Modal Licensing and Subject Specificity in Mandarin and Taiwan Southern Min: A Cartographic Analysis

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Abstract
This paper aims to provide an explanation of the modal licensing of subject indefinites under the cartographic approach (Rizzi 1997; Cinque 1999; Tsai 2015). We observe that there are asymmetries among modals licensing quantity subject indefinites in Mandarin and Taiwan Southern Min. Firstly, in contrast to deontic modals, no epistemic and dynamic modals may license subject indefinites. Secondly, not all deontic modals are equipped to carry out the same construal. This paper offers a coherent account of both asymmetries by recognizing the height of interpretation for both modals and subjects. The proposal is further supported by the specificity restriction displayed by individual subject indefinites, which varies with respect to the type of modals involved and their morpho-syntactic distributions, in particular, the curious behavior of the capacity modal *tit in Taiwan Southern Min.

Keywords: Modal, Subject Specificity, Chinese Syntax, Comparative Syntax

1. Introduction

It is widely noted that there are some restrictions of indefinite nominal phrases as a subject in Mandarin Chinese (Chao 1986, Li and Thompson 1981, Lee 1986, Shyu 1995, Tsai 1994, 1996, 2001, Xu 1996, Li 1996, 1998, Liao 2011, among others). Li (1998) proposes that subject indefinites cannot refer to individuals (henceforth individual SI) without the precedence of the existential operator *you 'have', as shown by contrast of (1). In contrast, a subject indefinite alone may obtain a quantity reading (henceforth quantity SI) in certain "bare" constructions, as in (2).

(1) a. * san-ge ren zuo-le yi-bu che. [individual]
   three-Cl person sit-Prf one-Cl car
   'Three persons were seated in one car.'

   * 三個人坐了一部車。

b. zuotian you san-ge ren zuo-le yi-bu che. [individual]
yesterday have three-Cl person sit-Prf one-Cl car
   'Three (specific) persons were seated in one car yesterday.'

   昨天有三個人坐了一部車。

Sentence (1) concerns the event of leaving by riding a car, so it requires an agent (i.e., individuals) as its subject. On the contrary, sentence (2) conveys a rule with respect to a certain quantity of person, and hence the subject is quantity-denoting. As shown by the contrast of these two sentences, individual SIs should be preceded by you, but quantity SIs do not have this restriction.

Tsai (2001) further points out that the quantity SI actually occurs in an implicit modal construction, as exemplified by (3) (Tsai 2001: 146).

\[(3)\]
\[
\begin{align*}
\text{a. } & \text{san-ge ren (yinggai/keyi) zuo yi-bu che. [quantity]} \\
& \text{three-Cl person should/may sit one-Cl car} \\
& \text{’Three persons should/may be seated in one car.’} \\
& \text{三個人(應該/可以)坐一部車。}
\end{align*}
\]
\[
\begin{align*}
\text{b. } & \text{san-ge ren zuo-de/bu-xia yi-bu che. [quantity]} \\
& \text{three-Cl person sit-can/cannot-down one-CL car} \\
& \text{’Three people can/cannot be seated in one car.’} \\
& \text{三個人坐得/不下一部車。}
\end{align*}
\]

Alternatively, the same construction can host an infixal modal -de- or its negative counterpart -bu-, which in turn triggers verb raising in syntax, as seen in (3).

Along the line of Tsai (2001), this paper sets out to investigate what types of modals are capable of licensing quantity SIs. In general, quantity SIs can only occur with two types of deontic modals, namely, ought-to-be modals and capacity modals. In episodic sentences, as mentioned above, these subject indefinites must be preceded by you 'have' and interpreted as individuals.

To provide a plausible explanation of the above phenomena, we suggest that deontic modals should be divided into two subtypes. First, an ought-to-be modal selects an implicit capacity modal phrase as its complement, which in turn licenses a quantity SI by introducing existential closure (∃-closure) on the edge of vP. Crucially, this proposal is supported by corresponding data from Taiwan Southern Min, where a quantity SI co-occurs with an ought-to-be deontic modal e and an explicit capacity modal tit. On the other hand, an ought-to-do modal is not compatible with a capacity modal, which explains why they fail to license quantity SIs. Finally, dynamic modals, being in the lexical layer, are simply too low to c-command the inner subject position, whereas epistemic modals, being in the
complementizer layer, are too high to select capacity modals, hence the failure of licensing quantity SIs (cf. Tsai 2015). The advantage of this cartographic analysis will become clear when we address the issues surrounding the specificity restriction observed by individual SIs.

This paper is organized as follows. Section 2 looks into the interaction of different types of modals and subject indefinites. In section 3, based on the proposal that modals are mapped onto distinct positions under the cartographic approach (Rizzi 1997; Cinque 1999), we provide a solution as to how quantity SIs are licensed by modals in section 4. Section 5 is devoted to relevant phenomena in Taiwan Southern Min, which are particularly interesting from a comparative point of view. We conclude this paper in section 6.

2. Modals and the Interpretation of Indefinite Subjects

As mentioned above, indefinite subjects can be interpreted as either quantity-denoting or individual-denoting, depending on the syntactic distribution of the subjects in question. In this section, we focus on subject indefinites in modal contexts. We will explore the issue surrounding quantity SIs, and then move on to the specificity restriction on individual SIs.

2.1. Quantity Subject Indefinites

Quantity SIs, as pointed out by Tsai (2001), are typically licensed in modal constructions, where the modal in question can be either overt or implicit. Even more interestingly, we notice that subject indefinites are acceptable only in the presence of deontic modals: in contrast to the deontic modals in (3a,b), the epistemic/dynamic modals in (4) simply do not have the same ability to license the SIs.

(4) a. * san-ge ren dagai zuo yi-bu che. [epistemic]
   three-CL person probably sit one-Cl car
   'Three persons will probably be seated in one car.'
   * 三個人大概坐一部車。

b. * san-ge ren ken zuo yi-bu che. [dynamic]
   three-CL person willing sit one-Cl car
   'Three persons are willing to be seated in one car.'
   * 三個人肯坐一部車。

Moreover, deontic modals should be further divided into two subtypes on the vP periphery, i.e., ought-to-be modals vs. ought-to-do modals, as already proposed for other languages (Feldman 1986; Hacquard 2006; see also Kratzer 1981, 1991, Portner 2009, among others). Simply speaking, the major difference between them is that when the former occurs
the addressee is under an obligation to carry out the event, but for the latter it is the subject that should fulfill the duty. Please see the contrast of (5) (Portner 2009: (226)) for an illustration.

(5) a. At least one son should become a priest.  
    [ought-to-be]
b. Mary should return the pen she borrowed.  
    [ought-to-do]

In (5a), the addressee, instead of any particular son, is under an obligation to make sure that at least one son will become a priest. On the other hand, with should as the ought-to-do modal, it is the subject (i.e., Mary) that is under an obligation to return the pen she borrowed, as exemplified by (5b).¹

More interestingly, these two types of modals also show difference with respect to the interaction of quantity SIs. Only ought-to-be modals are compatible with them, as illustrated by the following contrast of (6).

(6) a. san-ge ren  yinggai zuo yi-bu che.  
    [ought-to-be]
    three-Cl person should sit one-Cl car
    'Three persons should be seated in one car.'
    三個人應該坐一部車。
b. * san-ge ren  yinggai zhuang yi-bu che.  
    [ought-to-do]
    three-Cl person should assemble one-Cl car
    'Three persons should assemble a car.'
    * 三個人應該裝一部車。

More specifically, the subject of (6a) denotes a certain quantity of people with ought-to-be yinggai, and the subject of (6b) individuals with ought-to-do yinggai. This is because only the latter construal involves an Agent role carried by the car-assemblers, which enables the subject to fulfill the obligation.

2.2. Individual Subject Indefinites

It has been long established in the literature that individual SIs are allowed in the subject position when licensed existentially quantified by you 'have'. One intriguing observation is that a SI licensed by you only allows an individual interpretation. More interestingly, there is an inner-outer distinction for SIs with respect to their structural positions relative to deontic modals. A pre-modal indefinite subject (henceforth outer subject) must be specific, as in (7a),

1 It is worthwhile to mention that the modal should in (5b) may have the ought-to-be reading. In this case, it is the addressee that is required to make sure that Mary returns the pen she borrowed.
whereas a post-modal one (henceforth inner subject) is interpreted as nonspecific, as in (7b).

(7) a. **you san-ge ren** yinggai\(^{Deo}\) zuo yi-bu che.  [outer subject]
    have three-CL person should ride one-CL car
    'Three particular persons should ride a car.'
    有三個人應該\(^{Deo}\)坐一部車。

    b. yinggai\(^{Deo}\) **you san-ge ren** zuo yi-bu che.  [inner subject]
    should have three-CL person ride one-CL car
    'Three nonspecific persons should ride a car.'
    應該\(^{Deo}\)有三個人坐一部車。

This subtle specificity distinction can be detected by the felicity of a follow-up sentence expressing the specificity of SIs. As evidenced by the contrast of (8), outer subject is only compatible with sentences expressing that the SI refers to particular individuals. Since the outer subject is specific, it is felicitous to continue to point out the names of the denoted individuals, as in (8b). That is also why (8a) is infelicitous: asserting that any individual can fulfill the obligation is contradictory to the specific reading of the SI.

(8) a. **you san-ge ren** yinggai\(^{Deo}\) zuo yi-bu che,  [outer subject]
    have three-CL person should ride one-CL car
    #shei zuo dou keyi, shi san-ge jiu hao.
    who sit DOU can be three-CL just good
    'Three particular persons should ride a car. #Anyone can ride a car as long as there are three persons in total.'
    有三個人應該\(^{Deo}\)坐一部車，#誰坐都可以，是三個人就好。

    b. **you san-ge ren** yinggai\(^{Deo}\) zuo yi-bu che,  [outer subject]
    have three-CL person should ride one-CL car
    jiu shi Akui, Xiaodi, hen Lisi.
    just be Akui Xiaodi and Lisi
    'Three particular persons should ride a car. They are Akiu, Xiaodi, and Lisi.'
    有三個人應該\(^{Deo}\)坐一部車，就是阿Q、小D 跟李四。

In contrast to outer subject, sentences including an inner subject are only allowed to be followed by sentences implying that the speaker does not know the referent of the SI. Please consider (9).
(9) a. yinggai Deo you san-ge ren zuo yi-bu che, [inner subject] should have three-CL person ride one-CL car shei zuo dou keyi, shi san-ge jiu hao.
who sit DOU can be three-CL just good 'Three nonspecific persons should ride a car. #Anyone can ride a car as long as there are three persons in total.'
應該 Deo 有三個人坐一部車，誰坐都可以，是三個人就好。
b. yinggai Deo you san-ge ren zuo yi-bu che, [inner subject] should have three-CL person ride one-CL car #jiu shi Akui, Xiaodi, hen Lisi.
just be Akui Xiaodi and Lisi 'Three nonspecific persons should ride a car. #They are Akiu, Xiaodi, and Lisi.' 有三個人應該 Deo 坐一部車，#就是阿 Q、小 D 跟李四。

The inner subject in (9) does not refer to specific individuals, so it is odd to provide more information, such as the names, of the SI, as shown by the infelicity of (9b). Instead, as evidenced by (9a) it is only felicitous if the follow-up sentences implying that the SI does not have specific referent; that is, any individual can do the duty; no one is under the obligation.

Even more interestingly, epistemic and dynamic modals interact with SIs in a non-trivial way in terms of the specificity restriction. SIs receive a specific reading when preceding an epistemic modal, as in (10a). By contrast, they can be either specific or nonspecific when preceded by an epistemic modal, as in (10b).

(10) a. you san-ge ren mingtian dagai hui lai. [outer subject] have three-CL person tomorrow probably will come 'Three particular persons will probably come tomorrow.' 有三個人明天大概會來。
b. dagai you san-ge ren mingtian hui lai. [inner subject] probably have three-CL person tomorrow will come 'Three persons will probably come tomorrow.' 大概有三個人明天會來。

Again, this contrast becomes clear by means of the test of follow-up sentences we exploit before. Due to its specific interpretation, an outer subject is only compatible with sentences indicating that the speaker knows the referent of the SIs, such as providing the names of the individuals as in (11b). Please compare it with the infelicitous sentence as in (11a). On the other hand, when following epistemic modals, SIs can be specific or nonspecific, so the follow-up sentences can either further specify the names of the denoted
individuals, as in (12b), or just point out that SIs do not refer to particular persons, as in (12a).

(11) a. you san-ge ren mingtian dagai hui lai,  [outer subject] have three-CL person tomorrow probably will come
#dan wo bu zhidao shi shei.
but I not know be who
'Three particular persons will probably come tomorrow, #but I don’t’ know who will come.'
有三個人明天大概會來，#但我不知道是誰。
b. you san-ge ren mingtian dagai hui lai,  [outer subject] have three-CL person tomorrow probably will come
jiu shi Akui, Xiaodi, hen Lisi.
just be Akui Xiaodi and Lisi
'Three particular persons will probably come tomorrow. They are Akiu, Xiaodi, and Lisi.'
有三個人明天大概會來，就是阿 Q、小 D 跟李四。

(12) a. dagai you san-ge ren mingtian hui lai,  [inner subject] probably have three-CL person tomorrow will come
dan wo bu zhidao shi shei.
but I not know be who
'Three persons will probably come tomorrow, but I don’t’ know who will come.'
大概有三個人明天會來，但我不知道是誰。
b. dagai you san-ge ren mingtian hui lai,  [inner subject] probably have three-CL person tomorrow will come
jiu shi Akui, Xiaodi, hen Lisi.
just be Akui Xiaodi and Lisi
'Three persons will probably come tomorrow. They are Akiu, Xiaodi, and Lisi.'
大概有三個人明天會來，就是阿 Q、小 D 跟李四。

As for dynamic modals, they must follow indefinite subjects, and the subjects in question can be either specific or nonspecific, as evidenced by the contrast between (13a) and (13b).

(13) a. you san-ge ren mingtian ken lai.  [outer subject] have three-CL person tomorrow willing come
'Three persons are willing to come tomorrow.'
有三個人明天肯來。
All the patterns presented above point to the conclusion that the specificity effects on individual SIs vary according to their height relative to the particular type of modals involved. In the following discussion, we will provide a more explicit account of the interaction between SIs and modals in cartographic terms.

3. Mapping the Topography of Chinese Modals

Under the approach of syntactic cartography (Rizzi 1997; Cinque 1999), Tsai (2015) proposes to associate distinct types of modality with distinct structural positions in terms of "their height of interpretation". As illustrated in the diagram below, the three types of modals correspond to the three syntactic layers, i.e., epistemic modals located in the complementizer layer, deontic modals located in the inflectional layer, and dynamic modals located in the lexical layer.

The above hierarchical arrangement is supported by the restrictions on modal distributions, modal entailment relations, and modal-negation interactions. First, epistemic modals precede deontic and dynamic modals in Chinese multiple modal constructions, as evidenced by the contrast of (15) and (16).
Furthermore, deontic modals must precede dynamic modals, as shown by (17).

(17) a. Zhangsan bixu ken qu Taibei.
    Zhangsan must willing go Taipei
    'Zhangsan must be willing to go to Taipei.'
    張三必須肯去台北。
b. *Zhangsan ken bixu qu Taibei.
    Zhangsan willing must go Taipei
    *張三肯必須去台北。

These examples indicate that epistemic modals are located in a higher position than deontic modals, which in turn appear higher than their dynamic counterparts.

Second, epistemic modals can be distinguished from their deontic and dynamic counterparts in terms of the entailment relationship induced by symmetric predicates (Brennan 1997, Bulter 2003, Tsai 2015). Consider the following examples, where the (a)-sentence entails the (b)-sentence in (18) and (19), but not in (20) and (21).

(18) a. Akju he Xiaodi hen xiang.
    Akju and Xiaodi very similar
    'Akju looks like Xiaodi.'
    阿 Q 和小 D 很像。
The contrast in question supports our analysis of the modal topography in Mandarin. Epistemic modals in the left periphery operate over propositions in which the predicate and subject are already composed, so they can not affect the relation of the predicate and subject. Hence, the entailment relation is preserved. On the contrary, deontic and dynamic modals in the inflectional layer and lexical layer only operate on the symmetric predicates instead of the proposition, so the modals change the type of the predicates and destroy the symmetric
predicates.

Third, the interaction between modals and realis negation also serves to separate the three types of modals apart. Since the realis negator mei is closely related to tense/aspectual construals, Tsai (2015) assume that mei combines with the head of TP. Crucially, epistemic modals can only precede mei, as shown by the contrast between (22a) and (22b), whereas dynamic modals can only follow it, as shown by the contrast between (23a) and (23b). Finally, deontic modals can never co-occur with mei, as in (24a,b).

(22) a. Akju yiding\textsuperscript{Epi} mei qu xiancheng. \[epistemic\]
    Akju must not go county-town
    'Akju must have not gone to the county town.'
    阿 Q 一定 \textsuperscript{Epi}没去縣城。

b. *Akju mei yiding\textsuperscript{Epi} qu xiancheng. \[epistemic\]
    Akju not must go county-town
    'Akju must have not gone to the county town.'
    *阿 Q 沒一定 \textsuperscript{Epi}去縣城。

(23) a. *Akju yinggai\textsuperscript{Deo} mei qu xiancheng. \[deontic\]
    Akju should not go county-town
    'Akju should have not gone to the county town.'
    *阿 Q 應該 \textsuperscript{Deo}没去縣城。

b. *Akju mei yinggai\textsuperscript{Deo} qu xiancheng. \[deontic\]
    Akju not should go county-town
    'Akju should have not gone to the county town.'
    *阿 Q 沒應該 \textsuperscript{Deo}去縣城。

(24) a. * Akju gan mei qu xiancheng. \[dynamic\]
    Akju dare not go county-town
    'Akju dares to have not gone to the county town.'
    *阿 Q 敢没去縣城。

b. Akju mei gan qu xiancheng. \[dynamic\]
    Akju not dare go county-town
    'Akju dares to have not gone to the county town.'
    阿 Q 沒敢去縣城。

Since the realis negator mei is situated in T^0, its ordering restrictions indicate that epistemic modals stands above TP, while dynamic modals appear below TP. The incompatibility between deontic modals and mei may well stems from the fact that they are in
complementary distribution in the inflectional layer.

Along this line, we reach the conclusion that the licensing of subject indefinite is conditioned by the distribution of modals, which can license subject indefinites by introducing existential closure, which in turn binds the lower subject copy at LF. In the following section we will provide a cartographic analysis of the licensing of quantity SIs, which is directly supported by the specificity restriction displayed by individual SIs.

4. A Cartographic Analysis: the Licensing of Modals

4.1 Quantity Subject Indefinites

To begin with, it is instructive to note that quantity SIs typically appear in sentences containing *ought-to-be* deontic modals, but not in those with *ought-to-do* deontic modals, as evidenced by the contrast between (25a,b). Furthermore, once we employ an existential operator to license the subject indefinite in (25b), an individual reading emerges, and the modal interpretation is distinctively Agent-oriented, as evidenced by (25c).

(25) a. san-ge ren yinggai zuo yi-bu che.  
three-Cl person should ride one-Cl car  
'Three persons should ride a car.'

三個人應該坐一部車。  
*[ought-to-be deontics]*

b. *san-ge ren yinggai zhuang yi-bu che.
three-Cl person should assemble one-Cl car
'Three persons should assemble a car.'

*三個人應該裝一部車。
*[ought-to-do deontics]*

c. you san-ge ren yinggai zuo yi-bu che.
have three-Cl person should ride one-Cl car
'Three particular persons should ride a car.'

有三個人應該坐一部車。  
*[ought-to-do deontics]*

One the other hand, epistemic and dynamic modals are either too high or too low to license the quantity construals, as illustrated in (26a,b) respectively ((4a) and (4b) repeated here).

(26) a. *san-ge ren dagai zuo yi-bu che.  
three-CL person probably ride one-Cl car
'Three persons will probably ride a car.'

* 三個人大概坐一部車。
*[epistemic]*

b. san-ge ren yinggai zuo yi-bu che.  
three-Cl person should ride one-Cl car
'Three persons should ride a car.'

三個人應該坐一部車。
Here we propose that the *ought-to-be* modal of (26) assigns high priority to one situation over the others according to some form of estimation. Crucially, the *ought-to-be* modal does not involve a subject-oriented construal as its *ought-to-do* counterpart does. Rather, it selects a capacity modal phrase as its complement, which in turn licenses a quantity subject indefinite by introducing existential closure ($\exists$-closure) on the edge of $vP$, as sketched in the following diagram.

\[
\begin{array}{c}
\text{(27) } \text{* ought-to-be} \rightarrow \text{capacity modal} \rightarrow \text{quantity subject} \\
\text{\quad \quad \quad TP} \\
\text{\quad \quad \quad}\langle \text{quantity subject} \rangle \\
\text{\quad \quad \quad} \uparrow \\
\text{\quad \quad \quad} \Gamma \\
\text{\quad \quad \quad} \text{T} \\
\text{\quad \quad \quad} \text{Mp_{Deo}} \\
\text{\quad \quad \quad} \text{yinggai} \\
\text{\quad \quad \quad} \text{M'} \\
\text{\quad \quad \quad} \text{ought-to-be deontics} \\
\text{\quad \quad \quad} \text{MP_{Deo}} \\
\text{\quad \quad \quad} \text{capacity modal} \\
\text{\quad \quad \quad} \exists P \\
\text{\quad \quad \quad} \exists vP \\
\text{\quad \quad \quad} \langle \text{quantity subject} \rangle \\
\text{\quad \quad \quad} v \\
\text{\quad \quad \quad} v' \\
\text{\quad \quad \quad} \text{VP} \\
\text{\quad \quad \quad} \ldots
\end{array}
\]

Although the external argument raises further to the outer subject position, it is its lower copy that gets interpreted at the original merge site at LF (while undergoing deletion at PF). The above derivation then gives rise to the quantity reading. Note that the quantity subject can also follow the deontic modal (i.e., remaining in its original merge site), as evidenced by (28).

\[
\text{(28) } \text{yinggai}_{Deo} \text{ san-ge ren zuo yi-bu che.} \\
\text{should three-CL person ride one-CL car} \\
\text{'Three persons should ride a car.'} \\
\text{應該}_{Deo} \text{三個人坐一部車。} \quad \text{[ought-to-be deontics]}
\]

(25a) and (28) have virtually the same interpretation: The only difference seems to be that, in
the latter case, the upper copy gets deleted at PF instead.

Furthermore, an *ought-to-do* modal is incompatible with the capacity reading because it is Agent-oriented and therefore only allows an individual subject indefinite. Along this line, it also becomes clear why dynamic modals do not license a quantity SI: Not only are they agent-oriented, but also too low to warrant existential closure on the lower subject. On the other hand, epistemic modals, being situated in the complementizer layer (i.e., the left periphery), are simply too high to existentially close the lexical layer (or the vP periphery to the same effect). Finally, our analysis also explains how and why the presence of *you* 'have' gives rise to the specific interpretations, the reason being that it may well serve as a strong existential quantifier which blocks any default operation such as existential closure.

### 4.2. Individual Subject Indefinites

As hinted at above, (25) and (26) can be improved by inserting an existential operator *you* 'have' in front of the subject indefinite in question, and the reading is distinctively individual rather than quantity. Now recall our observation that the specificity involved is determined by the position of the subject in relation to modals, as shown below ((25-26) repeated here).

(29) a. yinggai\textsuperscript{Deo} you san-ge ren zuo yi-bu che.

should have three-CL person ride one-CL car

'Three nonspecific persons should ride a car.'

應該\textsuperscript{Deo}有三個人坐一部車。

[inner subject: nonspecific individual; modality: *ought-to-do*]

b. you san-ge ren yinggai\textsuperscript{Deo} zuo yi-bu che.

have three-CL person should ride one-CL car

'Three particular persons should ride a car.'

有三個人應該\textsuperscript{Deo}坐一部車。

[outer subject: specific individual; modality: *ought-to-do*]

(30) a. dagai\textsuperscript{Epi} you san-ge ren mingtian hui lai.

probably have three-CL person tomorrow will come

'Three persons will probably come tomorrow.'

大概\textsuperscript{Epi}有三個人明天會來。

[inner subject: specific, nonspecific individual; modality: epistemic]
b. *ken you san-ge ren mingtian lai.
   willing have three-CL person tomorrow come
   'Three persons are willing to come tomorrow.'
   [outer subject: specific or nonspecific individual; modality: dynamic]

Consider the case of *ought-to-do* deontics first: This interaction of modals and the interpretation of the subject would be a natural consequence if we take *you* in the *vP* periphery as a lexical counterpart of ∃-closure associated with the capacity modal, which in turn produces the nonspecific reading of (29). On the other hand, *you* in the left periphery, which functioned as an existential operator, assures that the outer subject is strongly quantified, yielding the specific reading of (29). The distribution of these elements can be visualized in the diagram below:

(32) specific subject > ought-to-do > nonspecific subject

\[
\begin{array}{c}
\text{specific subject} \\
\text{\quad \quad TP} \\
\text{\quad \quad } \exists P \\
\text{\quad \quad you} \\
\text{\quad \quad \quad } T' \\
\text{\quad specific subject} \\
\text{\quad \quad } T \\
\text{\quad \quad } M^P_{\text{Deo}} \\
\text{\quad yinggai} \\
\text{\quad \quad } M' \\
\text{\quad ought-to-do deontics} \\
\text{\quad \quad } \exists P \\
\text{\quad \quad you} \\
\text{\quad \quad \quad } vP \\
\text{\quad \quad nonspecific subject} \\
\text{\quad \quad \quad } v' \\
\text{\quad \quad \quad } VP \ldots
\end{array}
\]
Since epistemic modals are located on the complementizer layer, *you*, below epistemic modals, can be analyzed either as a lexical counterpart of ∃-closure between TP and vP or as an existential operator above TP, resulting in the nonspecific reading and specific reading respectively. Please consider the following diagram.

(33) epistemic modal > specific subject or nonspecific subject

```
  …  \(M^{\text{Epi}}\)
    \(\text{dagai}\)  \(M'\)
    \(M^{\text{Epi}}\)  ∃P
      you  TP
    specific subject  \(T'\)
      T  \(M^{\text{Deo}}\)
        M'  ∃P
          you  vP
        nonspecific subject  \(v'\)
          v  VP  …
```

The specific subject may further be topicalized to the sentence initial position, and be strongly quantified by the existential operator *you* above TopP, as visualized by (34).

(34) epistemic modal > specific subject or nonspecific subject

```
  …  ∃P
    you  TopP
  specific subject  \(M^{\text{Epi}}\)
    \(\text{dagai}\)  \(M'\)
    \(M^{\text{Epi}}\)  TP
      \(T'\)
        T  vP  …
```
Hence, indefinite subjects following epistemic modals may be specific or nonspecific, but those preceding them are specific.

Dynamic modals on the lexical layer occur lower than subjects, so they cannot be followed by the subjects. Due to the low position of dynamic modals, *you* above dynamic modals may be treated either as a lexical counterpart of $\exists$-closure or as an existential operator in the left periphery. Therefore, the subject may have the nonspecific or specific reading. The following diagram provides an illustration.

(35) specific subject, nonspecific subject $\rightarrow$ dynamic modal

\[ \ldots \quad \exists P \]
\[ you \]
\[ TP \]
\[ specific \ subject \quad \Gamma' \]
\[ T \quad M^{Deo} \]
\[ M' \]
\[ M^{Deo} \quad \exists P \]
\[ you \quad \nu P \]
\[ nonspecific \ subject \quad \nu' \]
\[ \nu \quad M^{Dyn} \]
\[ ken \quad \nu' \quad M^{Dyn} \]
\[ \nu \quad \nu' \quad VP \ldots \]

The interaction of modals and indefinite subjects can be neatly explained by the cartographic approach. Only modals on the inflectional layer can license quantity SI because of the capability of selecting a capacity modal. The capacity modal triggers $\exists$-closure on the inner subject, resulting in the quantity construal of (27). The *ought-to-do* modal, on the other hand, solicits help from an existential *you*, which in turn licenses the individual reading of (32). The position of *you* determines the lexical properties of it, which in turn influence the interpretation of the subject. On the one hand, *you* is functioned as an existential operator if it is located in the left periphery, so the subject is strongly quantified, yielding the specific reading. On the other hand, *you* on the edge of $\nu P$ is a lexical counterpart of $\exists$-closure, so the licensed subject has the nonspecific reading. As a result, the word order of individual SI on the one hand and *ought-to-do* deontics, epistemic and dynamic modals on the other hand directly reflects the hierarchical structure of these elements. The interpretation of indefinite
subjects exhibits a straightforward syntax-semantics mapping. All these testify to the general topography of Chinese modals laid out in (14).

The licensing of quantity-denoting indefinite subjects is attributed to the lexical property of capacity modals, which can introduce an existential closure. Only *ought-to-be* modals locates in an appropriate position and are semantically compatible with capacity modals, so quantity-denoting indefinite subjects are allowed in sentences contain *ought-to-be* modals but not the others. This analysis does not violate the inclusiveness condition because the existential closure is associated with capacity modals instead of certain syntactic projection. Besides, it explains why the word order of modals and subjects correlates to the interpretation of the subjects. Accordingly, the interaction of modals and the interpretations of subject further supports the transparent mapping of syntax and semantics.

5. Deontic Modals in Taiwan Southern Min

From the angle of dialectal comparison, it is worthwhile to note that Taiwan Southern Min patterns with Mandarin in a very interesting way. (36)a) demonstrates that only a deontic modal such as *ingkai*, but not an epistemic modal like *huanse* or a dynamic modal like *kann*, may co-occur with a subject indefinite.

(36)a. sann e lang ingkaiDeo / *huanseEpi / *kannDyn tse tsi tshia.
   three Cl person should/may/dare sit one Cl car
   ‘Three persons should/may/dare ride a car.’

b. * sann e lang ingkaiDeo khi Taipak.
   three Cl person should go Taipei
   (Intended) ‘Three persons should go to Taipei.’

On the other hand, the contrast between (36)a,b) indicates that the deontic modal *ingkai* is not always a SI licenser. The two sentences differ only in their choices of predicates, which leads to their distinct capability of SI licensing.

Furthermore, the existence of an implicit capacity modal under an *ought-to-be* modal in Mandarin also receives cross-dialectal support from Taiwan Southern Min, where it is overtly realized in the form of a bound morpheme *tit*. It typically follows the *ought-to-be* modal *e*, and can be found in various types of combination with *e*, as exemplified in (37).

(37)a. sann e lang e tsiah-tit tsi tshia tiann [e V tit]
   three Cl person E eat-TIT one Cl rice
   ‘Three people can finish a pot of rice.’

三個人會食得一鼎飯。
At first glance, it may seem that Taiwan Southern Min sports a variety of compound modals. However, not all of them are real compounds. Among those composed of *e* and *tit*, the permission *tit* is relatively high in the vP periphery, presumably among the same rank as an *ought-to-be* modal. In the following discussion, we will show how *e* and *tit* interact to derive their surface word orders and distinct modal interpretations.

To begin with, there are at least three differences between (37a) and (37b). The first one concerns their word order. In (37a) *e* and *tit* wrap around the main verb *tsiah* 'eat', while both of them follow the verb in (37b). Secondly, *tit* is obligatory in (37a) but optional in (37b). Without *tit*, the sentence becomes ungrammatical, as in (38a). This is because the modal flavor of *e* turns into epistemic, thus failing to license the quantity SI. On the other hand, the absence of *tit* in (38b) does not have any impacts on its capacity construal.

(38) a. *sann e lang e tsiah tsit tiann png. [e V tit]
   three Cl person E eat one Cl rice
   (Intended) 'Three people are supposed to finish a pot of rice.'
   *三個人會食一鼎飯。

b. *goo e lang tsap uann png tsiah-e-(tit) liau. [V e tit]
   five Cl person ten Cl rice eat-E-TIT finish
   'Five people can eat up ten bowls of rice.'
   五個人十碗飯食會了。

c. *sann e lang etit be thuanthephio. [etit V]
   three Cl person E.TIT buy group.ticket
   'It is allowed for three people to buy a group ticket.'
   三個人會得買團體票。

Finally, the *'e V tit'*-type and the *'V e tit'*-type differ in their ability to take a phase marker: The latter type must co-occur with a phase marker such as *liau* in (37b).² By contrast, no phase marker is allowed in the former type, as evidenced by (39).

(39) *sann e lang e tsiah tit liau tsit tiann png. [e V tit]
   three Cl person E eat TIT finish one Cl rice
   (Intended) 'Three people can finish a pot of rice.'
   * 三個人會食得了一鼎飯。

² Apart from *liau*, this contrast holds when it comes to other phase marker such as *suah*, *khi*, and *uan*.
obligatory object preposing triggered by a phase marker (see Teng 1995, among others).

\[ (40) \] *sann e lang tsit tiann png e tsiah tit liau. \quad [V \, e \, tit] 
three Cl person one Cl rice E eat TIT finish
(Intended) 'Three people can finish a pot of rice.'

* 三個人一鼎飯會食得了。

Now let's turn to the third type in (37), where the two morphemes are fused together as etit, and none of them can be dropped, as evidenced by (41a) and (41b). We will therefore take etit to be a genuine compound in Taiwan Southern Min.

\[ (41) \]

a. *sann e lang e be thuanthephio. \quad [etit]
three Cl person E buy group.ticket
(Intended) 'It is allowed for three people to buy a group ticket.'

* 三個人會買團體票。

b. * sann e lang tit be thuanthephio. \quad [etit]
three Cl person TIT buy group.ticket
(Intended) 'It is allowed for three people to buy a group ticket.'

* 三個人得買團體票。

To provide a coherent analysis of the three types of modal constructions discussed above, we first look into the issue from a diachronic perspective. As Lien (1997) argues quite convincingly, tit, a loan word from language contact, entered Southern Min in which it occurs post-verbally to cooperate with the native pre-verbal counterpart e. In view of its hybrid nature and the parallelism between the two elements, we propose that the three distinct constructions involving e and tit evolved from different paths:

At the initial stage when tit entered Southern Min, e and tit wrap around a verb, and the construction of 'e V tit' showed up. It is worth noting that e was a dynamic modal in early Southern Min before tit was adopted. In fact, the dynamic modal usage of e is still available in its cognate ue in Quanzhou Southern Min, as seen in (42a), as well as some constructions in Taiwan Southern Min in (42b-c).

\[ (42) \]

a. i ue Ingbun. \quad (Quanzhou Southern Min, Wang 1990)
he E English
'S/he can speak English.'

伊會英文。

b. hun ia e, tsiu ia e. \quad (Yang 2001:286 (73))
cigarette also E wine also E
'He not only smokes but also drinks.'

薰也會，酒也會。

c. i si hue tioh e sia ji. \quad (Yang 2001:289 (88))
s/he four year-old PRT E write character
'S/he learned to write when s/he was four.'
伊四歲就會寫字。

(Teng 1980)

d. i t s i n e l i m.  
s/he very able drink.  
'He can (really) drink.'

伊真會咻。

We suggest that tit is externally merged under MP\textsuperscript{Deo}, which in turn triggers the reanalysis of $e$ as a deontic modal. The underlying structure `$e \ V \ tit$' is given below.

\begin{equation}
\text{(43)}\ldots [\text{MP}^\text{Deo} \ e \ [\text{MP}^\text{Cap} \ tit \ [vP \ldots]]
\end{equation}

Here tit occupies the head position of the capacity modal phrase (i.e., MP\textsuperscript{Cap}), selected by the ought-to-be modal $e$. In other words, we have an overt counterpart of the covert capacity modal in Mandarin. Verb movement then takes place to form the '$e \ V \ tit$' pattern of (37a).

\begin{equation}
\text{(44)}
\end{equation}

As illustrated above, the main verb raises to join the capacity modal tit, where they fuse into a complex head. Next consider the scenario where it raises further to wrap around $e$, i.e., the head of MP\textsuperscript{Deo}. This eventually produces the pattern of 'V $e$ tit' in (37b), as illustrated in the following diagram.
Finally we have a case of real compounds such as *etit* in (37c). Unlike the other two constructions, this pattern develops from the integration of *e* and *tit* without resorting to verb movement, as sketched below.

The result is an *allowed-to-be* modal. Here again we have an instance of covert capacity modals embedded under *etit*. This pattern is by no means rare in Taiwan Southern Min: Apart from *etit*, compounds begin with *e* include *etang*, *esai*, and *eingtit*. 
If our analysis is on the right track, the cluster of phenomena examined so far reveal some important facts about the emergence of deontic modals in Taiwan Southern Min: The overt capacity modal is a product of language contact, which leads further to the grammaticalization of various root modals in this dialect. Our proposal thus not only accounts for the three distinct morpho-syntactic patterns of e and tit, but also tells a plausible story about their origins in historical terms.

In sum, the data in Taiwan Southern Min provide substantial support to our view concerning the hierarchical arrangement of modal categories in general. Moreover, both Mandarin and Taiwan Southern Min show that only ought-to-be modals may license quantity-denoting subject indefinites, which receives a full-fledged account from my cartographic analysis.

6. Concluding Remarks

Taking the disparity of modal licensing of SI as a point of departure, we propose to tackle the issue from a comparative point of view. As argued for throughout the paper, dynamic modals in the lexical layer are too low to c-command the inner subject position, while epistemic modals in the complementizer layer are simply too high for the same task, hence the incapability of licensing SI. Under the cartographic approach, distinct types of modality are associated with distinct types of structural projections, conforming to "the height of interpretation". We have thus presented a comprehensive view of the syntax-semantic interaction in SI-licensing, which in turn provides an explicit account of how the proposed mechanism achieves the desirable result from a cross-dialectal comparison.

To explain the asymmetry among deontic modals, we classify them into several subtypes. Only an ought-to-be modal, but not an ought-to-do modals, selects an implicit capacity modal phrase as its complement, which in turn licenses a quantity SI by introducing existential closure (∃-closure) on the edge of vP. This subject may then raise further to the outer subject position, but still get interpreted at its original merge site at LF (i.e., with its lower copy licensed by ∃-closure), hence the quantity reading.

Taiwan Southern Min has an overt capacity modal, tit, where e is an ought-to-be modal. This provides a piece of evidence for the existence of an implicit capacity modal in Mandarin. Compared with their Mandarin counterparts, ought-to-do modals in Taiwan Southern Min are not compatible with a capacity modal, which explains why they fail to license SI. In addition, it sports a variety of compound modals. The permission modal e-tit is one of them. We suggest that it is relatively high in the vP periphery, presumably in the same rank as ought-to-be modals, hence capable of licensing SI. By pinpointing the positions of modals in cartographic terms, the variety of their licensing capacity is accounted for, which once again testifies to the robust analyticity of Chinese in general (Huang 2004).
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