

## Modals as Verbs in Chinese: A GB Perspective\*

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Chinese, like many other languages, has a set of words called modals which indicate the speaker's attitude toward the proposition expressed by the sentence. This set of words has been acknowledged to express two types of modality, i.e., epistemic modality and deontic modality. Epistemic modality is the modality which makes judgments about the possibility or necessity of propositions; deontic modality is the modality which indicates permission, obligation, ability or disposition. According to this distinction, modals like *yinggai* 'should', *keyi* 'may' and *hui* 'will, can' may indicate either the epistemic modality or the deontic modality. Modals like *keneng* 'possible' can only express the epistemic modality and those like *gan* 'dare' and *ken* 'willing' can only express the deontic modality. In this paper, we will discuss some of intriguing issues about the syntax of modals within the framework of Government and Binding. It will be argued that Chinese modals, whether interpreted as epistemic or deontic, should head a VP projection and are primary predicates of the clause. In addition, Chinese modals can be divided into two types, i.e., raising modals and control modals. Three pieces of evidence will be given to support this classification. In our raising analysis of Chinese modals, it will also be suggested that in Chinese CP may be transparent for the ECP.

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\* An earlier version of this paper was presented in NACCL III in Cornell University in 1991. We thank the audience there for their comments, in particular, C.-T. James Huang. We are also grateful to Ting-chi Tang, Chu-Ren Huang, Feng-fu Tsao and two reviewers for discussions.

## Introduction

Chinese, just like many other languages, has a set of words called modals which indicate the speaker's attitude toward the proposition expressed by the sentence.<sup>1</sup>

- (1) a. *keneng* 'possible', etc.
- b. *yinggai* 'should', *keyi* 'may', *hui* 'will, can', etc.
- c. *xiang* 'want', *gan* 'dare', *ken* 'willing', *neng* 'can',  
          *yuanyi* 'willing', etc.

This set of words has been acknowledged by linguists to express two types of modality, i.e., epistemic modality and deontic modality (cf. Lyons (1977), Palmer (1979, 1986)). Epistemic modality is the modality which makes judgments about the possibility or necessity of propositions; deontic modality is the modality which indicates permission, obligation, ability or disposition. According to this distinction, of the modals in (1), *yinggai* 'should', *keyi* 'may' and *hui* 'will, can' may indicate either the epistemic modality or the deontic modality. *keneng* 'possible' can only express the epistemic modality and the other modals in (1c) can only express the deontic modality.

In addition to the different types of modality that the modals in (1) express, there are a number of intriguing issues concerning the syntax of modals. In this paper, we will discuss some of these issues within the framework of Government and Binding. In section 1, it will be argued that Chinese modals, whether interpreted as epistemic or deontic, should head a VP projection and are primary predicates of the clause. Section 2, then, goes

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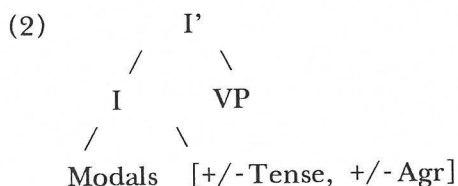
1 For different definitions of modals, see Lyons (1977) and Palmer (1979, 1986). The set of modals in (1) can be found in Tang (1979) and other works dealing with Chinese modals.

on to show that Chinese modals can be divided into two types, i.e., raising modals and control modals. Section 3 gives three pieces of evidence to support this classification. Section 4 discusses two further issues about the raising analysis of Chinese modals. One is related to the ECP, and the other to Case and empty expletives. Finally, we conclude this article, sketching two additional consequences of the proposed analysis.

## 1. Modals as Independent Predicates

### 1.1. Chomsky's Analyses of Modals

It is well-known that each sentence (clause) in English may at most contain one modal verb (*can, could, will, would, shall, should, may, might, etc.*) and it always precedes the auxiliaries *have* and *be*. To account for this, Chomsky (1957) proposed a special node AUX to generate modals in English, and assumed that only one modal can be inserted under this node. In the same spirit, Chomsky (1981, 1986) assumes that modals are generated under INFL, together with Tense and Agr, as in (2).



According to Chomsky's conception, (2) is a mono-clausal structure in which the verb under the node V is the main verb of the sentence. In this section, in contrast to Chomsky's analysis of English modals, we propose that Chinese modals are not constituents of INFL, but are main predicates that determine the argument structure of the sentence.<sup>2</sup>

2 Ross (1969), Gazdar et al. (1982), Falk (1984) and Pullum and Wilson (1977) also argued that English modals should be analyzed as main verbs, contrary to Chomsky's analysis.

## 1.2. Arguments for Modals as Independent Predicates

### 1.2.1. Sentence-final Modals

Generally, Chinese sentences containing modals, just like those in English, take the pattern subject-modal-VP, as illustrated below.

- (3) a. You should do it this way.  
b. You may not analyze it this way.

- (4) a. ni yinggai zheyang zuo  
you should this-way do  
You should do it this way.  
b. wo ke-bu-keyi zheyang fenxi  
I may-not-may this-way analyze  
May I analyze it this way?

It seems possible then that modals in Chinese are elements of INFL taking a VP complement as Chomsky analyzes English modals. The parallelism does not seem to be so straightforward, however. Apart from the pattern in (4), Chinese modals allow another pattern with the modal occurring at the end of the sentence, as in (5).

- (5) a. ni zheyang zuo (bu) yinggai  
you this-way do not should  
For you to do it this way is (un)acceptable.  
b. wo zheyang fenxi ke-bu-keyi  
I this-way analyze may-not-may  
May I analyze it this way?

Sentences like those in (5) are often heard in daily conversations and are contrasted with their English counterparts (6).

- (6) a. \*You do it this way should (not).  
b. \*You analyze it this way may (not).



Crucially, the contrast between (5) and (6) poses a problem for analyzing Chinese modals as elements of INFL. First consider the case of (6). On the assumption that modals are constituents of INFL and that functional categories take complements to their right in English, (6a) and (6b) are correctly predicted to be ill-formed, because the VP complements in (6) occur to the left of the modal. Now consider (5). Given that *yinggai* 'should' and *keyi* 'may' may occur in either the pre-VP position as in (4) or the post-VP position as in (5), no matter which direction we assume that INFL takes its complement in Chinese, either (4) or (5) would be incorrectly ruled out. This suggests that modals in Chinese might not be constituents of INFL; otherwise it would be puzzling why (5a) and (5b) are not ruled out as an analogue to (6a) and (6b).

If Chinese modals are not constituents of INFL, then where are they generated? We suggest that they are matrix predicates that project their own thematic arguments. To put aside the pre-VP modals for the moment, in particular, we propose that the post-VP modals in (5) are matrix predicates taking sentential subjects as their arguments. This analysis is supported by the fact that the sentence-final modals in (5) can be negated by the negative *bu* and form A-not-A questions, both of which are typical properties of verbs in Chinese.

The distribution of sentence adverbs supports this analysis. Sentence adverbs in Chinese generally occur either sentence-initially or after the subject but not in other positions, as illustrated below.

- (7) a. *xianran ta hen bu gaoxing*  
           obviously he very not happy  
           Obviously he is not happy.

- b. ta xianran hen bu gaoxing  
He obviously is not happy.
- c. \*ta hen bu gaoxing xianran  
He is not happy, obviously.

Now consider the distribution of sentence adverbs with respect to the construction (5).

- (8) a. xianran ni zheyang zuo bu yinggai  
obviously you this-way do not should  
Obviously, that you did it this way is not acceptable.
- b. ni zheyang zuo xianran bu yinggai  
That you did it this way obviously is not acceptable.
- c. \*ni xianran zheyang zuo bu yinggai  
Obviously that you did it this way is not acceptable.

The examples in (8) show that the sentence adverb *xianran* 'obviously' can be placed either sentence-initially or between *ni zheyang zuo* 'you do it this way' and *bu yinggai* 'should not' but can not be placed between the subject *ni* 'you' and *zheyang zuo* 'do it this way'. This indicates that the major constituents in (8) are *ni zheyang zuo* 'you do it this way' and *bu yinggai* 'should not' rather than *ni* 'you' and *zheyang zuo bu yinggai* 'should not do it this way'. The ungrammaticality of (8c), on the other hand, indicates that the subject *ni* 'you' is not the root subject. All these facts follow straightforwardly, if *ni zheyang zuo* 'you do it this way' is a sentential subject and *bu yinggai* 'should not' is the matrix predicate, as we propose.

A second argument in support of the claim that sentence-final (= post-VP) modals should be analyzed as matrix predicates is related to the fact that they may appear in comparatives, functioning as the scale/dimension of comparison, as (9) demonstrates.

- (9) ni zheyang zuo bi ta nayang zuo geng bu yinggai  
 you this-way do than he that-way do more not should  
 (lit.) For you to do it this way is more unacceptable than for him  
 to do it that way.

(9) suggests that the strings *ni zheyang zuo* 'you do it this way' and *ta nayang zuo* 'he does it that way' are constituents, since in comparatives the two compared things generally make up a syntactic constituent.<sup>3</sup> The comparative (9) also indicates that the scale/dimension of comparison *bu yinggai* 'should not' is the main predicate of the sentence, since the scale/dimension of comparison is always the main predicate of the sentence in Chinese. In other words, the sentence structure of examples like (5) should be analyzed as something like (10).

- (10) [ni zheyang zuo] [bu yinggai]

The best analysis of (10), of course, is that the string *ni zheyang zuo* 'you do this this way' is a sentential subject and *bu yinggai* 'should not' the main

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3 A reviewer pointed out that it is not always true that two compared things are constituents in Chinese comparatives, as illustrated by the example below.

- (i) ta jintian bi ni zuotian zao dao  
 he today comparatively you yesterday early arrive  
 Today he arrives earlier than you did yesterday.

Given examples like (i), it seems that one cannot conclude that the two compared things in (9) are constituents. However, there is reason to believe that the string *ni zheyang zuo* 'you did it this way' in (9) is a syntactic constituent. Consider (ii).

- (ii) [ni zheyang zuo]<sub>i</sub>, Zhangsan shuo t<sub>i</sub> bi ta nayang zuo geng bu yinggai  
 you this-way do Zhangsan say than be that-way do more not should  
 (lit.) For you to do this way, Zhangsan says is more unacceptable than for  
 him to do that way.

It is a standard assumption that only syntactic constituents can be moved. In (ii), since the string *ni zheyang zuo* can be topicalized, this indicates that it is a syntactic constituent.

verb of the sentence.<sup>4</sup>

The final argument in support of the matrix-predicate analysis of sentence-final modals can be formulated in relation to the property of islands. Huang (1982) has pointed out that the interrogative reason adverb *weisheme* 'why' and A-not-A operators may not occur in islands like sentential subjects or complex NPs, as the following examples demonstrate.

- (11) \**ni weisheme lai bijiao hao*

you why come more good

What is the reason *x* such that for you to come for *x* is better?

- (12) \**ni lai-bu-lai bijiao hao*

you come-not-come more good

(lit.) Is it better for you [to come or not to come]?

Interestingly, we find exactly the same pattern in constructions with sentence-final modals, as we can see from (13) and (14).

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- 4 The fact that the modal *yinggai* may appear in comparatives also implies that it might be an adjective, since generally only adjectives are gradable. The adjective-ness of the modal in question is further confirmed by the fact that it can be modified by degree adverbs like *hen* 'very' or *tai* 'too'.

- (i) a. *ni zheyang zuo bu tai yinggai*

you this-way do not too should

For you to do it this way is not very acceptable.

- b. *ni zheyang zuo hen bu yinggai*

you this-way do very not should

For you to do it this way is very unacceptable.

Given that the ability to be modified by degree adverbs is the major criterion differentiating verbs from adjectives in Chinese (cf. Tang (1979)), (i) strengthens the possibility that the modal *yinggai* 'should' might be an adjective. If the modal *yinggai* is really an adjective, then this constitutes a piece of evidence that it is not a constituent of INFL, but the main predicate of the sentence. Note also that not only the modal *yinggai* 'should' but other modals such as *hui* 'be able to' may be modified by degree adverbs and appear in comparative constructions.

- (13) \*ni weisheme zheyang zuo bu yinggai  
 you why this-way do not should  
 What is the reason x such that for you to do it for x is  
 unacceptable?

- (14) \*xiaohaizi chou-bu-chouyan bu yinggai?  
 children smoke-not-smoke not should  
 (lit.) Are children supposed [to smoke or not to smoke]?

How can we account for the fact that (13) and (14) show the same island-sensitivity as (11) and (12) discussed by Huang (1982) and Lin (1992), among others? The obvious answer is that the phrases *ni zheyang zuo* 'you do it this way' and *xiaohaizi chouyan* 'children smoke' are sentential subjects which constitute islands for extraction of *weisheme* 'why' and the A-not-A operator in LF.

Given the above evidence, we think it is justified to say that sentence-final modals are matrix predicates that take sentential subjects as their arguments as indicated in (15).

- (15) [CP [IP [CP ni zheyang zuo] [I' bu [VP yinggai]]]]

Before turning to further investigation of modals, it must be noticed that though most of the above discussion is focused on the sentence-final modals, we believe that the pre-VP modals like those in (4) should be treated alike. As a matter of fact, we propose that the two different positions of modals are related to a raising analysis of the modals. We postpone the discussion until section 2.

### 1.2.2. Epistemic Modals and Sentential Complements

Above, we have seen that the sentence-final modals *yinggai* 'should' and *keyi* 'may' may take a sentential argument. However, it was not mentioned

that they can only be interpreted as deontic. That is, *yinggai* 'should' in (4a) and (5a) and *keyi* 'may' in (4b) and (5b) do not indicate necessity or possibility, but indicate obligation and permission, respectively. In this section, we proceed to show that modals with the epistemic interpretation may also take a sentential complement as their argument. Consider the following examples.<sup>5</sup>

- (16) a. *yinggai you san-ge ren yijing chi-guo fan le*<sup>6</sup>

should have three-CL men already eat-ASP meal PAR

It ought to be the case that three men have already eaten their meals.

- b. *hui-bu-hui Lisi ye genzhe yiqi qu le*<sup>7</sup>

will-not-will Lisi also follow together go PAR

Could it be the case that Lisi went along with them?

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5 The abbreviations used in the glosses are the following: CL 'classifier', ASP 'aspect marker', QP 'question particle', PASS 'passive marker', PAR 'particle', GEN 'genitive marker'.

6 In (16), *you* is inserted before the indefinite subject noun phrase. This is because Chinese generally does not allow an indefinite (nonspecific) subject, as (i) shows.

(i) ??*san-ge ren yijing chi-guo fan le*

three-CL men already eat-ASP meal PAR

Three men have already eaten their meals.

7 Though the A-not-A form of the modal *hui* 'will' may take a clause with an overt subject, the simple base form *hui* 'will', interestingly, is not allowed to do so. Consider (i).

(i) \**hui Lisi ye genzhe yiqi gu-le-ma*

will Lisi also follow together go-ASP QP

Will it be the case that Lisi went together with him?

We have no explanation for this fact. However, it should be noticed that not only would the A-not-A form of the modal *hui* 'will' render such sentences as (i) grammatical, but insertion of focus markers such as *lian* 'even' or *shi* 'be' would also improve the construction, as we can see below.

- c. keneng ta yijing chi-guo fan le  
possible he already eat-ASP rice PAR

It is possible that he has already eaten his meal.

Each of the modals in the above examples takes an object clausal complement and can only have the epistemic interpretation. Again, this indicates that modals in Chinese cannot be constituents in INFL, since INFL always takes a VP complement rather than CP complement. But if they are verbs, it is only natural that they take a CP complement.

### 1.2.3. Modals and Reason Clauses

Another piece of evidence in favor of modals as matrix predicates can be constructed by taking the *yinwei*-clause 'because-clause' into consideration. Consider the examples in (17).

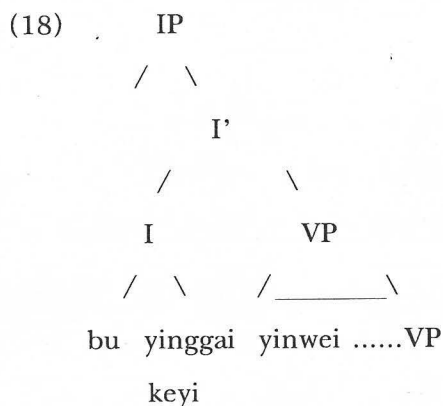
- (17) a. ni bu yinggai/keyi yinwei Lisi shi ge mingren  
you not should/may because Lisi is CL famous-man  
suoyi jiu rang ta mianfei ruchang  
so then let him free-of-charge enter  
You should/may not let Lisi enter free of charge  
because he is a famous man.

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- (ii) ?hui lian Lisi ye genzhe yiqi qu-le ma  
Will even Lisi also follow together go-ASP QP  
Would it be the case that Lisi also went with them?
- (iii) a. \*hui Lisi ba wo de qian na-zou-le ma  
will Lisi BA I GEN money take-away-ASP QP  
Would it be the case that Lisi took my money away?
- b. hui shi Lisi ba wo de qian na-zou-le ma  
Would it be the case that Lisi took my money away?

- b. ta bu hui yinwei Lisi shi ge mingren  
he not will because Lisi is CL famous-man  
suoyi jiu rang ta mianfei ruchang  
so then let him free-of-charge enter  
It will not be the case that he will let Lisi enter  
free of charge because he is a famous man.
- c. ta juegui bu gan yinwei Lisi shi ge  
he definitely not dare because Lisi is CL  
mingren suoyi jiu rang ta mianfei ruchang  
famous-man so then let him free-of-charge enter  
He definitely dare not let Lisi enter free of charge  
because he is a famous man.

It is well-known that English sentences with the pattern **not ... because** are ambiguous, depending upon whether or not the **because**-clause falls within the scope of **not**, i.e., whether or not the **because**-clause is c-commanded/m-commanded by the negator. If the scope of the **yinwei**-clause is within that of the negative, then the former is immediately dominated by VP; if not, it is immediately dominated by S (= IP) or S' (= CP). Interestingly, unlike the English glosses, all the examples in (17) have only one interpretation according to which the scope of the **yinwei**-clause falls within that of the negative **bu** 'not'. It thus seems that the reason clauses in (17) are immediately dominated by VP, with a structure like the following.





Nevertheless, on the basis of Jo-wang Lin's suggestion, C.-C. Tang (1990) proposes that reason clauses in Chinese may be licensed by C, and hence dominated by C' or CP. Their considerations go as follows. To begin with, consider (19).

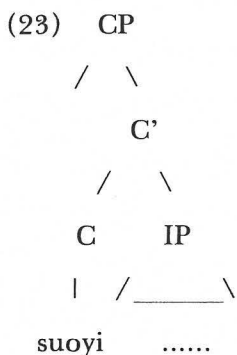
- (19) a. *yinwei* Lisi shi-ge mingren, *suoyi* wo jiu rang ta mianfei ruchang  
           because Lisi is CL famous-man so I then let him free-of-charge enter  
           Because Lisi is a famous man, I let him enter free of charge.
- b. \**yinwei* Lisi shi-ge mingren, wo *suoyi* jiu rang ta mianfei ruchang
- c. \**suoyi* *yinwei* Lisi shi-ge mingren wo jiu rang ta mianfei ruchang

The examples in (19) show that the *yinwei*-clause has to surface before the clause connective *suoyi* 'so', which in turn obligatorily appears to the left of an IP. In other words, reason clauses in Chinese, which occur outside *suoyi* 'so', cannot be immediately dominated by VP, but must be immediately dominated by some constituent larger than IP.

Second, though a constituent may be topicalized to a position after the connective as in (21), topicalization of the same element is barred to a position between the reason clause and the connective as in (22).

- (20) yinwei jingfei bu gou, suoyi wo jueding quxiao zhe-ci huodong  
 because outlay not enough so I decide cancel this-CL activity  
 Because the outlay is not enough, I decided to cancel the activity.
- (21) yinwei jingfei bu gou, suoyi zhe-ci huodong wo jueding quxiao
- (22) \*yinwei jingfei bu gou, zhe-ci huodong suoyi wo jueding quxiao

To explain the contrast between (21) and (22), Lin suggests that connectives like *suoyi* take the position of COMP as in (23), and thus it follows from the assumption of topicalization as a case of IP-adjunction that topicalized constituents can only surface after the clause connective, but not in between the reason clause and the connective. If this suggestion is on the right track, then the *yinwei*-clause must be dominated by some projection of COMP.<sup>8</sup>



Finally, a reason clause cannot occur to the right of a connective, as in (24).

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8 Note also that as Jo-wang Lin (persnal communication, 1990) points out, if the clause connective does not take the position of COMP, but instead is adjoined to IP, then the ill-formed (22) will be yielded, since topicalization, which involves IP-adjunction, allows the topicalized constituent to be adjoined to the IP dominating the connective and the clause that follows.

- (24) a. \*suoyi yinwei Lisi shi-ge mingren, wo jiu rang ta mianfei ruchang  
 so because Lisi is CL famous-man I then let him free-of-charge enter  
 b. \*suoyi wo yinwei Lisi shi-ge mingren, jiu rang ta mianfei ruchang

If the analysis of *suoyi* 'so' is correct, then to rule out (24) as ill-formed, the *yinwei*-clause cannot be immediately projected under IP or VP, for it is the very structure that generates the ill-formed sentences in (24).<sup>9</sup> In view of this, reason clauses in Chinese need to be projected under C' or CP.

Now let us return to (17), where the *yinwei*-clause occurs after the modal, but before the connective *suoyi* 'so'. If the above remarks are right, then the structure of (17) must be something like [... [modal [CP *yinwei* ... *suoyi* ...]]]. The structure, again, indicates that modals in Chinese are verbs that are subcategorized for CP complements rather than constituents of INFL that take VP complements.

#### 1.2.4. Adjacent Modals

There is another salient property of Chinese modals which also constitutes a good argument for the view that they are generated under the V node. Unlike English modals, Chinese modals allow for multiple occurrences as illustrated below.

- (25) ta yinggai hui lai  
 he should will come  
 It ought to be the case that he will come.

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9 C.-C. Tang (1990) has pointed out that the ill-formedness of (24) has to do not only with syntactic structure but also with pragmatic/semantic considerations concerning the presupposition of clause connectives.

(26) ta keneng hui (yuanyi) lai

he possible will willing come

It is possible that he will (be willing to) come.

(25) and (26) above contain two and three adjacent modals respectively. More interestingly, each of the adjacent modals may be negated by an independent negative *bu*, as (27)-(28) illustrate.

(27) ta bu yinggai bu hui bu lai

It ought not to be the case that it is not possible that he will not come.

(28) ta bu keneng bu hui bu yuanyi lai

It is not possible that he will not be unwilling to come.

The multiple occurrences of *bu* 'not' in examples like (27)-(28) strongly suggest that modals in Chinese are not constituents of INFL, since each clause presumably contains only one NEG node. But suppose we assume that each of the adjacent modals is an independent verb which is subcategorized for a clause; then it is straightforward to account for the multiple occurrences of the modals and the negative *bu* 'not' (cf. Huang (1988)). If every modal is an independent verb of its own clause, then it is natural that each modal can be negated by one independent negative, since each clause has its own NEG node.

In this connection, consider (29).

(29) ni yinggai bu hui (hai) meiyou chi-fan ba

you should not will yet haven't eat-rice PAR

It should not be the case that you haven't eaten your meal yet.

(29) shows that not only the modal *hui* 'will' but the verb *chi* 'eat' may be negated by an independent negative. Furthermore, the tense of the verb, as indicated by *meiyou* 'has not', is different from that of the modal, as

indicated by *bu* 'not'. This fact can be explained, only if the relevant construction involves two different clauses. For only under this analysis will there be two tense nodes with which the modal and the verb can be associated respectively. In other words, the modals in (29) must be verbs that are subcategorized for a CP clause.

#### 1.2.5. Modals and Topic Sentences

The fourth argument to support the matrix-predicate analysis of modals is related to constructions such as (31), which contain a base-generated topic in the embedded clause. As is well-known, a base-generated topic need not involve a gap in the comment clause and is always possible as long as the "aboutness" condition is satisfied (cf. Xu and Langendoen (1985)). One such example is the following.

(30) *shuiguo, wo zui xihuan pingguo*

Fruit I most like apple

As for fruits, I like apples most.

What interests us most about this type of sentence is the locus of the base-generated topic in constituent structure. Based on a number of independent phenomena, C.-C. Tang (1990) has shown that a base-generated topic in Chinese is adjoined to CP. Assuming that her arguments are correct, now consider the examples in (31).<sup>10</sup>

(31) a. *ta bu keneng [shuiguo zhi chi pingguo]*

he not possible fruit only eat apple

It is not possible that as for fruits, he eats only apples.

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10 Some speakers feel that examples like those in (31) are only marginal.

- b. xiaohaizi bu yinggai [shuiguo zhi chi pingguo]

children not should fruit only eat apple

As for fruits, children are not allowed to eat only apples.

The examples in (31) show that modals in Chinese may be followed by a complement containing a base-generated topic. If C.-C. Tang's analysis is right about the locus of base-generated topics, it is clear that modals in Chinese do not take VP complements but CP complements. In other words, modals are independent predicates subcategorized for a proposition.

### 1.3. Summary

To summarize this section, the empirical facts in Chinese indicate that modals in Chinese are best analyzed as verbs rather than constituents of INFL. Especially, the facts suggest that the structure of sentences with modals is something like [CP ... [IP NEG [VP MODAL [CP ... [IP ... ]]]]].

## 2. Raising and Control Modals

In this section, we will show that modals can be divided into two types, one being raising modals and the other being control modals.

### 2.1. Selectional Restrictions

Tang (1979) and Huang (1988) have observed that not all modals are alike with respect to licensing of their subject. They have pointed out that modals such as *yinggai* 'should', *keyi* 'may', the epistemic *hui* 'will', etc., differ from *gan* 'dare', *ken* 'be willing to', *neng* 'be able to', the deontic *hui* 'be able to', etc., at least in one respect; that is, while the former impose no selectional restrictions on the subject, the latter require that their subject be animate.

- (32) a. ta chi-guo fan le  
he eat-ASP meal PAR  
He has eaten his meal.
- b. ta yinggai chi-guo fan le  
he should eat-ASP meal PAR  
It should be the case that he has eaten his meal.
- c. ta keneng chi-guo fan le  
he possible eat-ASP meal PAR  
It is possible that he has eaten his meal.
- d. shu zhangjia le  
books increase-price PAR  
The price of books has increased.
- e. shu yinggai zhangjia le  
book should increase-price PAR  
It should be the case that the price of books has increased.
- f. shu keneng zhangjia le  
book possible increase-price PAR  
It is possible that the price of books has increased.
- (33) a. ta gan/yuanyi/neng lai  
he dare/willing/able come  
He dare/is willing to/is able to come.
- b. \*shu gan/yuanyi/neng zhangjia  
book dare/willing/able increase-price  
The price of books dare/is willing to/is able to increase.

The examples in (32) show that whatever can be the subject of the VP following the modal can be the subject of the modal. But this is not the case in (33). The modals in (33) require that their subject be animate. As

Huang (1988) pointed out, the fact that the modals in (32) impose no selectional restriction on the subject, together with the consideration that they may take a clause as their complement, seems to suggest that the sentences in (32) can be analyzed as raising constructions with the embedded subject moved to the matrix subject position. That is, examples (32b), (32c), (32e) and (32f) would have a structure like the following.

(34) a. [ta<sub>i</sub> [keneng/yinggai [t<sub>i</sub> chi-guo fan le]]]

b. [shu<sub>i</sub> [keneng/yinggai [t<sub>i</sub> zhangjia le]]]

The derivations in (34) explain why the subject of the VP can always be the subject of the modal.

Next, consider (33). Since modals of the type in (33) have selectional restrictions on the subject, it seems to suggest that the subject of the modals is selected by the modal and base-generated in its surface position.

(35) [ta [gan/yuanyi/neng [chi fan]]]

he dare/be willing to/be able to eat rice

In other words, the subject ta 'he' in (35) receives its theta-role from the modal. Yet, the verb chi 'eat' also has an external theta role to discharge. It cannot be assigned to the subject ta 'he', since it would otherwise receive two theta roles, violating the theta criterion. But then, what receives the external theta-role of the verb? We claim that (35) in fact involves a control construction with an empty PRO in the embedded clause. It is this PRO that receives the external theta role.

(36) [ta [gan/yuanyi/neng [PRO chi fan]]]

As a matter of fact, the proposed analysis of Chinese modals is not novel at all. Based on different languages, many linguists have suggested that the problem of selectional restrictions imposed by modals may be explained by postulating that those which do not impose selectional restrictions on the



subject are raising verbs, while those which do are control verbs (cf. Thraisson (1986), Picallo (1990), among others). Moreover, the classification seems to correspond to the distinction between epistemic modals and deontic modals, respectively.

## 2.2. The Analysis of Deontic *yinggai* and *keyi*

Though the epistemic/deontic interpretations of modals seem to correspond to the raising/control classification of modals, the modals *yinggai* 'should' and *keyi* 'may' do not fall under this classification so neatly. There is no problem with analyzing the epistemic *yinggai* 'It ought to be the case that ...' and *keyi* 'It is possible that ...' as raising modals. But analyzing the deontic *yinggai* 'be supposed/obliged to' and *keyi* 'be allowed/able to' as control modals does not seem to be well-motivated. To see why, let us begin with the interpretations of the deontic *keyi*. The deontic *keyi* has two interpretations. It may either denote the speaker's permission to the subject of the sentence or indicate the ability of the subject of the sentence, as the following examples show.

- (37) ni *keyi* qu Taipei  
       you may go Taipei  
       You are allowed to go to Taipei.
- (38) ta *yijing* *keyi* changhuan zhaiwu le  
       he already able pay     debts PAR  
       He is already able to pay his debts.

Though the ability reading of *keyi* may be analyzed as a control modal, it seems problematic to treat the permission reading of *keyi* as a control modal. Below, we will discuss the permission reading of *keyi* along with the deontic *yinggai* to show that they are best analyzed as raising modals rather than

control modals.

The deontic usages of *yinggai* 'be supposed/obliged to' and *keyi* 'be allowed to', just like their epistemic counterparts, allow for either an animate or an inanimate subject, as illustrated more clearly below.

- (39) a. ta *yinggai* lai

he should come

He is supposed/obliged to come.

- b. ta *yinggai* lai le

he should come PAR

It ought to be the case that he has come.

- c. shu *yinggai* zhangjia

book should increase-price

The price of books is supposed to increase.

- d. shu *yinggai* zhangjia le

book should increase-price PAR

It ought to be case that the price of books has increased.

- (40) a. ta *keyi* lai

he may come

He is permitted to come.

- b. ta (*yinggai*) *keyi* tong-guo kaoshi

he should may pass-ASP exam

(It should be the case that) It is possible that he will pass the exam.

- c. shu *keyi* quanbu maidiao

books may all sell-out

Books are allowed to be sold out.

- d. shu (yinggai) keyi mai de hen hao  
 book should may sell DE very well  
 (It should be the case that) It is possible that books may sell well.

(39) and (40) show that whatever can be the subject of the VP can be the subject of the deontic *yinggai* 'should' and *keyi* 'may'. It is therefore reasonable that the deontic usage of *yinggai* 'be supposed/obliged to' and *keyi* 'be allowed to' is treated on a par with the epistemic counterparts. As it is, from the viewpoint of semantics, the deontic interpretations of these two modals are roughly identical to the interpretations of the corresponding English passive predicates.<sup>11</sup> Since passive predicates do not assign theta-roles to their subject position, it is reasonable that the deontic *yinggai* 'should' and *keyi* 'may' also do not have the property of assigning a theta-role to their subject position. That is, they are raising predicates.

A second argument in support of the raising analysis of the deontic *yinggai* 'be supposed/obliged to' and *keyi* 'be allowed/permitted to' is that though examples like (4), repeated below, may be analyzed as involving a control construction with the subject controlling an empty PRO, examples like (5), also reproduced below, can in no way be analyzed as instances of control construction, since there is no possible controllee at all.

- (4) ni bu yinggai zheyang zuo  
 you not should this-way do  
 You should not do it this way.

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11 That *be supposed to*, *be allowed to*, etc., are the periphrastic counterparts of the corresponding modals *should* and *may* can be found in works such as Lakoff (1972), Bouma (1975) and Palmer (1979).

(5) ni zheyang zuo bu yinggai

you this-way do not should

You should not do it this way.

But if the modals in (4)-(5) are treated as raising verbs, then not only may the word order in (5) acquire a natural explanation but (4) can be related to (5) in a principled way. Consider the alternation in (41).

(41) a. That the earth is round is believed (by everybody).

b. The earth is believed to be round (by everybody).

(41) indicates that when a matrix verb is a raising predicate, either the whole complement of the verb or the internal subject of the complement may be moved to the matrix subject position. Now, suppose that the deontic *yinggai* 'be supposed/obliged to' and *keyi* 'be allowed to' are analyzed as raising predicates. Then, (5) can be assimilated to (41a) with the whole object complement raised to the matrix subject position and (4) to (41b) with the internal subject of the complement being raised from the embedded clause to the matrix clause.

### 2.3. Summary

In summary, modals in Chinese can be classified as follows:

(42) Raising modals: *keneng* 'possible', *yinggai* 'It should be the case that ...', *yinggai* 'be supposed/obliged to', *keyi* 'It may be the case that', *keyi* 'be allowed to', *hui* 'It will be the case that ...', etc.<sup>12</sup>

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12 A reviewer questions why the pattern [S *hui*] is not permitted if *hui* 'will' is a raising predicate. To answer this question, it should be first pointed out that English raising predicates display three patterns, as illustrated below.

Control modals: *keyi* 'be able to', *hui* 'be able to', *gan* 'dare', *ken* 'willing', *neng* 'be able to', *xiang* 'want', *yuanyi* 'willing', etc.

### 3. More Supporting Arguments

In this section, we will give more evidence to support the classification in (42).

#### 3.1. Modals and Intensifying *ziji*

Chinese *ziji* 'self' has various functions in a sentence. It may function as an anaphor bound by the subject as in (43)

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(A) Seem-type:

- (a) The earth<sub>i</sub> seems [<sub>t<sub>i</sub></sub> to be round].
- (b) \*[That the earth is round]<sub>i</sub> seems <sub>t<sub>i</sub></sub>.

(B) Be-believed type

- (a) [That the earth is round]<sub>i</sub> is believed <sub>t<sub>i</sub></sub> by everybody.
- (b) The earth<sub>i</sub> is believed [<sub>t<sub>i</sub></sub> to be round] by everybody.

(C) Be-taught type

- (a) [That the earth is round]<sub>i</sub> is taught <sub>t<sub>i</sub></sub> in the classroom.
- (b) \*The earth<sub>i</sub> is taught [<sub>t<sub>i</sub></sub> to be round] in the classroom.

The above three patterns show that whether or not an embedded subject or the whole embedded complement can be raised depends upon the idiosyncratic properties of the matrix predicates. (The idiosyncrasy might be derived from something which is still unknown at present stage.) Given this, it is not a surprise that some Chinese raising modals such as *hui* 'will' may allow only the embedded subject to be raised, while other raising modals such as *yinggai* 'should' and *keyi* 'may' allow either the subject or the whole embedded complement to be raised. Surely, to give a full analysis of the different raising possibilities is beyond the scope of the present paper. We therefore leave this topic to future research.

(43) Lisi xihuan ziji

Lisi like self

Lisi likes himself.

or as a subject-oriented intensifier as in (44).

(44) Lisi ziji qu Taipei

Lisi self go Taipei

The first function of *ziji* 'self' is not relevant to our concern. But the second function is worth more commenting before we proceed to further discussion. The intensifying function of *ziji* 'self' has two usages. It may intensify either a subject or the predicate phrase that follows it. Thus, (44) is ambiguous, depending upon what *ziji* 'self' intensifies. It may either intensify the subject Lisi, or intensify the verb phrase following it. That *ziji* 'self' in (44) has two different usages becomes even more perceptible when an adverb is inserted. Consider the contrast between (45a) and (45b).

(45) a. [Lisi ziji] jingchang qu Taipei

Lisi self often go Taipei

Lisi himself often goes to Taipei.

b. Lisi jingchang [ziji qu Taipei]

Lisi often self go Taipei

Lisi often goes to Taipei by himself.

(45a) and (45b) show that the adverb *jingchang* 'often' may appear not only in between *ziji* 'self' and the verb phrase, but also in between the subject and *ziji* 'self' with a change in meaning. It is clear then that *ziji* 'self' can intensify either the subject or the predicate phrase following it.

Now consider the following paradigm, in which *ziji* 'self' is intended to function as a VP modifier.<sup>13</sup>

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13 The addition of *shi ... de* in the examples below is intended to make it clear

- (46) a. ta yinggai ziji qu Taibei  
he should self go Taipei  
He is supposed to go to Taipei by himself.  
b. \*ta (shi) ziji yinggai qu Taibei (de)  
He is supposed to go to Taipei by himself.
- (47) a. ta keneng ziji qu Taibei  
he possible self go Taipei  
It is possible that he goes to Taipei by himself.  
b. \*ta (shi) ziji keneng qu Taibei (de)  
It is possible that he goes to Taipei by himself.
- (48) a. ta yuanyi ziji qu Taibei  
he willing self go Taipei  
He is willing to go to Taipei by himself.  
b. ta (shi) ziji yuanyi qu Taibei (de)  
He is willing to go to Taipei by himself.
- (49) a. ta xiang ziji qu Taibei  
he want self go Taipei  
He wants to go to Taipei by himself.  
b. ta (shi) ziji xiang qu Taibei (de)  
He wants to go to Taipei by himself.

The above paradigm shows that while the VP-modifying *ziji* 'self' can surface either before or after modals like *yuanyi* 'willing' or *xiang* 'want', it can only occur after modals like *yinggai* 'should' or *keneng* 'possible'. This, we take to be evidence for distinguishing raising modal verbs from control modal verbs. The argument goes like this. Suppose that modals like *yinggai* 'should' and

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that *ziji* 'self' goes with the modal following it rather than with the subject preceding it.

keneng 'possible' are indeed raising predicates; then the matrix subject position of (46b) and (47b) is unfilled at D-structure, i.e., it is an empty position with no features at all. It follows from this that the subject-oriented intensifier *ziji* 'self' cannot be properly licensed by a subject in the matrix clause in (46b) and (47b). (We assume that the relation between the intensifying *ziji* 'self' and its licenser is established at D-structure.)<sup>14,15</sup> Hence, (46b) and (47b) are ill-formed. On the other hand, suppose that modals like *yuanyi* 'willing' and *xiang* 'want' are control verbs; then the surface subjects of (48b) and (49b) are the base-generated subjects. In addition, the embedded subject position is filled by an empty PRO with features. Therefore, it is possible to place *ziji* 'self' either before or after the modal. In either case, the intensifying *ziji* 'self' is properly licensed and identified by a subject with content. The contrast between (46b), (47b) and (48b), (49b) thus supports the analysis that modals like *yinggai* 'should' and *keneng* 'possible' are raising predicates and those like *yuanyi* 'willing' and *xiang* 'want' are control predicates.<sup>16</sup>

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14 Note that *ziji* 'self' is not always licensed and identified by a subject at D-structure. It may also be licensed and identified by an object NP at D-structure. Consider (i) and (ii).

(i) a. [NP e] ye bei Lisi chumai-le Zhangsan ziji  
also by Lisi betray-ASP Zhangsan self

b. [Zhangsan ziji]<sub>i</sub> ye bei Lisi chumai-le t<sub>i</sub>  
Zhangsan himself was also betrayed by Lisi.

(ii) wo zhi jian-guo Zhangsan ziji, bu cen jian-guo ta taitai  
I only see-ASP Zhangsan self not ever see-ASP his wife  
I only saw Zhangsan himself, but never his wife.

15 For the assumption that subject-oriented elements are licensed at D-structure, also see Iatridou (1990).

16 Note that when *ziji* 'self' is construed as a subject intensifier rather than a VP intensifier, it may occur before the proposed raising modals, as illustrated in (i).

(i) [Lisi ziji] hui/yinggai qu Taibei



Note that the above remarks also hold true of modals like *hui* and *keyi*, which can be analyzed as either raising verbs or control verbs depending upon their interpretations. First consider the case of *hui*.

(50) *Lisi hui [ziji qu Taipei]*

- a. Lisi will go to Taipei by himself.
- b. Lisi knows how to go to Taipei by himself.

As the two translations of (50) indicate, (50) is ambiguous. Epistemically, *hui* indicates future prediction (or possibility) and is analyzed as a raising verb under our analysis; deontically, it imposes the property of ability on the subject and is a control verb under our analysis. Interestingly, when the intensifying *ziji* 'self' appears before the modal, the ambiguity disappears.

(51) *Lisi [ziji hui qu Taipei]*

Lisi self can go Taipei

Lisi knows how to go to Taipei by himself.

The modal in (51), as opposed to that in (50), can only have the deontic interpretation, not the epistemic interpretation. Again this follows from the previous analysis. The surface subject of the epistemic modal *hui* is a derived subject and therefore *ziji* 'self' cannot be properly licensed by a c-commanding NP within its clause at D-structure, if it appears before the modal; on the other hand, the surface subject of the deontic *hui* is a

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Lisi self will/should go Taipei

Lisi himself will/should go to Taipei.

Being a subject intensifier, *ziji* in (i) forms a constituent with the subject *Lisi*. Therefore, after it is licensed by the subject at D-structure, it can be raised to the matrix subject position together with the subject it intensifies. Hence the subject intensifier *ziji* 'self' may occur before raising modals. The following derivation would make this point clear.

- (ii) a. [NP e ] *hui/yinggai* [[*Lisi ziji*] *qu Taipei*]
- b. [*Lisi ziji*]<sub>i</sub> *hui/yinggai* [<sub>i</sub> *qu Taipei*]

base-generated subject, hence allowing the pre-modal *ziji* 'self' to be properly licensed by the subject at D-structure.

Next consider the case of *keyi* 'may'. *keyi* is different from *hui*, in that in addition to the epistemic interpretation, it has two deontic interpretations, one indicating permission of the speaker and the other indicating the ability of the subject of the sentence. Crucially, under our analysis, the epistemic interpretation and the permission interpretation involve a raising construction whereas the ability interpretation involves a control construction. This distinction is also reflected in their interaction with the intensifying *ziji* 'self'. Consider (52).<sup>17</sup>

(52) Lisi *keyi* [*ziji* *qu* Taipei]

- a. Lisi is allowed to go to Taipei by himself.
- b. Lisi knows how to go to Taipei by himself.

Like (50), (52) is ambiguous. However, when *ziji* appears before the modal, the permission reading of the modal becomes impossible.

(53) Lisi [*ziji* *keyi* *qu* Taipei]

Lisi knows how to go to Taipei by himself.

It goes without saying that the contrast between (52) and (53) comes from a distinction between raising vs. control analysis of the two interpretations of the modal. (52)-(53) thus further support the postulation of raising and control modals in Chinese.

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17 Though the modal *keyi* may have an epistemic interpretation meaning 'possible', this interpretation is not available in (52). This is because *keyi* is most easily interpreted as epistemic when it is used in combination with the modal *yinggai* 'should'. In other contexts, the epistemic interpretation is generally unavailable.

### 3.2. Modals and *lian*-construction

In Chinese, *lian* 'even' is generally taken as a focus marker, adding emphasis to a constituent.<sup>18</sup> If this emphasized constituent is an object, it would be preposed to sentence-boundary position, as illustrated below.

- (54) *lian neiben shu, ta dou kan-le*  
 even that-CL book he also read-ASP  
 He read even that book.

What is interesting about this construction is that *lian* 'even' may also emphasize a clause as shown in (55).

- (55) *lian qian diao-le ta dou bu zhidao*  
 even money lose-ASP he also not know  
 He even doesn't know his money was lost.

However, when *lian*-construction is applied to sentences containing modals, grammatical judgments differ according to the type of modals involved. Consider the examples below.

- (56) a. *Lisi bu yinggai/keyi jiegei Wangwu yibai yuan*  
 Lisi not should/may lend Wangwu one-hundred dollar  
 Lisi is not supposed/permitted to lend Wangwu one hundred dollars.
- b. \**lian jiegei Wangwu yibai yuan, Lisi dou bu yinggai/keyi* <sup>19</sup>

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18 One can analyze *lian* as either a preposition or a focus adverb (particle). Under either analysis, our conclusion below is not affected.

19 In (56), both the modals *yinggai* and *keyi* are interpreted as deontic. But even with an epistemic interpretation, the construction (56b) is still bad, as (i) shows.

- (i) a. *Lisi yinggai jie-guo yibai yuan gei Wangwu*  
 Lisi should lend-ASP one-hundred dollar to Wangwu  
 It ought to be the case that Lisi lent Wangwu one hundred dollars.
- b. \**lian jie-guo yibai yuan gei Wangwu, Lisi dou yinggai*  
 (lit.) Even lend Wangwu one hundred dollars Lisi is supposed/permitted to.

- c. Lisi bu keneng jiegei Wangwu yibai yuan  
Lisi not possible lend Wangwu one-hundred dollar  
It is not possible that Lisi will lend one hundred dollars to Wangwu.
  - d. \*lian jiegei Wangwu yibai yuan, Lisi dou bu keneng
  - e. Lisi bu hui chidao  
Lisi not will late  
Lisi will not be late.
  - f. \*lian chidao, Lisi dou bu hui
- (57) a. Lisi bu ken/yuanyi/gan jiegei Wangwu yibai yuan  
Lisi not willing/willing/dare lend Wangwu one-hundred dollar  
Lisi is not willing to/dare not lend Wangwu one hundred dollars.
- b. lian jiegei Wangwu yibai yuan, Lisi dou bu ken/yuanyi/gan  
(lit.) Even lend Wangwu one hundred dollars, Lisi is not willing to/dare not.
  - c. Lisi bu hui xiezi  
Lisi not able write-characters  
Lisi is not able to write characters.
  - d. lian xiezi, Lisi dou bu hui  
(lit.) Even write characters, Lisi is not able to.

In (56) and (57), the modals involved are raising verbs and control verbs, respectively, under our analysis. What is more, **lian** seems able to emphasize only the complement of control modals, which also holds true of ambiguous modals like **hui** as the contrast between (56f) and (57d) shows. We suggest that this contrast be explained in terms of a distinction between trace and PRO. Within the framework of GB theory, while a trace is subject to the

Empty Category Principle (ECP), PRO is not.<sup>20</sup> Given this, now consider the derivation of (56b), (56d) and (56f). Suppose that the modals in (56) are raising verbs, then the derivations of (56b), (56d) and (56f) are the following.<sup>21</sup>

- (58) a. \*lian [<sub>i</sub> jiegei Wangwu yibai yuan], Lisi<sub>i</sub> dou bu yinggai/keyi  
 b. \*lian [<sub>i</sub> jiegei Wangwu yibai yuan], Lisi<sub>i</sub> dou bu keneng  
 c. \*lian [<sub>i</sub> chidao], Lisi<sub>i</sub> dou bu hui

In (58), the subject Lisi is moved from the embedded subject to the matrix subject position and leaves a trace behind, which should be properly governed according to the ECP. However, the trace cannot be properly governed. It is not head-governed because the only possible head governor is *lian* but *lian*, being a focus adverb or preposition, can not be a proper head governor.<sup>22</sup> It is not theta-governed, because it is not directly theta-marked by a verb. Antecedent-government also fails because after the object clause is preposed to sentence-initial position, the subject fails to c-command the trace. Hence, the ill-formedness of (56b), (56d) and (56f). On the other

20 The ECP is defined as below.

(i) ECP (cf. Chomsky (1981, 1986))

A nonpronominal empty category must be properly governed.

We assume a conjunctive formulation of the ECP as many others have argued recently, (See Rizzi (1990), among others).

(ii) Proper Government

A is properly governed iff

(i) A is head-governed and

(ii) A is antecedent-governed or theta-governed.

21 For more details on the ECP with respect to the standard case of raising modals, see section 4.1.

22 Whether INFL is a proper head governor depends upon whether one adopts c-command or m-command as part of the definition of head-government. In this article, we assume that proper head-government requires c-command.

hand, suppose that the modals in (57) are control verbs; then the derivation of (57b) and (57d) have nothing to do with movement, since PRO is base-generated in its position. Consider the representations in (59).

- (59) a.   lian [PRO jiegei Wangwu yibai yuan], Lisi dou bu  
          ken/yuanyi/gan  
      b.   lian [PRO xiezi], Lisi dou bu hui

In (59), the empty categories are PROs. Since PRO is not subject to the ECP, the representations in (59) do not violate the ECP and are well-formed. The contrast between (56) and (57) thus supports the postulation of raising and control modals in Chinese.

### 3.3. Modals and Ergative Verbs

A major characteristic of ergative verbs is that they allow their thematic object to surface in subject position at S-structure, as illustrated below (cf. Perlmutter (1978), Burzio (1986)).<sup>23</sup>

- (60) a.   lai-le   san-ge   keren  
          come-ASP three-CL guests  
          There come three guests.  
      b.   (you) san-ge   keren lai-le  
          have three-CL guests come ASP  
          Three guests come.

In (60a), the noun phrase *san-ge keren* 'three guests' is the D-structure object of the verb *lai* 'come', while in (60b), it has moved to the subject position. What interests us most about the ergative construction is that when the construction contains modals, two patterns seem to emerge. If the

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<sup>23</sup> Ergative verbs are also known as unaccusative verbs as Perlmutter (1978) originally called them.

construction contains modals like *yinggai* 'should', *keyi* 'be allowed to' or *keneng* 'possible', the thematic object of the ergative verb may either stay at its D-structure object position, or optionally move to the subject position of the ergative verb or to the subject position of the modal. However, if the construction contains modals like *xiang* 'want', *yuanyi* 'willing' or *gan* 'dare', the thematic object cannot stay at its D-structure object position; nor can it move to the subject position of the ergative verb. Instead, it can only occur as the subject of the modal. These two patterns are illustrated below.

- (61) a. *mingtian de huiyi, you san-ge ren yinggai/keyi lai*  
tomorrow GEN meeting have three-CL men should/may come  
As for tomorrow's meeting, three men are supposed/permitted to come.
- b. *mingtian de huiyi, yinggai/keyi you san-ge ren lai*  
As for tomorrow's meeting, three men are supposed/allowed to come.
- c. *mingtian de huiyi, yinggai/keyi lai san-ge ren*  
As for tomorrow's meeting, three men are supposed/allowed to come.
- (62) a. *mingtian de huiyi, (you) san-ge ren gan/yuanyi lai*  
dare/willing  
As for tomorrow's meeting, three men dare/are willing to come.
- b. \**mingtian de huiyi, gan/yuanyi (you) san-ge ren lai*  
As for tomorrow's meeting, three men dare/are willing to come.

- c. \*mingtian de huiyi, gan/yuanyi lai san-ge ren

As for tomorrow's meeting, three men dare/are willing to  
come.

We show below that the contrast between (61) and (62) follows from the hypothesis that the modals in (61) are raising verbs, while those in (62) are control verbs. Consider the examples in (62) first. The contrast between (62a) and (62b-c) obviously indicates that modals like *gan* 'dare' or *yuanyi* 'willing' require a subject of their own. Now suppose that the modals in (62) are treated as control verbs; then it follows from the control theory that the thematic object of the ergative verb *lai* 'come' cannot be an overt NP, but must be an empty PRO controlled by the matrix subject. This must be the case, because the verb *lai* 'come' has only one argument and therefore the only argument is controlled. On the other hand, since the modals in (61) are assumed to be raising verbs, there is no requirement that the thematic object of the verb *lai* 'come' be a controlled empty PRO. Hence it can stay at its D-structure object position or is optionally moved to subject position. The same remarks apply to the ambiguous usages of modals like *hui* 'will, can'. When *hui* 'will, can' is interpreted epistemically, its interaction with ergative verbs patterns with (61); and when it is interpreted as deontic, its interaction with ergative verbs patterns with (62). Thus the interaction between modals and ergative verbs further supports the analysis that the modals in (61) are raising verbs, whereas those in (62) are control verbs.

#### 4. More on the Raising Analysis

In this section, we will address two further issues about the raising analysis of Chinese modals. One is related to the ECP and the other to Case and



empty expletives.

#### 4.1. The Raising Analysis and the ECP

The raising analysis of the epistemic modals and the deontic *yinggai* 'be supposed/obliged to' and *keyi* 'be allowed/permitted to' seems to pose a problem with respect to the ECP. As is well-known, raising structures generally involve a lexically-triggered S'-deletion that would delete the embedded S' from which the NP-subject is raised. However, under our analysis of raising modals, S'-deletion does not seem to be available. As we saw in (17) and (31), reproduced as (63) and (64), raising modals may take a complement with a reason clause as well as a complement with a base-generated topic.

(63) *ni<sub>i</sub> bu yinggai* [<sub>CP</sub> *yinwei Lisi shi ge mingren*

you not should because Lisi is CL famous-man

*suoyi t<sub>i</sub> jiu rang ta mianfei ruchang*]

so then let him free-of-charge enter

You should not let Lisi enter free of charge because he is a famous man.

(64) *ta<sub>i</sub> bu keneng* [<sub>CP</sub> *shuiguo t<sub>i</sub> zhi chi pingguo*]

he not possible fruit only eat apple

It is not possible that as for fruits, he eats only apples.

Since complements with reason clauses and complements containing base-generated topics are immediately dominated by CP, the embedded S' (= CP) node in (63) and (64) cannot be deleted. The question thus arises as to how the trace in (63) and (64) left by the movement of the subject can be properly governed. To answer this, we might first note that there are two approaches to the subject-to-subject raising construction in the literature.

One approach is that the S' node dominating the embedded complement is deleted (cf. Chomsky (1982)); the other approach is that the S' node in question is not deleted, but is transparent (cf. Riemsdijk and Williams (1986)). Given that the embedded S' (= CP) node in (63) and (64) cannot be deleted, we are forced to conclude that it involves transparency rather than deletion, if the trace is to be properly-governed by the modal or the raised subject. Though this conclusion is in contrast to the current assumption, it should be noted that the transparency approach is not necessarily inferior to the deletion approach, in that both approaches involve a stipulation triggered by individual lexical entry. As a matter of fact, if our analysis of (63) and (64) is correct, it might be the case that the S'-deletion approach is not on the right track.

Further evidence in support of the CP-transparency approach to raising constructions can be obtained from the fact that passivization is possible from the subject of a finite clause in Chinese. Consider the pair in (65).

- (65) a.   wo renwei Lisi shi ge hen hao-de xiaohai  
          I think Lisi is a very good child  
          I think Lisi is a very good boy.
- b.   Lisi<sub>i</sub> bei renwei t<sub>i</sub> shi ge hen hao-de xiaohai  
          Lisi PASS thought is a very good child  
          Lisi is thought to be a very good boy.

In (65a), the embedded clause is a finite clause which according to the current assumption is a CP. Since the embedded CP does not constitute a barrier for proper government of the embedded subject trace in (65b), it seems that the embedded CP is transparent.

Still another fact to be noted concerning CP-transparency is related to the fact that long distance binding of a subject reflexive is permitted in

Chinese, as illustrated below.

(66) Li xiaojie renwei ziji zui piaoliang

Li Miss think self most beautiful

(lit.) Miss Li thinks that herself is the most beautiful.

Here we see another case where CP does not block long-distance binding between an element contained in CP and one which is outside the CP. This fact suggests another alternative to look at the problem of NP-raising out of an embedded CP. That is, NP-raising out of a tensed clause might be unified with long distance binding of a subject reflexive in terms of the Generalized Binding Theory as proposed in Aoun (1985, 1986).<sup>24</sup> Let us first consider the case of long distance binding of a subject reflexive within the Generalized Binding Theory. Since the Chinese language lacks AGR, the embedded CP in (66) contains no accessible SUBJECT and hence is not the governing category of the anaphor. Instead the matrix clause is the governing category of the anaphor since there is an accessible SUBJECT, i.e. Li xiaojie, in this category. Now return to (63) and (64). Suppose, following Aoun (1985, 1986), that NP-traces are anaphors subject to Binding Principle A. Then, in (63) and (64), what is important is not that the trace must be properly governed, but that the trace must be bound in its governing category. Since the governing category of the trace is the same as the

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24 Aoun's Generalized Binding Principles are the following.

(i) Binding Principles

- A. An anaphor must be X-bound in its governing category.
- B. A pronominal must be X-free in its governing category.
- C. An R-expression must be A-free.

(where X = A or A')

(ii) Governing Category

B is a governing category for A iff B is the minimal maximal projection containing A, a governor of A and a SUBJECT accessible to A.

anaphor in (66), it can be long-distance bound by the matrix subject. Under this account not only may we account for the parallel between (66) and (63), (64), (65) but it becomes immaterial whether NP-raising out of an embedded CP involves transparency or deletion of S'.

Finally, it is worth pointing out that CP transparency is by no means an isolated phenomenon in Chinese. Rivero (1987), Campos (1989) and Yoon (1991) have, independently of us, found that raising and passivization are possible from a tensed CP clause in modern Greek, Spanish, Korean, Quechua, Niuean and Kipsigis. Given this, it seems clear that CP-transparency is a cross-linguistic phenomenon that must be dealt with by parametric theories.

It is beyond the scope of this paper to discuss what mechanism makes CP-transparency possible and what parameter distinguishes NP-raising out of IP in languages like English from NP-raising out of CP in languages like Chinese. For discussion of this issue, see, for instance, Yoon (1991), in which she claims that the A/A-bar nature of the Spec of CP and adjoined positions should vary across languages. For languages like Korean and Chinese, the Spec of CP can be an A-position. Hence, NP-movement through the Spec of CP will not violate the Illicit Movement Condition and non-clause-bounded NP-movement is possible. On the other hand, for languages like English, the Spec of CP is not an A-position, and thus subject NPs can only be extracted out of IP. Moreover, Yoon argues that traces of movement are not subject to the Binding Theory, but only to a version of the ECP conceived as a condition of Chains. If her claims are correct, then the CP-transparency/ECP approach to raising modals in Chinese is more desirable than the CP-deletion/Generalized-Binding approach.

## 4.2. Optional Raising, Case and Empty Expletives

Another phenomenon that must be addressed concerning the raising analysis of modals is why raising is not obligatory. Consider the following pairs of alternation.

- (67) a. yinggai you san-ge ren yijing chi-guo fan le  
 should have three-CL men already eat-ASP meal PAR  
 It ought to be the case that three men have eaten their meals.
- b. you san-ge ren yinggai yijing chi-guo fan le
- (68) a. hui-bu-hui Lisi ye genzhe yiqi qu le  
 will-not-will Lisi also follow together go PAR  
 Will it be the case that Lisi also went along?
- b. Lisi hui-bu-hui ye genzhe yiqi qu le
- (69) a. keneng ta yijing chi-guo fan le  
 possible he already eat-ASP meal PAR  
 It is possible that he has already eaten his meal.
- b. ta keneng yijing chi-guo fan le

It is well-known that within the framework of GB theory, NP-movement is motivated by lack of Case. The optimal hypothesis, of course, is that the Case-theoretic explanation carries over to the raising structures that we propose for sentences with raising modals. Indeed there are two such possible accounts for the optional raising of NP-subject. One is that raising modals may be optionally subcategorized for either a tensed complement or an infinitive complement.<sup>25</sup> When the selected complement is tensed, then the embedded subject may obtain Nominative Case from the embedded tensed

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25 Since the Chinese language lacks overt morphology, it is difficult to distinguish whether or not a clause is tensed. But see Huang (1982) and Li (1985).

INFL, making movement unnecessary; when it is infinitive, the embedded subject may not acquire Case from the embedded INFL and thus has to move to the matrix subject position to be assigned Case by the matrix tensed INFL. In either case, there is no Case filter violation. The other approach is that raising modals are obligatorily subcategorized for tensed complements, but assignment of Nominative Case by INFL is optional. If the embedded tensed INFL does not assign Nominative Case, then the embedded subject has to move to the matrix subject position in order to acquire Case from the matrix INFL. If it does assign Nominative Case, the embedded subject may stay at its D-structure subject position. This explains why raising of NP-subject can be optional in Chinese.<sup>26</sup>

A second issue that must be addressed with regard to the optional raising concerns the status of the matrix subject when the embedded subject is not raised to the matrix subject position. Chomsky (1981, 1986) has proposed the Extended Projection Principle to account for the appearance of the semantically empty element *it* in such sentences as (70).

(70) *It seems that John is smart.*

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26 It should be noted that the optionality of case-assignment has been assumed in Li (1985, 1990). That is, a potential case assigner need not discharge its case. Note also that, as will be argued in the following discussion, we claim that Chinese has null expletives. Therefore, the Extended Projection Principle will not be violated in cases with no raising of subject NPs. Given that, in addition to case-assignment, INFL has other properties like adjunct-licensing, the optionality of case-assignment by INFL raises no problem for the existence of INFL, either. In contrast to our approach, Yoon's (1991) analysis of the non-clause-bounded NP-movement argues that there is no intrinsic correlation between Case properties and Chain types. Thus, NP-traces are not necessarily Caseless and NP-movement is not necessarily obligatory, being triggered by the lack of Case. And Chains can bear more than one Case as long as each link of a Chain is uniquely Case-marked.

If the requirement that every clause have a subject is correct, then the existence of such sentences as the (a) examples in (67)-(69) would force us to conclude that these sentences have empty subjects, i.e., empty expletives, corresponding to the overt expletive *it*. However, Li (1985, 1990), in contrast to Huang (1988), has denied the existence of empty expletives in Chinese. In what follows, we will review her arguments, showing that she is not necessarily correct.

Li (1990) has essentially given three facts to support the non-existence of empty expletives in Chinese. We will consider them in order. First, she points out that examples like (71) are ill-formed.

(71) \**keneng ta qu nar*

likely he go there

It is likely that he goes there. (Li 1990, p. 128)

However, as we have seen previously, speakers do accept such sentences (cf. (16c)). As a matter of fact, Li herself acknowledges that (72) below is grammatical.<sup>27</sup>

(72) ?*keneng ta hui qu nar*

likely he will go there

It is likely that he will go there. (Li 1990, p. 129)

Yet, rather than taking (72) as evidence that *keneng* 'possible' may be subcategorized for a tensed clause, she attributes the grammaticality of (72) to the analysis that it is a sentence adverb, just as *huoxu* 'perhaps' is. Though we do not deny the possibility that *keneng* 'possible' may function as a sentence adverb, the point is that there are cases in which it cannot be analyzed as a sentence adverb. (73) is such a case.

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27 According to Li (1990, p. 150), the grammaticality of (71) ranges from totally acceptable to totally unacceptable.

(73) zheme jiandan de timu, bu keneng ta bu hui zuo

so simple DE question not possible he not will do

As for such simple questions, it is impossible that he is not able to answer.

Just like (72), *keneng* 'possible' in (73) is followed by a clause with an overt subject, though the object of the embedded verb *zuo* 'do' is topicalized. However, (73) differs from (72) in that *keneng* 'possible' in the former case is additionally negated by the negative *bu*. Crucially, this indicates that *keneng* 'possible' in (73) is not a sentence adverb, since sentence adverbs cannot be negated by *bu*, as we can see from (74) below.

(74) a. \*ta bu huoxu hui lai

he not perhaps will come

b. \*bu huoxu ta hui lai

not perhaps he will come

Thus, the modal *keneng* 'possible' is subcategorized for a tensed clause in Chinese, which invalidates Li's first argument.<sup>28</sup>

The second fact that Li cites to argue against the existence of empty expletives in Chinese is related to the impossibility of extraposition in Chinese, as illustrated by the following contrast:

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28 A reviewer pointed out that lexical negation is possible in Chinese as in *chufuyiliao* vs. *buchuyiliao* 'out of expectation vs. not out of expectation'. Given this, the question should be reduced to whether or not *bu keneng* 'not possible' in (73) constitutes a lexical negation. We do not exclude the possibility that *bu keneng* might form a lexical word, but there is evidence showing that in some cases *bu keneng* is not a lexical word, since other elements such as *tai* 'quite' can be inserted between *bu* 'not' and *keneng* 'possible'.

(i) bu tai keneng ta bu hui zuo zhe-dao timu

not quite possible he not can do this-CL question

It's not quite possible that he is not able to answer this question.

Given the grammaticality of (i), our point remains intact, regardless of whether lexical negation is possible.



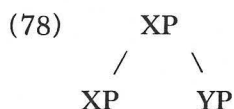
- (75) a. ta lai zher hen zhongyao  
he come here very important  
That he comes here is very important.
- b. \*hen zhongyao ta lai zher  
very important he come here  
It is very important that he comes here. (Li 1990, p.130)

According to Li, (75b) can be ruled out by the Extended Projection Principle, if one assumes that no expletives can fill the vacated subject position, after the sentential subject is extraposed. This account, though plausible, is not necessary. There is a better alternative. Before we spell out the details, let us first note that the ill-formedness of (75b) might not have anything to do with whether or not the vacated position in (75b) is filled by an expletive, but with the general impossibility of rightward movement in Chinese (see also C.-C. Tang (1990)). Consider the following contrast between English and Chinese.

- (76) a. A rumor that he is ill has been circulating.  
b. A rumor has been circulating that he is ill.  
(Radford 1989, p. 449)
- (77) a. Lisi zao jiu puochan zhege xiaoxi yijing chuanpian-le  
Lisi early already bankrupt this news already wide-spread-ASP  
The news that Lisi has gone bankrupt early is already  
widespread.
- b. \*zhege xiaoxi yijing chuanpian-le Lisi zao jiu puochan  
this news already wide-spread-ASP Lisi early already bankrupt  
The news is already widespread that Lisi has gone bankrupt  
early.

(76) shows that an S-bar within an NP subject in English may be extraposed

to the end of the sentence. In contrast, (77) shows that Chinese does not allow such kind of extraposition. Significantly, the impossibility of extraposition from subject NPs in (77) strongly indicates that extraposition of the sentential subject in (75b) might not be due to the non-existence of empty expletives. In (77b), though the S-bar within the subject NP is extraposed to the end of the sentence, the matrix subject position is still filled by the subject *zhege xiaoxi* 'this news'. Yet, (77b) is as ungrammatical as (75b), suggesting that something other than the non-existence of empty expletives is responsible for the general impossibility of extraposition in Chinese. We propose that the impossibility of extraposition be traced back to Huang's (1982) phrase structure constraint which says informally that Chinese phrase structures are head-final except at the lowest bar level, i.e., the one-bar level. Since extraposition, irrespective of extraposition of sentential subjects or extraposition from subject NPs, involves right-adjunction to a maximal projection, it creates a structure like (78), where YP is the extraposed clause right-adjoined to XP.



However, the structure (78) violates the constraint that Chinese phrase structures must be head-final at two-bar level. Hence extraposition is not allowed in Chinese. This unified account of (75) and (77) weakens Li's second argument for the non-existence of empty expletives in Chinese.

Li's third argument for the non-existence of empty expletives is based on the fact that a postverbal NP cannot get Case by forming a Chain with the subject expletive. Consider (79), where the ergative verb *tang* 'lie' is followed by a duration NP and the argument of the ergative verb.

- (79) a. \*tang-le henjiu yi-ge ren  
 lie-ASP long-time one-CL man  
 There lay a man for a long time.
- b. \*tang-le yi-ge ren henjiu  
 lie-ASP one-CL man long-time (Li 1990, p.140)

According to Li, ergative verbs can assign Case to an NP in postverbal position.<sup>29</sup> Now if another postverbal NP may receive Case by forming a Chain with an expletive in subject position, then there would be no account for the ungrammaticality of (79). Hence, Li concludes that expletive subjects do not exist in Chinese. This account, again, is not necessary. C.-C. Tang (1990, 1991), among others, has argued that when a postverbal duration/frequency phrase cooccurs with a postverbal argument to denote a non-activity reading, the argument must be definite. Consider the contrast below.

- (80) a. wo jian-guo na-ge ren liang-ci  
 I see-ASP that-CL man twice  
 I saw that man twice.
- b. wo jian-guo liang-ci na-ge ren  
 I saw that man twice.
- c. \*wo jian-guo yi-ge ren liang-ci  
 one-CL man  
 I saw one man twice.
- d. \*wo jian-guo liang-ci yi-ge ren  
 I saw one man twice.

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29 According to Li, all verbs, whether transitive or intransitive, active or passive, assign Case. To discuss her theory about Case-assignment is far beyond the scope of this paper. But see C.-C. Tang (1990) for the view that only transitive verbs assign Case in Chinese.

So the ungrammaticality of (79) is not necessarily due to the non-existence of empty expletives, but could be due to the fact that the post-verbal argument has to be definite when it cooccurs with another post-verbal duration/frequency phrase.<sup>30</sup> Again this weakens Li's claim that empty expletives do not exist in Chinese.

To recapitulate, Li's arguments for the non-existence of empty expletives do not seem to be convincing because modals in Chinese are subcategorized for a tensed clause with an overt embedded subject and the problematic cases that she discussed all have better alternative explanations. This being the case, it is still possible that empty expletives exist in the (a) examples in (67)-(69).<sup>31</sup>

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30 Note, however, that even if the indefinite noun phrase *yige ren* 'one man' in (79) is replaced by the definite noun phrase *nage ren* 'that man', the sentence is still ill-formed. This is because the post-verbal argument of ergative verbs must always be indefinite. But if the post-verbal argument is indefinite, it would be unable to cooccur with a duration/frequency phrase in post-verbal position. Put differently, the impossibility of such constructions as (79) is a conspiracy of two constraints: (i) the postverbal arguments of ergative verbs must be indefinite and (ii) when cooccurring with post-verbal duration/frequency phrases, the post-verbal arguments of verbs must be definite in order to denote a non-activity reading.

31 The following examples also point to the same conclusion.

- (i) a. *shi ta zuotian da-le ni*  
be he yesterday beat-ASP you  
It is he that beat you yesterday.
- b. *ta shi zuotian da-le ni*  
It is yesterday that he beat you.
- c. *shi-bu-shi ta zuotian da-le ni*  
be-not-be he yesterday beat-ASP you  
Is it he that beat you yesterday?

Huang (1988) has argued that the copular verb *shi* 'be' in (i) is a raising verb. If he is right, then the existence of (ia) and (ic) also suggests that there is an empty expletive in these sentences, if the extended part of the Projection Principle is universal.

## 5. Concluding Remarks

In this article, based on a number of facts, we have proposed that Chinese modals are actually independent verbs that are subcategorized for CP complements. Furthermore, they should be divided into two types, that is, raising vs. control modals, a classification not always corresponding to the epistemic vs. deontic distinction. NP-raising out of an embedded CP is also discussed in relation to the ECP. We showed that raising constructions in Chinese, as opposed to those in English, should involve CP-transparency rather than CP (= S')-deletion. In contrast to Li's (1990) claim, we also argued that empty expletives might exist in raising constructions containing raising modals. In addition to the above conclusions, two additional consequences of our analysis of modals as verbs are worth mentioning here.

First, the analysis that Chinese modals are not constituents of INFL but are independent verbs incidentally conforms to Hyam's (1987) study of null subject parameter. She has proposed that whether or not a language is a null subject language is correlated to the possibility of generating auxiliaries in INFL. According to her, modal auxiliaries in non-null subject languages are generated under INFL, whereas modal auxiliaries in null subject languages are not constituents of INFL, but are generated under the V node. Given that Chinese is a null subject language, our analysis provides a further piece of evidence to support the correlation between null subject languages and the auxiliary systems.

Another consequence of the analysis that Chinese modals are verbs is that this analysis gives a nice explanation for the contrastive relative word order of modals and the negative between English and Chinese. Notice that

while the negative **not** in English has to follow the modal that it negates, the corresponding negative **bu** 'not' in Chinese has to precede the modal that it negates. Compare the following contrast.

(81) a. He should/will not come.

b. \*He not should/will come.

(82) a. \*ta yinggai/hui bu lai<sup>32</sup>

he should/will not come

He should/will not come.

b. ta bu yinggai/hui lai

He should/will not come

He should/will not come.

The English negative **not** has to follow modals, since the latter are constituents of INFL which take a position higher than the node NEG (cf. Pollock (1989), among others). On the other hand, if modals in Chinese are analyzed as verbs, then it is a natural consequence that the negative **bu** 'not' appears before modals, since the former occupies a position higher than the verbs.

(Accepted for publication 18 November 1993)

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32 The sentence is ungrammatical only on the intended reading. When the sentence is interpreted with the scope of **bu** covering only the verb **lai** 'come' rather than **yinggai/hui** 'should/will', the sentence is well-formed.

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