An Epistemic Modal for Strict Comparison in Mandarin Chinese

Zhiguo Xie
The Ohio State University
Columbus, OH 43210, USA
xie.251@osu.edu

Abstract. The epistemic use of yào ‘should’ in Mandarin Chinese shows peculiarities. In this paper, I first describe the empirical properties of epistemic yào. The occurrence of epistemic yào is restricted to certain comparative constructions, but forbidden in other degree constructions or non-degree constructions. It cannot appear above or below negation. It has a quantificational force stronger than that of existential modals, yet weaker than that of strong necessity modals. It can appear with another epistemic modal yīnggāi, which has a very similar modal flavor and an identical quantificational force. When co-occurring, however, the two epistemic modals have to follow a strict word order. Next, I examine whether the above properties of epistemic yào arise as lexical idiosyncrasies, from syntax, semantics, or their interface. Where relevant in the discussion, I compare epistemic yào to the (near-)synonymous yīnggāi. The epistemic use of yào may constitute an interesting case of inter- and cross-linguistic variation in natural language modality.

Keywords: Epistemic modal, comparative construction, Mandarin Chinese

1 Introduction

Modals in natural language often come with “peculiar” properties. To better understand the possible range of such peculiarities, it is an important and meaningful enterprise to provide both empirical description and theoretical study of interesting restrictions on the distribution and interpretation of modal elements across different languages. Certain peculiarities on a modal may receive a systematic explanation in syntax, semantics, and/or syntax-semantics interface, while certain other peculiarities have to be wired in as lexical idiosyncrasies.

In this paper, I provide empirical description and theoretical analysis of the epistemic use of the modal yào ‘should’ in Mandarin Chinese. In section 2, I discuss empirical characteristics regarding the use and meaning of the epistemic yào. I pay particular attention to its distribution, quantificational force, and interaction with negation. I compare yào to the more commonly-used epistemic modal yīnggāi ‘should’. In section 3, I provide a formal analysis of the properties
observed with epistemic yào. Certain properties of the modal arise from its syntax, semantics, and syntax-semantics interface, while certain other properties are best treated as lexical idiosyncrasies. In section 4, I conclude the paper.

2 Empirical Properties of Epistemic Yào in Mandarin Chinese

Like many other languages, Mandarin Chinese has a variety of modal elements. Among them, yào, which also can be used as a regular main verb meaning ‘want, desire’, is one of the most productive and versatile. For instance, it can be used as a deontic modal to express obligations, as a dynamic modal to express volitional future, or as a predictive modal (Ren 2008). These several uses of yào have been studied from many different perspectives.

In addition, yào has an epistemic use which is, to the best of my knowledge, typologically rare in that it carries several unique restrictions. Though this use has been mentioned by Chinese grammarians and linguists, researchers have yet to provide a detailed empirical description, let alone a convincing theoretical treatise, of the properties of epistemic yào. In this section, I will discuss empirical properties of epistemic yào. In my discussion, I compare epistemic yào to yīnggāi ‘should’, which is often used to paraphrase the former modal.

2.1 Pattern of Distribution

First, the epistemic reading of yào is available only when it appears in certain comparative constructions. When yào appears in a non-comparative sentence, it cannot receive an epistemic reading. (1) is an example of the bǐ-comparative construction in Mandarin Chinese (e.g., Xiang 2005, J. Lin 2009). It allows epistemic yào to appear in it. The speaker can use (1) to express, with high certainty, her belief that the house price in Beijing is higher than in Shanghai. The speaker also can use the modal yīnggāi ‘should’ in place of yào to express (roughly) the same proposition. The sentence (2), by contrast, does not involve any comparative construction, and is not compatible with epistemic yào. To express the intended meaning of (2) with epistemic yào, yīnggāi can be used.

(1) Běijīng fàngjià yào/yīnggāi bǐ Shānhǎi gāo.
Beijing house price should BI Shanghai high
‘The (average) house price in Beijing should be higher than in Shanghai.’

(2) huángjīn jiàgé *yào/yīnggāi zài 1500 yuán bùxià fǔdòng.
gold price should at 1500 dollar around fluctuate
‘The price of gold should be fluctuating around 1500 dollars (per ounce).’

The following abbreviations are used in this paper: CL = classifier, MOD = modifier marker, PERF = perfective marker, POS = positive morpheme, DIST = distributive marker.
Second, though previous literature has discussed the appearance of epistemic yào in the bì-comparative construction, few (if any) researchers have considered how epistemic yào fares with other comparative constructions. Like in many other languages, comparative constructions in Mandarin Chinese involve either explicit or implicit comparison, depending on whether the ordering between two objects with respect to a gradable property is established by using special morphology of comparison or using the positive form of the gradable predicate (Kennedy 2007). Implicit comparative constructions are not compatible with epistemic yào. The gēn x bǐ qǐlái “compared with x” comparative is an implicit comparison strategy (Erlewine 2007). It does not allow epistemic yào in it. The sentence in (3), for instance, is only acceptable without the epistemically intended yào.

(3) gēn tā dìdī bǐ-qǐlái, xiǎomíng (*yào) suànshì hěn gāo.
with his brother compare-qlai Xiaoming should considered POS tall
Intended: ‘Compared to his brother, Xiaoming should be considered tall.’

By contrast, many explicit comparative constructions are compatible with epistemic yào. The sentence in (1) already showed the compatibility of epistemic yào with the bì comparative. Several other explicit comparative constructions in Mandarin Chinese have been discussed in the literature. The so-called transitive comparative construction, in which the standard of comparison appears right after the gradable predicate, allows epistemic yào (4). Similarly for the closely-related chū comparative, in which the degree morpheme chū intervenes between the standard of comparison and the gradable predicate. Some other comparative constructions that “licenses” epistemic yào include the gēng comparative (5) and the yu comparative (6). Moreover, yào in such constructions can be changed to yīnggāi without any significant effect on the grammaticality judgment or intuitive meaning.

(4) Wángjùn yào gāo (chū) Zhèngzhāng yī ge tóu.
Wangjun should tall exceed Zhengzhang one CL head
‘Wangjun should be a head taller than Zhengzhang.’

(5) zhè kē méiguī, huā hóng, yè zǐ yào gèng lǜ.
this CL rose flower red leaf should GENG green
‘This rose, its flowers are red; its leaves should be even greener (than its flowers are red).

(6) hòuniǎo de shòumìng yào cháng yu qītā niǎo lèi.
imigratory bird MOD life span should long YU other bird kind.
‘The life span of migratory birds should be longer than that of other kinds.’

Third, though many degree constructions in Mandarin Chinese allow epistemic yào, not all of them do. For example, Mandarin Chinese has a degree construction which involves the possessive/existential verb yǒu and appears very similar to the bì comparative in the surface structure. It typically takes the form of “X + yǒu + Y + G,” with X and Y being determiner phrases and G being a gradable predicate
or a dimension noun. Epistemic *yào cannot appear in this construction (7). Instead, *yīnggāi can be used to express the meaning intended with *yào.

(7) zhāngsān de chéngjì *yào/√yīnggāi yǒu tā gēge hǎo.  
Zhangsan MOD grade should have his brother good
‘Zhangsan’s grade should be as good as his brother’s’

Another degree construction in Mandarin Chinese is the so-called comparative correlative, which involves explicit comparison of the same or different individuals’ degrees associated with a property (J. Lin 2007). The construction does not allow epistemic *yào. The sentence in (8) is ungrammatical with *yào appearing in it. Again, *yīnggāi can be used before the first *yuè to express (roughly) the same meaning as intended with epistemic *yào.

(8) nà ge háizi (*yào/√yīnggāi) *yuè zhǎng yuè hǎokàn.  
that CL child should YUE grow YUE good-looking
‘It should be the case that the more the child grows, the prettier she becomes.’

Fourth, the equative construction, marked with hé/gēn/xiàng x yǐyàng g ‘equally as g as x’, does not allow epistemic *yào to appear in it, either. However, it allows epistemic *yīnggāi. This claim is illustrated by the sentence in (9), which is minimally different from (1) just in that it establishes an identity relation between the average house prices in Beijing and in Shanghai.

(9) Běijīng de fángjià *yào/√yīnggāi gēn Shànghǎi yǐyàng gāo.  
Beijing MOD house price should with Shanghai same high
‘The (average) house price in Beijing should be as high as in Shanghai.’

2.2 *Yào Co-occurring with *Yīnggāi

Fifth, I have shown above that when epistemic *yào appears grammatically in a comparative sentence, it can be replaced with *yīnggāi, and no significant change of meaning is observed between the two choices. In addition, *yào and *yīnggāi can occur together as epistemic modals in certain explicit comparative sentences, a phenomenon that has escaped observation in previous research. The sentence in (10) illustrates the co-occurrence of the two modals, both with an epistemic reading. The subject, jiāoqū de kōngqì, is inanimate and non-volitional. This property rules out the deontic reading for *yīnggāi, as well as the deontic and volitional future readings for *yào. The sentence can be understood as describing the speaker’s judgment about the current air quality in the suburb in relation to the city, thus ruling out the “predictive modal” reading for *yào discussed in Ren (2008). It is safe to claim that both *yīnggāi and *yào in the sentence receive an epistemic reading.
today suburb air should should BI city good
‘Air in the suburb today should be better than in the city.’

For the co-occurrence of epistemic yīnggāi and yào to be grammatical, all the restrictions regarding epistemic yào must be observed. The co-occurrence of epistemic yīnggāi can never “coerce” epistemic yào to be acceptable in a sentence that does not allow the latter in the first place. In addition, in acceptable cases of co-occurrence, yīnggāi must precede yào; switching the order of the two epistemic modals would yield an ungrammatical sentence. This is illustrated by the acceptability contrast between (10) (see above) and (11).

(10) *jīntiān jiāoqū kōngqì yīnggāi bǐ shiqū hǎo.
    today suburb air should should BI city good

(11) *jīntiān jiāoqū kōngqì yào yīnggāi bǐ shiqū hǎo.
    today suburb air should should BI city good

Co-occurrences of multiple modals are nothing rare in Mandarin Chinese (J. Lin & Tang 1995, T. Lin 2012). However, two epistemic modals of the same quantificational force are generally forbidden from occurring together. The sentence in (12), for example, involve epistemic modals yídīng and bǐrán ‘must’ with the same universal quantificational force. It is not acceptable regardless how the two modals are ordered relative to each other. Epistemic yào and yīnggāi, as will be discussed shortly, have the same weak necessity quantificational force. In this sense, co-occurrence of epistemic yào and yīnggāi in a comparative sentence is an interesting exception that requires explanation.

(12) *tā yídīng bǐrán xǐhuān nà jiǔ fāndiàn.
    he must/definitely must/definitely like that CL restaurant
    Intended: ‘He must like the restaurant.’

2.3 Lack of Scope Relation with Negation

Sixth, epistemic yào cannot enter into scope relation with negation in any way (Peng 2007). For instance, without occurrence of bù ‘not’, (13) would be grammatical. Adding bù, either before whether after yào, makes it ungrammatical. In addition, epistemic yào cannot appear in a negative context in any other fashion. For example, it cannot participate in the A-not-A question, either (14).

(13) diànzǐ chǎnpǐn zhōngguó (*bù) yào (*bù) bǐ méiguó piányí.
    electronic product China NEG should NEG BI US cheap

(14) *hēi zhīmá jiàzhí yào bù yào gāo yu bái zhīmá.
    black sesame value should NEG should high YU white sesame

In terms of interaction with negation, epistemic yīnggāi does not behave exactly the same as epistemic yào. Though epistemic yīnggāi cannot appear after
negation or participate in the A-not-A question, it can appear before negation, whether in a comparative sentence (15) or elsewhere.

(15) diànzǐ chǎnpǐn zhōngguó (*bù) yǐnggǎi (bù) bǐ méiguó piányì.
   electronic product China NEG should NEG BI US cheap
   'For many electronic products, it should be the case that they are not cheaper in China than in US.'

2.4 Weak Necessity Quantificational Force

Seventh, different modals have different quantificational strength. There is evidence that epistemic yào is a weak necessity modal comparable to should and ought to in English. First, different from kěnéng ‘possible’, epistemic yào is not an existential modal that expresses the mere existence of relevant possibilities. For example, in the conversation in (16) between A and B, the first clause in B’s responses indicates that B agrees with A’s judgment about the reliability of diaries as compared to memoirs. The second clause in B’s response is intended to be further elaboration of how she agrees. However, by using kěnéng ‘possible’, the second clause weakens, and as such, contradicts, the expressed agreement in the first clause. The weakening and contradiction is comparable to what is responsible for the infelicity of (17), which involves nominal quantificational phrases. Hence, epistemic yào has a stronger quantificational force than kěnéng.

(16) A: wǒ juéde rìjì yào bǐ huíyìlù kěkào.
   I feel diary should BI memoir reliable
   'I think that diaries should be more reliable than memoirs.'
B. #wǒ yě zhème juéde, rìjì kěnéng bǐ huíyìlù kěkào.
   I also so feel diary possible BI memoir reliable
   'I think so, too. Diaries are possibly more reliable than memoirs.'
(17) A: jué dàduōshù rén dōu lái le.
   outright majority people DIST come PERF
   'The by far majority of people have come.'
B: #duì, yǒuxié rén lái le.
   right some people come PERF
   'Right, some people have come.'

On the other hand, epistemic yào is somewhat weaker than canonical strong necessity modals like yídīng and kěndìng ‘must, certainly.’ This claim is evident from the fact that an epistemic modal statement expressed by yào can be ensued by a strong necessity epistemic statement, and reversing the order of the two statements would lead to infelicity (18). The pattern, again, is comparable to a statement involving a weaker quantifier followed by another statement involving a stronger quantifier (19). This similarity suggests that epistemic yào is not a strong necessity modal. Rather, it is similar to English should and ought to – as
already argued by Copley (2006) and von Fintel & Iatridou (2008) – in being a weak necessity modal. Moreover, epistemic yīnggāi has the same quantificational force as epistemic yào: if yào in (16) and (18) is changed to yīnggāi, the acceptability judgment remains the same.

(18)  

a. tā yào bǐ línju yǒuqíán,  
he should BI neighbor rich  
shishishàng tā kěndìng bǐ línju yǒuqíán.  
in fact he certainly BI neighbor rich  
‘He should be richer than his neighbors; in fact, he is certainly richer than his neighbors.’  
b. #tā kěndìng bǐ línju yǒuqíán, shishishàng tā yào bǐ línju yǒuqíán.

To summarize, in this section I discussed several important properties of the epistemic use of yào. In my discussion, I compared epistemic yào to another epistemic modal yīnggāi. Epistemic yào is acceptable only in certain comparative constructions, and hence has a narrower distribution than the (near-)synonymous epistemic yīnggāi. The two epistemic modals can be used together, in which case yīnggāi must precede yào. Epistemic yào cannot appear above or under negation, while epistemic yīnggāi can appear above, though not under, negation. In terms of quantificational force, epistemic yào and yīnggāi both express weak necessity, comparable to English should and ought to.

3 Explaining Empirical Properties of Epistemic Yào

In this section, I will address the question of where the above properties of epistemic yào each come from: whether it is a lexical idiosyncrasy, or arises from syntax, semantics, or the interaction thereof.

3.1 Incompatibility with the Comparative Correlative

I posit that the incompatibility of epistemic yào with the comparative correlative construction, as illustrated by the sentence in (8), is most likely a lexical idiosyncrasy. It has been proposed by J. Lin (2007) that the comparative correlative construction involves a causation relation between degrees. This means that the construction involves a change of state, and is dynamic in nature. The unacceptability of (8) is due to the requirement that epistemic yào cannot be combined with a dynamic prejacent. Confirming this explanation is yet another observation that the degree achievement construction, which is dynamic as well (Kennedy & Levin 2008), is not compatible with epistemic yào. By contrast, yīnggāi is (at least marginally) compatible with a dynamic prejacent and can be
used an epistemic modal in both the comparative correlative and degree achievement constructions (20).

(20)  nà ge hái zi (*yào/?yīnggāi) měi nián zhǎng gāo liǎng lí mǐ.  
that CL child should every year grow tall two cm 

Intended: ‘It should be the case that the child grows 2 cm taller each year.’  

Some modals in other languages manifest a similar distinction regarding whether the epistemic reading is allowed with an eventive prejacent. For example, *must* and *cannot* in English are allowed to receive an epistemic reading only when it has a stative prejacent (21), but *may* and *might* can have an epistemic reading no matter whether it combines with a stative or eventive prejacent (22). To the best of my knowledge, the only attempt to address the distinction so far is Ramchand (2014). The basic idea of her analysis is to attribute the distinction to how (indexically vs. anaphorically) an epistemic modal anchors the denotation of the prejacent in terms of time and world. The distinction, therefore, is treated as a lexical property in her analysis. I assume that Ramchand’s discussion applies to epistemic modals in Mandarin Chinese, as well. It is a lexical idiosyncrasy of epistemic *yào* that it cannot combine with dynamic comparative constructions.

(21) a. John must/cannot be in his office. (epistemic or deontic)  
   b. John must/cannot go to his office. (deontic, ability (*cannot*))  

(22) a. John may/might be in his office. (epistemic)  
   b. John may/might go to his office. (epistemic)  

3.2 Compatibility Only with Certain Comparative Constructions

Epistemic *yào* is compatible only with certain explicit comparative constructions, viz. the *bǐ* comparative, the transitive comparative, the *chū* comparative, the *gěng* comparative, and the *yu* comparative. By contrast, it is not compatible with the *yòu* degree construction, the equative construction marked with *hé/xìng x* yìyàng g ‘equally as g as x’, or any non-degree construction.

A common characteristics among the comparative constructions in which epistemic *yào* can occur is that they all involve strict comparative morphology. For the *bǐ* comparative, different proposals have been entertained, but all of them include a strict comparative morpheme. “Strict comparison” means “greater/less than.” J. Lin (2009), for instance, took a “direct” analysis of the *bǐ* comparative, in which he treated *bǐ* as an overt strict comparative morpheme. Xiang (2005) proposed a so-called “DegP-shell” analysis of the *bǐ* comparative. There are two degree heads in the syntactic structure, with the higher one occupied by *bǐ*, and the lower one by a covert strict comparative morpheme *exceed* that introduces an optional differential phrase. Liu (2011) posited that *bǐ* comparative contains either a strict comparative morpheme *gěng* ‘even-more’ or its covert counterpart. It is sufficient to conclude that whatever form the currently available proposals for the
syntax and semantics of the bǐ comparative take, they all include postulating some strict comparative morpheme, whether overtly or covertly.

The transitive comparative, along with the closely-related chū comparative construction, has been most extensively studied by Grano and Kennedy (2012). The transitive comparative requires the presence of a differential measure phrase. A differential measure phrase, in turn, “requires and is required by the presence of the degree morpheme” (p. 244). For the transitive comparative, the degree morpheme contributes a strict comparative meaning. The preposition chū is analyzed by Grano & Kennedy (2012) to be an overt counterpart of such a strict comparative morpheme. As for the yu comparative, Xie (2014b) showed it not to allow differential measure phrases. By capitalizing on this observation, he showed yu in the yu comparative to be in complimentary distribution with the comparative morpheme in the transitive comparative construction. Hence, it is reasonable to claim that yu itself is a strict comparative morpheme. For the gěng comparative, Liu (2010, 2011) has argued gěng itself is a strict comparative morpheme.

By contrast, the yǒu degree construction has been shown by Xie (2011, 2014a) to be an equative construction comparable to the as…as construction in English. According to Xie, its structure involves a covert degree morpheme, which encodes a “greater than or equal to” relation. It does not have a strict comparative morpheme. The equative construction marked by hé/gěn/xiàng x yīyàng g specifies a strict identity relation between two entities, and does not involve a strict comparative morpheme. As for the implicit comparative construction marked by gěn x bǐ qǐlái “compared with”, it makes use of “the inherent context sensitivity of the positive (unmarked) form” of gradable predicates (Kennedy 2007: p. 143). Its structure does not involve a comparative morpheme at all.

Based on the above discussion, it is reasonable to posit that the presence of a strict comparative morpheme (whether overt or covert) in the syntactic structure of a degree construction is responsible for the acceptability of epistemic yào in the construction. Those constructions without a strict comparative morpheme do not allow epistemic yào. There may be more than one way to represent the restriction in syntax. One option, within the Minimalist Program, is to say that in its epistemic use, yào somehow bears an uninterpretable Comp(аратive) feature which has to be checked by a matching Comp feature. Comparative constructions like the bǐ and transitive comparative constructions provide such a matching feature, while the equative constructions and implicit comparison do not.

Obviously, I have taken a syntactic approach to explain the distribution restriction of epistemic yào. The reader might ask whether a semantically-oriented approach, say within Kratzer’s (1981) possible-world semantics framework of modality, will work, as well. As far as I can see, the answer is negative. If we include in the semantic definition of epistemic yào the “strict comparison” contexts in which the modal can appear, a most likely component to encode the information is in the domain of quantification, by claiming that the worlds accessible from the speaker’s epistemic state in her base world all involve strict comparison. However, this restriction is at best vacuous, because any world can, in principle, support strict comparison of any sort.
A second semantically-oriented option is to require, or presuppose, that the prejacent of epistemic yào express a strict comparative relation. Then, the question comes down to how to take an intensional proposition, which is potentially an indefinite set of possible worlds, and check whether the proposition expresses a strict comparative relation. Though this option might be plausible, it is not clear to me how to represent it in a model-theoretic fashion.

3.3 Co-occurrence of Yào and Yīnggāi

It has been observed above that when epistemic yīnggāi and yào occur together, the former must appear before the latter on the surface. I argue that this property has to do with a very fine semantic distinction within epistemic modals as well as a structural constraint that reflects the semantic distinction. Lyons (1977) classified epistemic modals into subjective and objective sub-types. Subjective epistemic modals express the speaker’s judgment based on what (she thinks) she knows; objective epistemic modals express the speaker’s judgment based on observable evidence often available to the speaker, the hearer, and possibly other people in the local speech community (Papafragou 2006). Despite the subjective vs. objective distinction, epistemic modals in general contribute semantic content and may have syntactic reflection thereof (Hacquard & Wellwood 2012).

Though yào and yīnggāi are both epistemic modals, the former is an objective epistemic modal, and the latter is used subjectively (Peng 2007, Peng & Liu 2012). Since they bear different sub-flavors of epistemic modality, it is not surprising that they can co-occur, in spite of the fact that they have the same quantificational force (a point to be discussed soon). The two stacked modals express the speaker’s judgment based on her private perception of relevant objective evidence available to her (and possibly her local speech community, as well). Compared to its counterpart without yīnggāi, (10) has an extra layer of uncertainty which arises from the speaker’s indeterminacy typically associated with doxastic beliefs. By contrast, compared to its counterpart without yào, (10) does not express a mere guess on the part of the speaker, but conveys that the speaker actually bases her judgment on some objective evidence (e.g., the facts that there is a larger area of forest-covered hills in the suburb area, that it has just rained in the suburb but not in the city, and so on).

In addition, Peng (2007) and Peng & Liu (2012) posited that in Mandarin Chinese, a subjective (interpretation of an) epistemic modal should always appear before an objective (interpretation of an) epistemic modal. How to represent this structural restriction is not very material to the current paper. Presumably, the restriction arises from the syntax-semantics interface of epistemic modals. For our purpose, the most important thing to note is that Peng’s (2007) and Peng & Liu’s (2012) generalization is what lies behind the ordering constraint of yīnggāi and yào occurring together as epistemic modals: the former, which is a subjective epistemic modal, should appear before the latter, which is an objective epistemic modal.
3.4 Semantic Meaning of Epistemic Yào

I have shown above that the distribution restriction of epistemic yào is due to lexical and syntactic reasons. The semantic definition of the modal does not need to, and in fact cannot, encode the restriction. In section 2, I have also indicated that epistemic yào is semantically identical to epistemic yīnggāi, modulo the distinctions with regard to objectivity/subjectivity and scope relation with respect to negation (viz., epistemic yào cannot form scope relation with negation at all, whereas epistemic yīnggāi can (only) scope above negation). The objectivity/subjectivity distinction is clearly semantic in nature; it will be encoded in the modal base in the semantic definitions of the two modals. The distinction with regard to scopal relation with negation presumably has to do with the polarity properties of the two modals, and will be addressed in the next subsection.

Copley (2006) and von Fintel & Iatridou (2008) addressed several important semantic properties, especially the weak necessity quantification force, of English modals should and ought to. Epistemic yīnggāi and yào – ignoring the distinctions mentioned above for the moment – manifest properties that are comparable to should and ought to. In this paper, I primarily draw on Copley (2006) to define the semantics of epistemic yào and yīnggāi. The intuition is that a weak necessity epistemic modal requires: (i) the prejacent proposition of the modal is true in every world that is accessible from the speaker’s knowledge/belief status in her base world and that is ranked as most highly plausible according to some ideal, and (ii) the prejacent proposition would be allowed (not required) to be false if the speaker found herself in a different knowledge/belief status. The first requirement specifies that a weak necessity modal universally quantifies over a “most relevant” set of possible worlds – most relevant in the sense that the worlds are directly accessible from the speaker’s base world. The second requirement keys in the possibility of the prejacent proposition being false in a world that is (potentially) only compatible with a world in which the speaker finds herself dislocated from her current being (so to speak). It is the secondary possibility – which exists only in a “stretched” domain of quantification – that contributes the perceived weakness in the quantificational force of weak necessity modals.

Regarding the objectivity/subjectivity distinction between epistemic yào and yīnggāi, I posit that it arises from the choice of modal base. For epistemic yào, the speaker’s knowledge/belief is required to be based on objective evidence that is available to her, thus making the modal base objectively-oriented. By contrast, the modal base for epistemic yīnggāi is concerned with the speaker’s subjective perception of evidence or probably even arbitrary judgment.

The semantics of epistemic yào (time variable ignored) is defined in (23), where MBobj indicates that the modal base for epistemic yào is objective in nature. ALT is a function that takes an element and returns a set of alternatives to the element. The semantics of epistemic yīnggāi is the same as that of epistemic yào, except for the modal base being MBsub.
3.5 Negation and Yào

It has been noted above that negation is not allowed to occur in an epistemic yào sentence, regardless of the relative position between negation and yào. As I will argue below, actually there are two separate yet related stories behind this restriction. One has to do with why epistemic yào (and epistemic yīnggāi, for that matter) cannot appear under negation. The other has to do with why the reverse order is not allowed, either.

Let us first address the former question. The idea that I would like to pursue is that when epistemic yào or yīnggāi appears under negation (often marked by bù ‘not’), semantically it is equivalent to the existential epistemic modal kěnéng appearing above negation. It is lexical competition between bù yào/bù yīnggāi (epistemically intended) and kěnéng bù, I hypothesize, that leads to the unacceptable status of the former two phrases. The semantic definition of bù yào (epistemically intended) is given in (24). Among the two conjuncts linked by “∨,” the second one basically states that all modal bases alternative to the one accessible from the speaker’s base world can verify the prejacent proposition of epistemic yào. However, this requirement cannot hold in general, as it amounts to saying that the modal base accessible from the speaker’s base world ranks the least ideal among all possible modal bases. Nothing a priori renders such an “ugly” status for the modal base accessible from the speaker’s base world. Hence, the second conjunct is constantly false. The semantics of bù yàoepistemic is just equivalent to the first conjunct, which in turn is equivalent to the semantics of kěnéng bù. Due to the semantic equivalence, bù yàoepistemic competes with kěnéng bù. The former loses, presumably because yào carries more morpho-syntactic restrictions and such restrictions do not have any semantic import or reflection.

(24) \[[yào_{epistemic}]\] = \[λwp. \forall w'(w' ∈ HIGH-PLAUSIBILITY(MB_{obj}(w)) → p(w') = 1) ∧ ∃M(M ∈ ALT(MB_{obj}(w)) ∧ ∃ w" (w" ∈ HIGH-PLAUSIBILITY(M) ∧ p(w") = 0))\]

Regarding the fact that epistemic yào cannot appear above negation, I propose, albeit tentatively I should admit, that it has to do with the polarity property of the modal. Iatridou & Zeijlstra (2013) showed that deontic and epistemic modals can be grouped as positive-polarity items (PPIs), negative polarity items (NPIs), and polarity-neutral items. The classification does not only apply to English modals, but to modals in many other languages. The three types of modals manifest rather distinguished behaviors with respect to their scope relation with respect to negation. For the purpose of this paper, it suffices to note that “all neutral and NPI modals scope under negation” (Iatridou & Zeijlstra 2013: p564).

Assuming that modals in Mandarin Chinese also carry polarity distinctions, epistemic yào cannot be an NPI, because it can occur in positive sentences. It is
very likely not a PPI, either, for it does not pass PPI-ood tests (Szabolcsi 2004). For instance, PPIs (like ‘someone’ and ‘must’) are acceptable in the scope of clause-external negation (25). However, epistemic yào cannot appear in such a context, as suggested by the unacceptability of the sentence in (26).

(25)  a. No one says that the president found someone.
   b. I do not think that he must come home tonight.

(26) wǒ bù rènwéi tā (*yào) bǐ tā dìdī gāo.
   I not believe he should BI his brother tall
   Intended: ‘I do not think that he should be taller than his younger brother.’

Hence, epistemic yào patterns with such English (semi-)modals as have to and need to in being a polarity-neutral item. An interesting characteristic of polarity-neutral modals is that they scope under negation for semantic interpretation. Therefore, even when epistemic yào appears above negation on the surface, it has to end up scoping under negation semantically. It has been just established above, however, that epistemic yào does not allow for such a semantic scope relation.

4 Conclusions

Modals can carry all sorts of peculiarities, in terms of distribution and interpretation. In this paper, I provided both empirical description and theoretical investigation of the rarely-discussed epistemic use of yào in Mandarin Chinese. Epistemic yào can only occur in certain comparative constructions. It cannot enter into any scope relation with negation. Its quantificational force is stronger than that of existential modals, yet at the same time weaker than that of strong necessity modals. Epistemic yào can appear with another epistemic modal yīnggāi, which has the same modal flavor (broadly speaking) and quantificational force. When the two epistemic modals co-occur, however, yīnggāi has to precede yào. In the theoretical analysis component, I examined where each property of yào comes from: lexical idiosyncrasies, syntax, semantics, or the interface between syntax and semantics. I think that the epistemic use of yào constitutes an interesting case in studying inter- and cross-linguistic variation in natural language modality.

References


