RESEARCH ARTICLE

Co-occurrence of Epistemic Modality in Chinese

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ABSTRACT

In Chinese, epistemic modality expressions include adverbs, auxiliary verbs, and sentence-final particles. This study focuses on the co-occurrence of various degrees of epistemic modality expressions and discusses the effect of their co-occurrence on the likelihood of sentences. First, we collected data on co-occurrence cases of various expressions from a large-scale corpus and analyzed the characteristics of the distribution of these co-occurrence patterns. Second, we examined how modal adverbs and sentence-final particles of different scales of modality affect the likelihood of sentences when they co-occur. We observed that lower certainty expressions precede higher ones, following a hierarchy of Mod_{possibility} > Mod_{probability} > Mod_{certainty}, regardless of their categories. Moreover, the sentence-final particle吧ba diminishes the likelihood of a proposition, while the sentence-final particle是...的(shi)...de strengthens it. The findings in this study contribute to a deeper understanding of epistemic modality in Chinese and offer novel resources for the acquisition of the language.

KEYWORDS

Chinese, co-occurrence, epistemic modality, sentence-final particles

ARTICLE INFORMATION

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1. Introduction

The Chinese languages exhibit a variety of strategies for expressing epistemic modality. Although some epistemic modalities may appear semantically incompatible, they can co-occur in a single sentence, as shown in (1).

(1)大约孔乙己的确死了。
probably Kong Yiji really dead
‘Probably Kong Yiji is really dead.’

This research aims to examine the co-occurrence patterns of epistemic modal expressions in Chinese. We analyze the interaction and influence of various modal expressions on the likelihood of the interpretation of a sentence.

Previous studies have analyzed the semantic nuances and distributional patterns of epistemic modal expressions. However, most scholars focus on the usage and functions of modal auxiliary verbs and adverbs. Their co-occurrence and the effects of combining different scales of modal expressions on the likelihood of sentence interpretation have not been thoroughly examined. To address this research gap, we adopt a corpus-based approach using the Center for Chinese Linguistics (CCL) corpus (Pekin University), a large-scale Chinese corpus, to collect authentic language samples and investigate the frequency and distribution of different co-occurrence patterns.
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Analyzing the correlation between modal auxiliary verbs and adverbs and their co-occurrence with sentence-final particles (SFPs) can provide valuable insights into how Chinese speakers express and interpret degrees of certainty and uncertainty in their discourse. This knowledge contributes to a deeper understanding of language variation and usage and has the potential to inform language teaching.

This paper is organized into six sections. In Section 2, we provide a comprehensive review of the relevant literature on epistemic modality. Section 3 outlines the corpus-based methodology used to collect and analyze linguistic data from the CCL corpus. We also outline the criteria for selecting modal auxiliary verbs, modal adverbs, and their combinations for our investigation. In Section 4, we present the results of different co-occurrence patterns. Furthermore, we identify the dominant co-occurrence patterns through a quantitative analysis. Section 5 discusses the results of our investigation and analyzes how different combinations of modal adverbs affect the likelihood of interpretation of a sentence. Moreover, we discuss the effect of inserting SFPs on the likelihood of interpretation of the sentence. In Section 6, we provide a conclusion that summarizes the key findings and highlights the contributions and significance of this research.

2. Literature Review

Modal expressions have long been discussed across languages in the literature (e.g., Von Wright 1951; Lyons 1977; Chung and Timberlake 1985; Palmer 1986). In English, modal auxiliary verbs such as can, must, and should are generally regarded as the primary resources for expressing modality, while other categories, for example, modal adverbs, are also attracting growing attention (e.g., Quirk et al. 1985; Hoye 1997; Halliday and Matthiessen 2014; Keizer 2018). In Chinese, modal expressions include modal auxiliary verbs, modal adverbs, and SFPs (e.g., Tsang 1981; Tiee 1985; Qi 2006; Xu 2008). This section provides an overview of the previous analyses of various epistemic modal expressions and their co-occurrences.

Palmer (1986) divides modality into two main categories, namely epistemic and deontic modalities. Epistemic modality, which is related to propositions, expresses a speaker’s assessment of the empirical status of a proposition. Deontic modality, which is related to events, denotes speakers giving permission or laying an obligation for the event in the future. Hoye (1997) provides a detailed analysis of the co-occurrence of modal auxiliary verbs and modal adverbs. He demonstrates the use of adverbs to emphasize or change the meaning of the modal auxiliary verb in some manner. Adopting Close’s (1975) classification of epistemic modal auxiliary verbs, Hoye (1997: 240) categorizes modal adverbs into three groups expressing the epistemic trichotomy of certainty, probability, and possibility, as shown in Table 1.

Table 1. Classification of Epistemic Modal Expressions in English

<table>
<thead>
<tr>
<th>Auxiliary Verbs</th>
<th>Probability</th>
<th>Certainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>might, may, could, can*</td>
<td>should, ought to, would, will</td>
<td>must, can’t</td>
</tr>
<tr>
<td>possibly, conceivably, perhaps, maybe</td>
<td>probably, quite, likely, most likely, well**</td>
<td>certainly, definitely, indeed, presumably, surely, for certain, of course, undoubtedly, necessarily</td>
</tr>
</tbody>
</table>

* Only in rhetorical questions: “Can this be love at first sight?”

** Only after could, may, and might.

Previous studies have focused on three categories of modal expressions in Chinese, namely auxiliary verbs (Tsang 1981; Xu 2008); modal adverbs (see Tiee 1985; Zhang 2000; Shi 2003); and SFPs (see Zhu 1982; Wang 1987; Zhao 2019). For brief discussions on the co-occurrence of these three categories, see Qi (2006), Qi (2007), and Wan (2016).

Zhang (2000: 60–62) divides adverbs into 10 categories, and epistemic modality is classified as “evaluative adverbs,” including 的确 dí què, 一定 yí dìng, 必定 bì ding.

As for the subcategories of modality, Shi (2003: 21–22) classifies modal adverbs from a semantic perspective into two categories, namely epistemic modality and deontic modality, based on Lyons’ (1977) and Palmer’s (1986) work. Epistemic modality is further divided into two subcategories, that is, deductive and speculative. First, epistemic deductive reasoning confirms the factuality of a proposition, and it can be further divided into three sub-categories. These sub-categories are confirmation (e.g., 想必 xiǎng bì), assertion (e.g., 确实 què shí, 的确 dí què), and indication (e.g., 才 cái). Second, epistemic speculation is the speculation of the truth of a proposition, and it can be divided into two subcategories, namely possibility (e.g., 大约 dà yuē, 大概 dà gài) and necessity (e.g., 必然 bì rán, 必定 bì ding). Regarding the order of sequential use of modal adverbs, Shi (2003: 24) proposes that several types of adverbs can be flexible. For example, adverbs indicating possibility can appear before or after adverbs indicating assertion. Shi (2003: 25–26) further summarizes four principles of the constraints on the order of modal adverbs, which are the principle of scope, the principle of subjective degree, the principle of coherence, and the principle of prominence.
Xu (2008:265) highlights that seven auxiliary verbs express epistemic modality, which belongs to the three dimensions of epistemic modality. These dimensions included possibility, represented by 可能 kě néng and 能 néng, necessity, represented by 应该 yīng gāi and 该 gāi; and prediction, represented by 要 yào, 得 děi, and 会 huì.

Qi (2006:7) argues that four categories—modal adverbs, modal auxiliary verbs, SFPs, and exclamatory particles—can express mood. These four categories can co-occur in one sentence, forming 15 combinations, including the co-occurrence of modal auxiliary verbs.

Although previous analyses have established a relatively comprehensive understanding of the Chinese modality system, few studies have explored the co-occurrence patterns of various types of modal adverbs and the influence of co-occurrence on semantics. This study examines the co-occurrence patterns of epistemic modal expressions in Chinese through three research questions: (1) What are the characteristics of the distribution of co-occurrence patterns of epistemic modal expressions? (2) How do different scales of modality affect the likelihood of sentences when they co-occur? (3) How do the SFPs affect the likelihood of sentences?

3. Methodology

Due to the absence of uniform classification criteria in previous studies on Chinese modal auxiliary verbs and adverbs, this study adopts the classification method of modal auxiliary verbs and adverbs in English (Table I) proposed by Hoye (1997) to compare the co-occurrence of epistemic modal expressions in Chinese. We classify Chinese modal auxiliary verbs and adverbs according to the possibility/probability/certainty scale. Furthermore, we refer to the Xiandai Hanyu Yuqi Chengfen Yongfa Cidian (transl. Dictionary of the Usage of Mood Components in Modern Chinese) to identify the categories of each word selected for investigation and cross-reference the results with previous research. To identify these three epistemic scales, we consult dictionary definitions of the words and incorporate our introspection as native speakers of Chinese. The classification of Chinese epistemic auxiliary verbs and adverbs is listed in Table 2.

Table 2. Epistemic Modal Expressions in Chinese

<table>
<thead>
<tr>
<th>Auxiliary verbs</th>
<th>Possibility (AUX_probability)</th>
<th>可能 kě néng, 容易 róng yì</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability (AUX_probability)</td>
<td>会 hui, 应该 yīng gāi</td>
<td></td>
</tr>
<tr>
<td>Certainty (AUX_certainty)</td>
<td>必 bì</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adverbs</th>
<th>Possibility (ADV_probability)</th>
<th>似乎 sì hū, 好像 hào xiàng, 仿佛 fǎng fú, 或许 huò xù, 兴许 xīng xù, 也许 yě xǔ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability (ADV_probability)</td>
<td>恐怕 kǒng pà, 想必 xiǎng bì, 势必 shì bì, 大半 dà bǎn, 大约 dà yuē, 大概 dà gài, 大抵 dà dǐ, 多半 duō bǎn</td>
<td></td>
</tr>
<tr>
<td>Certainty (ADV_certainty)</td>
<td>绝对 jué duì, 确实 quē shí, 确定 què dìng, 一定 yī dìng, 必然 bì rán, 必定 bì dìng, 铁定 tiě dìng, 肯定 kěn dìng, 指定 zhǐ dìng, 准 zhǔn, 准保 zhǔn bǎo</td>
<td></td>
</tr>
</tbody>
</table>

To analyze how different scales of modality affect the likelihood of sentences when they co-occur, we combine the six subcategories and obtain a total of 12 combinations, namely AUX的可能性=AUX possibility, AUX的可能性=AUX certainty, AUX的可能性=AUX probability, AUX的可能性=ADV possibility, AUX的可能性=ADV certainty, AUX的可能性=ADV probability, AUX的可能性=ADV certainty, AUX的可能性=ADV probability, AUX的可能性=ADV certainty, AUX的可能性=ADV possibility, AUX的可能性=ADV certainty, AUX的可能性=ADV probability, and AUX的可能性=ADV certainty. We also examine the reverse versions of the 12 combinations, resulting in a total of 24 combinations. All instances of co-occurrence appear in the same main clause. To avoid any ambiguity, we exclude negations such as 不可能 bù kě néng, 不会 bù huì, and 不应该 bù yīng gāi and interrogative sentences. The results are presented in the next section.

4. Results and Discussion

English modal verbs expressing the same modality can only co-occur in a coordinated structure within the same clause (Palmer 1974: 97), as shown in (2).

(2) John can and will help his friends.

On the other hand, Chinese modal verbs can be used more freely in co-occurrence. The results of the investigation of the co-occurrence of epistemic modal auxiliary verbs are compiled in Table 3.
Table 3 elucidates that Chinese modal auxiliary verbs that express possibility and probability co-occur most frequently (in total, 12,177 tokens). The frequency of the co-occurrence of 可能 kě néng and 会 huì, as an instance of the AUXposibility–AUXprobability order, is significantly high (96.6%). Moreover, 9,998 out of 11,767 cases of the co-occurrence of 可能 kě néng and 会 huì are adjacent ones (i.e., 可能会 kě néng huì). In the 1,769 non-adjacent cases, other types of adverbs (e.g., 更 gèng “more,” 就 jiù “then,” 还 hái “also,” 将 jiāng “will,” 突然 tū rán “suddenly,” and 最终 zuì zhōng “ultimately”) may appear between 可能 kě néng and 大约 dà yuē. Furthermore, 可能 kě néng may also be used at the initial position of a clause, followed by the subject. The co-occurrence of AUXposibility and AUXcertainty is notably infrequent, and the rules of Chinese prosody could be a contributing factor to this contrast. Liu (1990) has proposed that monosyllabic and disyllabic synonyms, including allogeneic synonyms, should generally be combined with words of the same number of syllables in terms of syllable collocation. As the auxiliary verb 必 bì, which expresses certainty, is a monosyllabic word, its conjunction with auxiliary verbs that have two syllables, such as 可能 kě néng and 容易 róng yì, happens less frequently. On the other hand, the combination of 必 bì and the monosyllabic auxiliary verb 会 huì is frequently observed.

Consequently, it is possible to infer, except in some unusual circumstances, that epistemic modal auxiliary verbs used to express a judgement of a lower degree of likelihood of the empirical status of a proposition tend to occur in positions that precede those of a higher degree of likelihood, as shown in (3).

(3) \( \text{Mod}_{\text{possibility}} > \text{Mod}_{\text{probability}} \)

The examples of each co-occurrence pattern are as follows:

(4) \( \text{AUX}_{\text{possibility}} - \text{AUX}_{\text{probability}} \)

不 吃 米饭 可能 会 得 糖尿病。
NEG eat rice AUXpos AUXpro get diabetes
‘You may get diabetes by not eating rice.’

(5) \( \text{AUX}_{\text{probability}} - \text{AUX}_{\text{possibility}} \)

它 就 会 可能 危害 整个 社会的 稳定 发展。
It then AUXpro AUXpos endanger whole society’s stable development
‘It can endanger the stable development of the whole society.’

(6) \( \text{AUX}_{\text{possibility}} - \text{AUX}_{\text{certainty}} \)

甚至 连 读者 也 可能 必 在 同样的 不自觉的 矛盾之中。
ADV ADV reader also AUXpos AUXcer in same unconscious contradiction
‘Even the reader is probably in the same unconscious contradiction.’

(7) \( \text{AUX}_{\text{certainty}} - \text{AUX}_{\text{possibility}} \)

因此 他们 必 更 容易 误入 歧途。
CONJ 3-PL AUXcer more AUXpos go astray
‘So they are more likely to go astray.’

(8) \( \text{AUX}_{\text{certainty}} - \text{AUX}_{\text{probability}} \)

若 娶 了 你， 必 会 加倍 爱惜 哩。
SBJV marry PRT 2-SG, AUXcer AUXpro doubly cherish SFP
Table 4: Co-occurrence of Epistemic Modal Adverbs

<table>
<thead>
<tr>
<th>Co-occurrence</th>
<th>Tokens</th>
<th>Reversed word order</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADV(<em>{\text{possibility}})-ADV(</em>{\text{probability}})</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>ADV(<em>{\text{possibility}})-ADV(</em>{\text{certainty}})</td>
<td>247</td>
<td>61</td>
</tr>
<tr>
<td>ADV(<em>{\text{probability}})-ADV(</em>{\text{certainty}})</td>
<td>144</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 4 shows the contrast between different word order patterns. Word order patterns with a lower degree of likelihood preceding a higher degree of likelihood are preferred to reversed ones, especially the co-occurrence of ADV\(_{\text{possibility}}\)-ADV\(_{\text{certainty}}\) (80.2%) and ADV\(_{\text{probability}}\)-ADV\(_{\text{certainty}}\) (95.4%). Despite a lower ratio, ADV\(_{\text{possibility}}\)-ADV\(_{\text{probability}}\) is used more frequently than ADV\(_{\text{probability}}\)-ADV\(_{\text{possibility}}\) (59.1%). The frequency of the co-occurrence of 也许 yě xǔ and 的确 di què, as an instance of the ADV\(_{\text{possibility}}\)-ADV\(_{\text{certainty}}\) order, is higher than other combinations (17.8%). Regarding the ADV\(_{\text{probability}}\)-ADV\(_{\text{certainty}}\) order, 想必 xiǎng bì and 一定 yí ding co-occur most frequently (31.3%).

Similar to the distribution of auxiliary verbs, the co-occurrence patterns of epistemic modal adverbs follow the hierarchy of likelihood in (9). Examples of each co-occurrence pattern are as follows:

(9) Mod\(_{\text{possibility}}\) > Mod\(_{\text{probability}}\) > Mod\(_{\text{certainty}}\).

(10) ADV\(_{\text{possibility}}\)-ADV\(_{\text{probability}}\),

好像 家里人 大抵 都 是 这样。

'Ve seem to be the same in most families.'

(11) ADV\(_{\text{probability}}\)-ADV\(_{\text{possibility}}\),

这 失眠 大概 也许 不是 因为 这个。

'This insomnia is probably not because of this.'

(12) ADV\(_{\text{possibility}}\)-ADV\(_{\text{certainty}}\),

...等等 办法， 也许 一定 能够 推迟 审判。

'...and other ways, it may certainly be possible to postpone the trial.'

(13) ADV\(_{\text{certainty}}\)-ADV\(_{\text{possibility}}\),

这一 规律 的确 似乎 是 适用于 这 一纲 的。

'This rule does seem to apply to this syllabus.'

(14) ADV\(_{\text{probability}}\)-ADV\(_{\text{certainty}}\),

大概 准 是 个 好人。

'Probably he/she will be a good person.'

(15) ADV\(_{\text{certainty}}\)-ADV\(_{\text{probability}}\),

他的 “精神” 也 的确 半 丢失 了。

'His `spirit’ is indeed mostly `lost’ as well.'
Table 5 shows that auxiliary verbs are more likely to follow the adverbs, regardless of their meaning. The word order patterns of ADV certainty—AUX probability and ADV possibility—AUX probability co-occur most frequently. Furthermore, 18,782 out of 19051 cases of the former pattern are co-occurrences of ADV certainty and 会 hui. Concerning the latter pattern, 7,139 out of 7,891 cases are ADV possibility and 会 hui. The reason why 会 hui is used so frequently may be attributed to the fact that it is one of the most frequently used typical modal verbs in modern Chinese (Wang (2002: 18)). Similarly, the combination of auxiliary verbs and adverbs expressing probability confirms this explanation (2,468 out of 2,568 cases of 会 hui).

The examples of each co-occurrence pattern are as follows:

(16) AUX possibility—ADV probability
世间 的 生意 可能 大抵 如此。
world of business AUX pos ADV pro same
'The business of the world is probably about the same.'

(17) ADV probability—AUX possibility
这 大概 容易 产生 腐败。
this ADV pro AUX pos cause corruption
'This is probably likely to cause corruption.'

(18) AUX possibility—ADV certainty
他 可能 确实 就是 杀人犯。
3-SG AUX pos ADV cer indeed is murderer
'He may indeed be the murderer.'

(19) ADV certainty—AUX possibility
肥胖 确实 可能 影响 心脏 的 正常 功能。
obesity AUX cer AUX pos affect heart of normal function
'Obesity may indeed affect the normal function of the heart.'

(20) AUX possibility—ADV possibility
你 也 会 好像 没 看见 的。
2-SG also AUX pro AUX pos NEG see SFP
'You will also look like you didn’t see it.'

(21) ADV possibility—AUX probability
咱们也许会一起共事的。
1-PL ADVpos AUXpro together work SFP
'We'll probably work together.'

(22) AUXprobability–ADVcertainty
地球温度就会必然增加。
Earth temperature then AUXpro ADVcer increase
'The Earth’s temperature will then definitely increase.'

(23) ADVcertainty–AUXprobability
他准会吓跑了。
3-SG ADVcer AUXpro scare off SFP
'He will be scared off.'

(24) ADVpossibility–ADVcertainty
二者之间似乎必有一个是非。
between the two ADVpos AUXcer have one CL right and wrong
'There seems to always have a right and a wrong between the two.'

(25) ADVprobability–ADVcertainty
在党的大概必是少数。
those in the party ADVpro AUXcer be minority
'Those in the party probably must be a minority.'

5. Discussion
In this section, we discuss how different modal adverbs and their combinations affect the likelihood of interpretation of sentences. We also explore the co-occurrence of modal adverbs with SFP 吧 ba, which expresses uncertainty, and (是) ... 的 (shi) ... de, which emphasizes propositions. Furthermore, we discuss how the two SFPs affect the likelihood of interpretation of the sentence.

First, we assumed that the unmarked proposition 孔乙己死了 Kong Yiji Sile (Kong Yiji is dead) expresses the highest degree of likelihood or a real-world fact, as shown in (26a). We added epistemic modal adverbs from three categories to the proposition (26b–d) and combined them with different scales (26e–g).

(26) a. Unmarked: 孔乙己死了 ‘Kong Yiji is dead’.  
b. ADVpossibility: 或许孔乙己死了。  
c. ADVprobability: 大约孔乙己死了。  
d. ADVcertainty: 孔乙己的确死了。  
e. ADVpossibility–ADVprobability: 或许孔乙己大约死了。  
f. ADVpossibility–ADVcertainty: 或许孔乙己的确死了。  
g. ADVprobability–ADVcertainty: 大约孔乙己的确死了。

To visualize the likelihood of these seven cases, we put them all on one continuum, as illustrated in Fig. 1. Instead of a numerical value, we denoted likelihood by a range. We found that, as an unmarked proposition, (26a) denotes a probability of 100%, which can be indicated by 1. Meanwhile, (26b–d) represents an incremental scale of likelihood. As for (26e), the co-occurrence of possibility and probability describes a stronger likelihood than (26b) does. Because of 的确 dí què, (26f) and (26g) indicate higher points on the scale of likelihood than (26b) and (26c).

Figure 1. Likelihood scales of modal adverbs.
Second, we considered the co-occurrence patterns of modal adverbs with the SFPs 吧 ba and (是) ... 的 (shi) ... de. Examples with 吧 ba are provided in (26a–g).
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We observed that 吧 ba diminishes the likelihood conveyed by each modal adverb in (26b'), (26c'), and (26e'–g'). Furthermore, (26a') is more likely to be understood as a confirmation to the addressee rather than as a subjective estimation by the speaker. The combination in (26d') sounds distinctly odd, probably due to the conflict between the certainty of 的确 dí què and 吧 ba. As mentioned in Qi's (2007: 130) work, modal adverbs and SFPs are more likely to co-occur when they express the same subjective degree. On the other hand, in (26f') and (26g'), although 的确 dí què co-occurs with 吧 ba, the presence of the adverbs 或许 huò xǔ and 大约 dà yuē reduces the certainty conveyed by 的确 dí què and makes these sentences sound more natural. The overall tendency shifts toward the left in a continuum, as illustrated in Figure 2.

![Figure 2](image)

Figure 2. Likelihood scales of modal adverbs with the SFP 吧 ba.

Finally, we considered the co-occurrence patterns of modal adverbs with the SFPs (是)…的 (shì)…de, as shown in (26a''–g'').

![Figure 3](image)

Figure 3. Likelihood scales of modal adverbs with the SFP (是)…的 (shì)…de.

6. Conclusion
This study investigated the patterns of co-occurrence of epistemic modality expressions in Chinese, providing insights into the intricate connection between modal adverbs and SFPs in expressing different levels of certainty and uncertainty. By conducting a thorough analysis of linguistic data from the CCL corpus, we identified prevalent co-occurrence patterns and explored the semantic factors that shape their usage.

According to our findings, demonstrate that the co-occurrence patterns of auxiliary verbs and adverbs follow the hierarchy of likelihood \( \text{Mod}_{\text{possibility}} > \text{Mod}_{\text{probability}} > \text{Mod}_{\text{certainty}} \). We observed that the occurrence of adverbs of different scales can affect the likelihood of a proposition. Taking SFPs into account, we also found that the co-occurrence with the SFP 吧 ba is primarily associated with expressions indicating a lower level of certainty, whereas the SFP (是)…的 (shì)…de, which emphasizes propositions, reinforces the certainty of the entire sentence.

The findings obtained from this study provide significant insights into the ways in which Chinese language users utilize particular lexical elements to express different levels of epistemic modality. This statement highlights the complex nature of linguistic structures and the ability of specific lexical components to alter the meaning of sentences.
However, it is important to acknowledge that this study does have several limitations. The utilization of the CCL corpus as a source of linguistic data, albeit offering a strong basis, limits our understanding to the patterns and usages that are encompassed within it. Therefore, it is possible that the results may demonstrate a certain level of specificity to the particular situations and dialogues contained within the corpus.

In order to gain a deeper understanding of the versatility and adaptability of the co-occurrence patterns identified in our study, we propose that future research should investigate their potential application in various linguistic situations, including casual spoken conversation and digital communication platforms. Furthermore, a thorough examination of the impact of cultural and social elements on the utilization of epistemic modality expressions has the potential to provide profound contextual understandings of language usage and development.

In conclusion, the findings obtained from this study have the potential to greatly contribute to the field of language education by enhancing educators’ understanding of the nuanced use of epistemic modality expressions in the Chinese language. Consequently, this facilitates the creation of enhanced educational resources and instructional approaches that closely coincide with the subtle linguistic nuances and practical applications of these phrases, thus augmenting the effectiveness and pertinence of language instruction.

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