Moving heads to specifiers

Evidence from Mandarin multiple pre-subject modals

Abstract Based on a hitherto neglected set of multiple pre-subject modal sentences, this squib offers a novel syntactic account of Mandarin modals whereby the derivation of pre-subject modal sentences involves Internal Merge of modals to specifiers of the left-peripheral focus projection, and discusses new problems facing a traditional head-movement analysis and the existing XP-movement accounts. If correct, our proposal lends novel support to recent claims that 'true' syntactic head movement targets specifier positions.

Keywords modals · head movement · (Internal) Merge · Mandarin

1 Introduction

A recalcitrant problem with the syntax of Mandarin modals concerns the flexible ordering of these modals with respect to the surface subject:

(1)   a.   *Pre-subject modal sentence*
       yinggai[epis] Zhangsan xiang jia   le
       should   Zhangsan miss   home SP
       'It should be the case that Zhangsan misses home now.'
   b.   *Post-subject modal sentence*
       Zhangsan **yinggai**[epis] xiang jia   le
       Zhangsan should   miss   home SP
   'Zhangsan should miss home now.'

Cases involving single modals like (1a–b) have been well studied, and the common consensus is that modals are in their base position, and that post-subject modals are

Address(es) of author(s) to be included.

the result of XP-movement of the subject past the modal (see Lin and Tang 1995; Tsai 2010, 2015; Lin 2011, 2012; Chou 2013 among others), which is taken to instantiate *raising* (e.g. Lin 2011, 2012; Chou 2013) or to always instantiate *topicalisation* (e.g. Tsai 2010, 2015). This general line of analysis will be referred to as the XP-MOVEMENT APPROACH.

(2)   XP-movement approach
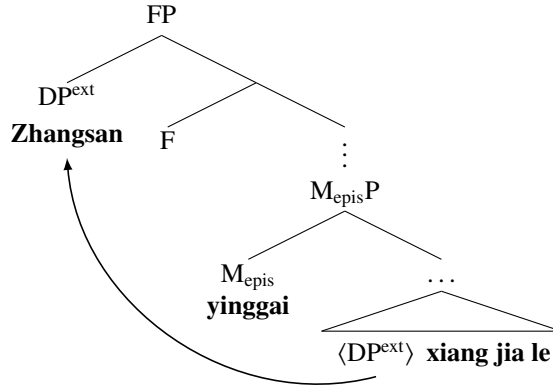
In contrast, Hsu (2019) recently pursues an interesting approach that differs from the previous analyses in deriving the pre-subject modal sentence *from* the post-subject modal one, such that the former will involve head movement of the modal to a left-peripheral X^0-position (more specifically, Foc^0):

(3)   Traditional head-movement approach
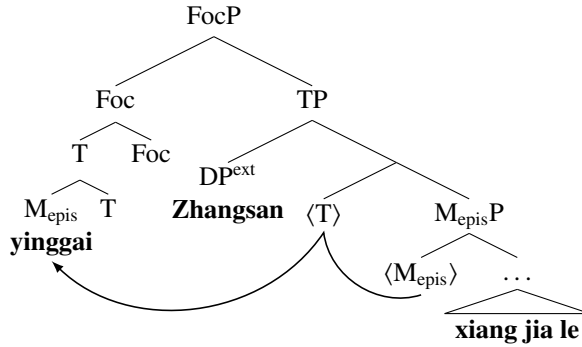
In this squib, we complicate the existing empirical picture by bringing in and exploring the implications of a hitherto neglected set of facts involving multiple pre-subject modals for the analysis of Mandarin modal constructions:

(4)   **yinggai**[epis] **keneng**[epis] ta   erzi shou   shang le
       should   may   3.SG son receive injury SP
       'It should be the case that his son may have become injured.'

(5)   **keneng**[epis] **bixu**[deon] women yiqi   gongzuo le
       may   must   1PL   together work   SP

'It may be the case that we must work together now.'

(6) **yinggai**[epis] **dei**[deon] Huang laoshi   shuo hua   le
     should   must   Huang teacher say   speech SP
     'It should be the case that Teacher Huang must speak now.'

These facts are significant for various reasons. For one thing, the data considered in (Lin, 2012), the first and only detailed study of the syntax of Mandarin multiple-modal constructions, exclusively involve multiple *post-subject* modals. As we will demonstrate, the current facts indicate that a traditional head-movement analysis is untenable, and that the existing XP-movement approaches cannot be maintained. For another, the observation that Mandarin permits multiple modals in pre-subject position now lends plausibility to yet another approach whereby pre-subject modal sentences are derived via modal movement to SpecFocP (cf. Toyoshima 2001). In what follows, we aim to pursue and develop such a novel idea.

This squib is structured as follows. Section 2 introduces the main background assumptions as well as the current proposal, and Section 3 offers related arguments. In Section 4, two alternative accounts are discussed. Section 5 is the conclusion.

2 The proposal: Head-to-Spec movement

The account to be proposed below builds on Harizanov and Gribanova's (2019; hereafter 'H&G') recent proposal that there are in fact two distinct classes of phenomenon that fall within the the traditional realm of head movement, which should be captured by distinct grammatical operations. Many instances of what is previously described as head movement in fact involve *postsyntactic amalgamation*. This operation produces head-adjunction structures, is morphology-driven, and cannot possibly yield any interpretive effect. On the other hand, bona fide instances of *head movement* that occurs in the syntax do not produce adjunction structure, are not driven by morphology, and may yield effects on interpretation.

It is long observed that there are instances of head movement that appear puzzling from the perspective of the Head Movement Constraint (hereafter 'HMC'). For instance, verb-fronting in a number of Slavic languages, including Bulgarian participle fronting, is known to be able to skip intervening heads (Lema and Rivero, 1989; Rivero, 1991; Lambova, 2004). At that time, such phenomena were commonly taken to counter-exemplify the HMC, and the term 'long head movement' was coined to refer to the movement operation involved in (7b).

(7) a. šte si   bila   **pročela** knigata   [Bulgarian]
         FUT be-2.SG been-FEM read-FEM book-the
         'You will have read the book.'   (Embick and Izvorski 1997, ex. (30a))
     b. **pročela**₁ šte si   bila   __₁ knigata   [Bulgarian]
         read-FEM FUT be-2.SG been-FEM   book-the

                                                              (ibid., ex. (30c))

However, the fact that 'head movement' should observe the HMC is also suspect from a minimalist perspective, since it does not obey the Extension Condition (Chomsky,

1995), unlike other instances of narrow-syntactic movement. The main significance of H&G's shift of perspective is that there is in fact nothing inherently special about head movement per se; *genuine* instances of head movement indeed obey the Extension Condition. Accordingly, the fact that head movement should target a specifier position is completely unsurprising, and constitutes the default state of affairs (see also Toyoshima 2001; Matushansky 2006; Harizanov 2019 among others). It also follows that head movement does *not* actually observe the HMC, a requirement which only stems from misunderstandings at the time. Rather, it is postsyntactic amalgamation that is actually subject to the stringent locality requirement.

We therefore propose that post-subject modals, as heads, move directly from their base position to SpecFocP in Mandarin. To execute the idea, we assume, à la Heck and Müller (2007), the existence of the structure-building feature $[\bullet F\bullet]$ that triggers movement of the goal to a specifier of the head that bears such a feature. Furthermore, the structure-building feature can be further specified with the diacritic '0' or '2' (Müller, 2017, 2018), such that, respectively, only the minimal or maximal projection of the category feature F constitutes the relevant goal. In the current case, modal movement is induced by the $[\bullet M_0\bullet]$ feature on the null functional head Foc^0, as the following example derivation illustrates:

(8) Head-to-Spec approach

$$
\begin{array}{c}
\text{FocP} \\
\end{array}
$$

M$_{epis}$ **yinggai** Foc $[\bullet M_0 \bullet]$ TP
DP^{ext} **Zhangsan** T M$_{epis}$P
$\langle$M$_{epis}\rangle$ SPP
xiang jia le
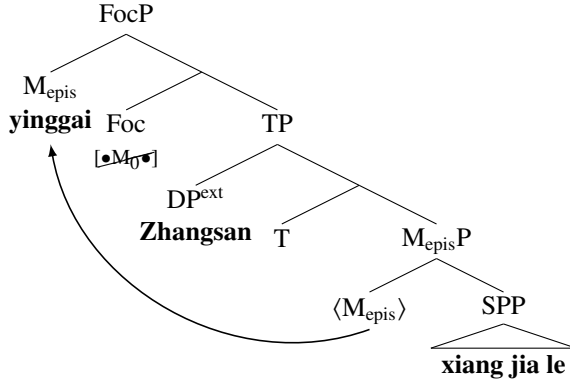
The null Foc^0 in this case may encode thetic focus (Hsu 2019).[1] Hsu observes that pre-subject modal sentences readily occur in contexts that call for a *thetic focus* struc-

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[1] A reviewer notes the following example and 'wonder[s] how a thetic focus is compatible with a subject focus':

(i) yinggai^{epis} shi Zhangsan mai pisa huilai-le
     should   FOC Zhangsan buy pizza return-PFV
     'It should be the case that it is Zhangsan who has bought pizzas and now returned.'

It is worth noting, however, that (i) does not involve the null Foc^0 of current interest, but a distinct Foc^0 (i.e. *shi*). Accordingly, the example does not bear on the claim that the null Foc^0 may encode thetic focus. Instead, we believe the reviewer's example shows that the focus marker *shi* can likewise bear at least one instance of $[\bullet M_0\bullet]$ (in fact more, and hence, our proposal is actually more general than we thought). The fact that (i) expresses subject focus is then not unexpected, since this is how focus association normally works with *shi*. We thank the reviewer for raising this example.

ture (in Lambrecht's 1994 terminology). For instance, (9b) as compared to (9a) is infelicitous in the given context:

(9)   [Context: The doorbell rings.]
    a. yinggai^{epis} Zhangsan mai pisa huilai-le
        should   Zhangsan buy pizza return-PFV
        'It should be the case that Zhangsan has bought pizzas and now returned.'
    b. #Zhangsan yinggai^{epis} mai pisa huilai-le
        Zhangsan should   buy pizza return-PFV
        'Zhangsan should have bought pizzas and now returned.'

<div align="right">(Hsu 2019:24, ex. (10))</div>

It is also worth clarifying that while an X^0 is targeted for movement in (8), the movement is expected to pattern with *phrasal* movement in its behaviour, given that the same operation (i.e. MERGE) is involved. Recently, Arregi and Pietraszko (2020) argue forcefully that an ontology of movements based on movement targets (i.e. the type of moved element, which in this case is X^0) as in the traditional GB conception would lead to a number of wrong predictions (see also Hein 2018; Harizanov and Gribanova 2019). Simplifying, a more accurate ontology of movements should be defined based on the type of landing site that the movement targets, rather than the type of element targeted for movement.[2]

3 Supporting arguments

To our knowledge, the proposal just presented has not been defended or even considered in previous literature. In this section, we present arguments in its favour, and, where relevant, provide further technical details of the current proposal.

3.1 The absence of HMC effects

One argument for the proposed Head-to-Spec account is that modal displacement in fact does *not* observe locality restrictions such as the HMC. Erlewine (2017) notes that the sentence particle (SP) *le* scopes below epistemic but above deontic and dynamic modals. Consider:

(10)   The SP *le* scopes above the deontic modal *bixu* but below the epistemic modal *keneng*
    a. Zhangsan bixu^{deon} qu Taibei le   [LE > MUST; *MUST > LE]
        Zhangsan MUST   go Taipei LE
        <u>Asserts</u>: 'Zhangsan must go to Taipei.'
        <u>Presupposes</u>: 'Zhangsan need not go to Taipei in the immediate past.'
        (i)   'It has become the case that Zhangsan must go to Taipei.'
        (ii) *'Zhangsan must have gone to Taipei.'

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[2] In fact, this is not the typology of movements that Arregi and Pietraszko (2020) propose, but nonetheless suffices for current purposes.

b. Zhangsan keneng^epis qu Taibei le   [*LE > MAY; MAY > LE]
    Zhangsan MAY   go Taipei LE
    <u>Asserts</u>: 'Zhangsan may have gone to Taipei.'
    <u>Presupposes</u>: 'Zhangsan had not gone to Taipei in the immediate past.'
    (i)   *'Zhangsan is able to have gone to Taipei.'
    (ii)   'Zhangsan may have gone to Taipei.'

                                            (Erlewine 2017:49, ex. (23b))

It follows that the SP projection headed by *le* is situated between the epistmic modal and the denotic/dynamic modal projections:

(11)

$M_{epis}P$

M_{epis} SPP

$M_{deon}P$ SP
             le

M_{deon} . . .
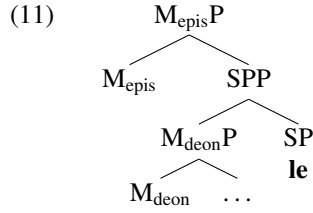
Now, displacement of a denotic modal in the presence of *le* does *not* result in ungrammaticality:

(12)   **bixu**^deon Zhangsan qu Taibei **le**
       must   Zhangsan go Taipei SP
       'It has become the case that Zhangsan must go to Taipei.'

(13)   **yinggai**^deon wo ma pisa **le**
       should   1SG buy pizza SP
       'It has become the case that I should buy pizzas.'

The well-formedness of these examples (not noted in Hsu 2019) is unexpected under the traditional head-movement approach, since their derivations would accordingly involve the skipping of the SP headed by *le* by the deontic modal. By contrast, the fact that (12)–(13) is grammatical falls out from our proposal, since modal displacement is triggered by the structure-building feature [●M_0●]. Accordingly, the SP *le*, which does not bear the cateogry feature 'M(odal)', does not constitute a potential goal.

As a reviewer points out, the traditional head-movement approach could obviate the current HMC problem if one abandons the assumption that the relative scope of *le* and deontic modals is computed on the basis of c-command. The reviewer might have in mind the following structure:

(14)

T $M_{deon}P$

    M_{deon} SPP

   . . . SP
                  le
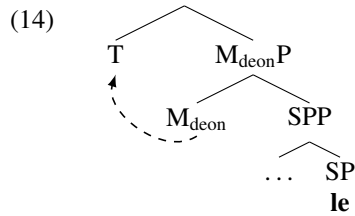
We leave it to proponents of the traditional head-movement approach to come up with an alternative theory of scope that could correctly distinguish between the two cases in (10), where the deontic modal *bixu* and the epistemic modal *keneng* both linearly precede *le*. But even if such a theory is formulable, one piece of evidence against (14) is that the deontic modal forms a constituent with the verb phrase to the exclusion of *le*.

(15)   A: ta   mingtian bixu^{deon} zhunbei pisa le
               3SG tomorrow must   prepare pizza SP
               'By tomorrow, it will have become the case that he must prepare pizzas.'
      B: shenme? wo ting bu qingchu. ta   mingtian <u>zenme</u> le?!
               what   1SG hear NEG clear   3SG tomorrow how   SP
               'What? I didn't catch that. By tomorrow, it will have become the case that he what?!'
      A: bixu^{deon} zhunbei pisa!
               must   prepare pizza
               'Must prepare pizzas!'

Compare the following exchange, where *zenme* replaces an unintelligible string that does not form a constituent:

(16)   A: ta   mingtian bixu^{deon} zhunbei pisa le
               3SG tomorrow must   prepare pizza SP
               'By tomorrow, it will have become the case that he must prepare pizzas.'
      B: shenme? wo ting bu qingchu. *ta   <u>zenme</u> pisa le?!
               what   1SG hear NEG clear   3SG how   pizza SP
               'What? I didn't catch that. It has become the case that he what pizzas?'

On the other hand, the following structure would obviate the HMC problem, while maintaining the standard syntax–semantics mapping:

(17)
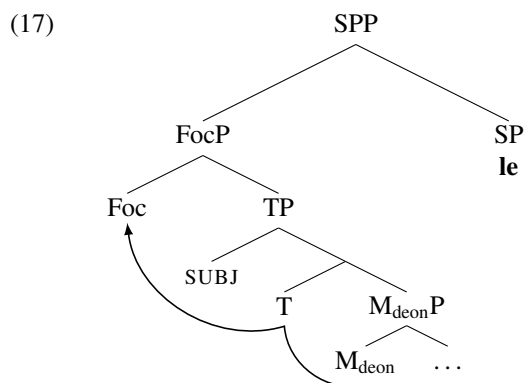
This structure assumes that the SP *le* is situated in the high CP-region, as proposed in Paul (2014) and others (cf. Erlewine 2017, which recently offers arguments that *le* is situated low in the *v*P-region). The grammaticality of the following example,

however, indicates that small-size coordination to the exclusion of the surface subject is possible (crucially, both coordinates contain the SP *le*):[3]

(18) ta ji [yinggai^{deon} zhao gongzuo le], ye [yinggai^{deon} yang jia le]
3SG both should   find work   SP also should   raise home SP
'It has become the case that he should look for a job, and it has also become the case that he should support his family.'

The traditional head-movement approach, furthermore, faces additional problems when it is extended to cover *multiple* pre-subject modal sentences, as we will demonstrate in the next section.

3.2 Order preservation effects

Another argument is that the current proposal readily accommodates the existence of multiple pre-subject modal sentences noted in the Introduction (recall (4)–(6)). We take these facts to indicate that the null Foc^0 can bear one or more instances of the structure-building feature $[\bullet M_0 \bullet]$. For explicitness, we assume Chomsky's (1995) conception of cyclicity:

(19) *Featural Cyclicity* (based on Richards 2001:38)
A feature must be discharged as soon as it is introduced into the derivation.

Moreover, we assume that the following constraint holds in grammar:

(20) *Shortest* (Richards 2001:98)
A dependency bewteen the members of a pair P of elements $\{\alpha, \beta\}$ obeys Shortest iff no well-formed dependency could be created between the members of a pair P′, created by substituting γ for either α or β, such that the set of nodes c-commanded by one element of P′ and dominating the other is smaller than the set of nodes c-commanded by one element of P and dominating the other.

The combination of these two assumptions yields desirable consequences. Consider first a case where Foc^0 bears one instance of $[\bullet M_0 \bullet]$ and more than one modal is present in the structure:

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[3] The use of the discontinuous coordinator *ji...ye* helps preclude ATB subject extraction, since it is a category-sensitive coordinator that does not conjoin full clauses:

(i) *ji [ta yinggai^{deon} zhao gongzuo le], ye [ta yinggai^{deon} yang jia le]
both 3SG should   find work   SP also 3SG should   raise home SP
Intended: 'It has become the case that he should look for a job, and it has also become the case that he should support his family
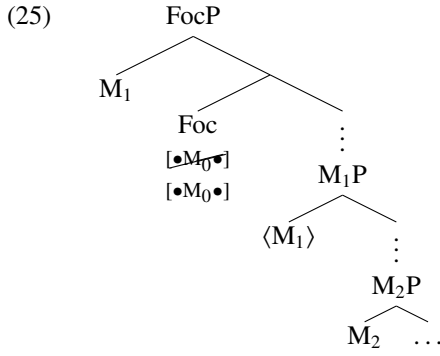
(21)

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        Foc      ⋰
      [•M₀•]    ⋮
               M₁P
              ╱  ╲
           M₁    ⋮
                M₂P
               ╱ ╲
             M₂  …
```
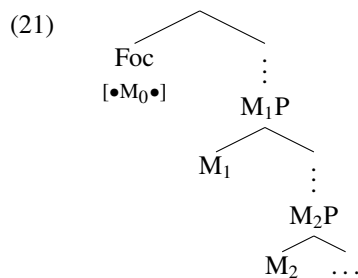
Given Featural Cyclicity, Foc^0, upon entering the derivation, must immediately discharge its structure-building feature. In this case, it might target either M_1^0 or M_2^0 for movement. If it attracts M_2^0, Shortest will not be obeyed since the attraction of the higher M_1^0 (which *is* licit) would involve a shorter 'path' (i.e. the set of nodes c-commanded by Foc^0 and dominating M_1^0 is a proper subset of, hence *smaller* than, the set of nodes c-commanded by Foc^0 and dominating M_2^0, due to the fact that (at least) the node 'M_2P' is an element of the latter, but not the former, set). Accordingly, attraction of M_2^0 is blocked. Indeed, only the highest modal can be displaced to a pre-subject position:

(22) a. **yinggai**$_1^{epis}$ ta erzi —₁ **keneng**^{epis} shou shang le
    should 3.SG son may receive injury SP
    'It should be the case that his son may have become injured.'

   b. *__keneng__$_1^{epis}$ ta erzi **yinggai**^{epis} —₁ shou shang le
    may 3.SG son should receive injury SP

(23) a. **keneng**$_1^{epis}$ women —₁ **bixu**^{deon} yiqi gongzuo le
    may 1PL must together work SP
    'It may be the case that we must work together now.'

   b. *__bixu__$_1^{deon}$ women **keneng**^{epis} —₁ yiqi gongzuo le
    must 1PL may together work SP

(24) a. **yinggai**$_1^{epis}$ Huang laoshi —₁ **dei**^{deon} shuo hua le
    should Huang teacher must say speech SP
    'It should be the case that Teacher Huang must speak now.'

   b. *__dei__$_1^{deon}$ Huang laoshi **yinggai**^{epis} —₁ shuo hua le
    must Huang teacher should say speech SP

Now, consider a derivation where Foc^0 bears two instances of the structure-building feature [•M_0•], one of which has already been discharged:[4]

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[4] To be even more explicit, we assume that features on a lexical item are ordered (à la Müller 2010), such that when Foc^0 bears two or more structure-building features of the same kind, they are discharged one at a time.

(25)

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            FocP
          /      \
        M₁        Foc
                 [•M₀•]    ⋮
                 [•M₀•]
                          M₁P
                        /      \
                     ⟨M₁⟩        ⋮
                              M₂P
                             /    \
                           M₂    …
```

At this point, only one potential goal exists (i.e. $M_2{}^0$), and Featural Cyclicity as is in fact says nothing about whether this goal should land in a specifier position higher or lower than the one just created by $M_1{}^0$ (or whether both options are possible). Nonetheless, given Shortest, $M_2{}^0$ is required to move to a position *below* $M_1{}^0$, rather than above, since the 'path' (which can be understood in terms of the set of nodes c-commanded by the the potential landing site and dominating Foc^0) involved in the former will again be shorter than the one involved in the latter. Put differently, $M_2{}^0$ must 'tuck in' (in Richards' 2001 terminology) below $M_1{}^0$.

It thus follows that pre-subject modals in a multiple-modal sentence *must* preserve their base order.[5] This prediction is borne out:

(26) **yinggai**[epis] **keneng**[epis] ta   erzi shou   shang le   = (4)
      should   may   3.SG son receive injury SP
      'It should be the case that his son may have become injured.'

(27) **keneng**[epis] **bixu**[deon] women yiqi   gongzuo le   = (5)
      may   must   1PL   together work   SP
      'It may be the case that we must work together now.'

(28) **yinggai**[epis] **dei**[deon] Huang laoshi   shuo hua   le   = (6)
      should   must   Huang teacher say   speech SP
      'It should be the case that Teacher Huang must speak now.'

The ordering of modals in these pre-subject modal sentences is identical to that found in the base examples:

(29) ta   erzi **yinggai**[epis] **keneng**[epis] shou   shang le
      3.SG son should   may   receive injury SP
   'It should be the case that his son may have become injured.'

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[5] The question of whether the so-called epistemic modals are in fact adverbs is not new. In fact, Lin (2012) also faces the same question from a reviewer who questions the status of epistemic modals, and devotes an entire section to addressing the question. Chou (2013), who adopts the same assumption as Lin's, also addresses a similar concern in a footnote. We refer the interested reader to Lin (2012, section 4) and Chou (2013, footnote 7) for further discussion on why epistemic modals are not adverbs. See also J.-W. Lin and Tang (1995).

(30)   women **keneng**[epis] **bixu**[deon] yiqi   gongzuo le
        1PL   may   must   together work   SP
        'It may be the case that we must work together now.'

(31)   Huang laoshi **yinggai**[epis] **dei**[deon] shuo hua   le
        Huang teacher should   must   say   speech SP
        'It should be the case that Teacher Huang must speak now.'

And the following sentences are ungrammatical:

(32)   *__keneng__[epis] **yinggai**[epis] ta   erzi shou   shang le
         may   should   3.SG son receive injury SP

(33)   *__bixu__[deon] **keneng**[epis] women yiqi   gongzuo le
         must   may   1PL   together work   SP

(34)   *__dei__[deon] **yinggai**[epis] Huang laoshi   shuo hua   le
         must   should   Huang teacher say   speech SP

   In our account, then, the current order preservation effect follows naturally from the way Featural Cyclicity and Shortest interact. By contrast, under the traditional head-movement approach, the only viable way to generate sentences like (26)–(28) is to assume that a Mandarin modal can freely right-adjoin to any higher modal to form an X^0-complex.[6]

(35)
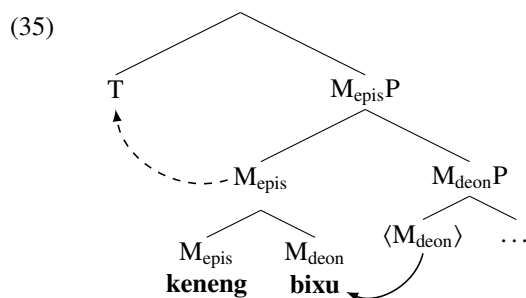
   There are at least two problems with such an analysis. The first problem is that the movement seen in (35) goes against the commonplace assumption that Mandarin head movement always involves left-adjunction (Lin 2001; Paul and Whitman 2010; Huang 2015; see also Kayne 1994 for a theoretical proposal that head-adjunction can only be to the left). Even in the case of verb–object compounds, whose formation involves head movement when disyllabic compound components are involved (Author 2016), the N–V order is observed:

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[6] The current argument against the traditional head-movement approach is independent of the HMC problem discussed in Section 3.1 (i.e. the argument would not lose its force even if it were the case that movement of a deontic modal would not actually cross the SP *le*).

(36) a. menpiao shoumai yuan   b. *shoumai menpiao yuan
     ticket   sell   person   sell   ticket   person
     'ticket seller'

(37) a. jiaqin   siyang chang   b. *siyang jiaqin   chang
     poultry feed   yard   feed   poultry yard
     'poultry-feeding yard'

The second problem is that the modal complex thus formed in (35) does not in fact behave as an X^0-unit, as the coordination test indicates:

(38) keneng^{epis} [[bixu^{deon} mei-ge   ren   dou canjia kaoshi], erqie [bixu^{deon}
     may   must   every-CL person all attend exam   and   must
     mei-ge   ren   dou na yi-bai   fen]] le
     every-CL person all   get one-hundred mark SP
     'It may be the case that everyone must take the exam, and that everyone must get 100 marks.'

Importantly, the epistemic modal in the following example can scope over the entire coordination. Furthermore, coordination below the X^0-level is otherwise impossible in Mandarin (Huang 1984):

(39) a. [huo-che] gen [qi-che]   b. *[huo gen qi]   che
     fire-car   and   gas-car   fire   and   gas car
     'train and automobile'   (ibid.:61, exx. (13a–b))

3.3 The case of triple modals

As a matter of fact, Mandarin sentences may contain three modals in a row.

(40) women **yinggai**^{epis} **keneng**^{epis} **keyi**^{deon} yiqi   qu chi fan
     1PL   should   may   can   together go eat rice
     'It should be the case that we may be allowed to go to have a meal together.'

(41) Zhangsan **keneng**^{epis} **yinggai**^{deon} **dei**^{deon} lai
     Zhangsan may   should   must   come
     'It may be the case that it should be the case that Zhangsan must come.'

The possibility of triple modals offers an opportunity to further examine the ordering restrictions on moved modals in Mandarin.[7] Bošković (1997) observes that when three *wh*-phrases undergo fronting in a Slavic language like Bulgarian, the order of the second and third *wh*-phrases is free:

(42) a. kogo   kakvo e   pital   Ivan?   [Bulgarian]
     whom   what   is   asked Ivan
     'Who did Ivan ask what?'   (Bošković 1997:239, ex. (20a))

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[7] We thank a reviewer for suggesting that we explore the current question.

b. ?*kakvo kogo e pital Ivan?   [Bulgarian]
   what   whom is asked Ivan

(ibid.:239, ex. (20b))

(43)   a.   koj kogo kakvo e pital?   [Bulgarian]
            who whom what   is asked
            'Who asked whom what?'

(ibid.:239, ex. (20c))

       b.   koj kakvo kogo e pital?   [Bulgarian]
            who what   whom is asked

(ibid.:239, ex. (20d))

Bošković (1998) proposes that the ordering freedom seen in (43) arises in Bulgarian because in fact only one *wh*-phrase checks the strong [+*wh*] feature on C^0. All *wh*-phrases have to undergo obligatory fronting, however, not because C^0 requires it, but because every *wh*-phrase itself bears a strong [+focus] feature (the [+focus] feature on the interrogative C^0 is weak). Because Economy requires that the strong [+*wh*] feature on C^0 be checked through the shortest movement possible, it will be checked by the highest *wh*-phrase. In contrast, Economy does not require a particular order in which the remaining *wh*-phrases check their strong [+focus] features, as the same number of nodes (more specifically, maximal projections) will be crossed regardless of the way in which focus movement proceeds (see also Bošković 1999).[8]

Mandarin does not exhibit such an ordering freedom, however. Regardless of the number of modals being displaced, the order of the pre-subject modals remains rigid and their base order must be preserved:[9]

(44)   a.   **yinggai**[epis] **keneng**[epis] **keyi**[deon] women yiqi   qu chi fan
            should   may   can   1PL   together go eat rice
            'It should be the case that we may be allowed to go to have a meal together.'

       b.   ***yinggai**[epis] **keyi**[deon] **keneng**[epis] women yiqi   qu chi fan
            should   can   may   1PL   together go eat rice

(45)   a.   **keneng**[epis] **yinggai**[deon] **dei**[deon] Zhangsan lai
            may   should   must   Zhangsan come
            'It may be the case that it should be the case that Zhangsan must come.'

       b.   ***keneng**[epis] **dei**[deon] **yinggai**[deon] Zhangsan lai
            may   must   should   Zhangsan come

We take the absence of an ordering flexibility with respect to the triple pre-subject modals as further support for our assumption that Foc^0 may bear more than one instance of the structure-building feature [●M_0●]. This is because if modal movement

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[8] The Bulgarian facts also fall under Richards' (1997, 1998) Principle of Minimal Compliance. The basic idea is that once a constraint is obeyed once, the part of the structure where the constraint is obeyed can then tolerate subsequent violations of the constraint. We refer the interested reader to Richards' work for details, and leave open how the Principle might be reconciled with the observed Mandarin facts.

[9] A reviewer wonders whether factors like topicality might have an effect on the order of the pre-subject modals (see Jaeger 2004; Krapova and Cinque 2005; Scott 2012 on such such effects with multiple *wh*-movement in some languages). No such effect has been found. We thank the reviewer for raising this question.

is indeed target-driven rather than moving-element-driven as we propose, then each instance of [•M$_0$•] on Foc^0 must be discharged in a way that conforms to Featural Cyclicity and Shortest.[10] Notice also that unlike the case of Bulgarian *wh*-phrases, movement of Mandarin modals is 'optional', such that in a multiple-modal structure, it is possible to front only some and not all of the modals to a pre-subject position (recall the (a) examples in (22)–(24), for instance).

4 Alternatives

4.1 The XP-movement approach

So far, the arguments offered in the previous section all militate against the traditional head-movement approach: as we have shown, some derivations will accordingly (i) incur an HMC violation; (ii) involve rightward head-adjunction; and/or (iii) the formation of an X^0-complex. There is thus enough reason not to pursue a traditional head-movement analysis further. Significantly, the current neglected multiple modal data also cast doubt on the *existing* XP-movement approaches that take the pre-subject modal sentence as more basic. Consider (46), for instance, which exemplifies the derivation of a multiple post-subject modal sentence under Lin's (2012) XP-movement account (which extends the theory proposed in Lin 2011).

(46)　[$_{TP}$ ta$_i$　T$_{FIN}$ [$_{VP}$ keneng [$_{TP}$ t_i T$_{FIN}$ [$_{VP}$ keyi [$_{TP}$ PRO$_i$ T$_{NONFIN}$ jin
　　　　　 3SG　　　　may　　　　　　　can　　　　　　　　enter
　　　xiancheng]]]]]
　　　town
　　　'It may be the case that she can enter the town.'

One question that now arises is how multiple pre-subject modal examples like (47) can be accommodated under Lin's account:

(47)　**keneng**^{epis} **keyi**^{deon} ta　jin　xiancheng
　　　may　　　can　　3SG enter town
　　　'It may be the case that she can enter the town.'

To accommodate such examples, one might assume that the Mandarin PRO can be overtly realised. The issue, however, is that such an option is *not* otherwise available in the language, as Huang (1989) notes (notice that PRO is standardly invoked in analysing the following examples):

(48)　*wo　bi　Lisi [**ta**　lai]
　　　1SG force Lisi　3SG come
　　　Intended: 'I forced Lisi to come.'　　　　　　　(Huang 1989:190, ex. (13))

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[10] Bošković (1999) offers an alternative way of implementing focus movement that is also target-driven. In particular, whereas the *wh*-feature on the Bulgarian interrogative C^0 has the 'Attract-1F' property, the focus feature has instead the 'Attract-all-F' property. Accordingly, each instance of [•M$_0$•] that the Mandarin Foc^0 bears will be of the 'Attract-1F' type.

(49) *Lisi shefa [**ta**   lai]
      Lisi try   3SG come
      Intended: 'Lisi tried to come.'   (ibid.:190, ex. (14))

On the other hand, Tsai (2015) proposes a different XP-movement account within the cartographic framework, where the subject of a multiple post-subject modal sentence has undergone topicalisation.

(50) [$_{TopP}$ ta$_i$ Top [$_{M_{epis}P}$ keneng [$_{TP}$ t_i T [$_{M_{deon}P}$ keyi jin   xiancheng]]]]
                3SG   may   can enter town
      'It may be the case that she can enter the town.'

In order for this account to accommodate sentences like (47), one must now subscribe to the view that the external argument may remain in Spec-vP in Mandarin. However, the following contrast suggests that the external argument (when present) must obligatorily raise to Spec-TP in an active sentence.

(51) a. Zhangsan you qipian-le   Lisi
          Zhangsan again deceive-PFV Lisi
          'Zhangsan deceived Lisi again.'
      b. *you Zhangsan qipian-le   Lisi
          again Zhangsan deceive-PFV Lisi

Crucially, the following example indicates that the adverbial *you* 'again' is base-generated *outside vP*.

(52) Lisi <**you**> bei   Zhangsan <***you**> qipian-le
      Lisi again PASS Zhangsan   again deceive-PFV
      'Lisi was deceived by Zhangsan again.'

In Liu and Huang's (2016) latest analysis of Mandarin passives, which improves on Huang (1999), the post-BEI phrase (e.g. *Zhangsan* in (52)) occupies Spec-vP.
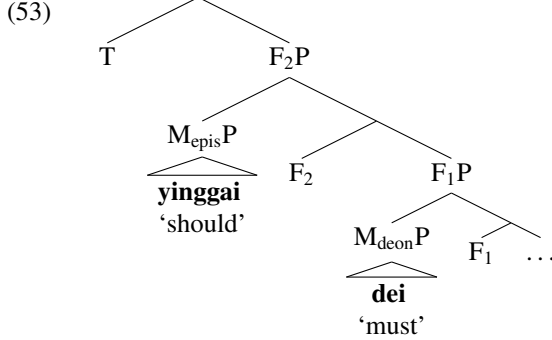
In sum, the multiple modal data of current interest indicate that some of the ingredients involved in the existing XP-movement accounts must be rethought. While this in no way necessarily entails that an XP-movement analysis has been excluded (given that the necessary revisions might or might not be tenable), the current discussion again highlights the significance of our observation—an adequate XP-movement analysis *must* leave room for the possibility of multiple pre-subject modals.[11]

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[11] Recently, Yip and Lee (2020) explore the question of why the pre-subject modal counterparts of certain post-subject modal sentences are ungrammatical in Mandarin. They propose an explanation whereby modal movement is possible only if it has a semantic effect (generalising some of the ideas in Fox 2000). Their account is thus similar to ours in the sense that pre-subject modal sentences are derived from post-subject modal ones. If their explanation is basically correct, and no alternative explanation for their data sets is available under the XP-movement approach (which assumes the reverse derivational relation), the results of their work will then constitute an important argument against such an approach.

We hasten to note, however, that their proposed explanation is perfectly compatible with a Head-to-Spec analysis, and that Yip and Lee (2020) have *not* explicitly addressed the question of where a moved modal exactly lands (which is the main issue being addressed in this squib). We thank a reviewer for bringing Yip and Lee to our attention.

4.2 Modals as maximal projections

A reviewer remarks that the fact that modal movement targets specifiers would be hardly surprising if modals are themselves maximal, rather than minimal, projections. The reviewer might have in mind the following structure:

(53)

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              ╱╲
             ╱  ╲
            T    F₂P
                 ╱╲
                ╱  ╲
           M_episP  ╲
            ╱╲    F₂   F₁P
       yinggai          ╱╲
       'should'    M_deonP  F₁ ...
                    ╱╲
                  dei
                 'must'
```

In this respect, it is worth noting that our proposal is no different from the major existing works in taking Mandarin modals to be minimal projections (J.-W. Lin and Tang 1995; Huang, Li and Li 2009; Lin 2011, 2012; Chou 2013; Yip and Lee 2020). Ascertaining the exact status of Mandarin modals, however, has turned out to be a rather tricky issue, and helpful diagnostics are hard to come by.[12] We thus simply note here that if the current results should instead constitute support for the claim that Mandarin modals are maximal projections, this work will likewise have advanced our understanding of the syntax of Mandarin modals, for this is at odds with most, if not all, of previous authors' assumption that Mandarin modals are minimal projections. Such a potential insight, once again, would not have obtained if one had neglected the current multiple pre-subject modal facts.

5 Conclusion

In this squib, we proposed M^0-to-SpecFocP movement as the mechanism for the derivation of pre-subject modal sentences in Mandarin. The current head-to-spec movement approach was shown to obviate the problems facing a traditional head-movement analysis and the existing XP-movement approaches when extended to accommodate the fact that multiple pre-subject modals are possible. This hitherto neglected fact, therefore, helps inform the analysis of Mandarin modals, while lending credence to a novel line of approach that had not been entertained before. If correct, the current account on the whole provides additional evidence for distinguishing

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[12] One potentially relevant fact is that Mandarin modals can appear in A-not-A form, e.g. *ying-bu-ying-gai* 'should-NEG'; *dei-bu-dei* 'must-NEG' (Chao 2011:749). Notice also that the A-not-A form is possible with words belonging to different categories: *xi-bu-xi-huan* 'like-NEG'; *piao-bu-piao-liang* 'pretty-NEG'; *ba-bu-ba* 'BA-NEG'; *bei-bu-bei* 'PASS-NEG'; *zai-bu-zai* 'at-NEG'. Crucially, the following examples (either specifiers or adjuncts) are ill-formed: *man-bu-man-de* 'slowly-NEG'; *fei-bu-fei-chang* 'extremely-NEG'; *dao-bu-dao-di* 'after all-NEG'. We leave to future work whether this fact can indeed be turned into a piece of evidence for the claim that Mandarin modals are minimal projections.

syntactic head movement from post-syntactic head movement as recently discussed in Harizanov and Gribanova (2019), and for positing Head-to-Spec movement as in Toyoshima (2001) and others.

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