

## On the Topography of Chinese Modals

Wei-Tien Dylan Tsai

### **Abstract:**

This paper offers a comprehensive cartographic account of the modality spectrum in Chinese. It becomes clear from our study that the complicated relation between modals and modality calls for a more articulated theory of the organization of functional projections: More specifically, epistemic modals occupy the complementizer layer, deontic modals the inflectional layer, and dynamic modals the lexical layer. Moreover, we provides an explanation of certain cases of actuality entailments in Chinese modals from a typological point of view, in that Chinese develops a more "analytic" strategy to represent the scope relation between modals and other sentential operators, i.e., by merging an operator where it should be.

### **Keywords:**

Chinese Modals, Cartographic Approach, Comparative Syntax, Actuality Entailment.

### **Subject Index:**

actuality entailment

cartographic approach

Chinese

complementizer layer

deontic modal

dynamic modal

epistemic modal

inflectional layer

irrealis mood

irrealis negation

left periphery

lexical layer

modality spectrum

multiple modal construction

realis negation

# On the Topography of Chinese Modals\*

Wei-Tien Dylan Tsai

## 1. The Spectrum of Modality

Chinese modals have a rather peculiar trait of keeping their verbal origins while undergoing grammaticalization and leaving their cognates throughout syntactic projections (cf. Lin & Tang 1995, Lin 2005, among others). It is thus very different from their English counterparts in not observing the so-called Transparency Principle (cf. Lightfoot 1979), which basically requires a modal to cut away their verbal origins. This also has an interesting consequence in creating a "showroom" for displaying the evolution history of a functional category from the lexical layer to the complementizer layer in the sense of Rizzi (1997).

A good example comes from *hui* in Chinese. It can be construed either as a verb 'meet', as in (1a), or as a noun 'meeting', as in (1b):<sup>1</sup>

- (1) a. zongtong zuotian **hui**-jian-le san-ge waijiaoguan. [verb]  
 president yesterday meet-see-Prf three-Cl diplomat  
 'The president met three diplomats yesterday.'
- b. zongtong zuotian you san-ge **hui**. [noun]  
 president yesterday have three-Cl meeting  
 'The president had three meetings yesterday.'

As an extension, verbal *hui* can also mean 'know' or 'understand', as in (2a). It in turn develops into an ability modal, meaning 'be able to', as in (2b). Furthermore, it can also act as a deontic modal of disposition when following a habitual adverb such as *changchang* 'often', as in (2c). Interestingly enough, if the word order between *changchang* and *hui* is reversed, as in (2d), then *hui* is construed as a future modal instead. In (2e), *hui* can also be a generic

modal, expressing the physical property of water in our world. Finally, it may appear in conjunction with an epistemic adverb, expressing irrealis mood, as in (2f).<sup>2</sup> We therefore have a full spectrum of modality along the syntactic projections in Chinese:<sup>3</sup>

- (2) a. yiqian waijiaoguan dou **hui** fayu. [verb]  
 before diplomat all know French  
 'In old time, all diplomats know French.'
- b. yiqian waijiaoguan dou **hui** shuo fayu. [dynamic modal]  
 before diplomat all can speak French  
 'In old time, all diplomats can speak French.'
- c. waijiaoguan changchang **hui** lai zheli. [deontic modal]  
 diplomat often tend.to come here  
 'Diplomats often tend to come here.'
- d. waijiaoguan **hui** changchang lai zheli. [future modal]  
 diplomat will often come here  
 'Diplomats will come here often.'
- e. shui **hui** wang dichu liu. [generic modal]  
 water HUI towards low.land flow  
 'Water flows to lower places.'
- f. waijiaoguan dagai **hui** lai zheli. [epistemic modal]  
 diplomat probably Irr come here  
 'Diplomats will probably come here.'

In this paper, we entertain a three-tier analysis of Chinese modal projections in the spirit of Rizzi (1997): Namely, epistemic modality is encoded on the complementizer layer, deontic modality on the inflectional layer, and dynamic modality on the lexical layer. More

specifically, epistemic modals are associated with the information structure in the left periphery, hence discourse/knowledge-oriented, whereas deontic modals are associated with the event structure encoded by IP, hence more inclined to be subject-oriented. Finally, dynamic modals are associated with the argument structure. As a result, they are essentially agent-oriented, which explains why they are often treated like control verbs in the literature.

In section 2, we show how the above modal hierarchy is established with the help from an array of tests. Section 3 proceeds to address the issue of how to tell modal adverbs from modal auxiliaries in Chinese. In section 4, we offer a sketch of the topography of Chinese modals based on our findings. Finally, section 5 warps up this paper by exploring some interesting consequences of our three-tier modal analysis.

## 2. The Syntax-semantics Correspondences of Modal Construals

### 2.1. The Co-occurrence Restrictions

To see how the syntactic cartography works for Chinese modals, it is instructive to note that modal adverbs are often paired with modal auxiliaries in Chinese, very much in line with Cinque's (1999) conception of adverbial projection, i.e., one functional head for one adverb. In addition, there is a curious co-occurrence restriction between modal adverbs and modal auxiliaries. Take (3a) for instance: the epistemic adverb *yiding* 'surely' is paired with the epistemic auxiliary *yao*, whereas the deontic version of *yiding* 'obligatorily' is paired with the deontic version of *yao*, as in (3b). However, if the adverb-auxiliary pair is of distinct modality, then an epistemic adverb may precede a deontic auxiliary, as in (3c). Crucially, a deontic adverb can never be followed by an epistemic auxiliary, as evidenced by the ungrammaticality of (3d) ( $X^E$ : epistemic X;  $X^D$ : deontic X):

- (3) a.    *huoche yiding<sup>E</sup> (shi) yao<sup>E</sup> kai le,*  
          train    surely    be    YAO    start Inc

cai hui yizhi ming qidi.

just will continuously blow steam.whistle

'The train must<sup>E</sup> be leaving, so it kept blowing the steam whistle.'

b. huoche yiding<sup>D</sup> yao<sup>D</sup> kai le,

train obligatorily YAO start Inc

women dei yizhao shijian-biao fache.

we have.to according.to time-table launch

'The train must<sup>D</sup> leave, so it has to launch according to the time table.'

c. huoche yiding<sup>E</sup> (shi) yao<sup>D</sup> kai le,

train surely be YAO start Inc

cai hui yizhi ming qidi.

just will continuously blow steam.whistle

'The train must<sup>E</sup> have to leave, so it kept blowing the steam whistle.'

d. \* huoche yiding<sup>D</sup> yao<sup>E</sup> kai le,

train obligatorily YAO start Inc

women dei yizhao shijian-biao fache.

we have.to according.to time-table launch

'\*The train must<sup>D</sup> be leaving, so it has to launch according to the time table.'

The same pattern applies to *hui* as well: So in (4a) and (4b), an epistemic adverb such as *dagai* 'probably' can be followed either by epistemic *hui* or ability *hui*. On the other hand, although a deontic adverb such as *bixu* 'obligatorily' can be followed by ability *hui*, as in (4d), it can never be followed by epistemic *hui*, as in (4c). This co-occurrence restriction indicates that epistemic adverbs and auxiliaries always appear higher than their deontic and dynamic counterparts (X<sup>A</sup>: ability X):

- (4) a. Akiu dagai hui<sup>E</sup> qu xiancheng,  
train probably HUI go town  
wo bu shi hen queding.  
I not be very sure  
'Akiu probably will go to the town. I am not very sure.'
- b. Akiu dagai hui<sup>A</sup> qu xiancheng,  
train probably HUI go town  
wo bu shi hen queding.  
I not be very sure  
'Akiu probably knows how to go to the town. I am not very sure.'
- c. \* Akiu bixu hui<sup>E</sup> kai che,  
train obligatorily HUI drive car  
fouze che mai le ye meiyong yong.  
otherwise car buy Inc still have.not use  
'\*Akiu obligatorily will drive a car, otherwise there is still no use to buy a car.'
- d. Akiu bixu hui<sup>A</sup> kai che,  
train obligatorily HUI drive car  
fouze che mai le ye meiyong yong.  
otherwise car buy Inc still have.not use  
'Akiu must<sup>D</sup> know how to drive, otherwise there is still no use to buy a car.'

This co-occurrence restriction indicates that epistemic adverbs and auxiliaries always appear higher than their deontic and dynamic counterparts.

## 2.2. Entailment Relations

Another test comes from the well-known fact that a symmetric predicate allows mutual

entailment when the roles of its arguments are reversed, as in (5):

- (5) a. Akiu gen Xiaodi hen xiang.  
 Akiu with Xiaodi very alike  
 'Akiu looks very much like Xiaodi.'  
 —→ Xiaodi gen Akiu hen xiang.  
 Xiaodi with Akiu very alike  
 'Xiaodi looks very much like Akiu.'

Butler (2003) argues quite convincingly that the entailment relation is maintained only in presence of epistemic modals, while it is blocked by deontic or dynamic modals. Chinese modals display exactly the same pattern, as illustrated by the contrast between (6a) on the one hand, and (6b,c) on the other hand (see also K. Huang 2009) ( $X^V$ : volitional X):

- (6) a. Akiu keneng gen Xiaodi hen xiang.  
 Akiu possibly with Xiaodi very alike  
 'It is possible that Akiu looks very much like Xiaodi.'  
 —→ Xiaodi keneng gen Akiu hen xiang.  
 Xiaodi possibly with Akiu very alike  
 'It is possible that Xiaodi looks very much like Akiu.'
- b. Akiu bixu gen Xiaodi hen xiang.  
 Akiu obligatorily with Xiaodi very alike  
 'Akiu must<sup>D</sup> look very much like Xiaodi.'  
 —×→ Xiaodi bixu gen Akiu hen xiang.  
 Xiaodi obligatorily with Akiu very alike



'Xiaodi must<sup>D</sup> look very much like Akiu.'

c. Akiu yao<sup>V</sup> gen Xiaodi hen xiang.

Akiu want with Xiaodi very alike

'Akiu wants<sup>V</sup> to look very much like Xiaodi.'

→ Xiaodi yao gen Akiu hen xiang.

Xiaodi want with Akiu very alike

'Xiaodi wants<sup>V</sup> to look very much like Akiu.'

### 2.3. Interaction between Root Modals and Inner/Outer Subjects

As pointed by (Diesing 1992), inner subject indefinites are typically nonspecific, while outer subject indefinites are typically specific. We may employ this distinction to tell deontics apart from dynamics: While both are classified as root modals in the traditional terms, they differs crucially with respect to their structural positions. Namely, deontics typically stand in-between the inner subject and the outer subject. As a result, when a deontic modal precede a subject indefinite, then the subject has to be nonspecific, as evidenced by (7):

(7) zhe-ci bixu yao<sup>D</sup> you liang-ge ren lai. [deontics + inner subject]

this-time obligatorily YAOhave two-Cl person come

'This time there have to be two persons coming.' (nonspecific)

On the other hand, when a deontic modal follows a subject indefinite, as in (8), then the subject must be specific:

(8) zhe-ci you liang-ge ren bixu yao<sup>D</sup> lai. [outer subject + deontics]

this-time have two-Cl person obligatorily YAOcome

'This time two persons have to come.' (specific)

By contrast, dynamics like *gan* 'dare' and *ken* 'willing' can never appear higher than the inner subject, as in (9):

(9) \* zhe-ci gan/ken you liang-ge ren lai. [\*dynamics + inner subject]

this-time dare/willing have two-Cl person come

'This time there are two persons who dare come.' (nonspecific)

This clearly shows that root modals are not a homogenous group: deontic modals are separated from dynamic modals by the inner subject position in the cartographic terms. This property also explains why dynamics are often treated like a control predicate, situated within the *vP* phase.

## 2.4. Interaction between Epistemic Modals and Negation

Another interesting fact discovered by our inquiry is that epistemic modals cannot appear within the scope of realis negation *mei*, as shown by the contrast between (10a,b), as well as that between (11a,b) ( $\text{Neg}^{\text{Rea}}$ : realis negation):

(10) a. Akiu yiding<sup>E</sup> **mei** jin xiancheng. [epistemics +  $\text{Neg}^{\text{Rea}}$ ]

Akiu surely have.not enter town

'Akiu must have not entered the town.'

b.\* Akiu **mei** yiding<sup>E</sup> jin xiancheng. [\* $\text{Neg}^{\text{Rea}}$  + epistemics]

Akiu have.not surely enter town

'Akiu must have not entered the town.'

- (11) a. Akiu keneng **mei** jin xiancheng. [epistemics + Neg<sup>Rea</sup>]  
 Akiu possibly have.not enter town  
 'It is possible that Akiu have not entered the town.'
- b.\* Akiu **mei** keneng jin xiancheng. [\*Neg<sup>Rea</sup> + epistemics]  
 Akiu have.not possibly enter town  
 'It is not possible that Akiu have entered the town.'

On the other hand, as illustrated in (12a,b) and (13a,b), there is no such restriction on epistemic modals with irrealis negation *bu*, regardless of word ordering (Neg<sup>Irr</sup>: irrealis negation):

- (12) a. Akiu yiding<sup>E</sup> **bu** jin xiancheng. [epistemics + Neg<sup>Irr</sup>]  
 Akiu surely not enter town  
 'It is certain that Akiu will not enter the town.'
- b. Akiu **bu** yiding<sup>E</sup> jin xiancheng. [Neg<sup>Irr</sup> + epistemics]  
 Akiu not surely enter town  
 'It is uncertain that Akiu will enter the town.'
- (13) a. Akiu keneng **bu** jin xiancheng. [epistemics + Neg<sup>Irr</sup>]  
 Akiu possibly not enter town  
 'It is possible that Akiu will not enter the town.'
- b. Akiu **bu** keneng jin xiancheng. [Neg<sup>Irr</sup> + epistemics]  
 Akiu not possibly enter town  
 'It is impossible for Akiu to enter the town.'

Double negation again displays the same pattern: Irrealis negation *bu* can appear on

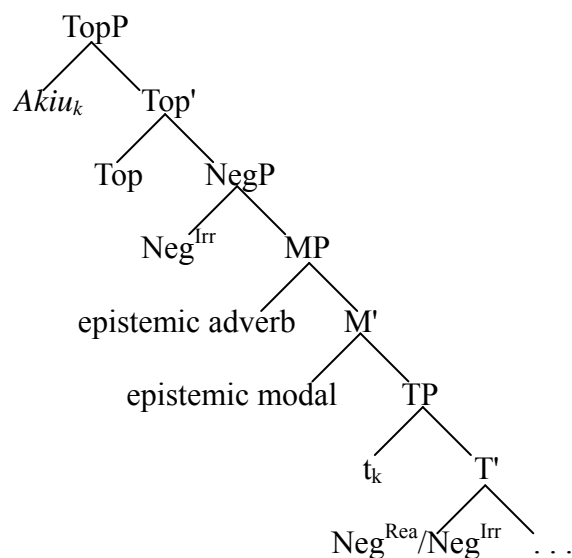
both sides of an epistemic modal, as in (14a,b). Realis negation *mei*, on the other hand, can only follow an epistemic modal. This is illustrated by the contrast between (15a,b) and (16a,b):

- (14) a. Akiu **bu** yiding<sup>E</sup> **bu** jin xiancheng. [Neg<sup>Irr</sup> + epistemics + Neg<sup>Irr</sup>]  
 Akiu not surely not enter town  
 'It is uncertain that Akiu will not enter the town.'
- b. Akiu **bu** keneng **bu** jin xiancheng. [Neg<sup>Irr</sup> + epistemics + Neg<sup>Irr</sup>]  
 Akiu not possibly not enter town  
 'It is impossible for Akiu to enter the town.'
- (15) a. Akiu **bu** yiding<sup>E</sup> **mei** jin xiancheng. [Neg<sup>Irr</sup> + epistemics + Neg<sup>Rea</sup>]  
 Akiu not surely have.not enter town  
 'It is uncertain that Akiu have not entered the town.'
- b. Akiu **bu** keneng **mei** jin xiancheng. [Neg<sup>Irr</sup> + epistemics + Neg<sup>Rea</sup>]  
 Akiu not possibly have.not enter town  
 'It is impossible for Akiu to have not entered the town.'
- (16) a.\* Akiu **mei** yiding<sup>E</sup> **bu** jin xiancheng. [\*Neg<sup>Rea</sup> + epistemics + Neg<sup>Irr</sup>]  
 Akiu have.not surely not enter town  
 'It was uncertain that Akiu will not enter the town.'
- b.\* Akiu **mei** keneng **bu** jin xiancheng. [\*Neg<sup>Rea</sup> + epistemics + Neg<sup>Irr</sup>]  
 Akiu have.not possibly not enter town  
 'It was impossible for Akiu to enter the town.'

These facts lead us to the conclusion that realis negation is most likely associated with T,

while irrealis negation can also appear in the left periphery, as sketched below:

(17)



### 3. Adverb or Auxiliary? Evidence from VP-preposing and VP ellipsis

One question remains as to the categorial status of Chinese modal elements. That is, how do we know that *yao* and *hui* are auxiliaries, while *yiding* and *bixu* are adverbs? Here two tests are provided to tackle the issue: The first one has to do with their ability to license VP fronting. As is well-known, VP-fronting can be implemented only under head-government (cf. Huang 1993).<sup>4</sup> It follows that only modal auxiliaries can license VP-fronting, whereas modal adverbs, being situated in the Spec position, are not qualified to do so. This prediction is borne out, as evidenced by the contrast between (20b) and (20c). Also, deontic adverbs and deontic auxiliaries show exactly the same pattern, as illustrated by the contrast between (21b) and (21c):

(20) a. Akiu keneng **hui**<sup>E</sup> [qu xiancheng].

Akiu possibly HUI go town

'It is possible that Akiu will enter the town.'

b. [qu xiancheng]<sub>k</sub>, Akiu keneng **hui**<sup>E</sup> t<sub>k</sub>. [VP-fronting]

- go town            Akiu possibly HUI
- c.\* [**hui**<sup>E</sup> qu xiancheng]<sub>k</sub>, Akiu keneng t<sub>k</sub>. [M'-fronting]
- HUI go town            Akiu possibly
- (21) a. Akiu bixu            **yao**<sup>D</sup> [qu xiancheng].
- Akiu obligatorily YAO go town
- 'Akiu must be entering the town.'
- b. [qu xiancheng]<sub>k</sub>, Akiu bixu            **yao**<sup>D</sup> t<sub>k</sub>. [VP-fronting]
- go town            Akiu obligatorily YAO
- c.\* [**yao**<sup>D</sup> qu xiancheng]<sub>k</sub>, Akiu bixu t<sub>k</sub>. [M'-fronting]
- YAO go town            Akiu obligatorily

The second test has to do with VP ellipses, which again requires head-government. It follows that only modal auxiliaries, but not modal adverbs, can license VP ellipses. Epistemics and deontics show exactly the same pattern in this respect, as evidenced by the contrast between (22a,b), as well as that between (23a,b): This head government requirement thus argues for an adverb-auxiliary distinction among Chinese modal elements, as we shall see in the diagram (25). The spec-head configuration formed by the adverb-auxiliary pair also fit quite well into Saito & Murasugi's (1990) analysis of VP ellipsis:

- (22) a. Akiu yiding<sup>E</sup> **hui**<sup>E</sup> [qu xiancheng],
- Akiu surely HUI go town
- Xiaodi ye yiding<sup>E</sup> **hui**<sup>E</sup> \_\_\_\_.
- Akiu also surely HUI
- 'Akiu must be entering the town, and Xiaodi must, too.'
- b.\* Akiu yiding<sup>E</sup> **hui**<sup>E</sup> [qu xiancheng],

Akiu surely HUI go town

Xiaodi ye yiding<sup>E</sup> \_\_\_\_.

Akiu also surely

(23) a. Akiu bixu **yao<sup>D</sup>** [qu xiancheng],

Akiu obligatorily YAO go town

Xiaodi ye bixu **yao<sup>D</sup>** \_\_\_\_.

Akiu also obligatorily YAO

'Akiu must enter the town, and Xiaodi must, too.'

b.\* Akiu bixu **yao<sup>D</sup>** [qu xiancheng],

Akiu obligatorily YAO go town

Xiaodi ye bixu \_\_\_\_.

Akiu also obligatorily

#### 4. Topography of Chinese Modals and A Three-tier Cartographic Analysis

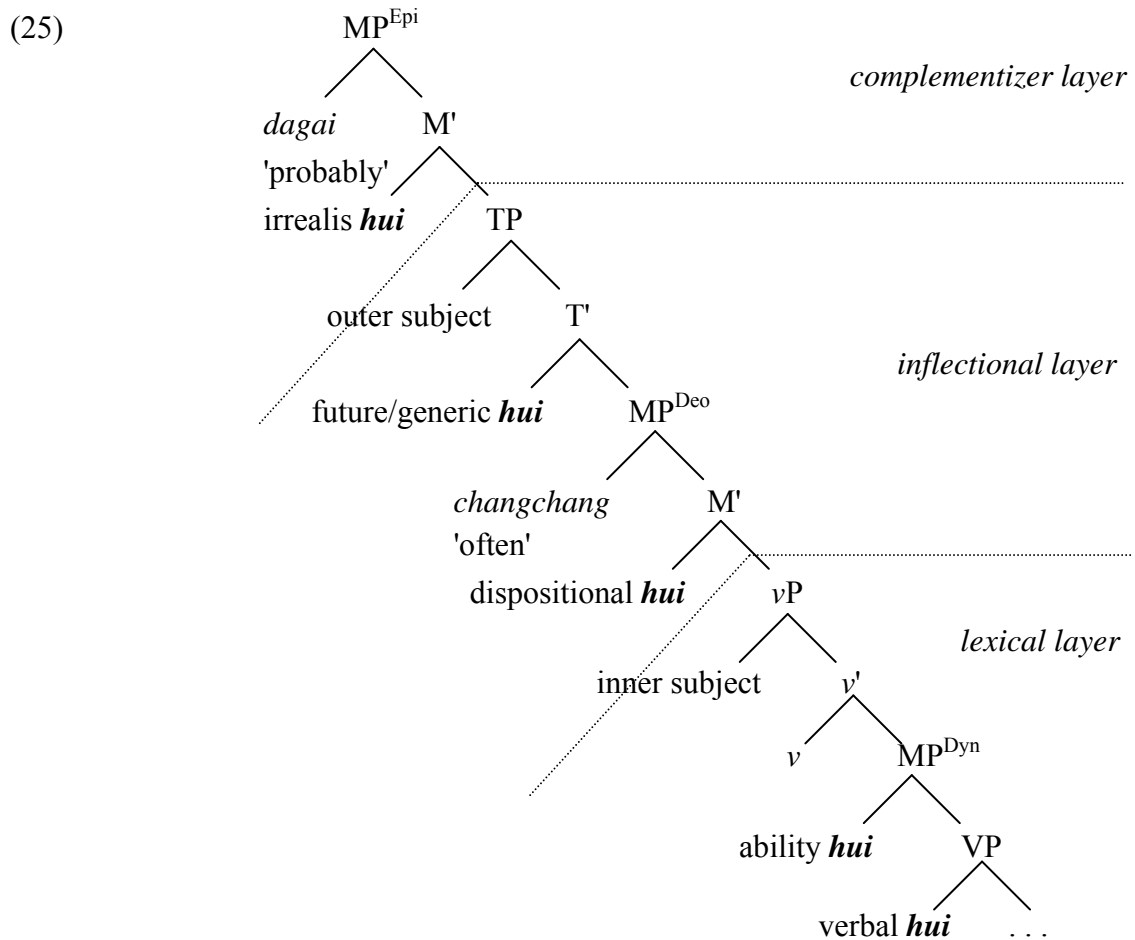
The spectrum of modality mentioned above provides us useful reference points to map out the topography of Chinese modal adverbials and auxiliaries. It has been noted long since Lin and Tang (1995) that epidemics and deontics should be separated in terms of their syntactic distribution, and it is also argued by J. Lin (2007) that there can be multilayered modal projections of distinctive types in Mandarin. Here we would like to explore these intuitions a step further along the cartographic approach championed by Rizzi (1997) and Cinque (1999): That is, we should be able to find multiple occurrences of *yao* and *hui* within one sentence, while the modal topography illustrated above is strictly observed. Mandarin provides ample evidence for this prediction, where "the height of interpretation" determines meaning, and there is no confusion about which type of modality is involved in which type of syntactic projection, as exemplified by the following multiple modal construction:

(24) Akiu dagai (hui<sup>E</sup>) bixyu yao<sup>D</sup> hui<sup>A</sup> kaiche.

Akiu probably HUI obligatorily YAO HUI drive

'Akiu probably will have to be able to drive.'

All in all, our findings are in line with Cinque's (1999) view on adverbial projections, as summarized in the diagram (25). Moreover, the syntax-semantics correspondences encoded in this modal hierarchy can be further aligned with the three tiers of syntactic projection à la Rizzi (1997) in a non-trivial way:



## 5. Further Consequences

### 5.1. Modals and Indefinite *Wh* Licensing



One nice consequence of mapping out the topography of *hui* is that we will be able to offer a straightforward account of why only epistemic modals may license indefinite *wh*'s in Chinese, as illustrated by the contrast between (26) and (27a-c):

(26) *chufa qian, Akiu dagai hui dao nali xiuxi yixia.* [epistemic modal]

go.out before Akiu probably Irr go where rest a.bit

'Before going out, Akiu will probably go somewhere and take a rest.'

(27) a.\* *Akiu hui changchang dao nali xiuxi yixia.* [future modal]

Akiu will often go where rest a.bit

'Akiu will go somewhere and take a rest often.'

b.\* *Akiu changchang hui dao nali xiuxi yixia.* [deontic modal]

Akiu often tend.to go where rest a.bit

'Akiu tends to go somewhere and take a rest often.'

c.\* *Akiu hui shuo nali de hua.* [dynamic modal]

Akiu can speak where Lnk language

'Akiu can speak languages of somewhere.'

By contrast, it is perfectly all right for future, dispositional, and ability *hui* to co-occur with an interrogative *wh*, as evidenced by (28a-d):

(28) a. *Akiu dagai hui dao nali xiuxi?* [epistemic modal]

Akiu probably Irr go where rest

'Will Akiu probably go somewhere and take a rest.'

b. *Akiu hui changchang dao nali xiuxi?* [future modal]

Akiu will often go where rest

'Where will Akiu go and take a rest often?'

- c. Akiu changchang **hui** dao nali xiuxi? [deontic modal]

Akiu tomorrow tend.to go where rest

'Where does Akiu tend to go and take a rest often?'

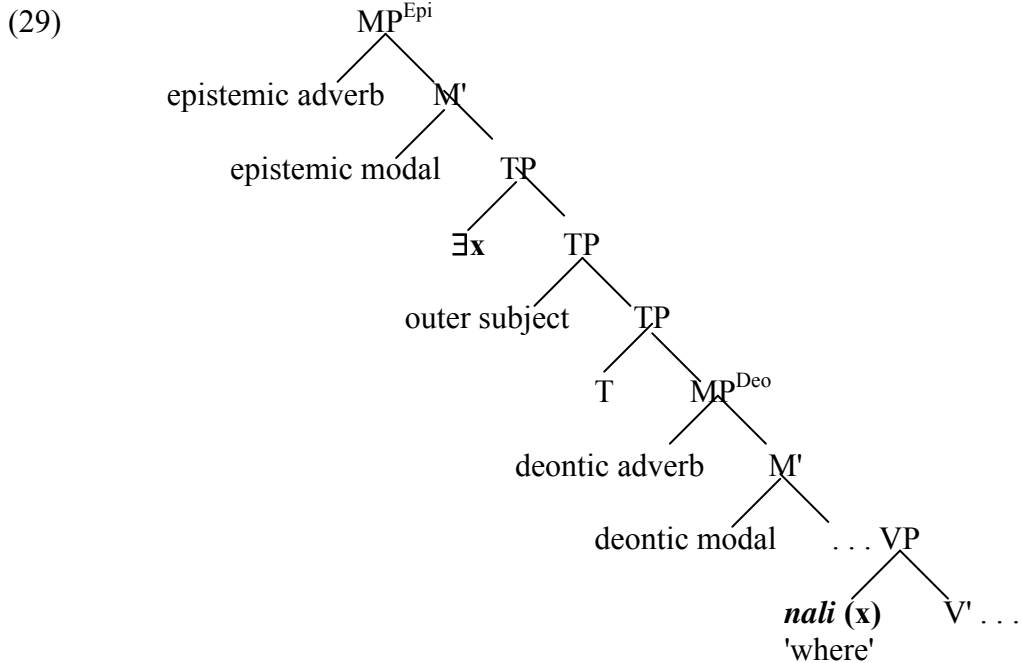
- d. Akiu **hui** shuo nali de hua? [dynamic modal]

Akiu can speak where Lnk language

'What languages can Akiu speak?'

Lit. 'Akiu can speak where's languages?'

Our observation clearly shows that only an epistemic modal is high enough to trigger existential closure on the IP level (cf. Heim 1982), and thereby license the indefinite *wh*-in-situ, as illustrated in the diagram (29).<sup>5</sup> On the other hand, the placement of deontics and dynamics is simply too low to introduce the implicit existential quantifier:



## 5.2. Modals and Aspectual Licensing

For our purpose here, it would be worthwhile to examine the interaction between modals and

aspects in Mandarin, since this is exactly where actuality entailments occur (cf. Bhatt 1999 and Hacquard 2006): Epistemic modals typically allow a perfective aspect within their scope, as in (30a-c). By contrast, deontics and dynamics do not allow the same construal, as shown by the ungrammaticality throughout (31a-c) and (32a-c):<sup>6</sup>

(30) a. Akiu keneng qu-le xiancheng.

Akiu possibly go-Prf town

'It is possible that Akiu has gone to the town.'

b. Akiu yiding<sup>E</sup> qu-le xiancheng.

Akiu surely go-Prf town

'Akiu must<sup>E</sup> have gone to the town.'

c. Akiu yinggai<sup>E</sup> qu-le xiancheng.

Akiu should go-Prf town

'It should be the case that Akiu has gone to the town.'

(31) a. \* Akiu bixu qu-le xiancheng.

Akiu obligatorily go-Prf town

'\*Akiu should<sup>D</sup> have gone to the town.'

b. \* Akiu yiding<sup>D</sup> qu-le xiancheng.

Akiu obligatorily go-Prf town

'\*Akiu must<sup>D</sup> have gone to the town.'

c. \* Akiu yinggai<sup>D</sup> qu-le xiancheng.

Akiu ought go-Prf town

'\*Akiu ought to have gone to the town.'

(32) a. \* Akiu gan qu-le xiancheng.

Akiu dare go-Prf town

'\*Akiu dares have gone to the town.'

b. \* Akiu ken qu-le xiancheng.

Akiu willing go-Prf town

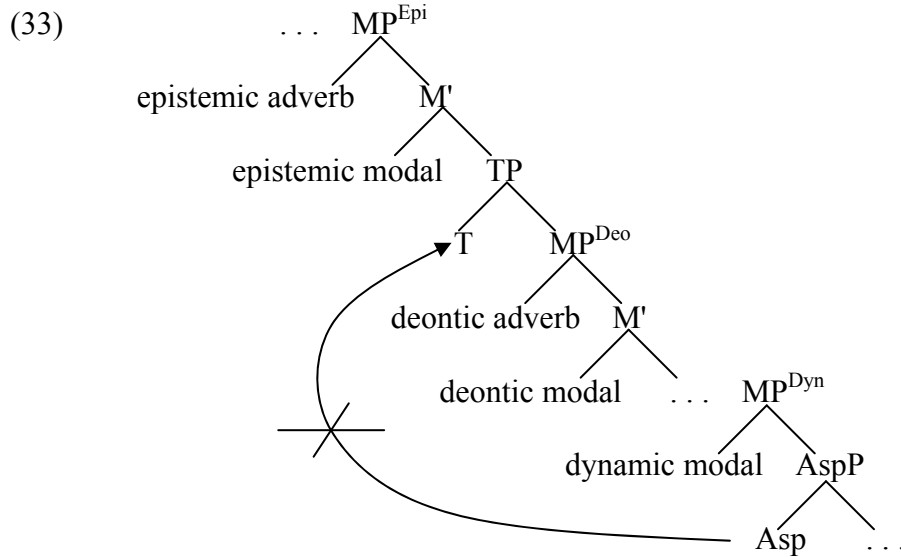
'\*Akiu is willing to have gone to the town.'

c. \* Akiu neng qu-le xiancheng.

Akiu be.able.to go-Prf town

'\*Akiu is able to have gone to the town.'

As sketched in the following diagram, the reason for this contrast may well be that the covert Asp-to-T raising is blocked by either deontic or dynamic modals. The same blocking effect does not show up for those epistemics in (30a-c), because they are situated in the left periphery, simply too high to intervene:



### 5.3. Modals and Actuality Entailments

Curiously enough, when the ability modal *neng* precedes a frequency adverb such as *changchang* 'often', as in (34a), the sentence has the usual irrealis reading. By contrast, when *changchang* precedes *neng*, as in (34b), the interpretation is distinctively realis (cf. Tsai &

Portner 2008): For (34b) to be true, Akiu must have been to Taipei in the actual world a number of times, which cannot be canceled, as shown by the contrast between (35a,b):

(34) a. Akiu neng changchang qu Taipei. [irrealis]

Akiu can often go Taipei

'Akiu can often go to Taipei.'

b. Akiu changchang neng qu Taipei. [realis]

Akiu often can go Taipei

'Akiu was often able to go to Taipei.'

(35) a. Akiu neng changchang qu Taipei,

Akiu can often go Taipei

dan conglai mei qu-guo.

but never have.not go-Pst

'It is possible for Akiu to go to Taipei often, but he never did.'

b. # Akiu changchang neng qu Taipei,

Akiu often can go Taipei

dan conglai mei qu-guo.

but never have.not go-Pst

<sup>#</sup>'Akiu was often able to go to Taipei, but he never did.'

The above contrast is reminiscent of the cases of actuality entailment discussed by Bhatt (1999) and Hacquard (2006). It is pointed out that certain modal verbs, when in a perfective form, produce an entailment that an event of the kind described by the clause under the scope of the modal actually occurred: For instance, (36b), but not (36a), entails that Jane took the train:

- (36) a. Pour aller au zoo, Jane pouvait prendre le train.  
 To go to the zoo, Jane can-past-impf take the train  
 'Jane could have taken the train to go to the zoo.'
- b. Pour aller au zoo, Jane a pu prendre le train.  
 To go to the zoo, Jane past-pfv can take the train  
 'Jane was able to take the train to go to the zoo.'

According to Hacquard, the actuality entailment occurs with ability modals and certain deontic modals, but not with epistemic modals, and the actuality entailment of (36b) is derived by raising a perfective aspect over a dynamic modal in French.

This movement strategy, however, is not available in Chinese. The only way to achieve a similar result is to merge an aspectual operator like *changchang* 'often' directly above a deontic or dynamic modal. This also suggests that we should get actuality entailments with adverbs of quantification such as *zongshi* 'always' and *tongchang* 'usually', as evidenced by (37b), which are not compatible with epistemic modals for some reason, as shown in (37a):

- (37) a. \* Akiu neng zongshi/tongchang qu Taipei. [irrealis: possibility]  
 Akiu can always/usually go Taipei  
 'Akiu can always/usually go to Taipei.'
- b. Akiu zongshi/tongchang neng qu Taipei. [realis: ability]  
 Akiu always/usually can go Taipei  
 'Akiu was always/usually able to go to Taipei.'

The same observation carries over to the two distinct readings of *yao* and *hui*, as shown by (38a,b) and (39a,b) respectively. More specifically, only the *ought-to-do* construal of

(38b), but not the *ought-to-be* construal of (38a), results in the actuality entailment in question:

- (38) a. Akiu yao changchang xiuxi. [irrealis: necessity]  
 Akiu YAO often rest  
 'Akiu needs to rest often.'
- b. Akiu changchang yao xiuxi. [realis: human need]  
 Akiu often YAO rest  
 'Akiu often needed to rest.'

Similarly, when *hui* precedes *changchang*, it is interpreted as future, as in (39a); when *hui* follows *changchang*, it is subject-oriented, hence interpreted as dispositional, as in (39b):

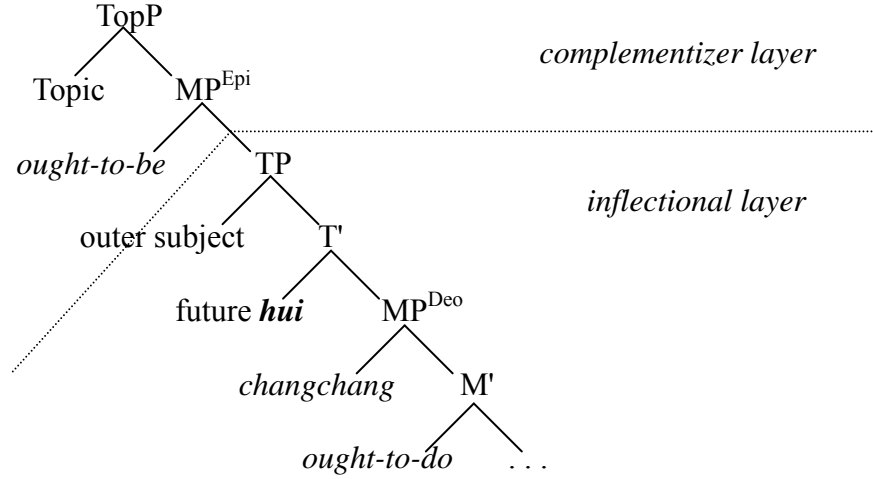
- (39) a. Akiu hui changchang qu Taipei. [future]  
 Akiu HUI often go Taipei  
 'Akiu will go to Taipei often.'
- b. Akiu changchang hui qu Taipei. [realis: dispositional]  
 Akiu often HUI go Taipei  
 'Akiu was often inclined to go to Taipei.'

So the generalization seems to be that, when an actuality entailment occurs, the modal involved is always near the lower end of the spectrum. Namely, they are typically dispositional, *ought-to-do*, ability, and volitional, just as we might expect from the modal topography presented in (25).

In light of the modal topography, we may now present a fine structure for the two types of necessity modals in (38a,b), as sketched in the diagram (40). In particular, we entertain the

possibility that *ought-to-be* is hosted by an epistemic modal projection in the left periphery, hence beyond the scope of the outer subject. The rationale is that the construal has more to do with the perspective of the communicating agents (that is, speaker and addressee). By contrast, *ought-to-do* is strictly subject-oriented, and can only be situated in the inflectional layer, that is, within the scope of the outer subject (irrelevant details omitted):

(40)



We may therefore analyze *changchang* as a habitual operator OFFTEN. The actuality entailment of (39b) thus comes out when the operator is merged above dispositional *hui*, binding an event argument inside the scope of the modal (cf. Tsai & Portner 2008), as illustrated in (41b):

- (41) a.  $\Diamond$  OFFTENe [Akiu goes to Taipei in e]  
 b. OFFTENe  $\Diamond$  [Akiu goes to Taipei in e]

(41a), on the other hand, represents the irrealis semantics of (39a), where future *hui* scopes over the habitual operator instead. This give us a plausible account of the origin of actuality entailments in Chinese. From a typological point of view, this is exactly what we would expect in a robust analytic language such as Chinese, where in-situ construals are more or



less the norm for encoding "the height of interpretation".

#### 5.4. Implicit Modals and Non-canonical *Wh*'s in Chinese

Finally, we look into the rather peculiar behavior of non-canonical *wh*'s in (42a,b), where *shenme* 'what' functions like a negative modal:

(42) a. Akiu **shenme** qu-le Beijing! ta qu-le Shanghai.

Akiu what go-Prf Beijing he go-Prf Shanghai

'Akiu couldn't have gone to Beijing! He has gone to Shanghai.'

b. Akiu qu **shenme** Beijing! ta zheli gongzuo dou mei zuowan.

Akiu go what Beijing he here work all have.not finish

'Akiu shouldn't go to Beijing! He hasn't even finished the work here.'

The curious thing about these construals is that the placement of *shenme* 'what' actually corresponds to our modal hierarchy mentioned above: Namely, when it serves as a sentential adverbial as in (42a), the negative modality is epistemic, even though there is no overt modal involved. By contrast, (42b) employs *shenme* as a VP-adverbial of some sort, and the reading is clearly deontic without an overt modal. Although the details have to be worked out for a proper syntactic account, the distinction clearly shows that, even in the case of implicit modals, the modal hierarchy is strictly observed.

#### 6. Conclusion

To wrap up our discussion, it seems that the epistemic-root dichotomy adopted by Butler's (2003) phasal analysis and Kratzer's (1991) modal base analysis needs further refinement. The cartographic approach, in my opinion, provides a more illuminating solution by accommodating all the spectrum effects displayed by Chinese modals. Furthermore, we have

offered an explanation of actuality entailments based on the topography of Chinese modals. That is, in contrast to the head-movement mechanism induced by French morphology, Chinese develops a more "analytic" strategy to represent the scope relation between modals and other sentential operators, namely, by merging an operator where it should be. This strongly recalls the scope isomorphism observed in Huang (1982), accordingly to which Chinese is essentially an operator-in-situ language.

As we try to disentangle the complicated relation between modals and modality, it becomes clear that a more articulated theory is needed to account for the syntax-semantics correspondences in question. Chinese plays a crucial role here in that we can pinpoint the exact location of modal adverbs and modal auxiliaries in terms of this strict syntax-semantics correspondence encoded by the notion "the height of interpretation". Through this study, we can say with a certain degree of confidence that syntax does make a considerable contribution to the shaping of the modality spectrum.

All in all, it seems that further studies can be done by using the topography of Chinese modals as a standard for comparison. On the diachronic front, we are in a position to map out the evolutionary path for Chinese modals along the line of Roberts (1993) and Roberts & Roussou (1999), a process dated way back to Archaic Chinese. This move is supported not only by a plethora of functional usages from a single modal, but also by the fact that for each usage, there is a version of the modal in the corresponding height of the interpretation. On the synchronic front, some interesting results have been produced by putting Japanese, Vietnamese and Mayrinax Atayal into the perspective. These languages show exactly the same kind of cartographic effects, but with a twist in terms of their individual morpho-syntactic makeups. Hopefully this line of inquiry will continue to shed light on the cartographic nature of modal constructions across languages, while giving a comparative edge to the whole endeavor.

## References

- Bhatt, Rajesh. 1999. *Covert Modality in Non-Finite Contexts*. Ph.D. dissertation, University of Pennsylvania.
- Butler, Jonny. 2003. A Minimalist Treatment of Modality. *Lingua* 113: 967-996.
- Cheng, Lisa L.-S. 1991. *On the typology of wh-questions*. MIT: PhD Dissertation.
- Chomsky, Noam. 2001. Derivation by Phase. In *Ken Hale: a Life in Language*, ed. by Michael Kenstowicz. Cambridge, MA: MIT Press.
- Chomsky, Noam. 2005. On Phases. In *Foundational issues in linguistic theory: essays in honor of Jean-Roger Vergnaud*, ed. by Robert Freidin, Carlos Otero and Maria Zubizarreta. Cambridge, MA: MIT Press.
- Cinque, Guglielmo. 1999. *Adverbs and Functional Heads*. Oxford: Oxford University Press.
- Diesing, Molly. 1992. *Indefinites*. Cambridge, MA: MIT Press.
- Feldman, F. 1986. *Doing the Best We Can*. Dordrecht: Reidel.
- Hacquard, Valentine. 2006. *Aspects of Modality*. Ph.D. dissertation, MIT.
- Heim, Irene. 1982. *The semantics of definite and indefinite noun phrases*. University of Massachusetts, Amherst: PhD Dissertation.
- Huang, C.-T. James. 1993. Reconstruction and the Structure of VP: Some Theoretical Consequences. *Linguistic Inquiry* 24: 103-138.
- Huang, X.-Y. Kevin. 2009. *Multiple-modal Constructions in Mandarin Chinese: A View from Cartography and MP*. MA Thesis, National Tsing Hua University, Taiwan.
- Kratzer, Angelika. 1991. Modality. In *Semantik/Semantics: An International Handbook of Contemporary Research*, ed. by von Stechow, A. and Wunderlich, D., 639–650. de Gruyter, Berlin.
- Lightfoot, David 1979. *Principles of Diachronic Syntax*. Cambridge: Cambridge University Press.

- Li, Y.-H. Audrey. 1992. Indefinite *Wh* in Mandarin Chinese. *Journal of East Asian Linguistics* 1: 125-155.
- Lin, T.-H. Jonah. 2007. Multiple-Modal Constructions in Mandarin Chinese and Their Finiteness Properties. Ms. National Tsing Hua University.
- Lin, Jo-Wang. 1998. On Existential Polarity *WH*-phrases. *Journal of East Asian Linguistics* 7: 219-255.
- Lin, Jo-Wang and Jane Tang. 1995. Modals as verbs in Chinese: a GB perspective. *The Bulletin of Institute of History and Philology* 66: 53-105. Taipei: Academia Sinica.
- Portner, Paul. 2009. *Modality*. Oxford: Oxford University Press.
- Rizzi, Luigi. 1990. *Relativized Minimality*. Cambridge, MA: MIT Press.
- Rizzi, Luigi 1997. The Fine Structure of the Left Periphery. In *Elements of Grammar*, ed. by L. Haegeman. 281-338. Dordrecht: Kluwer.
- Roberts, Ian. 1993. *Verbs and Diachronic Syntax*, Dordrecht: Kluwer.
- Roberts, Ian & Anna Roussou. 1999. A Formal Approach to Grammaticalization. *Linguistics (Special Issue on Grammaticalization)* 37: 1011-1041.
- Stowell, Tim. 2004. Tense and Modals. In *The Syntax of Time*, ed. by J. Guéron & J. Lecarme. Cambridge, MA: MIT Press.
- Tsai, W.-T. Dylan. 2008. Tense Anchoring in Chinese. *Lingua* 118: 675–686.
- Tsai, W.-T. Dylan. 2011. Rethinking Formal Licensing. Paper presented in GLOW in Asia Workshop for Young Scholars, Mie University, Japan.
- Tsai, W.-T. Dylan and Paul Portner. 2008. Adverb-Modal Interactions and Actuality Entailments in Chinese. Paper presented in IsCCL-11, National Chiao Tung University, Taiwan.
- Wu, H.-H. Iris. 2002. *On Ellipsis and Gapping in Mandarin Chinese*. MA Thesis, National Tsing Hua University, Taiwan.
- Wurmbrand, Susi. Modal Verbs must be Raising Verbs. In *WCCFL 18 Proceedings*, ed. by S.

---

\* This paper is a tribute to Professor Luigi Rizzi. I am very much indebted to him for the inspiration and encouragement throughout the years. I would also like to thank Adriana Belletti, Gennaro Chierchia, Guglielmo Cinque, James Huang, Richard Kayne, Jonah Lin, Paul Portner, Ian Roberts, Jiansuan Shen, Ur Shlonsky and Peter Svenonius for their helpful comments at the various stages of completing this work. The research leading to this article is funded by the National Science Council of Taiwan (NSC 98-2411-H-007-051).

<sup>1</sup> The abbreviations used in this paper are glossed as follows: Cl: classifier; Inc: inchoative aspect; Irr: irrealis mood; Neg: negation; Prf: perfective aspect; Rea: realis mood; Top: topic marker.

<sup>2</sup> Here we are using the notion of “irrealis mood” in a neutral sense, in that the actual interpretation hinges on the modal adverbs occupying the SPEC position. Namely, *hui* gets a possibility reading in the company of *dagai* ‘probably’, and a necessity reading in the company of *yiding* ‘surely’.

<sup>3</sup> As noted by Ur Shlonsky (p.c.), *hui* in (2a,b) behaves like German *können* and Scandinavian *kunne*. The contrast between (2c,e) and (2d) recalls the double use of English *will* as a future auxiliary and a dispositional modal (*But then again, John will make this sort of mistake, won't he? ≈ ... is prone to ...*). The observation is very interesting from the viewpoint of grammaticalization, as English *will* also develops from a verb (as seen in the usage of *be willing to*), though it has lost its verbal origin presumably due to the transparency principle proposed by Lightfoot (1979). This shows there is probably a universal “path” from a lexical category to a functional category as predicted by syntactic cartography.

<sup>4</sup> For a minimalist account of the head-government effects discussed here, see Tsai (2011), where formal licensing in Rizzi's (1990) sense is reinvented as an “insurance” bought by Merge so that the No Tampering Condition is strictly observed by subsequent operations such as deletion under identity at PF.

<sup>5</sup> Here we assume that existential closure is available in intensional/polarity contexts such as the domains of negation, epistemic modals, and conditionals, which are also the “natural habitats” of Chinese indefinite *wh*-expressions (cf. Cheng 1991, Li 1992, and Lin 1998, among others).

<sup>6</sup> It has been brought to my attention by Ur Shlonsky (p.c.) that English actually allows perfective aspect under deontic modals, as in *You must have finished the assignment by*

---

*tomorrow*. The reason may have to do with the fact that Chinese lacks morphological tense, and needs to implement tense-anchoring through syntactic means (cf. Tsai 2008): For instance, perfective aspect *le* typically substantiates past tense in root contexts with the help of certain adverbials which arguably brings out the implicit even argument for syntactic binding. This process is not required for a morphologically tensed language like English, and is subject to blocking effects from the presence of deontic modals in the inflectional layer.