the *wh*-phrase leaves the evaluation domain of the focus operator, as illustrated in (43), below. This example indicates that the interactions of clause-initial modals with *wh*-questions are similar to the interactions of other focus elements with such questions, thus confirming that sentence-initial modals are associated with focus marking.[16]

(43) *Shei,   yinggai   Zhangsan   xihuan-guo   ne?*
      who   would   Zhangsan   like-EXP   Q-PART
      'Who is it the case that Zhangsan should have liked?'

   Similar intervention effects are found in modalized sentences containing other types of focus, such as *only* focus. As the following examples show, a sentence-internal modal is compatible with *only* focus, for instance, *zhiyou Xiaomei* in (44a), but a sentence-initial modal is not (44b). Again, the acceptability of the latter type of

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[16] It has been pointed out by a reviewer that two alternative accounts that do not rely on the notion of focus seem worth considering. That is, 1) in situ *wh*-phrases and focus operators need to be licensed by relevant C heads if they are to take a propositional scope; thus, the head movement of modals to these C heads voids the Cs' ability to license these *wh*-phrases and focus operators; or 2) the C heads that license in situ *wh*- and focus are incompatible with the C head that attract modals. Based on the facts of remedied effects in examples like (40) and (43), the contrasts discussed in this section may not be due to the incompatibility of C heads or a competition of C heads' licensing, because such incompatibility should not be resolved by moving elements around. Moreover, in Section 6.2, more data show that – unlike here, scope-sensitive elements mark different spans of units and result in intervention effects – focus operators that mark identical spans in a sentence are acceptable.

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sentence can be improved if the *only*-focus is moved out of the valuation domain of the sentence-initial modal, as in example (44c).

(44) (a) *Zhangsan zhiyou Xiaomei keyi xihuan*
      Zhangsan only Xiaomei can like
      'Zhangsan is allowed to only like [Xiaomei]$_F$.'
  (b) **Keyi Zhangsan zhiyou Xiaomei xihuan.*
      can Zhangsan only Xiaomie like
      'It is the case that Zhangsan is allowed to only like Xiaomei.'
  (c) *?Zhiyou Xiaomei, keyi Zhangsan xihuan.*
      only Xiaomei can z hangsan like
      'Only Xiaomei, it is the case that Zhangsan is allowed to like.'

Examples of focus intervention effects involving sentence-initial modals are shown in examples (41) and (44b) and the remedied counterparts (examples (43) and (44c), respectively) show that such focalized interpretations and their associated focus operators need to be licensed by relevant C heads and that head raising of modals to relevant C heads does not prevent such heads from attracting in situ *wh*-phrase and focus operators, as long as the foci's licensing are not mixed/crossed within the same CP.[17] If this account is tenable, it is expected that when the C that will license an in situ *wh*-phrase is different from the C that a modal is moved to, each of such association can be properly licensed.

Therefore, it is important to consider the nature of the structural interaction between *wh*-questions and the sentence-initial modals in other types of embedded clauses. According to Huang (1982), verbs such as *juede* 'think' are subcategorized for a declarative CP that cannot license *wh*-questions within itself – unlike verbs such as *xiangzhidao* 'wonder'. For purposes of the current study, this structure provides a useful environment in which to examine the proposed focus-intervention effects. That is, because the licensing domain of *wh*-questions is not in the embedded CP of *juede*, that embedded CP should allow a clause-initial modal.

Example (45) shows that the embedded *wh*-phrases of a *juede* sentence are interpreted at the level of the matrix CP.

(45) *Lisi juede* [$_{CP}$ *Zhangsan yinggai mai shenme-dongxi*]?
    Lisi think Zhangsan should buy what
    'What does Lisi think that Zhangsan should buy?'

Interestingly, an ungrammatical sentence that contains both a sentence-initial modal and a *wh*-phrase becomes more acceptable when it is embedded under *juede*. For example, in a scenario where everyone is assigned by Lisi to buy something, a

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person wondering about the purchase that Lisi has assigned to Zhangsan could ask, as shown in (46).

(46) ? *Lisi juede* [CP *yinggai Zhangsan mai shenme-dongxi*]?
      Lisi   think   should   Zhangsan   buy   what
      Lit: 'What does Lisi think it is the case that Zhangsan should buy?'

A similar amelioration effect can be found with *only*-focus, as compared with (38), as shown in (47).

(47) ? *Lisi juede* [CP *zhiyou Zhangsan mai shenme-dongxi*]?
      Lisi   think   only   Zhangsan   buy   what
      'What does Lisi think that only Zhangsan bought?'

Phenomena similar to those in (46) and (47) have been reported in other languages. In Japanese and Korean, for instance, the intervention effects found in *wh*-questions containing intervening quantifiers may be canceled or weakened in embedded declarative clauses, as in (48).[18]

(48) (a) *??Daremo-ga nani-o   yon-da-no.* (Japanese; Tomioka 2007: 2571)
            everyone-NON what-ACC read-PAST-Q
            'What did everyone read?'
      (b) *Kimi-wa* [CP *daremo-ga nani-o   yon-da-to*]   *omotteiru-no*?
            you-TOP   everyone-NOM what-ACC read-PAST-COMP think-Q
            'What do you think everyone read?'

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[18] It has been pointed out by an anonymous reviewer that the following data with a *sika*-phrase in Japanese show a stronger focus-intervention effect (ia), whereby the *sika*-phrase co-occurring with *nai* 'not' conveys the same meaning as *only*-phrases. The sentence can be improved when the *wh*-phrase is preposed (ib).

(i) a. *John-sika   nani-o   tabe-nakat-ta   no?
         John-only   what-ACC   eat-not-Past   Q
         'What did only John eat?'
     b. Nani-o   John-sika   tabe-nakat-ta   no?
        what-ACC   John-only   eat-not-Past   Q

However, the same reviewer noted that unlike (48b), embedding the ungrammatical clause (ia) in the complement of *think* (as in (ii) below) does not seem to improve acceptability. I consulted three native speakers of Japanese, who all confirmed the contrast shown in (i) but reported different degrees of acceptability of (ii). However, the Chinese counterpart of (ii), as shown in (47), presents the same effect as (46). I consider these findings to imply that the effects proposed for sentence-initial modals in this section still hold. The differences in acceptability between sentences like (48b) and (ii), while very interesting, are beyond the scope of the current study. Readers may refer to Kitagawa, Tamaoka & Tomioka (2013) for some related issues.

(ii) ?*Mary-wa [John-sika nani-o   tabe-nakat-ta to]   omotteiru no?
       Mary-TOP   John-only what-ACC   eat-not-Past   COMP think   Q
       'What does Mary think that only John ate?'

From the current analysis, it follows that the clause-initial quantificational operator, for example, *yinggai* in (46) and *daremo-ga* 'everyone' in (48b), does not intervene in the valuation of *wh*-phrases, because the valuations of *wh*-features and the quantificational operator are not in the same phase. That is, *wh*-features occur in matrix CP, whereas the scope elements are in embedded CP (cf. Uriagereka 1999; Chomsky 2000).[19] However, intervention effects do occur when the valuations of both types of quantificational elements (e.g. quantifier/focus and *wh*-phrases) appear in the same phase, e.g. in the same matrix clause or in the same embedded interrogative CP.

The above observations indicate that the phenomenon under discussion cannot be subsumed under optional subject-raising; i.e. Chinese modals cannot be raising verbs. However, the structural restrictions of modals and their associated phenomena can be accounted for if one accepts the present analysis that sentence-initial modals are in CP, focus-marking a TP, and that canonical modals are in TP. The contrasts presented in this section support the present paper's assumptions 1) about the associations of focus with c-command and 2) that, in Chinese, the valuation of focus features between specifier and head is covert.

Additional new observations are presented in Section 6, as a means of elaborating on the types of focus that sentence-initial modals can express. The major types, i.e. propositional focus and subject focus, comply with the c-command requirement of focus association.

6. FOCUS TYPES EXPRESSED BY SENTENCE-INITIAL MODALS

6.1 *Propositional focus, assertive polarity, and* verum *focus*

In addition to propositional focus discussed in the previous sections, sentence-initial modals in Chinese can express two other types of proposition-related focus: assertive polarity and *verum* focus. Their differences can be illustrated by considering the discourse in (49) and (50). The example (49) presents the propositional focus that has been discussed – focalizing a proposition that is not yet at issue – where *keyi* 'may' in speaker *B*'s response demonstrates the assertion of the proposition that *Zhangsan can buy tickets [for us] tomorrow*. After (49), speaker *A* could update the common ground by uttering a sentence like (50), to confirm that speaker *B*'s proposal is feasible and to then bring up a new idea. In such a case, the polarity of the proposition in (50) is emphasized (cf. Holmberg 2015).[20] It should also be noted that the utterance in (50) follows the previous conversation in (49);

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[19] Detailed analysis of this phenomenon is not of concern here. However, in prior literature, it has been proposed that such *wh*-questions may either undergo covert phrasal movement or feature movement to the intended valuation domain. These changes may be because of the proper mapping of syntax and information structure, or feature competition, which is why the *seemingly* intervening focus operator does not incur ungrammaticality. Readers may refer to Tomioka (2007) and Yang (2012) for more information.

[20] I am grateful to one of the anonymous reviewers for this point.

and, because of (49), the propositional focus can become part of the background after updating the common ground – the assertive polarity being introduced; thus its following TP in (50) can be omitted.

(49) A: *Women   xingqitian   zhijie   zai   dianying-yuan   pengmian.*
          we   Sunday   directly   at   movie-theater   meet
          'Let's meet directly at the movie theater on Sunday.'
      B: *Keyi   Zhangsan   mingtian   qu   mai   piao,   ranhou*
          can   Zhangsan   tomorrow   go   buy   ticket   then
          women   xingqitian   zhijie   zai   dianying-yuan   pengmian.
          we   Sunday   directly   at   movie-theater   meet

'It is OK that Zhangsan goes to buy tickets [for us] tomorrow, [and] then we meet at the movie theater on Sunday directly.'

(50) A: *Shi   keyi   (Zhangsan   mingtian   qu   mai   piao   de); danshi*
          EMP   can   Zhangsan   tomorrow   go   buy   ticket de   however
          na.yang   hui   hen   mafan   ta.
          that.way   will very   trouble he
          'It is indeed OK (that Zhangsan goes to buy tickets [for us]); however, this way he will go to a lot of trouble.'

Syntactically, examples like (50) illustrate two more important points. First, the focus unit of the same span can form a focus complex (a point addressed further in Section 6.2). That is, the polarity of the proposition expressed by the modal in (50) has been further emphasized by the emphatic marker *shi*. Second, the facts of the ellipsis support the functional-head analysis (Lobeck 1995) of sentence-initial modals. In (50), the clause following the modal *keyi* (i.e. *Zhangsan mingtian qu mai piao*) can be omitted. Similarly, following the conversation in (49), if no other concerns need to be addressed, one may confirm *B*'s proposal simply by saying *Keyi!* 'Can!'. These examples of clause ellipsis suggest that a functional head – i.e. focus, as proposed in the present study – may be involved.

Another type of proposition-related focus that has been widely discussed in the literature is *verum* focus, which in English and German typically relies on a stressed element in the left periphery of a sentence (associated with C) to emphasize the truth value of the prejacent (Höhle 1992; Lohnstein 2016).[21] *Verum* focus is also possible in Chinese, but is expressed by a linguistic device different from those in German and English, i.e. sentence-initial modals. In the discourse in (51), after speaker *B*

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[21] I am grateful for an anonymous reviewer's comment that the discourse in (51) led to exactly the same *verum* effect as in German/English; thus, it would be interesting to know whether the fronting of the modal alone induces *verum* focus or whether there are interactions with other abstract properties in the left periphery (cf. Gutzmann, Hartmann & Matthewson 2020). However, due to the lack of an overt C head in Chinese, and due to the scope of the current study, I leave the detail investigation of interaction between fronted modals and *verum* focus for future study.

proposes a plan (51B), speaker *C* considers the prejacent (51B) and uses (51C) to assert a belief in both the superiority and the feasibility of a different plan.

(51) A: *Women   xingqitian   zhijie   zai   dianying-yuan   pengmian.*
we   Sunday   directly   at   movie-theater   meet
'Let's meet at the movie theater on Sunday directly.'

B: *Zhangsan mingtian   bu   keyi   xian   qu   mai piao   ma*?
Zhangsan tomorrow not can   ahead   go   buy   ticket Q-PART
Ta zhu-de   bijiao   jin.
he   live-De rather   close
'Can't Zhangsan go to buy tickets [for us] tomorrow? He lives very close.'

C: *Dui*! *Keyi   Zhangsan   mingtian   qu   mai   piao,   ranhou*
yes   can   Zhangsan   tomorrow   go   buy   ticket   then
women   xingqitian zhijie   zai   dianying-yuan   pengmian.
we   Sunday   directly   at   movie-theater   meet
'Yes! Zhangsan CAN go to buy tickets [for us] tomorrow, [and] then we'll meet at the movie theater on Sunday directly.'

Example (51) indicates that Chinese sentence-initial modals can mark propositions that are at issue, like stressed English modals can (cf. Hole 2012). Structurally, these focus readings of sentence-initial modals can be accounted for if such modals are merged in CP for marking focus.

6.2 *Subject focus*

Although it is not the main concern of the current study, based on the well-established structural generalization – focus c-commanding association (e.g. Jackendoff 1972; Tancredi 1990; Aoun & Li 1993; Bayer 1996) – the current analysis of sentence-initial modals can be extended to account for scenarios involving subject focus. Before the facts are presented, it is worth noting that due to the c-commanding association requirement, Chinese focus markers only associate with their immediately c-commanding constituents; thus, a sentence-initial focus marker can express a propositional focus or a subject focus but not an object focus.

The current proposal relies on the following assumptions: first, that differing spans of focus units in a sentence incur intervention effects during their focus-operator association (see Section 5), and second, that different types of focus of the same span can form a focus complex licensed by the same functional head, as a result of continuously updating of the common ground in conversations: a process exemplified by the compatibility of emphatic *shi* and sentence-initial *keyi*, shown in Section 6.1. It is important to note, however, that the proposed view of such focus complexes is not a Chinese-specific phenomenon and is not restricted to situations related either to *verum* focus or to focus marked at the sentence-initial domain.

Similar examples can be found in English. For instance, the English cleft focus *in Paris* in (52a) can be modified by a focus particle, such as *only*, as in (52b) (see Hole 2011). Examples (52c) and (52d) are their equivalents in Chinese.

(52) (a) It was in Paris that Paul fell in love.
      (b) It was only in Paris that Paul fell in love.
      (c) Baoluo shi zai Bali zhui-ru ai-he   de.
           Paul   EMP in Paris fall-in love-river DE.
           'It was in Paris that Paul fell in love.'
      (d) Baoluo shi zhiyou zai Bali cai   zhui-ru ai-he   de.
           Paul   EMP only in Paris then fall-in love-river DE.
           'It was only in Paris that Paul fell in love.'

The following mini-discourse examples demonstrate that sentence-initial modals can be compatible with the major types of subject focus, given appropriate discourse contexts.[22] The crucial point is that the focus span of the sentence-initial modals is on the subject only. Examples of this include the *wh*-subject in (53), the *only*-subject in (53D), (53E), the cleft-subject in (54B), and the *even*-subject in (54D).

(53) A: *Shei   mai-dan?*
          who   pay-the.bill
          'Who pays the bill?'
      B: [*Zhangsan*]   *mai-dan.*
           Zhangsan   pay-the.bill
           'Zhangsan pays the bill.'
      C: Dui, [*Yinggai Zhangsan*] *mai-dan.*
          yes   should   Zhangsan   pay-the.bill
           'Yes, it should be Zhangsan who pays the bill.'
      D: [*Zhiyou Zhangsan*] *mai-dan   ma?*
          only   Zhangsan   pay-the.bill Q-PART
          'Did only Zhangsan pay the bill?'
      E: *Dui,* [*yinggai zhiyou Zhangsan*] *mai-dan.*
          yes   should   only   Zhangsan   pay-the.bill
           'Yes, it should only have been Zhangsan who paid the bill.'

(54) A: *Zuotian   [shi Zhangsan]   mai-dan   de   ma?*
          yesterday   EMP Zhangsan   pay-the.bill DE   Q-PART
          'Was it Zhangsan who paid the bill yesterday?'
      B: Dui, [*yinggai shi Zhangsan*] *mai-dan   de.*
          yes   should   EMP Zhangsan   pay-the.bill DE
           'Yes, it should have been Zhangsan who paid the bill.'

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[22] In these examples, when different focus types are involved, the typical focus-licensing mechanism is assumed: i.e. a focus operator c-commands a constituent as its focus associate, and its focus scope is valued covertly at the focus head in the CP domain to obtain proposition scope for *wh*-question, cleft, and *only*-focus. When modals stay in situ, they do not express subject focus.

C: *Zhangsan   benlai   yiwei   man-fei.*
   Zhangsan   originally   think   free-fee
   'Zhangsan originally thought [it was] free.'

D: [*Yinggai lian zu-zhang*]   *dou bu zhidao zheli yao   shou-fei.*
   should   even team-leader   all   not know   here require charge-fee
   'It should be even [our] team leader who does not know this place charges fees.'

In each of these scenarios, the focus features are valued by the relevant heads in CP and form a focus complex. Provided that there are appropriate updates to the common ground of conversations, it is assumed that these complex focus units are formed compositionally in semantics.

Last but not least, while cleft-subject is exhaustive (cf. Szabolcsi 1981), the subject focus marked by the sentence-initial modal is not. A common paradigm utilized to show exhaustivity is based on the logical consequences that flow from whether the focus unit at issue is compatible with additional members being added to the focalized domain, for example (55).

(55) (a)* Only John saw the movie, and Bill did, too.
     (b)* It was John who saw the movie, and Bill did, too.

The same type of exhaustive reading has also been reported for Chinese cleft construction, e.g. (56a) (Tsai 1994; Hole 2011), whereas examples containing a sentence-initial modal, such as (56b), do not exhibit the same restriction. The difference shown in (56) provides further confirmation of the current study's contention that sentence-initial modals are associated with unique focus features that differ both from *only* and from cleft foci.

(56) (a) *Shi Zhangsan mai-dan   (de)* (*, *Lisi ye   shi*). ((cf. (55b))
         EMP Zhangsan pay-the.bill DE   Lisi also did
         'It was Zhangsan who paid the bill (*, and Lisi did, too).'
     (b) *Keyi Zhangsan   mai-dan* (, *Lisi ye   keyi*).
         can Zhangsan   pay-the.bill Lisi also can
         'It can be Zhangsan who pays the bill (and Lisi can, too).'

7. CONCLUSION AND RESIDUAL ISSUES

This study of the interpretations and structural characteristics of Chinese epistemic and deontic modals in the sentence-initial position has argued that sentences with sentence-initial and sentence-internal modals should not be treated as involving free-word-order alternations, whether resulting from an optional topicalization or from an optional subject-raising (e.g. Lin & Tang 1995; Tsai 2010, 2015; Lin 2011, 2012; Chou 2013). The new evidence it has presented indicates that previous

analyses of these matters have yielded incorrect predictions and cannot provide consistent explanations of the facts concerning the syntax and information-packaging expressed by modals in different positions.

7.1 *Residual issues*

One remaining question relates to the fact that, among the three major semantic types of modals, only epistemic and deontic ones may occur before a subject, while dynamic modals related to personal willingness, volition, and ability – like *ken* 'be willing to' and *gan* 'dare' – cannot. In (57), for instance, the modal *keyi* 'can' in the sentence-internal position can express either a deontic reading or a dynamic one. However, when this modal occurs before the subject, for example (58), only the deontic reading survives.

(57) *Zhangsan   keyi   changge.*
      Zhangsan   can   sing
      (a) 'Zhangsan is allowed to sing.' →Deontic
      (b) 'Zhangsan is able to sing.' →Dynamic

(58) *Keyi   Zhangsan   change* (,   *Lisi   tiaowu*)
      can   Zhangsan   sing   Lisi   dance
      (a) 'Zhangsan is allowed to sing (, [and] Lisi to dance).' →Deontic
      (b) *'Zhangsan is able to sing.' →Dynamic

This contrast requires some further consideration of structural implementation. It is possible that dynamic modals initially merge in a lower position as the control verb, as proposed by Lin & Tang (1995), or inside *v*P, as proposed by Tsai (2015); and if so, it is not possible to raise to T and then to C. However, there are some challenges to both these accounts. Applying a control-verb analysis to dynamic modals requires accepting that this special type of control verb, unlike typical control verbs, does not assign a consistent theta role (e.g. the 'adjunct' theta role in Roberts 1985) and that this is inconsistent with the general theta criterion (Chomsky 1981).

Semantically, it is well known that dynamic modals do not express modal interpretations at the level of propositions while epistemic and deontic modals do (Palmer 2001). Aspectual categories are generally assumed to be functional categories in the split-TP domain (Huang et al. 2009; cf. Pollock 1989), but in Chinese, most are expressed as verb suffixes, 'as a result of affix hopping in Phonetic Form' (Huang et al. 2009: 104). Only progressive aspect *zai-* and imperfective aspect *mei(you)* occur preverbally. Unlike other types of modals, dynamic ones usually are not compatible with aspect markers (similar to German, see Wurmbrand 1999). Nonetheless, the examples in (59) show that occasionally, *mei(you)* occurs in a dynamic modalized sentence, provided that the dynamic modal follows the imperfective.

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(59) (a) ?*Ta   mei   neng   kaiche.*
            he   imperfective   can   drive
            'He cannot/has not yet gained the ability to drive (because he is
            injured).'
      (b) **Ta   neng   mei   kaiche.*
            he   can   imperfective   drive
            'He cannot/has not yet gained the ability to drive (because he is
            injured).'

Examples like (59) suggest that dynamic modals are lower than aspect phrases. Therefore, the reason for dynamic modals' inability to raise to C may be related to aspect-verb association, in which the aspect head blocks the potential head-movement of dynamic modals. However, comprehensive and holistic investigation of that issue must await future research.

7.2 Final remarks

This paper's findings have three main theoretical implications. The first is that changes in word order in Chinese are not ascribable to an optional or free derivation in syntax but rather are required by syntactic computations to express specific information packaging, as evidenced by the interaction between sentence-initial modals and other focus elements. The second is that Chinese's features related to information structure are active in narrow syntax (cf. Rizzi 1997; Cinque 1999; Miyagawa 2010); and the third is that Mandarin Chinese, although profoundly different from Germanic and Romance languages typologically, includes both the split-CP à la Rizzi (1997) and split-Infl à la Pollock (1989), presenting a neat mechanism of interaction between syntax and information structure (cf. Lechner 2006; Szabolcsi 2011).

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