

The Use of Modal Auxiliaries as Hedging Devices in Chinese Research Articles

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Abstract

This study investigates the use of six Chinese modal auxiliaries as hedging devices in academic abstracts. Drawing on a corpus of 40 abstracts—evenly sampled from Economics, Linguistics, Engineering, and Natural Sciences. We analysed the document-level frequencies, functional distributions, and disciplinary variations of the target modals. The primary finding is a generally sparse use of modalisation overall. The abstracts predominantly relied on 会 (*hui*), 可以 (*keyi*), and 能够 (*neng(gou)*), while 可能 (*keneng*) and 应该 (*yinggai*) were rare or entirely absent in several disciplines. Cross-disciplinary contrasts at the abstract level were modest: Economics and Natural Sciences showed slightly broader type coverage, while Linguistics and Engineering were more restricted in the range of modals used. Functionally, these modal auxiliaries in abstracts more often served to create explanatory linkage between propositions than to express epistemic uncertainty. The implications of these patterns for understanding the rhetorical conventions of Chinese academic abstract writing are discussed.

Keywords: Modal auxiliaries; Chinese research articles; frequency and distribution; hedging devices; disciplinary differences.

Introduction

The American scientist Zadeh in 1965 proposed the concept of “Fuzzy sets” for the first time. He used examples to illustrate the concept of hedges, which stated, “the class of animals includes dogs, horses, and birds, as well as their members, but excludes such objects as rocks, fluids, and plants. However, the same kind of ambiguity arises when a number such as 10 is a member of the ‘class’ of all real numbers greater than 1.” (Zadeh, 1965: 338). Lakoff (1973) initially defined hedges as a lexical group used to introduce ambiguity or clarity in statements. These linguistic tools are important in academic writing because they help express uncertainty, which improves communication in global scholarly conversations. Yang (2013) highlights the common use of hedging devices in academic writing, especially in relation to “epistemic modality” and interpersonal functions. These aspects assist in sharing information effectively. This emphasises the need to understand how to use hedges properly in academic writing. Supporting this view, evidence from learners indicates that skill level and recurring mistakes in modal auxiliaries significantly affect clarity and interpersonal tone in writing (Bual, 2024).

Lakoff (1973) and Hyland (1998) explained the meaning and function of hedging devices. In a significant study, Hyland (1998) claims that hedging in academic writing often comes through dictionary verbs, epistemic adjectives, adverbs, and modal verbs. This classification is essential for understanding how to use hedging techniques in academic discourse.

Moreover, Coates (1983) lists the English modal auxiliaries commonly found in academic writing: must, should, ought (to), may, might, can, could, will, would, and shall. Recent comparative research goes beyond Indo-European languages. For example, Xanaliyeva and Umrzaqova (2024) compare English and Uzbek, linking the differences between the languages to typological factors. English shows more grammaticalisation and specialisation of auxiliaries, while Uzbek has a simpler system with fewer auxiliary forms. For English comparative modals, “rather” and “sooner” share preference semantics but diverge syntactically: corpus evidence shows that “rather” licenses a wider range of complements, whereas “sooner” is largely restricted to infinitival, a pattern the authors analyse in construction-grammar terms (Nykiel & Thaisen, 2024).

In the realm of Chinese study on modal auxiliaries as hedges, Song (2009) categorises Chinese modals based on functions such as possibility, willingness, and necessity. Subsequent research (e.g., Wu, 1999) establishes a connection between hedging uses and their meanings through English-Chinese contrast. However, specific Chinese morphemes or formulas that encapsulate hedging practices are still limited. Yang (1998) pointed out that a long-standing problem is that there are few Chinese modal items that can be used to express fine-grained probabilities. In practice, a single Chinese modal often has to cover multiple English meanings, which can lead to either under-hedging or over-generalisation in academic writing. As a result, Chinese scholars could have difficulty

achieving the same level of accuracy as in English when employing modal auxiliaries to mitigate or temper assertiveness in academic writing.

Literature Review

Many studies in the previous years researched modality of hedges in English academic literature (e.g. Hyland, 1998; Varttala, 1999; Prince et al., 1982). Varttala (1999) categorised hedges into five distinct types: Cognitive Modal Auxiliary Verbs, Cognitive Modal Verbs, Cognitive Modal Adjectives, Cognitive Modal Adverbs, and Cognitive Modal Nouns. The definition of modality is contentious among several Linguistics organisations. Halliday (1970) defines modality as an interpersonal resource enabling the speaker or writer to intervene in the speech event to indicate a specific perspective on the proposition. According to Quirk et al. (1985), language modality reflected how speakers judge a topic's authenticity. Further defining modality as a linguistic expression of the speaker's assessment of the possibility and necessity of content is Huddleston & Pullum (2002). This viewpoint highlights the importance of modal auxiliaries in expressing epistemic stance, and it is supported by the research of Torabiardakani et al. (2015) and Hu & Cao (2011), which investigated the different ways that modal auxiliaries are used in academic articles written in English and Chinese. Tong (2021) wrote that modality is the primary semantic carrier for interpersonal communications under the functional linguistic view, and modal verbs are the important part of the modality.

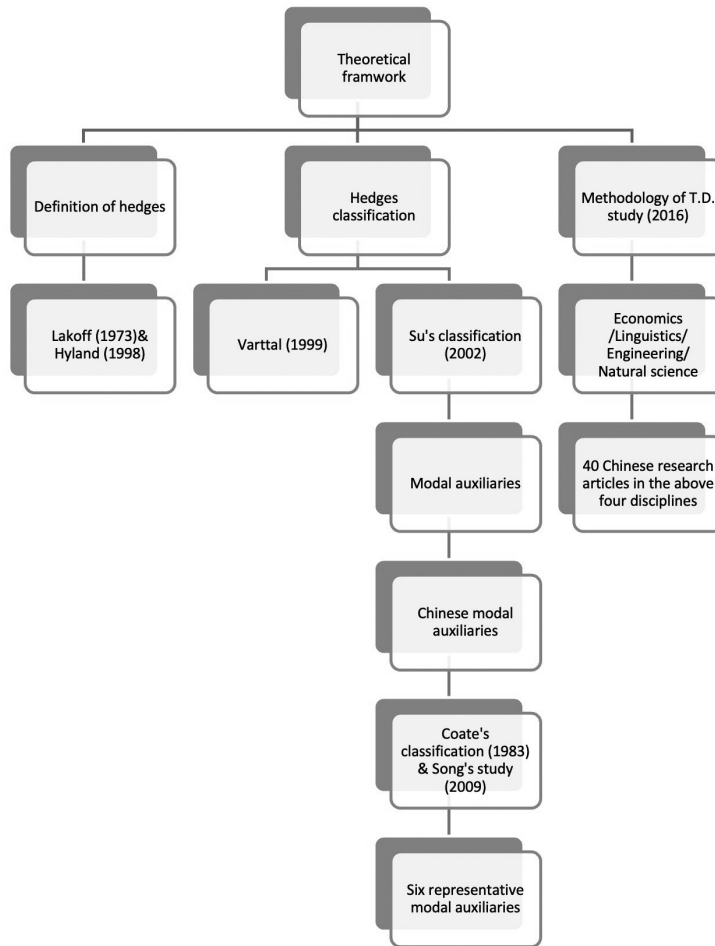
In Chinese academic writing, the style itself is often characterised by vagueness and euphemism. In most situations, writers do not rely solely on specialised lexical items to convey hedging; instead, hedging is frequently realised through intonation and discourse features, as well as other linguistic mechanisms. Hu & Cao (2011) analysed several Linguistics articles, demonstrating that journals published in Chinese used fewer hedging devices than those published in English. Zhao & Sun (2014) found that studies on Chinese hedges often overlooked modal auxiliaries due to their minimal occurrence in the papers compared with those in English journals. Nevertheless, even with low frequency in Chinese research articles, these auxiliaries retain their pragmatic functions and contribute to mutual understanding between readers and writers. Zhao (1999) pointed out that it was hard to figure out how much possibility was in words, but he also said that adding this made the writing more scientifically sound. This observation underscores the use of Chinese modal auxiliaries as hedging techniques in academic writing. The study also found two more sorts of hedging strategies: hedges that focus on the writer and hedges that focus on the reader. Xu and Nesi (2017) talked about the results of these investigations, which showed that using modal auxiliaries in Chinese academic writing depended on the situation and helped to make ideas and arguments clearer. Liu et al. (2022) summarised that academic discourse is characterised by professional expression,

logical expression, objectivity, and adherence to a prescribed writing style. Given these characteristics of academic writing, further research is needed to explore the pedagogical strategies for better effect in teaching.

However, most studies on hedging have focused on data-oriented disciplines (e.g., the hard sciences) as their source of discourse data, with few mentioning the use of modal auxiliaries in social sciences or arts and humanities. Hardjanto (2016) analysed different disciplines in English language journals, finding that modal auxiliaries used as hedges are most frequent in Linguistics and least frequent in natural science articles. Despite previous findings, research on the use of modal auxiliaries as hedges in Chinese research articles, whether by Chinese or international scholars, remains scarce. Possible explanations for this gap include insufficient research into the relevant vocabulary and a perceived lack of scholarly interest in the subject. Chinese modal auxiliary words are often underestimated among the hedging strategies. Still, they may serve as fairly appropriate propositions to achieve the intended effect. According to Erton (2018), modal auxiliaries should be taught their lexical and social pragmatic meanings to help learners to study them in semiotic environments.

If modal auxiliaries of hedges are most frequently used in Linguistics and least so in the natural sciences in Chinese research articles published in English, are there differences, if any, in the use of modal auxiliaries as hedges in Chinese articles? How do Chinese scholars react to the problem that the vocabulary of modal auxiliaries in Chinese is not as rich as those in English, and what is their preference in the choice of suitable modal auxiliaries in their work? To address this gap, the study examines the following three research questions:

1. What are the overall frequency and distributional patterns of the six target Chinese modal auxiliaries (“会、可以、能、能够、可能、应该”) in the abstracts of the 40 selected Chinese research articles?
2. Do the frequency and selection preferences of these six modal auxiliaries in the abstracts vary across the four selected academic disciplines of Linguistics, Economics, Engineering, and Natural Sciences?
3. What are the primary pragmatic functions realised by these modal auxiliaries in the context of research article abstracts, specifically concerning the balance between epistemic hedging and explanatory linkage?

Figure 1*Conceptual Framework***Methodology**

Drawing from the examples from 40 abstracts in Chinese-language articles in academic journals in the four academic disciplines of Linguistics, Economics, Engineering, and Natural Sciences, this study investigates the disciplinary and functional variations of modal auxiliaries in Chinese academic writing. The choice of these disciplines to ensure a robust cross-disciplinary comparison representing, following the model of Hardjanto (2016), both the hard and soft sciences. Linguistics is a social science focusing on human language structure and theory; Economics is a social science examining resource allocation and market behaviour; Engineering is an applied science concerning

the design and optimisation of technical systems' while the Natural Sciences investigate natural laws through objective observation and experiment.

The corpus consists of 40 Chinese research article abstracts (N=40), with ten articles sampled from the highest-ranking domestic journals for each of the four disciplines. All articles were sourced from top-tier publications indexed in the China National Knowledge Infrastructure (CNKI) database, ensuring high academic rigour and relevance. The publication period was strictly limited to 2020–2021.

Only the abstract of each article was included in the corpus. The total word count of the entire abstract corpus was 13,900 words. This total word count was recorded to facilitate standardisation. Several Chinese scholars have focused on the abstracts in similar studies (e.g. Ma & Wang 2013; Zhou, 2015).

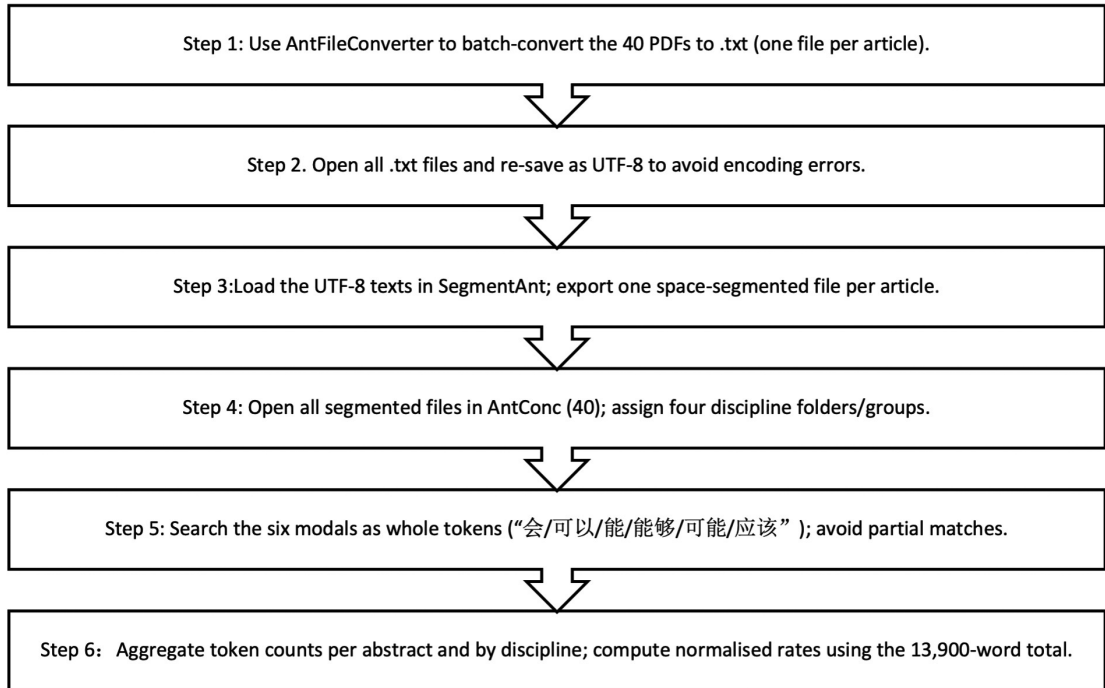
The analysis exclusively targeted six specific Chinese modal auxiliaries based on their frequency and established roles as potential hedging devices in academic discourse (Yang, 2013): *hui* (会), *keyi* (可以), *neng* (能), *nenggou* (能够), *keneng* (可能), and *yinggai* (应该). The procedure to answering the question is by counting the frequencies of the six modal auxiliaries in each abstract, followed by adding each modal auxiliaries' appearance in the same disciplines of the ten articles. In addition to document-level counts, a length-normalised rate for the 40 abstracts was computed according to the following formula:

Normalised rate (per 1,000 words) = modal tokens ÷ total abstract words × 1,000.

Normalisation is reported for completeness; primary analyses remain document-level counts and distributions. The data were further subjected to computation according to Hardjanto's formula to obtain a coefficient for purposes of comparison.

Normalised frequency = Frequency (count of modal auxiliaries) * 10,000 / Word count

Lastly, we would get the frequency and distribution of the Chinese modal auxiliaries in the different disciplines, and the frequency and distribution of the six different modal auxiliaries in the articles of the same disciplines. Figure 2 illustrates how the data were processed.

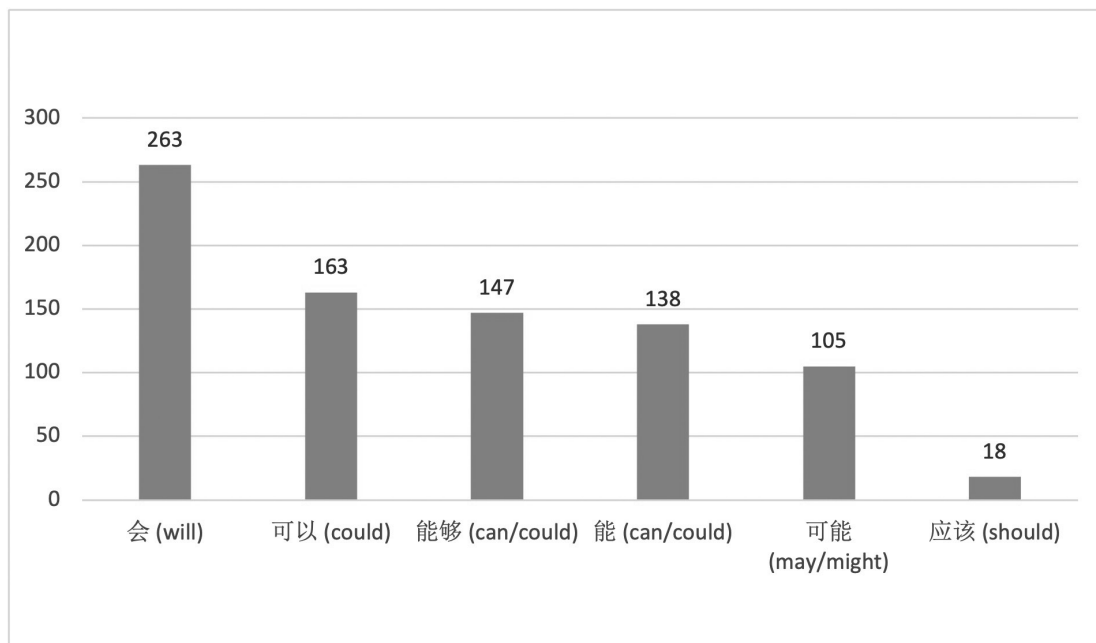
Figure 2*Data Processing Workflow for the Abstract Corpus (N = 40)*

Result and Discussion

Across the 40 abstracts were identified 834 modal tokens of Chinese modal auxiliaries: *hui* (会 “will/would”) 263 (31.6%), *keyi* (可以 “may/can”) 163 (19.5%), *nenggou* (能够 “be able to/can”) 147 (17.6%), *neng* (能 “can”) 138 (16.6%), *keneng* (可能 “may/might/possible”) 105 (12.6%), and *yinggai* (应该 “should/ought to”) 18 (2.2%) (Figure 3). Using the 40-abstract total of 13,900 words, the overall normalised rate is 60.00 per 1,000 words ($834 \div 13,900 \times 1,000$). Length-normalised rates (per 1,000 words) are: *hui* 18.92, *keyi* 11.73, *nenggou* 10.58, *neng* 9.93, *keneng* 7.55, *yinggai* 1.29. These normalised figures mirror the count-based profile in Figure 3. These length-normalised figures corroborate the count-based pattern in Figure 3. The modal auxiliary *hui* (会) was the most frequent, contributing 31.6% of all modal tokens (263/834; rate = 18.92 per 1,000 words). *Keyi* (可以) ranked second (19.5%, 163; rate = 11.73/1,000), and *nenggou* (能够) third (17.6%, 147; rate = 10.58/1,000).

Figure 3

Token counts for six Chinese Modal Auxiliaries across 40 Abstracts (N = 40; total = 834).



Together, these three modals account for 68.7% of all modal tokens in the corpus. The comprehensive profile shown in Figure 3 indicates that modalisation in abstracts is evident yet selective, primarily focussing on *hui* (会), *keyi* (可以), *nenggou* (能够), and *neng* (能), whereas *keneng* (可能) and *yinggai* (应该) are rarely utilised. Expanding on this foundation, we now investigate whether the frequency and selection preferences of these six modals differ among the four disciplines at the abstract level.

Frequency of Modal Auxiliaries by Discipline

This section discusses Research Question 2, which investigates whether the six target modal auxiliaries' frequency and selection preferences differ among the four academic disciplines in the abstract corpus.

Table 1*Type Coverage in Abstracts by Discipline*

Discipline	Types attested (count/6)	<i>hui</i> (会)	<i>keyi</i> (可以)	<i>nenggou</i> (能够)	<i>neng</i> (能)	<i>keneng</i> (可能)	<i>yinggai</i> (应该)
Economics	6/6	10/10 (100%)	10/10 (100%)	9/10 (90%)	9/10 (90%)	9/10 (90%)	5/10 (50%)
Linguistics	6/6	4/10 (40%)	4/10 (40%)	4/10 (40%)	3/10 (30%)	4/10 (40%)	3/10 (30%)
Engineering	3/6	7/10 (70%)	0/10 (0%)	7/10 (70%)	9/10 (90%)	0/10 (0%)	0/10 (0%)
Natural Sciences	6/6	2/10 (20%)	3/10 (30%)	2/10 (20%)	2/10 (20%)	2/10 (20%)	1/10 (10%)

Table 1 shows that the type of coverage and selection preferences of the six target modal auxiliaries differ among the four academic disciplines. All six target modal auxiliaries were reported by three out of the four disciplines, which were Economics, Linguistics, and Natural Sciences. In the analysis of the four disciplines, the abstracts show different selection preferences. However, Economics demonstrates comprehensive coverage of all six modals across the documents analysed. The modals *hui* and *keyi* are present in all 10 abstracts, achieving a 100% occurrence rate. Additionally, *nenggou*, *neng*, and *keneng* are each found in 9 out of 10 abstracts, resulting in a 90% frequency rate for these terms. Even the least common one, *yinggai* is used in 5/10 (50%) of the abstracts. Linguistics indicates the presence of six types, although with a moderate range: each of the six modals appears in only 3 to 4 out of 10 abstracts, representing between 30% and 40% of the total.

Notably, the Engineering is limited to three categories (3/6), namely, *hui*, *nenggou*, and *neng*, which display a relatively broad scope for the capability set (*neng* 9/10 = 90%, *nenggou* 7/10 = 70%). As a result, *keyi*, *keneng*, and *yinggai* are not represented. Natural Sciences attests all six types (6/6) but with low breadth overall: most modals appear in 1–3 of 10 abstracts (10–30%); *yinggai* appears only in 1/10 (10%). Across disciplines, epistemic modals show the narrowest breadth. In our data they occur in only 10–50% of abstracts by discipline (Natural Sciences: *keneng* 2/10, *yinggai* 1/10; Linguistics: 3–4/10; Engineering: 0–2/10; Economics: 5–9/10). By contrast, the volitional/ability set has markedly wider coverage—reaching 70–100% in Economics and 70–90% in Engineering (e.g., *hui* 10/10, *keyi* 10/10, *neng/nenggou* 7–9/10), though only 10–40% in Lin-

guistics and Natural Sciences. In short, abstracts prefer meanings that have to do with capability, permission, or prediction over meanings that have to do with probability or inference.

Based on research question 2: “selection preferences” are primarily reflected in which modal types are available and their distribution in the literature. Economics exhibits the broadest and densest coverage; Engineering exhibits a narrow, ability-focused distribution (can/can-good plus can); and Linguistics and the Natural Sciences exhibit a broad corpus but a shallower distribution. These coverage comparisons yield the following results: occurrence rate (≥ 1 vs 0) as shown in Table 2 below:

Table 2

Occurrence Rates per Abstract (≥ 1 modal) by Discipline

Discipline	Abstracts with ≥ 1 modal (n/10)	Percentage (%)	Note
Economics	10	100%	Count ≥ 1 token as present
Linguistics	5	50%	
Engineering	10	100%	
Natural Sciences	3	30%	

Note. Each discipline contributes 10 abstracts. Rate = $(n/10) \times 100$, computed at the document level.

The results are similar with Hardjanto’s findings in 2016, who also found that in English research articles, the modal auxiliaries are used more frequently in the social sciences. Although social science papers require preciseness as in the natural and Engineering sciences, they often do not have the data to show the results visually. The data or theories in social sciences need to be analysed and explained in detail. Analysis and explanation are the keys to showing their thoughts to the readers more precisely and objectively. An intriguing aspect of this study is the higher frequency of modal auxiliary usage in economic papers compared to linguistic ones. This phenomenon in Chinese research articles may be attributed to the inherent nature of economic discourse, which frequently involves forecasting and necessitates a cautious yet decisive tone, thereby influencing the choice and frequency of modal auxiliaries. From the results, “*hui*,” “*keyi*,” and “*neng*” appeared most frequently in Economics, but in Linguistics, “*keneng*” is also commonly used. As Economics emphasises the function of forecasting, it is bound to emphasise the language of caution and moderation.

The judgement of economic trends is vital in these articles. This preference aligns with the probability-threshold and permissive uncertainty semantics of “*May*” (Feng, 2022), suggesting that abstract writers favour a gentler degree of epistemic commitment, preserving openness and revisability of claims. Thus, the forecasting is not certain but should not be overly hesitant or dubious. Therefore, the modal auxiliaries in the Economics appeared most often but did not contain too many possible words. Also, future studies can concentrate on the Economics and Linguistics research papers to examine their variables to better analyse the differences between them.

Functions of Modal Auxiliaries: Epistemic Hedging vs. Explanatory Linkage

In the abstract corpus, the modal auxiliaries more often served to create explanatory linkage (e.g., signalling resultative or inferential connections, as in “由此可以...” / “因此会...”) than to express pure epistemic hedging (e.g., expressing doubt, as in “可能 / 或许...”). The high-frequency forms *hui* (会) / *keyi* (可以) / *nenggou* (能够) were frequently employed to logically connect prior statements with ensuing claims or findings. This indicates that abstract writing conventions are subject-specific, and the choice of modal verbs is influenced by the need to concisely convey both content and appropriate academic tone.

While *hui* (会), *keyi* (可以), *neng* (能) and *nenggou* (能够) were the most frequent modals overall, their distribution varied significantly by discipline: Natural Science abstracts exhibited the highest frequency of *neng* (能), Linguistics favoured *nenggou* (能够), and both Economics and Engineering relied most heavily on *hui* (会). To illustrate their functional use, consider these examples from each discipline (refer to Table 3). The translated version of the Chinese sentences is used for purposes of analysis, while the Chinese version is shown as notes at the end of the paper.

Table 3

Primary Functional Analysis of Modal Auxiliaries in Chinese Research Abstracts: Explanatory Linkage vs. Epistemic Hedging (Token Counts and Percentages by Function)

Discipline	Example (Translated)	Chinese Modal	Pragmatic Function
Economics	“The development of new digital finance formats will (会) have an important impact on the strategic decisions of micro-enterprises.” 1	会	Prediction: Introducing a future-oriented claim based on the presented premise.
Linguistics	“It can (能够) make up for the deficiencies of previous metaphor research...” 2	能够	Capability/Explanation: Stating a capability that adds to or concludes the preceding argument.
Engineering	“Flow control will (会) exhibit time-varying and instability characteristics.” 3	会	General Characteristic/Expected Outcome: A statement of an objective property, serving an explanatory function.
Natural Science	“It can (能) exhibit various effects... under the drive of a magnetic field, stress field or temperature.” 4	能	Objective Capability/Property: Functioning as a conjunctive explanation.

Core Function: Explanatory Linkage and Frequency Extremes

In the abstract corpus, modal auxiliaries mostly drive explanatory connection, which is not what was expected. As demonstrated in Table 3, their main job is to provide logical consequence, which shows the requirement for clear, objective presentation. This functional analysis reveals two extremes in modal frequency. *hui* (会) is the most frequently occurring form, though its core function (to explain conclusions rather than predict) often leads to its omission in English translations (Wang, 2021). This form also exhibits a key functional split: it serves as a forward-looking prediction in Economics (e.g., “The development of new digital finance formats will have an important impact...”), but an objective explanatory statement of general properties in Engineering (e.g., “Flow control will exhibit time-varying and instability characteristics.”). This explanatory role of establishing logical consequence is frequent across disciplines where findings must be succinctly framed as conclusions. Conversely, *yinggai* (应该) is the least attested form (18 tokens, 2.2%), reinforcing its minimal role due to its primary expression of subjective intention.

Disciplinary Rhetoric and Positional Constraints

Academic discipline emerges as the primary driver of modal usage, aligning with Hyland's

(1998) view. Social Sciences (e.g., Economics) display the highest modal frequency—a pattern also seen in earlier works (Hardjanto, 2016; Zhou & Wang, 2008). This contrasts with Engineering and Natural Sciences which use noticeably fewer modals to avoid overstating uncertainty. Economics uses modals for prediction, while Linguistics employs them to refine objective scholarly opinions, highlighting different priorities in how knowledge is built (Song, 2009; Tong, 2021). The study examined the materials and articles and found that *keyi* (可以) is mainly used. The data indicate that *keyi* (可以) is consistently positioned to follow existing theories, thereby conveying a strong possibility or potential for verification. Taking one of the examples here, “Loba outlines in detail the basic anatomy of geometry that can delineate the key ideas of its construction flood.”⁵ The term *keyi* (可以) in this context helps to ensure or confirm the potential for verification. In contrast, *nenggou* (能够) and *neng* (能) are consistently observed to co-occur with personal pronouns, typically expressing personal ability or capacity. The fragments included, “As early as 1799, Laplace was able to describe general mechanics in each frame of reference. We were able to get some new information...”⁶ The English text that follows is the authors’ own translation of the Chinese original; wording and grammar were cross-checked by a second bilingual reviewer.

Structural Polysemy and Challenges to Semantic Equivalence

Prior work consistently suggests Discussions carry heavier modalisation than Abstracts (Hu & Cao, 2011); our analysis, however, is only focused on the Abstract. Our translation analysis revealed a significant challenge: The findings indicate that *keyi* (可以) and *nenggou* (能够) were frequently translated to the identical English equivalent (e.g., be able to) without adequate consideration of contextual and scholarly semantic distinctions. Likewise, *neng* (能) was typically translated as “can,” which often misses nuanced differences in meaning and the translator’s practical decisions. These English modal expressions inherently carry different pragmatic focusses: can typically signifies self-capability or general possibility; be able to generally highlights the successful achievement of a result following an effort; and could expresses a more tentative possibility or a potential ability that did not necessarily materialise. The small Chinese modal inventory (Yang, 1998) is the root of lexical ambiguity, creating a core cross-linguistic challenge for semantic equivalence. This structural difference means that translators cannot rely on word-for-word substitution, necessitating a move beyond the literal to the pragmatic. The analysis confirms that context-sensitive strategies (Yang, 2013; Hu & Cao, 2011) are necessary for translation, particularly due to the following semantic disparities:

Epistemic Understatement: The translation of epistemic modals can misrepresent authorial stance. For example, translating *keneng* (可能) as “might” can significantly understate the degree of possibility implied by the Chinese context (e.g., “The results of the study may/might indicate...”).⁷

Polysemy and Rhetoric: The high functional load of *neng* (能) (e.g., potentially implying

“ability” or “probability”) introduces semantic fuzziness that strategically lessens the writer's overt assertiveness, providing readers with interpretive space. In contrast, *keneng* (可能) is semantically less vague because it is confined to indicating a level of epistemic possibility.

Translation of Synonyms: Our analysis found that *keyi* (可以) and *nenggou* (能够) were frequently translated to the identical English equivalent (e.g., be able to) without adequate consideration of contextual and scholarly semantic distinctions.

Ultimately, the pragmatic function of Chinese modals is deeply intertwined with disciplinary rhetoric, structural limitations, and the communicative goal at hand. Chinese language is inclined to use the least number of words to express the “maximum” meaning. Therefore, *neng* (能) may be used in many fields, though it may not serve the actual function. Modal auxiliary verbs present challenges due to semantic ambiguity (or polysemy) and must be handled carefully. Taking *neng* (能) and *keneng* (可能) as examples, the former demonstrates high polysemy, potentially implying “be able to”, “could”, “would”, or “most probably”. In contrast, *keneng* (可能) is semantically less ambiguous because it is confined to indicating a level of epistemic possibility (uncertainty). The ambiguous *neng* (能) has a high functional load because it has a wide range of meanings. This means that it may not be as precise as the more specialised *keneng* (可能).

Conclusion

This study offers a comprehensive analysis of the pragmatic functions of Chinese modal auxiliaries in research article abstracts, revealing that their usage and translation are fundamentally shaped by rhetorical needs, disciplinary conventions, and structural linguistic constraints. Contrary to the typical expectation of heavy epistemic hedging, the modal auxiliaries in the abstract corpus primarily serve to establish explanatory linkage and logical consequence, a function aligned with the abstract's goal of concise and objective presentation. This functional emphasis exhibits clear disciplinary variation: while Social Sciences (particularly Economics) show the highest frequency, consistent with their need for prediction and evaluation, Natural Sciences and Engineering utilise noticeably fewer modals, favouring a style marked by objectivity (Zhou & Wang, 2008). Furthermore, the structural limitations of the Chinese modal inventory (Yang, 1998) create lexical ambiguity and pose a significant challenge to cross-linguistic equivalence. We confirm that this structural reality necessitates the adoption of context-sensitive strategies in translation (Yang, 2013; Hu & Cao, 2011), particularly to address the risk of epistemic understatement (e.g., *keneng* (可能) translated as might). Ultimately, the pragmatic function of Chinese modals is deeply intertwined with disciplinary rhetoric, structural limitations, and the communicative goal at hand. Despite these results, several limitations of this study should be addressed in future research. It's important to note that our study relied on a small sample of just ten abstract per discipline. These patterns from

abstracts may not be generalisable, as the study does not account for the greater modalisation likely present in full-length sections. Because of these limitations, corpus expansion should be prioritised for any future study at a large-scale full-text Discussion section comparison analysis to see through the functional transition of modal auxiliaries. Further study is needed to better understand how near-synonyms such as *keyi* (可以) vs. *nenggou* (能够) fail to achieve translation equivalence and the impact of semantic ambiguity, such as *neng* (能), on the reader's perception of the author's assertion in academic settings.

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Notes

In the text, the following Chinese sentences and phrases are replaced by their translated English versions:

- 1 “数字金融新业态的发展会对微观企业的战略决策产生重要影响”
- 2 “...能够弥补以往隐喻研究对其用法及共现研究的不足”
- 3 “流量控制会出现变性和不稳定性”
- 4 “在磁场、应力场或温度的驱动下能表现出磁热、磁致伸缩...等多种效应”
- 5 “罗巴切夫斯基详细阐述了泛几何的基本假设，从中可以总结出其建立泛几何的关键思想”
- 6 “早在1799年，拉普拉斯就能够在给定参考系下描述出一般的力学。我们能够获得一些新的信息...”
- 7 “这个研究结果可能存在...”

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