Revisiting two finiteness phenomena for Mandarin Chinese complementation structures:
An empirically oriented approach via systematic hypothesis testing

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Abstract

The literature has debated whether Mandarin Chinese exhibits a finiteness distinction despite the absence of overt tense and agreement marking. C.-T. J. Huang (2022), along with other Generative studies, have re-affirmed this distinction and repeatedly rejected Hu et al. (2001), which presents opposing views. If the finiteness distinction exists, it should be a detectable empirical fact, transcending theoretical perspectives. To empirically test this, we first formulate finiteness as a relative concept using a methodological criterion, which is inspired by Lowe (2019) and potentially cross-linguistically applicable. We devise two testable hypotheses to investigate the distributions of modals (*hui/yao*) and aspectual markers (*-le/-guo*), which have been seen as having implications for finiteness distinction. After conducting tests on diverse complementation verbs, we have identified empirical deficiencies in past studies. We have shown that it is possible to synthesise insights from apparently opposite camps to form integrated perspectives which can account for a wider range of new empirical data. Under a broader concept of finiteness, the distributions of *hui/yao* and *-le/-guo* reveal Chinese finiteness as semantic dependency where non-finite complements are more semantically dependent on the matrix clause than finite complements. Overall, we employ a descriptive, evidence-based approach to address the Chinese finiteness conundrum.

Keywords: finiteness; control; complementation; corpus data; Mandarin Chinese

1   Introduction

In the Generative tradition, finiteness has been regarded as an important property of Universal Grammar. Klein (2009: 341) considers finiteness to be "a fundamental organisational principle of human languages with numerous important consequences in syntax, semantics, and pragmatics". Interestingly, finiteness is also a notion "used by everybody but understood by nobody" (Klein 2009: 336). A possible reason is that finiteness has been perceived as a concept much wider than the traditional view of finiteness as manifested in the inflectional morphology of tense and agreement. The finiteness principle can be "specific to particular languages" (Klein 2009: 341), adding to the difficulty of arriving at a universal definition. Similar to Klein (2009), Adger (2007: 23) states that "there is no expectation that the notion will be unitary or that it will correspond in any deterministic way to the traditional idea" with finiteness triggering "a possibly open-ended set of phenomena".

Mandarin Chinese presents an intriguing case for the study of finiteness. Being an isolating language, it lacks verbal inflection for tense and person-number agreement (Li & Thompson 1989). If one adopts the traditional definition of finiteness, Chinese is not a language making a finiteness distinction. To probe further into whether Chinese can be claimed as a tensed language in a typological sense, Hu et al. (2001: 1118-1119) employ Stassen's (2003: 350-351) tensedness parameter, according to which they adjudicate that Chinese should be considered a non-tensed language because Chinese does not possess a grammaticalised

category of tense either morphologically bound to verbs or minimally involving a distinction between past and non-past time reference.[1] Some other studies, including several typologically oriented ones, are also inclined towards the view that Chinese lacks positive empirical evidence to be categorised as a language that distinguishes finiteness, if one does not presume a Generative view about the universality of finiteness (e.g., Bisang 2001; Hu et al. 2001; Y. Huang 1994; Morbiato 2018; Xu 1985, 2003). For ease of reference, we will call this the Non-Distinction camp. On the other hand, many Generative studies continue to argue that Chinese encodes finiteness at abstract levels with a possibly openly-ended set of empirical phenomena attributed to finiteness. These phenomena include the potential occurrence of two modals *hui/yao* (e.g., C.-T. James Huang 1989; 1982; Y.-H. A. Li 1990; Grano 2015; Zhang 2019; He 2020), interpretation of two aspectual markers *-le/-guo* (e.g., Grano 2015; He 2020; C.-T. J. Huang 1982,1989; N. Huang 2018; Y.-H. A. Li 1990), occurrence of speaker-oriented adverbs (e.g., Zhang 2019), sentence-final aspect particles (e.g., Grano 2015, 2017; T.-H. J. Lin 2011, 2012, 2015; Zhang 2019), overtness of the embedded subject (e.g., Grano 2015; C.-T. J. Huang 1989; N. Huang 2024; Li 1985; Li 1990; Tang 1990; Zhang 2016), *congqian* 'before' collocation (e.g., Y.-H. A. Li 1990), inner topicalisation and focus fronting (e.g., Paul 2002; Grano 2017; N. Huang 2018), long-distance passivisation (e.g., C.-T. J. Huang 1999), etc.[2] A recent overview of these phenomena is found in C.-T. J. Huang (2022), re-affirming the finiteness distinction and exploring how it can be encoded in syntax.

This paper visits two of the above phenomena, namely the potential occurrence of two modals *hui/yao* and the interpretation of two aspectual markers *-le/-guo* in the complement clause. Being pertinent to temporal reference made them the earliest phenomena regarded by Generative studies as capable of diagnosing finiteness in a language that lacks overt tense inflection. However, according to the Non-Distinction camp (e.g., Xu 1985, Hu et al. 2001), these phenomena can be sufficiently explained using alternative means, for example, lexical-semantic principles, without positing clausal finiteness, given that we are discussing a language which lacks overt finiteness marker in the first place. In recent years, Generative perspectives appear to have become the dominant view regarding the Chinese finiteness conundrum.[3] A natural question is whether alternative explanations, such as lexical-semantic ones, still provide valid insights into the conundrum or whether they have become obsolete. If the finiteness distinction exists in Chinese as an empirical fact, this distinction should become self-evident through an in-depth systematic examination across divergent complementation verbs. Such empirical investigations do not need to rely on a specific theoretical tradition and can be kept theory-neutral; thus, the conclusions can be trusted by linguists regardless of theoretical orientations. In fact, Hu et al. (2001: 1120) state that a motivation for them to adopt Stassen's (2003) typological criteria to tackle the finiteness debate is the model-neutral approach characterised in Stassen's work.

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[1] With Chinese being a language that lacks morphological tense, some Generative studies have posited that the language possesses covert semantic tense (see e.g., Sun 2014).

[2] Some of these analyses have been reviewed by Paul (2018). Although we have included Grano (2015) on par with other Generative studies, to be more accurate, he argues that it is better to adopt a clause-size distinction for the data which have been analysed by his predecessors as showing a finiteness split. However, in Grano (2017: 259), he states that "Mandarin can nonetheless be said to exhibit a finite/nonfinite distinction, but only if 'finiteness' is construed broadly as a cluster of properties that enable a clause to stand alone as a syntactically unembedded assertion".

[3] There are recent criticisms of the Generative perspectives, mainly from typologically oriented research. For example, Morbiato (2018: 83-90) conducted a native-speaker survey on Y.-H. A. Li's (1990) *congqian* 'before' collocation test as a language-specific finiteness diagnostic. Upon discovering that the collocation pattern lacked support from her participants, Morbiato (2018) raised questions about the reliability of this language-specific finiteness diagnostic. Eventually, Morbiato (2018) concluded that there is no clear-cut evidence for finiteness in Chinese.

This paper has two major objectives:

i. Revisiting the two phenomena through an in-depth empirical investigation where divergent complementation verbs are put to systematic tests. Based on the behaviour of their complement clause, we can deduce whether we need to posit any clausal finiteness or whether alternative explanations, such as lexical-semantic ones, are already sufficient.

ii. Adopting a descriptive, evidence-based approach with the empirical discussion kept as theory-neutral as possible using terminology understandable by general linguists, regardless of theoretical traditions. We assume that the Chinese finiteness distinction, if existent, should be an empirical fact: the finiteness distinction in the complement clause would give rise to two different complement classes that can be empirically substantiated.

To guide our investigation, we formulate three testable hypotheses in § 2 based on data sets from previous studies. The hypotheses are formulated in a way that effectively tests the claim about the existence of two distinct complement classes. Independent evidence is sought to test the postulation of this complement-type distinction. We seek such evidence in the form of distributional correlation among language properties, in particular, how the occurrence of the modals and the interpretation of aspectual markers correlate with the (non-)control properties of divergent complementation verbs. The importance of examining correlational relations among language properties in establishing complement-type distinction is noted in numerous studies, including Grano (2015; 2017), C.-T. J. Huang (2022), and Zhang (2016, 2019) (see also Cristofaro, 2007). In this paper, we label the complementation verbs in (1) as "control" verbs which enforce the identification of a matrix argument with an unexpressed subject argument (Ø) of the complement clause (see e.g., Landau 2000; Stiebels 2007a).[4] On the other hand, given that Chinese is a discourse pro-drop language (C.-T. J. Huang 1984; 1989), "non-control" verbs, such as those in (2), allow their unexpressed subject argument in the complement clause to refer to any discourse-salient entity. Generally speaking, control verbs do not allow their embedded subject to be overt, while non-control verbs do.[5]

(1) Control verbs
a. xiaoming$_i$ **shefa**/**zhunbei** {Ø$_{i/*j}$ | *ta} jiejue wenti
Xiaoming try/prepare   Ø   3SG solve problem
'Xiaoming tries/prepares to solve the problem.'
b. zhangsan$_i$ **quan**/**bi**   xiaoming$_j$ {Ø$_{*i/j}$ | *ta} jinkuai wancheng gongzuo
Zhangsan persuade/force Xiaoming Ø   3SG soon finish   work
'Zhangsan persuades/forces Xiaoming to finish work soon.'

(2) Non-control verbs and discourse pro-drop
a. xiaoming$_i$ **shuo**/**xiangxin** {Ø$_{i/j}$ | ta$_{i/j}$} shi ge hao   xuesheng
Xiaoming say/believe   Ø   3SG be CL good student
'Xiaoming says/believe (he/she) is a good student.'
b. zhangsan$_i$ **gaosu** xiaoming$_j$ {Ø$_{i/j/k}$ | ta$_{i/j/k}$} mingtian   qu
Zhangsan tell   Xiaoming Ø   3SG   tomorrow go
'Zhangsan tells Xiaoming (he/she) will go tomorrow.'

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[4] For a classification of different types of Chinese control verbs (e.g., exhaustive, partial, split, implicit), one may refer to e.g., Grano (2015), Lam (2023a).

[5] A phenomenon known to be an exception to this generalisation is Chinese copy control, where the controllee can be made overt under certain licensing conditions. See e.g., Grano (2015), Zhang (2016), Lam (2023b).

We aim to incorporate a wider range of complementation verbs than those in the existing literature. Their lexical-semantic classes are presented in § 3.

To guide our forthcoming discussion, it is important to establish certain working criteria to specify what we mean by "finiteness" in this paper. To constitute a meaningful discussion, our concept of finiteness needs to be broader than the traditional sense. If one simply adheres to the Latin grammarian tradition and defines being finite as having overt tense and/or agreement marking, there is nothing else to discuss besides concluding that Chinese simply does not possess a finiteness distinction. In fact, Lowe (2015; 2019) has pointed out that the traditional definition is problematic even among Indo-European languages, not to mention its wider cross-linguistic validity.[6] For example, Lowe (2015) observes that Latin and Sanskrit participles display tense and number distinctions, undermining the use of these verbal features to define finiteness. To further complicate the matter, as far as morphology is concerned, other criteria such as mood (e.g., Vincent 1998), evidential (e.g., Nikolaeva 1999), politeness markers (e.g., Bisang 2007), and switch-reference markers (e.g., Roberts 1988) have all been posited as finiteness markers in respective languages (see also Nikolaeva 2010: 1177-1178). It has become increasingly clear that there is simply not a universal grammatical category of finiteness (e.g., Bisang 2007; Cristofaro 2007; He 2020). Studies have endeavoured to understand finiteness as a broader concept that is potentially cross-linguistically valid. A case in point is Grano (2017). Citing McFadden and Sundaresan (2014), he views being finite as possessing a cluster of properties that enable a clause to stand alone as a syntactically unembedded assertion.[7] As discussed by Lowe (2019), the only way to preserve a notion of finiteness in linguistic theories is to admit its cross-linguistic relativity and approach it as a prototypical concept with prototypical finite clauses being non-dependent, non-modal, non-negative, and assertive; in this way, finiteness can be construed as a relative concept such that, in any given language, a syntactically unembedded declarative clause is a "finite" clause, and any clause type that deviates from the unembedded declarative clause by subjecting to systematic restrictions not imposed on the unembedded declarative clause can be said to be "non-finite" (see also Givón 2001: Ch. 18; Nikolaeva 2010: 1179-1180). Under this view, the task of diagnosing the finiteness of a clause rests upon finding what the potential systematic restrictions are and whether the clause is subject to such restrictions.[8] Since finiteness is both a syntactic and semantic concept (Lowe 2019), we may expect those restrictions to be syntactic and/or semantic. In this paper, despite the aforementioned difficulty of defining finiteness, we will experiment with a methodological criterion that recognises finiteness as a relative concept. The criterion is inspired by Lowe (2019) and encapsulated in (3). We term this a "methodological criterion" as we recognise the language-specific nature of finiteness; this means what could potentially be cross-linguistically applicable is not a specific grammatical category of finiteness but the methodology that one may adopt to distinguish finiteness across languages. With this criterion, whether a language can be said to make a finiteness distinction depends on the (positive) empirical evidence it presents. As such, we do not presume finiteness to be a universal phenomenon, thus sharing the position espoused by some past studies, for example, Bisang (2001, 2007). Further, we characterise finiteness as a property of the clause (see e.g., Bisang, 2001).

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[6] See Nikolaeva (2010: 1178) for further problems of the traditional definition.
[7] A challenge of defining finiteness as an independent assertion comes from the cross-linguistic study of imperatives and hortatives which tend to be non-finite, despite occurring as the root clause (Nikolaeva 2007).
[8] One may roughly compare Lowe's (2019) view of "finiteness" and "non-finiteness" to Stassen's (1985) "balancing" and "deranking", which characterise those scenarios where some embedded clauses are as free as unembedded clauses (balancing) while others are susceptible to restrictions not found in unembedded clauses (deranking). In Stassen's (1985: 76-83) original work, "balancing" and "deranking" focus on the form of the verb to embody the restrictions. However, since a clause is (usually) headed by a verb, a deranked verb form eventually leads to a deranked clause.

(3)   Methodological criterion for recognising finiteness as a relative concept
        In any given language, the syntactically unembedded, declarative, non-modal, non-negative clausal
        structure is considered the prototypical finite structure, which is used as a standard of comparison
        for other clause types. If a clause type is permeable to systematic restrictions not imposed on the
        prototypical finite structure, it can be said to be "non-finite". A clause type is regarded as "finite"
        if it is as free from restrictions as the prototypical finite structure.

To provide a glimpse into how this methodological criterion works, for example, in English, the
prototypical finite structure is a syntactically unembedded, declarative, non-modal, non-negative clause
which contains a verb that may inflect for tense and/or agreement. Compared to this prototypical finite
structure, participle and infinitival clauses, which are deprived of tense and agreement coding, are
considered non-finite clause types in this language according to our methodological criterion. Similarly, in
Japanese, the prototypical finite structure may take tense and politeness markers. Japanese converbs, where
there are systematic restrictions for both markers (Bisang 2007), are considered non-finite using this
methodological criterion.

        The remaining sections are organised as follows. § 2 reviews existing data sets from previous studies
and draws testable hypotheses. § 3 systematically tests complementation verbs of divergent lexical semantics.
§ 4 suggests future research directions. § 5 concludes the paper.

2   Background: Past data sets and testable hypotheses

This section is devoted to the formulation of testable hypotheses. At the outset, we make explicit the
following assumption, calling upon the importance of distribution-correlation evidence for postulating a
clause-type distinction in finiteness terms:

(4)   Distribution-correlation evidence for clause-type distinction
        To establish a clause-type distinction (finite vs non-finite), distribution-correlation evidence is
        necessary. As such, the evidence demonstrates that constructs of the same clause type share a
        common set of properties enabled by that clause type.

The forthcoming discussion inspects the distributional correlation between, on the one hand, the
(non-)control properties of the complementation verbs and, on the other hand, two potentially finiteness-
related phenomena. As discussed, the importance of inspecting distributional correlations among language
properties is noted in other studies on Chinese finiteness, including Grano (2015; 2017), C.-T. J. Huang
(2022), and Zhang (2016, 2019).

2.1   Modals (*hui*, *yao*) in complement clause
2.1.1   Data sets in past studies

This section delves into two modals, *hui* and *yao*, both of which can indicate futurity (or possibility) but with
nuanced semantic distinctions (Hu et al. 2001: 1124). Past studies have suggested that the embedded clause
of some complementation verbs allows *hui*, while other verbs do not, contributing to the purported division
between finite and non-finite classes (e.g., C.-T. J. Huang 1982; 1989; 2022; Y.-H. A. Li 1990; Grano 2015;
Zhang 2019; He 2020). Control verbs are said to prohibit *hui* in their complement clause, while non-control
verbs do not impose this systematic restriction, allowing the occurrence of *hui*; thus, a correlation is claimed
between control properties and the distribution of *hui*. As such, control verbs are claimed to select non-
finite clauses, and non-control verbs finite clauses. Some relevant data used to support the purported
division are shown in (5) and (6).

(5) (Putative) non-finite class[9]

   a. lisi **shefa** (*hui) lai
     Lisi try   will come
     'Lisi tries to come.'   (C.-T. J. Huang 1989: 189)

   b. wo **zhunbei** mingtian (*hui) lai
     I   prepare tomorrow will come
     'I prepare to come tomorrow.'   (C.-T. J. Huang 1989: 248)

   c. wo **bi** lisi (*hui) lai
     I   force Lisi will come
     'I force Lisi to come.'   (C.-T. J. Huang 1989: 189)

   d. wo **quan**   ta (*hui) lai
     I   persuade 3SG will come
     'I persuade him to come.'   (Y.-H. A. Li 1990: 22)

(6) (Putative) finite class

   a. zhangsan **xiangxin** ta hui lai
     Zhangsan believe   3SG will come
     'Zhangsan believes that he will come.'   (C.-T. J. Huang 1989: 188)

   b. wo **gaosu** ta   huoche hui kai
     I   tell 3SG train   will leave
     'I tell him that the train will leave.'   (Y.-H. A. Li 1990: 22)

On the other hand, although *hui* is prohibited by control verbs, the same sentences can be formed using another modal *yao*. (7) and (8) illustrate this. Xu (1985; 1994) and Hu et al. (2001) reject the idea that the occurrence of *hui* indicates clausal finiteness. Instead, they propose a lexical-semantic explanation based on the *hui-yao* asymmetry. They argue that while both *hui* and *yao* can express futurity, they have subtle semantic differences. *Hui* indicates objective futurity, uncertainty of future eventuality, and low volitionality. (5)b and (5)c are incompatible with *hui* because "it is hard to imagine how it is possible to persuade or force a person to come without knowing that he will come or without his own activation of the action of his coming" (Hu et al. 2001: 1124).

(7) (Putative) non-finite class

   a. wo **quan**   ta yao lai
     I   persuade 3SG will come
     'I persuade him to come.'   (Xu 1994: 324)

   b. ta **bi**   wo yiding yao zai liang tian zhinei wancheng
     3SG force I   must will at two day within finish
     'He forces me to finish it within two days.'   (Xu 1994: 324)

(8) (Putative) finite class

   zhangsan **xiangxin** lisi hui/yao lai
   Zhangsan believe   Lisi will/will come
   'Zhangsan believes that Lisi will come.'   (Grano 2015: 152)

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[9] We use the term "putative" in the examples of § 2 to show that although these examples are considered by their respective studies to support the purported finiteness division, whether they can be construed as evidence for finiteness requires in-depth systematic testing to be presented in § 3.

Similarly, according to Hu et al. (2001), (5)d is unacceptable with *hui* due to semantic incompatibility between the modality of uncertain possibility and planned eventhood denoted by *zhunbei* 'prepare'. In contrast, in (7), *yao* expresses subjective futurity, certainty of future events, and high volitionality. As explained by Hu et al. (2001), "if one persuades or forces a person to come, one expects his persuasion or forcing will produce an effect upon the person being persuaded or forced so as to make him accept his persuasion or forcing and carry out the action of coming". Further research is needed to ascertain whether such lexical-semantic explanations can be extended to other control verbs concerning the *hui-yao* distribution.[10]

2.1.2   Testable Hypothesis One: Correlation between (non-)control and *hui-yao* distribution

The debate in § 2.1.1 revolves around the question of whether it is a (postulated) complement-type distinction (i.e., finiteness) or lexical semantics that best explains the *hui-yao* distribution. As past studies usually focus on a rather limited set of complementation verbs, to better understand the issue, it is important to consider a wider range of verbs and systematically examine the distribution of *hui* and *yao* in their embedded clauses. (9) shows the logically possible outcomes regarding the modals *hui* and *yao* in the embedded clause.

(9)   Group 1: Compatible with both *hui* and *yao*
       Group 2: Incompatible with *hui* but compatible with *yao*
       Group 3: Compatible with *hui* but incompatible with *yao*
       Group 4: Incompatible with both *hui* and *yao*

The past data in § 2.1.1 can be classified into Groups 1 and 2. An in-depth empirical investigation will shed light on the attestation of Groups 3 and 4. To guide our systematic testing, a testable distribution-correlation hypothesis is formulated in (10), relating the distribution of the modals to (non-)control relations.

(10) Testable Hypothesis One (to be tested in § 3.2)
       The complement clauses of control verbs display systematic restrictions on the occurrence of the modals (*hui/yao*). In contrast, the complement clauses of non-control verbs do not have such restrictions on the occurrence of the modals.

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[10] This paper discusses the distributional facts of *hui* and *yao*. Note that, as an auxiliary, *yao* can be ambiguous between its functions as, among others, a future modal or deontic modal (see e.g., T.-H. J. Lin 2012: 155). For the same sentence, contextual support is often required to differentiate between these two functions. For example, sentence (i) can mean either *you will come to the UK* or *you have to come to the UK* depending on the context. Similarly, the English modal *will*, besides expressing futurity, can also convey deontic modality (Huddleston & Pullum 2002: 194).
(i) ni   yao   lai   yingguo
   you   will/have.to come   UK
   'You will/have to come to the UK.'
In the context of control constructions, it is not uncommon to see studies debating which functions *yao* performs. For example, while Grano (2015: 152) considers the embedded *yao* of a *zhunbei* 'prepare'-, *quan* 'persuade'- or *bi* 'force'-construction to be a future marker, He (2020: 319) argues that it is a deontic or dynamic modal. The lack of contexts could be a reason attributing to the interpretational debate among researchers. However, no matter whether the embedded *yao* is best interpreted as a future, deontic, or dynamic modal (or perhaps each of them is a valid option in an appropriate context) still does not alter the distributional fact that an embedded *yao* is permitted in a *zhunbei* 'prepare'-, *quan* 'persuade'- or *bi* 'force'-construction. On the other hand, *hui* can be used as, among others, a future modal or a modal to express one's ability (see e.g. T.-H. J. Lin 2012: 155).

If the attested patterns confirm the hypothesis, we will regard them as constituting distribution-correlation evidence that motivates the postulation of a complement-type distinction (i.e., finite vs non-finite). If the attested patterns fail to confirm the hypothesis, alternative explanations pertinent to the lexical semantics of the complementation verbs will be explored.

2.2   Aspectual markers (-*le*, -*guo*) in complement clause and Testable Hypothesis Two
2.2.1   Data sets in past studies

This section focuses on the perfective marker -*le* and experiential marker -*guo*. Past studies posit a finiteness distinction based on the occurrence of the aspectual markers -*le* and -*guo*, correlating their distribution to the (non-)control properties of the complementation verbs. In the early days, it was claimed that control verbs impose restrictions on the complement clause, disallowing the occurrence of -*le* and -*guo*, whereas non-control verbs do not have such restrictions.[11]. (11) and (12) display some relevant data.

(11) (Putative) non-finite class
    lisi   **shefa** lai-(*guo/*le)
    Lisi   try   come-EXP/PFV
    'Lisi tries to come.'   (C.-T. J. Huang 1989: 189)

(12) (Putative) finite class
    a. zhangsan   **shuo** ta   lai-le
       Zhangsan   say   3SG come-PFV
       'Zhangsan says that he has come.'   (C.-T. J. Huang 1989: 188)
    b. zhangsan   **gaosu** lisi   wangwu   chi-le/guo   fan
       Zhangsan   tell   Lisi Wangwu   eat-PFV/EXP food
       'Zhangsan tells Lisi that Wangwu has eaten.'   (Grano 2015: 152)

However, there are (apparent) counterexamples where the embedded clause of a control verb is compatible with -*le*/-*guo*:

(13) (Putative) non-finite class
    a. wo **bi**   ta   lai-le
       I   force 3SG come-PFV
       'I have forced him to come.'   (C.-T. J. Huang 1989: 190)
    b. wo **jiao** ta   kan-guo nide   shu
       I   ask   3SG read-EXP your book
       'I have asked him to read your book.'   (C.-T. J. Huang 1989: 190)
    c. zhangsan   **qing** lisì   chi-le/guo   fan
       Zhangsan   invite Lisi eat-PFV/EXP food
       'Zhangsan has invited Lisi to have a meal.'   (Grano 2015: 154)
    d. zhangsan   **bi**   lisi   chi-le   fan
       Zhangsan   force Lisi eat-PFV food
       'Zhangsan has forced Lisi to eat.'   (Grano 2015: 156)

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[11] For example, C.-T. J. Huang (1989: 189) claims that "when embedded under a control verb like *bi* 'force', *quan* 'persuade', *shefa* 'try', etc., a clause may never take any element of AUX'.

Supporters of the finiteness distinction (e.g., C.-T. J. Huang 1989; Y.-H. A. Li 1990; N. Huang 2018) argue that the occurrence of the aspectual markers -le or -guo in (13) does not constitute counterexamples. They argue that although the markers appear to be affixed to the embedded verbs on the surface, they are associated with the control verbs at the matrix level – a phenomenon termed "Aspectual Lowering". In (13)b, -guo is claimed to scope over the asking-to-read event instead of the reading event. According to J.-W. Lin (2003; 2006), -le and -guo have both aspectual and temporal components, and part of their semantic contribution is to place an event's topic time before the evaluation time, which is the understood time of the complementation verb. For example, (14) entails the time of Mary's getting angry precedes the time of John's saying.

(14) yuehan shuo mali   sheng-guo/-le qi
    John   say Mary get-EXP/PFV   angry
    'John says that Mary has been angry (before the saying time.)'

(adapted from J.-W. Lin 2006: 26)

Grano (2015: 153-155) applies J.-W. Lin's (2003; 2006) observation to control constructions. (13)c does not entail that the time of Lisi having a meal precedes the time of Zhangsan's invitation. He concludes that the presence of -le or -guo in the control complement does not indicate that the embedded-event time precedes the matrix-event time. This is because the "aspectual marker is semantically associated with the matrix level: it places the matrix event (Zhangsan inviting Lisi to have a meal) temporally prior to the utterance time" (Grano, 2015: 155). Turning to our current approach to finiteness as described in (3), we may say that a control verb imposes restrictions on its complement clause such that the embedded verb is not semantically associated with an aspectual marker, even though the marker is morphologically affixed to the embedded verb; rather, the aspectual marker scopes over the control verb, which denotes the matrix event.[12] To some extent, Aspectual Lowering helps preserve the view that there are two distinct clause types, depending on whether the complementation verb is a control or non-control verb; only the former imposes systematic restrictions on the complement clause.[13]

Xu (1985) and Hu et al. (2001) challenge the view that an embedded aspectual marker is semantically associated with the control verb. They provide data demonstrating that affixing -le/-guo to the embedded verb causes a different interpretation than affixing it to the control verb. The data undermine the claim that both options receive a matrix interpretation.

(15) a. wo **qing**-guo   ta   chi fan (keshi ta mei lai)
        I   invite-EXP 3SG eat food but   3SG not come
        'I have invited him to have a dinner (but he didn't come).'
     b. wo **qing**   ta   chi-guo fan (#keshi ta   mei lai)
        I   invite 3SG eat-EXP rice but   3SG not come
        'I have invited him to have a dinner (#but he did not come).'

(adapted from Xu, 1985: 349)

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[12] Since the embedded event is part of the matrix event, if the perfective/experiential assertion covers the matrix event, by implicature, it will also cover the embedded event. However, the key point of "Aspectual Lowering" is the claim that the embedded aspectual marker is associated with the matrix verb; therefore, the temporal effect is claimed to be imposed on the matrix event relative to its evaluation time (i.e., speech time), rather than on the embedded event relative to its evaluation time (i.e., matrix-event time).

[13] Here, we maintain a consistent view of finiteness as presented in (3). In comparison, C.-T. J. Huang (2022: 32) turns to a notion of "transparency", which is another plausible way of explaining Aspectual Lowering. We will return to discuss C.-T. J. Huang (2022) in § 4.

In (15)a, *-guo* is attached to the control verb, while in (15)b, it is attached to the embedded verb. According to Xu (1985) and Hu et al. (2001), for (15)b, if *-guo* were semantically associated with the control verb, the follow-up sentence should be semantically compatible in the same way as (15)a. However, the result shows (15)b is semantically incompatible with the follow-up, unlike (15)a. This weakens the claim of Aspectual Lowering.

2.2.2   Testable Hypothesis Two: Correlation between (non-)control and *-le/-guo* distribution

There are several issues to be tested systematically. The first issue concerns the compatibility of *-le/-guo* with the embedded verb. Another issue pertains to the temporal sequence of events denoted by the complementation verb and embedded verb, which has implications for whether *-le/-guo* in a control complement has a matrix construal. To this end, we expect three logical possibilities in terms of temporal sequence: (i) $t_{embed} < t_m$; (ii) $t_m < t_{embed}$; (iii) $t_m = t_{embed}$.[14] To test whether *-le/-guo* is semantically associated with the complementation verb, we can form a sentence pair similar to the one in (15), probing into interpretational effects between having *-le/-guo* affixed to the complementation verb vs having it affixed to the embedded verb.

To guide the testing process, we formulate a testable hypothesis in (16), correlating the (non-)control properties of the complementation verbs with the distribution of *-le/-guo*. If the attested patterns confirm the hypothesis, they constitute distribution-correlation evidence for proposing two distinct complement-clause types in finiteness terms. If the attested patterns do not confirm the hypothesis, alternative explanations shall be explored.

(16)   <u>Testable Hypothesis Two (to be tested in § 3.3)</u>
The complement clause of a control verb has restricted behaviour concerning the distribution of *-le* and *-guo* in one of the following ways:
(a) it is ungrammatical to affix *-le* or *-guo* to the complement clause
(b) it is grammatical to affix *-le* or *-guo* to the complement clause but the aspectual marker is semantically associated with the complementation verb rather than the embedded verb. Such semantic association can be evidenced by:
> (i) a temporal effect where the aspectual marker places the matrix event temporally prior to the speech time and the embedded event does not precede the matrix event; and/or
> (ii) there are no interpretational differences between affixing the aspectual marker to the complementation verb and affixing it to the embedded verb since both options should constitute a matrix construal.

In contrast, the complement clause of a non-control verb does not display the above restrictions. Affixing *-le* or *-guo* to the embedded verb results in the event time of the complement clause preceding the event time of the matrix clause.

3   Application of diagnostics and systematic hypothesis testing

This section closely inspects how the two phenomena (occurrence of *hui/yao* and distribution of *-le/-guo*) are embodied in the complement clause, testing the two hypotheses.

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[14] "t_m" is the event time of the matrix clause. "t_{embed}" is the event time of the embedded clause. "$<$" notates temporal precedence. "$=$" notates temporal simultaneity.

3.1 Introducing the data set of complementation verbs

Table 1 displays the set of complementation verbs to be studied. They are divided into control and non-control verbs, based on our criteria of (non-)control in § 1. The verbs are further classified into lexical-semantic groups, following similar categorisations in, for example, Grano (2015: 141), Landau (2000: 38), Polinsky (2006: 4), and Stiebels (2007: 15-16). Some of the object-control verbs (e.g., *guai* 'blame', *pei* 'accompany', *dailing* 'lead', *bi* 'force', *qing* 'invite') are featured by Chao (1968, 147-149) as "pivotal verbs", whose object is analysed as serving simultaneously as the subject of the embedded clause.

Lexical-semantic groups	Control verbs
Implicative	*qitu* 'attempt'
	shefa/changshi 'try'
	gan 'dare'
Desiderative	*dasuan* 'intend'
	zhunbei 'prepare'
	zhiyi 'persist'
	jujue 'refuse'
Directive	*bi* 'force'
	jinzhi 'prohibit'
	jiao 'ask'
	mingling 'order'
	quan 'persuade'
	qing 'invite'
	guli 'encourage'
Factive	*guai* 'blame'
	gongxi 'congratulate'
	yuanliang 'forgive'
Comitative	*pei* 'accompany'
	dailing 'lead'

Lexical-semantic groups	Non-control verbs
Attitudinal	*xiangxin* 'believe'
	renwei 'think'
	huaiyi 'doubt'
	guji 'predict'
	xiwang 'hope'
Communication	*tingshuo* 'hear'
	shuo 'say'
Commissive	*baozheng* 'guarantee'
Desiderative	*jianchi* 'insist'
Factive	*faxian* 'discover'

Lexical-semantic groups	Raising verbs
Situational	*sihu* 'seem'
Aspectual	*kaishi* 'begin'
	tingzhi 'stop'
Permissive	*rang* 'let'

Table 1: Complementation verbs under investigation in this paper

Several raising verbs are included.[15] Past studies on the Chinese finiteness debate focus on control verbs and much less has been said about raising verbs, although the assumption is that if the complement clauses of control verbs are analysed as non-finite, the same generally apply to those of raising verbs, as in English and other languages. Our criteria for control vs raising are purely based on theta-role tests featured in the general syntactic literature (e.g., Adger 2003; Börjars et al. 2019; Huddleston & Pullum 2002; Radford 2016). Permissive *rang* 'let' is considered a raising verb, assigning theta roles to its subject and embedded

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[15] English aspectual verbs (e.g., *begin*, *stop*) are sometimes claimed to be ambiguous between control and raising. According to Huddleston and Pullum (2002: 1197-1198), the sort of data which has resulted in this claim involves apparent tension between agentivity and passivisation. Instead, they convincingly argue that a unitary treatment of English aspectual verbs as raising verb is much more preferable. A way to show that Chinese aspectual verbs are raising verbs is to apply the meteorological clause compatibility diagnostic discussed by Lam (2023a: 35-36).

proposition but not to its object (cf. Paul 2021).[16] In (17), we contrast *rang* 'let' with the control verb *mingling* 'order' in a semantic-restriction diagnostic for control-raising differentiation (see also Lam 2023a; 2023b).

(17) a. #zhangsan **mingling** {bingkuai ronghua | shiqing fasheng}
      Zhangsan order   ice   melt   event   happen
      '#Zhangsan orders the ice to melt. /#Zhangsan orders the event to happen.'
    b. zhangsan **rang** {bingkuai ronghua | shiqing fasheng}
      Zhangsan let   ice   melt   event   happen
      'Zhangsan lets the ice melt. /Zhangsan lets the event happen.'

Mingling 'order' imposes semantic restrictions on its object which needs to be an animate participant capable of receiving a request. In (17)a, *bingkuai* 'ice' and *shiqing* 'event' do not fulfil such semantic requirements, rendering the respective sentences semantically anomalous. *Rang* 'let' does not impose such semantic restrictions on its object. It assigns a theta role to its subject and embedded proposition respectively, with *bingkuai* 'ice' and *shiqing* 'event' being part of their respective embedded proposition. Therefore, (17)b is semantically well-formed. Huddleston and Pullum (2002: 1234-1235) have provided further evidence to support why English permissive verbs (e.g., *let*, *allow*, *permit*) should be analysed as selecting a raised object. Their argumentation can be extended to Chinese permissive verbs.[17]

      We have included factive verbs (e.g., *guai* 'blame', *yuanliang* 'forgive') in the control class. These verbs are seldom discussed in the Chinese finiteness debate compared to other lexical-semantic groups. However, they are commonly featured in the cross-linguistic literature as control verbs (e.g., Landau 2000; Grano 2015). For example, Landau's (2000: 45-46) factive class includes *regret* and *forget*, whose non-finite complement clause denotes a past event before the matrix event, as shown in (18) and (19).[18]

(18) Mary said that John **regretted** working together on the presentation.
(19) Maria pensava che Gianni avesse **dimenticato** (Italian)
    Mary thought that John   had   forgotten
    di essersi baciarti alla festa
    to have   kissed   at party
   'Mary thought that John had forgotten to have kissed at the party.'

According to Landau (2000: 45), the Italian *dimenticato* 'forgotten' is unambiguously factive with its non-finite complement denoting a past event. Factive verbs contrast with implicative verbs, the latter of which have a complement denoting a future event. Ussery et al. (2016) discuss how in Chinese, the verb *wangji* 'forgive' can be either factive or implicative, which they claim has consequences for the finiteness of its embedded clause. To avoid such complexity, we exclude this verb from our data so that all the factive verbs in our data only have factive interpretations.

      Some object-control verbs (e.g., *guli* 'encourage', *bi* 'force', *gongxi* 'congratulate', *pei* 'accompany') allow an alternative subcategorisation pattern without a lower clause. When a lower clause appears, we

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[16] Paul (2021: 7-8) argues that Chinese does not have complementation verbs selecting a raised object, contrary to previous studies. Motivated by a Minimal approach, her conclusion is based on structural tests that probe into complement-clause size rather than theta-role diagnostics. Therefore, her conclusion is different from ours.

[17] According to Huddleston and Pullum (2002: 1234-1235), "*allow*... is best treated as a raising verb in all cases: it does not encode the giving of permission to anyone, though it may, in favourable circumstances, trigger an implicature that permission is given to the object-referent. *Permit* and *let* behave in essentially the same way."

[18] This contradicts Ussery et al.'s (2016: 7) claim that English non-finite complement refers to unrealised future, which is true for implicative verbs but not for factive verbs.

consider it a subcategorised argument of the verb with a controllee whose reference is lexically determined by the complementation verb.[19] In (20)b, where there is a lower clause, the unexpressed subject is enforced by *guli* 'encourage' to co-refer with the object *Xiaoming*, but in (20)a, where *guli* 'encourage' only selects a subject and object, the personal pronoun *ta* co-refers with a discourse-salient entity. This paper focuses on those subcategorisation patterns with complementation.

(20) a. zhangsan$_i$ **guli** xiaoming$_j$. ta$_{i/j}$ dei zuo yi-ge hao-ren
      Zhangsan encourage Xiaoming 3SG need.to be one-CL good-person
      'Zhangsan encourages Xiaoming. He needs to be a good person.'

   b. zhangsan$_i$ **guli** xiaoming$_j$ Ø$_{*i/j}$ dei zuo yi-ge hao-ren
     Zhangsan encourage Xiaoming Ø need.to be one-CL good-person
     'Zhangsan encourages Xiaoming to be a good person.'

3.2 Modals (*hui, yao*): empirical patterns and discussion

Following our discussion in § 2.1.2, Tables 2 and 3 display the distribution of *hui* and *yao*.

Distribution	Non-control verbs
Compatible with both *hui* and *yao*	*xiangxin* 'believe', *renwei* 'think', *huaiyi* 'doubt', *guji* 'predict', *xiwang* 'hope', *tingshuo* 'hear', *shuo* 'say', *baozheng* 'guarantee', *jianchi* 'insist', *faxian* 'discover'
Incompatible with *hui* but compatible with *yao*	(unattested)
Compatible with *hui*, but incompatible with *yao*	(unattested)
Incompatible with both *hui* and *yao*	(unattested)

Table 2: Distribution of *hui* and *yao* in the complement clauses of non-control verbs

Distribution	Control/raising verbs
Compatible with both *hui* and *yao*	*dasuan* 'intend', *pei* 'accompany', *dailing* 'lead', *sihu* 'seem', *kaishi* 'begin'
Incompatible with *hui* but compatible with *yao*	*shefa/changshi* 'try', *qitu* 'attempt', *zhiyi* 'persist', *zhunbei* 'prepare', *jiào* 'ask', *mingling* 'order', *guli* 'encourage', *bi* 'force', *qing* 'invite', *quan* 'persuade', *gongxi* 'congratulate', *guai* 'blame'
Compatible with *hui*, but incompatible with *yao*	(unattested)
Incompatible with both *hui* and *yao*	*jujue* 'refuse', *gan* 'dare', *jinzhi* 'prohibit', *yuanliang* 'forgive', *tingzhi* 'stop', *rang* 'let'

Table 3: Distribution of *hui* and *yao* in the complement clauses of control/raising verbs

We first survey the general trends in Tables 2 and 3 before discussing specific examples. Table 2 shows that all non-control verbs are compatible with *hui* and *yao*, providing consistent support for

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[19] Our view of complement control as a lexically determined phenomenon, with the controller decided by the complementation verb, is influenced by the Lexical-Functional Grammar (LFG) tradition, which is often considered a form of Generative Grammar. Another type of control is adjunct control which, in LFG, is characterised as a constructionally determined phenomenon. See e.g., Bresnan (1982), Bresnan et al. (2016), and Dalrymple et al. (2019).

Hypothesis One. The strong correlation between the non-control relation and distribution of the modals suggests that non-control verbs select the same unrestricted clause type, on par with a syntactically unembedded declarative clause in this language (see the methodological criterion of finiteness in (3)), permitting the occurrence of *hui* and *yao*, regardless of varying lexical semantics across the non-control verbs. On the other hand, the control verbs in Table 3 show more varied patterns than what has been reported in past studies (§ 2.1.1). This variation appears to contradict Hypothesis One. Combining Tables 2 and 3, Hypothesis One appears to be only partly supported by our empirical data. A straightforward solution would be to reject the hypothesis and resort entirely to lexical-semantic explanations. However, rejecting the hypothesis lightly does not seem to justify the distribution-correlation pattern witnessed in Table 2. Further, while Hu et al. (2001) have offered insights into the *hui-yao* asymmetry using lexical-semantic explanations (§ 2.1.1), not much has been said about those control verbs which are compatible or incompatible with both modals. On the other hand, note that Grano (2015: 152-153) offers an alternative explanation, positing that *hui* and *yao* are fundamentally distinct syntactic entities – with *yao* being the abstract future morpheme WOLL, following Abusch (1985) and Wurmbrand (2011) – but we doubt whether this explanation can account for those situations where both *hui* and *yao* are allowed or forbidden as his data do not cover those possibilities. Additionally, Grano (2015: 152-153) does not include any independent language-specific evidence to support his claim that the differences between *hui* and *yao* are syntactic in the grammatical system of Mandarin. After inspecting a wider range of data than in previous studies, we have unearthed new patterns which were hitherto unnoticed and deserve an explanation.

Given the above considerations, we propose an integrated view to explain the occurrence of the embedded modals (*hui/yao*), combining both complement-type and lexical-semantic explanations. We side with the view that the data do evidence two distinct complement types – finite vs non-finite; however, we disagree that non-finiteness should be characterised as prohibition of the modals, contradicting the general position adopted by prior studies, particularly towards *hui* (e.g., C.-T. J. Huang 1982; 1989; 2022; Y.-H. A. Li 1990; Grano 2015; Zhang 2019; He 2020). Instead, we propose that a non-finite complement clause should be characterised as being susceptible to semantic influence from the matrix clause and thus permeable to the interaction between the lexical semantics of the complementation verb and that of an embedded modal. Such interaction can cause semantic incompatibility, resulting in the restricted occurrence of *hui* and/or *yao* in some cases, as shown in Table 3. On the other hand, finite complement clauses are less susceptible to semantic influence from the matrix clause and thus the lexical semantics of the complementation verb has much less, if any, interaction with an embedded modal. This leads to a relatively free choice of *hui* and *yao* as shown in Table 2. In other words, contrary to past studies which rely on either complement-type (finiteness) or lexical-semantic explanations, we propose an integrated approach synthesising both perspectives.

To show how our integrated approach works, we apply it to discuss the distribution in Table 3, exploring how the patterns can be explained in terms of semantic interaction under the analysis that these complementation verbs select for a non-finite complement clause, susceptible to semantic influence from the matrix clause. As mentioned in § 2.1.1, Hu et al. (2001) discuss the lexical-semantic differences between *hui* and *yao*: *hui* expresses objective futurity, uncertainty of events, and low volitionality, while *yao* conveys subjective futurity, certainty of future events, and high volitionality. Hu et al. (2001: 1124) explain why the complement clauses of *quan* 'persuade' and *bi* 'force' are incompatible with *hui* but compatible with *yao* based on how the meaning of these verbs interacts with that of the modals. We agree with their explanation for *quan* 'persuade' and *bi* 'force'. Here, we build on their argumentation and show that lexical-semantic interaction can also explain the *hui-yao* asymmetry in (21) to (25), which are new data extracted from the Sinica and CCL corpora (Chen et al. 1996; Zhan et al. 2019). The data only show the *yao* situation, but for

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illustrative purposes, we have added *hui* and marked it as semantically anomalous based on our introspective judgment.[20]

(21) xilawang tingjian zhe hua   jiu **shefa** (yao/#hui) shahai ta
    Herod heard   these words then try   will   kill 3SG
    'After hearing these words, Herod tries to kill him.'   (CCL corpus)

(22) wo ye **changshi** (yao/#hui) jieshou zhe-zhong xiandai keji
    I   also try   will/will accept this-CL   modern technology
    dui wo de   tiaozhan
    to I   DE challenge
    'I also try to accept the challenge of this modern technology.'   (CCL corpus)

(23) nu   zhujiao **zhiyi** (yao/#hui) da   yi-tong dianhua
    female protagonist persist will/will   make one-CL phone.call
    'The female protagonist persists in making a phone call.'   (Sinica corpus)

(24) wo **guli**   xuesheng yiding (yao/#hui) chuguo   qu kankan
    I   encourage student must   will/will go.abroad go explore
    'I encourage students to go abroad to explore (new things).'   (Sinica corpus)

(25) (wo) **gongxi**   ni (yao/#hui) zuo   mama   le
    I   congratulate you will/will become mother SFP
    'I congratulate you for becoming a mother.'   (Sinica corpus)

In (21), the person who tries is the one performing the action in the embedded proposition. The lexical semantics of *shefa* 'try' requires Herod in (21) to show high volitionality in committing the murder. This requirement is compatible with the semantics of *yao*, but not *hui*. The same can be said for (22), where *changshi* 'try' (a synonym of *shefa* 'try') is used. Likewise, in (23), the lexical semantics of *zhiyi* 'persist' requires the female protagonist to show high volitionality in engaging in the activity of making a phone call. For (24), one hopes the encouragement will have an effect upon the person to actively carry out the required action. This requirement is compatible with the subjective futurity and high volitionality expressed by *yao*, but not with the objective futurity and low volitionality associated with *hui*, similar to the case of *quan* 'persuade' discussed by Hu et al. (2001). For (25), when one congratulates a person for an event denoted by the embedded proposition, it is either that the event has already happened, or in (25), one is certain about the future occurrence of the event. Because *yao* conveys certainty of future events and *hui* conveys uncertainty, only *yao* but not *hui* is appropriate. As such, we can explain the behaviour of the group of verbs in Table 3 which are incompatible with *hui* but compatible with *yao*. Before moving to the next group, note that our findings do not support C.-T. J. Huang's (2022: 25) view that *try*-predicates (exemplified by *changshi* 'try') are incompatible with *yao* in the complement clause. As discussed, our corpus data (including both *changshi* 'try' and *shefa* 'try') suggest that their complement clause can denote a future event relative to the matrix clause, refuting his view that the matrix and complement clauses of a *try*-construction need to be of simultaneous time reference. The additional corpus data in (26) clearly illustrate this point:

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[20] We could not find any corpus examples containing these complementation verbs with an embedded *hui*, corroborating our judgment that they are incompatible.

(26) women shefa [zai jinhou ji tian jiejue zhe yi wenti]
     we   try   in after.today few day resolve this one issue
    'We are trying to resolve this issue in the next few days.'   (CCL corpus)

In (26), the temporal phrase *zao jinhou ji tian* 'in the next few days' is in the complement clause modifying *jiejue* 'resolve'. If the temporal phrase were modifying the matrix verb *shefa* 'try', it would precede the matrix verb, following word-order requirements in Mandarin.

    Another group in Table 3 forbids both *hui* and *yao*. Here, we focus on those complementation verbs which have not appeared in any previous studies on the *hui-yao* distribution. We attribute the restricted occurrence of *hui* and *yao* to the interaction of lexical semantics between the complementation verb and the modal.

(27) xiaoming **rang** ta   (#yao/#hui) qu yingguo
    Xiaoming let   3SG will/will   go UK
    'Xiaoming lets him go to the UK.'

(28) xiaoming **jujue** (#yao/#hui) qu yingguo
    Xiaoming refuse will/will   go UK
    'Xiaoming refuses to go to the UK.'

(29) xiaoming **jinzhi** zhangsan (#yao/#hui) canjia huodong
    Xiaoming prohibit Zhangsan will/will   join   activity
    'Xiaoming prohibit Zhangsan from joining the activity.'

(30) xuexiao **tingzhi** (#yao/#hui) ban huodong
    school   stop   will/will   hold activity
    'The school stops holding activities.'

(31) xiaoming **yuanliang** zhangsan   (#yao/#hui) beipan ziji
    Xiaoming forgive   Zhangsan   will/will   betray SELF
    'Xiaoming forgives Zhangsan for betraying him.'

The complementation verbs in (27) to (31) can be categorised into three lexical-semantic classes. The first type (*rang* 'let') expresses permission. If one chooses to use a modal auxiliary in (27), a permission modal such as *keyi* 'can' should be used instead. The second type (*jujue* 'refuse', *jinzhi* 'prohibit', and *tingzhi* 'stop') implies that the protagonist should not undertake the action in the embedded proposition. However, both *hui* and *yao* express the meaning that the protagonist *will* carry out the action, contradicting the meaning of the complementation verbs. For (31), *yuanliang* 'forgive' in a complementation construction generally requires a past-oriented complement, making *hui* and *yao* semantically incompatible.[21]

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[21] To express the meaning that one forgives a person for an action that one will undertake, *yuanliang* 'forgive' is usually used in a non-complementation construction:
(i) suiran   xiaoming mingtian yao likai, danshi zhangsan rengran hui yuanliang ta
    although Xiaoming tomorrow will leave but   Zhangsan still   will forgive 3SG
    'Although Xiaoming is leaving tomorrow, Zhangsan will still forgive him.'

Table 3 contains complementation verbs whose complementation clauses are compatible with both *hui* and *yao*. To the best of our knowledge, this group has not been featured in any previous studies. (32), (34), (35), and (36) are new data extracted from the zhTenTen17 corpus (Jakubíček et al. 2013).

(32) a. wo **dasuan** hui   xuanyong butong   chandi-de   kafei   dou   zuo   changshi
       I   intend   will   use   different origin-DE   coffee bean   as   trial
       'I intend to use coffee beans of different origins as trials.'   (zhTenTen17 corpus)

   b. ni   zaoshang xinglai   faxian ziji   bei   waixingren zhuazou, ni   **dasuan** hui   zenme zuo
       you morning wake.up   find   self   PASS   alien   abduct   you   intend   will   what   do
       'If you woke up in the morning and found yourself abducted by aliens, what would you
       intend to do?'   (zhTenTen17 corpus)

   c. erpa   yuan   **dasuan** yao   qu   yanhai chengshi gongzuo
       Erpa initially intend   will   go   costal city   work
       'Initially, Erpa intends to go to a costal city to work.'   (zhTenTen17 corpus)

(33) xiaoming   **pei**   zhangsan (hui/yao) zai mingtian   qingchen likai   zheli
     Xiaoming accompany Zhangsan will/will   at tomorrow   morning   leave   here
     'Xiaoming accompanies Zhangsan to leave here tomorrow morning.'

(34) a. xixi mu   zhanlan   jiang **dailing** zhongduo pinpai   (jiang) hui   zai siyue beijing,
       Xixi Wood Exhibition will   lead   many   brands   will   will   at April Beijing
       wuyue zhengzhou, qiyue xian, he   shiyiyue   beijing jinxing   xunzhan
       May   Zhengzhou July   Xian and   November Beijing conduct   tour
       'Xixi Wood Exhibition will lead many brands to conduct a tour in Beijing in April,
       Zhengzhou in May, Xian in July, and Beijing in November.'[22]   (zhTenTen17 corpus)

   b. zhengfu   chaiqian   ban   renyuan ceng   ji   ci **dailing** shang qian
       government   demolition office staff   once   several   CL lead   up.to thousand
       jiancha yao   qiangxing jin   cun   zhangliang fangwu
       police   will   force   enter   village   measure   house
       'Government demolition office staff have led thousands of police officers to force their way
       into the village to measure houses several times.'   (zhTenTen17 corpus)

(35) a. dang chongwu fasheng PCM de   shihou,
       when pet   develop PCM DE   time
       shenti-de danbaizhi jiu   **kaishi** hui bengjie   xiaohao
       body-DE protein   then   begin   will   break.down consume
       'When a pet develops PCM, the body's protein begins to break down and consume.'
                                                                            (zhTenTen17 corpus)

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[22] In this corpus example, following the matrix object *zhongduo pinpai* 'many brands' are two future markers *jiang* and *hui*. Our introspective judgment showed that even without the first future marker *jiang*, the sentence remains grammatical. Limited by the length, our paper does not include a discussion on the distribution of *jiang*, for which readers may refer to e.g., N. Huang (2015).

b. haiyou ji   ge   yue   jiu   dao biye   jile,
   only   few CL   month then   to graduation season
   biye.dang-men **kaishi** yao zhunbei lunwen dabianle
   graduate-PL   begin will prepare thesis   defence
   'Graduation season is only a few months away, and graduates are beginning to prepare for
   their thesis defence.'   (zhTenTen17 corpus)

(36) a. jihua-hao-de   shiqing **sihu** chang hui biangua
        plan-well-DE   event   seem often will change
        'Well-planned events often seem to change.'   (zhTenTen17 corpus)
     b. ta   **sihu** zong   yao xiyin   bieren-de   zhuyi
        3SG seem always will attract others-DE attention
        'He seems to always attract others' attention.'   (zhTenTen17 corpus)

(32) shows *dasuan* 'intend' can take an embedded *hui* or *yao* – in contrast to *zhunbei* 'prepare', which is incompatible with embedded *hui* due to semantic incompatibility between the modality of uncertain possibility expressed by *hui* and planned eventhood conveyed by *zhunbei* 'prepare' (Hu et al., 2001: 1124). *Dasuan* 'intend' denotes an intention which can be fleeting (or tentative) and without the entailment of concrete planning, thereby avoiding semantic incompatibility with *hui*. For *pei* 'accompany' in (33), *dailing* 'lead' in (34), *kaishi* 'begin' in (35), and *sihu* 'seem' in (36), these verbs are semantically compatible with an embedded modal of either type, expressing subjective or objective futurity, certainty or uncertainty of future events, and high or low volitionality. As discussed earlier in this section, the general position adopted by prior studies is the prohibition of the modals, particularly *hui*, in control complements (e.g., C.-T. J. Huang 1982; 1989; 2022; Y.-H. A. Li 1990; Grano 2015; Zhang 2019; He 2020). Our data thus provide counterevidence to the general position in the literature.

   We exemplify some non-control verbs in Table 2, which demonstrate unrestricted behaviour.

(37) xiaoming **tingshuo** zhangsan (hui/yao) qu yingguo
     Xiaoming hear   Zhangsan will/will go UK
     'Xiaoming has heard that Zhangsan will go to the UK.'

(38) a. ye   jiaxiu **jianchi** dianshang   qudao   yao you gongsi
        Ye Jiaxiu insist   e-commerce channel will by   company
        zishen-de   zhuanye tuandui yunying
        professional-DE own   team   operate
        'Ye Jiaxiu insisted that the e-commerce channel will be operated by the company's own
        professional team.'   (zhTenTen17 corpus)
     b. wo haishi **jianchi** wo hui qu
        I   still   insist   I   will go
        'I still insist that I will go.'   (Sinica corpus)

(39) a. shizhang **baozheng** shizhengfu   yao songgei ni   yi-ge
        mayor   guarantee city.government will give   you one-CL
        zhongshen mianfei-de dianziyoujian xinxiang
        for.life   free-DE   email   mail.box
        'The mayor has guaranteed that the city government will give you a free email
        account for life.'   (Sinica corpus)

b. wo ye   **baozheng** wo hui wei ci qidao
   I   also guarantee I   will for this pray
   'I also guarantee that I will pray for this.'   (Sinica corpus)

The correlation between non-control and the distribution of the modals deserves an explanation. In line with (4), we postulate that the correlation has implications for a complement-type distinction in the embedded clause. The fact that all non-control verbs demonstrate unrestricted compatibility with both modals is taken as indicative of an unrestricted complement type, on par with a syntactically unembedded declarative clause; thus, their complement clause can be termed as "finite" using the methodological criterion in (3). As discussed before, in our integrated approach, being a finite embedded clause means less susceptibility to the semantic influence of the matrix clause; there is little, if any, interaction between the lexical semantics of the complementation verbs and the embedded modals.

To further test our integrated approach, it is possible to compare synonyms of different control relations to assess the feasibility of relying solely on lexical-semantic explanations without considering complement-type distinction. For example, our previous discussion on *zhiyi* 'persist' showed that the lexical semantics of this control verb requires the agentive entity in the embedded proposition to display high volitionality, causing incompatibility with *hui*. *Jianchi* 'insist' in (38) is a (partial) synonym of *zhiyi* 'persist', both demanding the occurrence of an event. Unlike *zhiyi* 'persist', *jianchi* 'insist' is a non-control verb and is fully compatible with both *hui* and *yao*. Relying only on lexical-semantic explanations, it is difficult to explain why the lexical semantics of *jianchi* 'insist' does not banish *hui*, while its synonym *zhiyi* 'persist' does.[23] Further, the lexical semantics of *baozheng* 'guarantee' in (39) should require its embedded proposition to convey high certainty of future events, thus anticipating semantic incompatibility with *hui*. Nonetheless, the data show that *baozheng* 'guarantee' is compatible with both *hui* and *yao*. In our proposal, this compatibility follows the unrestricted nature of its complement clause.

In Table 3, some control/raising verbs (e.g., *dasuan* 'intend', *sihu* 'seem') are compatible with both *hui* and *yao*. One might want to analyse them as selecting for a finite complement since they appear to align with the non-control verbs in Table 2. However, as we will see in § 3.3, this alignment pattern no longer holds when it comes to the *-le/-guo* distribution. If they truly selected for the same complement type, we would expect them to display the same alignment pattern concerning both *hui/yao* and *-le/-guo* distributions.

To sum up, this section has tested Hypothesis One regarding how complementation verbs interact with the embedded modals *hui/yao*. We have proposed an integrated approach, synthesising complement-type (finiteness) and lexical-semantic explanations, contrary to past studies that rely on either of them. An advantage of this integrated approach is its ability to account for a wider range of (new) empirical data than in past studies. The distributional patterns in Tables 2 and 3 suggest that Chinese has two types of complement clauses, one of which is permeable to restrictions caused by semantic incompatibility between the complementation verb and the embedded modal whereas the other complement type is relatively inert to such restrictions. Using the methodological criterion in (3), the former can be labelled as "non-finite" while the latter "finite". With this finiteness terminology, our empirical findings suggest that Chinese control/raising verbs select for non-finite complement clauses, while non-control verbs select for finite complement clauses. (40) further sums up our integrated approach.

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[23] Proponents of the view that lexical-semantic explanations alone are sufficient could attempt to probe into the subtle semantic differences between the synonyms and correlate the differences with their behaviour towards embedded *hui* and *yao*. So far, there has not been any convincing argument in the literature that precisely correlates such differences to achieve the required explanatory power.

(40) <u>An integrated approach to account for *hui/yao* distribution</u>
Finiteness in the complement clause can be conceptualised as susceptibility to semantic influence (or restrictions) from the matrix clause. The finite class is less susceptible, while the non-finite class is more susceptible. For the finite class, there is little, if any, semantic interaction between the lexical semantics of the complementation verb and that of the embedded modal (*hui/yao*), whereas the non-finite class is permeable to such interaction. The consequence of such semantic influence is the restricted occurrence of the modal (*hui/yao*) observed in some non-finite contexts due to semantic incompatibility between the complementation verb and the embedded modal.

3.3   Aspectual markers (*-le, -guo*): empirical patterns and discussion

This section examines the interaction between complementation verbs and aspectual markers *-le* and *-guo* to test Hypothesis Two. The results are presented in Tables 4 and 5.

(Symbols: V_{embed}: embedded verb; t_m: time of matrix event; t_{embed}: time of embedded event; t_{speech}: speech time; <: temporal precedence)

Compatibility	Temporal sequence of events with post-V_{embed} *-le/-guo* (& semantic association)	Non-control verbs
Compatible with post-V_{embed} *-le/-guo*	$t_m < t_{embed} < t_{speech}$ (*-le/-guo* semantically associated with embedded verb)	(unattested)
	$t_{embed} < t_m < t_{speech}$ (*-le/-guo* semantically associated with embedded verb)	*xiangxin* 'believe', *renwei* 'think', *huaiyi* 'doubt', *guji* 'predict', *xiwang* 'hope', *tingshuo* 'hear', *shuo* 'say', *baozheng* 'guarantee', *jianchi* 'insist', *faxian* 'discover'
	$t_m = t_{embed} < t_{speech}$ (*-le/-guo* semantically associated with embedded verb)	(unattested)
	$t_m < t_{embed} < t_{speech}$ OR $t_{embed} < t_m < t_{speech}$ OR $t_m = t_{embed} < t_{speech}$ (*-le/-guo* semantically associated with complementation verb)	(unattested)
Incompatible with post-V_{embed} *-le/-guo*	/	(unattested)

Table 4: Patterns of non-control verbs (*-le* and *-guo* affixed to embedded verbs)

Compatibility	Temporal sequence of events with post-V_{embed} *-le/-guo* (& semantic association)	Control/raising verbs
Compatible with post-V_{embed} *-le/-guo*	$t_m < t_{embed} < t_{speech}$ (*-le/-guo* semantically associated with embedded verb)	*quan* 'persuade', *bi* 'force', *guli* 'encourage', *qing* 'invite', *jiào* 'ask', *mingling* 'order', *rang* 'let'
	$t_{embed} < t_m < t_{speech}$ (*-le/-guo* semantically associated with embedded verb)	*yuanliang* 'forgive', *gongxi* 'congratulate', *guai* 'blame'
	$t_m = t_{embed} < t_{speech}$ (*-le/-guo* semantically associated with embedded verb)	*shefa/changshi* 'try', *qitu* 'attempt', *zhiyi* 'persist', *pei* 'accompany' *dailing* 'lead',
	$t_m < t_{embed} < t_{speech}$ OR $t_{embed} < t_m < t_{speech}$ OR $t_m = t_{embed} < t_{speech}$ (*-le/-guo* semantically associated with complementation verb)	(unattested)
Incompatible with post-V_{embed} *-le/-guo*	/	*dasuan* 'intend', *zhunbei* 'prepare', *jujue* 'refuse', *gan* 'dare', *jinzhi* 'prohibit'

Table 5: Patterns of control/raising verbs (*-le* and *-guo* affixed to embedded verbs)[24]

We first survey the general trends in Tables 4 and 5. All the non-control verbs in Table 4 show consistent patterns: compatible with post-V_{embed} *-le/-guo*, temporal sequence of $t_{embed} < t_m < t_{speech}$, and *-le/-guo* semantically associated with the embedded verb. The strong correlation between the non-control relation and distribution of *-le/-guo* suggests that non-control verbs select for the same unrestricted complement type, on par with a syntactically unembedded declarative clause (see the methodological criterion (3)), supporting Hypothesis Two. However, for control/raising verbs, Table 5 shows more varied patterns than what Hypothesis Two predicts. Similar to the previous situation of *hui/yao* distribution, rejecting the hypothesis lightly does not seem to justify the distribution-correlation between non-control verbs and *-le/-guo* distribution. The overall patterns appear to be more complicated than expected.

We will address the intricate interaction between complementation verbs and *-le/-guo*, focusing on compatibility, semantic association, and temporal sequence. The investigation will show that the complement clauses of non-control and control/raising verbs are of two distinct types, which can be characterised in finiteness terminology, and will discuss the nature of finiteness in relation to post-V_{embed} *-le/-guo*.

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[24] We have omitted *sihu* 'seem', *kaishi* 'begin', and *tingzhi* 'stop' from the results since it is difficult to differentiate between t_m and t_{embed} in these raising constructions. On the other hand, such judgment is still possible for *rang* 'let' whose matrix clause characterises a thematic relation between an enabler and the event they permit.

To start with, we examine the compatibility issue in Table 5 concerning control/raising verbs. Most of them allow post-V$_{embed}$ -*le*/-*guo*, contradicting part (a) of Hypothesis Two. However, we have also noticed control verbs whose embedded clauses cannot take a post-V$_{embed}$ -*le*/-*guo* as exemplified in (41) and (42).[25] To our knowledge, the incompatibility of the following verbs has not been documented in past studies:

(41) #xiaoming {**dasuan**/**zhunbei**/**jujue**/**gan**} qu-le/-guo   yingguo
     Xiaoming   intend/prepare/refuse/dare   go-PFV/-EXP UK
     '#Xiaoming intends/prepares/refuses/dares to have been to the UK.'

(42) #xiaomíng **jinzhi**   zhangsan qu-le/-guo   yingguo
     Xiaoming prohibit Zhangsan go-PFV/-EXP UK
     'Xiaoming prohibits Zhangsan from going to the UK.'

In § 3.2, we argued that Chinese control/raising verbs select non-finite complements which are susceptible to semantic influence from the matrix clause. The pattern in (41) and (42) can be explained in the same direction. A plausible way of explaining their semantic anomaly is: these control verbs impose semantic restrictions on their complement clause, requiring the embedded event to be future-oriented or simultaneous with the matrix event, whereas -*le*/-*guo* requires the complement clause to denote an event that precedes the matrix event, causing semantic anomaly, thus, restricted occurrence of -*le*/-*guo*. On the other hand, non-control verbs in Table 4 do not impose such restrictions on the temporal reference of their finite complements. For now, this explanation appears to serve the purpose of accounting for (41) and (42), but it remains to be seen if the explanation needs revision when we take into account the patterns of semantic association and temporal sequence, which we will soon address.

As discussed in § 2.2.1, a number of past studies claim that control verbs can trigger Aspectual Lowering, where post-V$_{embed}$ -*le*/-*guo* is analysed as semantically associated with the control verb rather than the embedded verb (e.g., C.-T. J. Huang 1989; N. Huang 2018; Y.-H. A. Li 1990). Yet, many of them do not display empirical diagnostics to justify the claim of Aspectual Lowering. Following Hu et al. (2001) and Xu (1985), this claim can be tested using an interpretational diagnostic, comparing the meaning expressed by a complementation construction with a post-V$_{embed}$ -*le*/-*guo* vs post-matrix-verb -*le*/-*guo*. The interpretational diagnostic allows an objective evaluation of which verb -*le*/-*guo* is semantically associated with by inspecting contextual compatibility with follow-up sentences. We apply this diagnostic to new empirical data, illustrated by (43) and (44), where the test is exemplified using -*le*. Although the claim of Aspectual Lowering in past studies targets control verbs, we have also included a raising verb *rang* 'let' in (44) as a comparison.

(43) a. xiaoming {**shefa**/**changshi**/**zhiyi**}
        Xiaoming try /try   /persist
        xiuhao-**le** jiu diannao (#keshi xianzai diannao haishi   huaide)
        repair-PFV old computer but   now   computer still.be   not.working
        'Xiaoming tried to repair the old computer./
        Xiaoming persisted in repairing the old computer./
        (With the computer repaired,) #however, now the computer is still not working.'

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[25] In zhTenTen17, Sinica, and CCL corpora, we could not find any valid cases to support the claim that these verbs are compatible with a post-V$_{embed}$ -*le*/-*guo*.

b. xiaoming {*shefa-le/changshi-le/*zhiyi-le}

    Xiaoming try-PFV   try-PFV   persist-PFV

    (yao) xiuhao jiu diannao (keshi xianzai diannao   haishi   huaide)

    will repair old computer but   now   computer still be not.working

    'Xiaoming tried to repair the old computer./

    Xiaoming persisted in repairing the old computer./

    However, now the computer is still not working.'

<div align="right">(Partly adapted from Lam 2022: 205)</div>

(44) a. xiaoming {guli   /jiao /rang}

    Xiaoming encourage /ask /let

    zhangsan xiuhao-le jiu diannao (#kashi xianzai diannao   haishi huaide)

    Zhangsan repair-PFV old computer but   now   computer still.be not.working

    'Xiaoming encouraged/asked/let Zhangsan to repair the old computer.

    (With the computer repaired,) #however, now the computer is still not working.'

   b. xiaoming {guli-le   /jiao-le /*rang-le}

    Xiaoming encourage-PFV /ask-PFV/let-PFV

    zhangsan (yao) xiuhao jiu diannao (kashi xianzai diannao   haishi huaide)

    Zhangsan will repair old computer but   now   computer still.be not.working

    'Xiaoming encouraged/asked/let Zhangsan to repair the old computer.

    However, now the computer is still not working.'

In (43) and (44), sentences (a) and (b) exhibit a contrast in semantic compatibility with the follow-up sentence. Affixing an aspectual marker to a control verb does not yield the same reading as affixing it to an embedded verb. In (43)a, *xiuhao-le* 'repair-PFV' implies that the repairs have been completed, making it anomalous if the follow-up sentence suggests otherwise. In contrast, affixing *-le* to the control verb *changshi* 'try' in (43)b indicates that the protagonist attempted to carry out the repairs, but there is no guarantee that the computer has been repaired, explaining why the construction is compatible with a follow-up assertion that the computer is still broken. To further strengthen the validity of the results, we have deliberately introduced the optional modal *yao* 'will' in the complement clause of sentence (b) to mark a temporal separation between the two events, making it clear that the trying event does not entail the successful accomplishment of the repairs. These findings can be taken as counterevidence to the claim that a post-V_{embed} aspectual marker is semantically associated with the control verb. Furthermore, as shown in (43)b and (44)b, there are control verbs incompatible with *-le*. For example, *shefa* 'try' is incompatible with *-le*, unlike its synonym *changshi* 'try'; similarly, *zhiyi* 'persist' and *rang* 'let' are incompatible with *-le*.[26] The intrinsic incompatibility of these control/raising verbs with *-le* poses a further problem for the claim of Aspectual Lowering. If the claim that a post-V_{embed} *-le* is associated with the complementation verbs were correct, no post-V_{embed} *-le* should even be allowed in the *shefa* 'try', *zhiyi* 'persist', and *rang* 'let' constructions, contrary to the results of (43)a and (44)a. Overall, our new empirical data suggest that a post-V_{embed} aspectual marker is semantically associated with the embedded verb.

      Before moving to the next pattern, note that, in order to maintain Aspectual Lowering, Grano (2015: 153, 159-160) sketches a notion of "actuality entailment" to explain the unacceptability of the

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[26] See C. N. Li and Thompson (1989: 202-205) for a discussion of why some Mandarin verbs are intrinsically incompatible with *-le*.

parenthetical follow-up in situations such as (43) and (44):[27] when *-le* is affixed to the embedded verb, although *-le* is syntactically and semantically associated with the matrix level, the sentence entails that the embedded event is realised with the whole sentence being restructured into a monoclausal structure; when *-le* is affixed to the control verb, it suppresses the realisation of the embedded event with the sentence remaining a biclausal one. In order words, for Grano (2015), the analysis of (43) and (44) require both mechanisms of Aspectual Lowering and actuality entailment. However, the fact that Grano (2015: 160) has to "leave it to future research to investigate this possibility more fully" already hints that this is not a well-developed argumentation. Based on Grano (2015: 159-160), it is also not clear to us how this actuality entailment works, including its precise conditions for activation and suppression, which also appear to be critically dependent on the clausal structure of the construction. It would appear that the motivation behind Grano's (2015) suggestion is to identify a remedy that could sustain the view of Aspectual Lowering, even if the remedy itself brings additional theoretical burdens.[28] Further, using an actuality entailment account to maintain Aspectual Lowering still does not explain the empirical issue we raised earlier regarding the implications of the intrinsic incompatibility of *shefa* 'try', *zhiyi* 'persist', etc. with *-le*, which would need to be addressed if the embedded *-le* indeed rendered a matrix construal. Therefore, after securitising a wider range of data, we side with Hu et al. (2001) and Xu (1985) that the claim of Aspectual Lowering has unresolved (empirical) issues. Based on the prior work of Hu et al. (2001) and Xu (1985), the determination of which verb *-le/-guo* is semantically associated with can be readily tested by how the meaning of the whole sentence is understood against contextual compatibility with follow-up sentences. Hu et al. (2001) and Xu (1985) have concluded that the outcome of such tests suggests no Aspectual Lowering is involved, meaning that *-le/-guo* is semantically associated with the embedded verb rather than the complementation verb. After conducting tests on a wider data set, we agree with them that this outcome is not any different than any other common instances where affixing a verb with an aspectual marker means rendering that particular verb (not any other verbs in the sentence) perfective or experiential aspect. There is no joint (or additional) mechanism of Aspectual Lowering and actuality entailment required to interpret (43) and (44).

Another important empirical pattern is the temporal sequence of events when *-le/-guo* is suffixed to a post-V$_{embed}$. As mentioned in § 2.2.1, Grano (2015) and J.-W. Lin (2003; 2006) argue that *-le/-guo* has a temporal component: when affixed to an embedded verb, this component places the time of the embedded event before the matrix event ($t_{embed} < t_m$) if the complement clause is finite. This temporal sequence is attested for all non-control verbs in Table 4, supporting Hypothesis Two, indicative of a finite subclause.

Grano (2015: 153-155) focuses on the control verb *qing* 'invite', which displays the pattern of $t_m < t_{embed} < t_{speech}$, discussing that a post-V$_{embed}$ *-le/-guo* in a control construction places the matrix event prior to the speech time and (by implication) embedded-event time. Our empirical data presented in Table 5 considers a wider range of control verbs and illustrates two additional patterns not addressed by Grano (2015): $t_{embed} < t_m < t_{speech}$ and $t_m = t_{embed} < t_{speech}$.

(45) a. xiaoming **yuanliang/guai** zhangsan qipian-le/-guo ziji
Xiaoming forgive/blame Zhangsan lie-PFV/-EXP SELF
'Xiaoming forgives/blames Zhangsan for having lied to him.' ($t_{embed} < t_m < t_{speech}$)

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[27] One may refer to, for example, Bhatt (1999) for a discussion of actuality entailment in the general literature (independent of the Chinese finiteness literature).

[28] In other words, when it comes to the distribution of *-le* and *-guo*, the machinery of actuality entailment is only needed for the proponents of Aspectual Lowering. Being a proponent of Aspectual Lowering, He (2020: 334-351) has provided further discussion on actuality entailment. For Hu et al. (2001) and Xu (1985), since they have never agreed with Aspectual Lowering in the first place, they do not need any mechanism of actuality entailment to interpret the distribution of *-le* and *-guo*. For them, *-le/-guo* is associated with the embedded verb to which *-le/-guo* is attached, in the same way as one would expect for any verbs that are affixed with an aspectual marker.

b. xiaoming **gongxi**   zhangsan de-le/-guo   jiang
   Xiaoming congratulate Zhangsan win-PFV/-EXP prize
   'Xiaoming congratulates Zhangsan for having won the prize.'   ($t_{embed} < t_m < t_{speech}$)

(46) a. xiaozhang... **zhiyi**   jiagei-le...   yuyanghe
     Xiaozhang   persist marry-PFV Yuyanghe
     'Xiaozhang persists in marrying Yuyanghe   (zhTenTen17 corpus; $t_m = t_{embed} < t_{speech}$)
   b. xiaoming **pei**   zhangsan qu-le/-guo   beijing
     Xiaoming accompany Zhangsan go-PFV/-EXP Beijing
     'Xiaoming accompanied Zhangsan to go to Beijing.'   ($t_m = t_{embed} < t_{speech}$)

(45) contains factive verbs, which as discussed in § 3.1 are commonly found in the cross-linguistic literature as control verbs but rarely discussed in the literature on Chinese finiteness. In (45), the embedded event precedes the matrix event, while in (46) the matrix and embedded events occur simultaneously, contradicting any suggestion that a post-V_{embed} -*le*/-*guo* always places the matrix event temporally before the embedded event in a control construction. The question that remains is how to explain the various temporal sequences for control constructions which we have noticed via the systematic testing of our data.

Before returning to -*le*/-*guo*, note that non-control verbs generally allow a flexible temporal sequence between t_m and t_{embed}, which is context-dependent and can be influenced by the presence of, for example, time adverbials. (47) encodes the temporal sequence of $t_m = t_{embed}$, (48) encodes $t_m < t_{embed}$, and (49) $t_{embed} < t_m$.

(47) xiaoming {**shuo/faxian/baozheng/xiangxin/huaiyi/jianchi/xiwang**}
     Xiaoming say/discover/guarantee /believe   /doubt/insist   /hope
     (ta) zhengzai   nuli   gongzuo
     3SG at.the.moment   diligently work
     'Xiaoming says/discovers/guarantees/believes/doubts/insists/hopes that he is
      working diligently at the moment.'

(48) xiaoming {**shuo/faxian /baozheng/xiangxin/huaiyi/jianchi/xiwang**}
     Xiaoming say /discover/guarantee /believe   /doubt /insist /hope
     (ta) mingtian hui nuli   gongzuo
     3SG tomorrow will diligently work
     'Xiaoming says/discovers/guarantees/believes/doubts/insists/hopes that he will
      working diligently tomorrow.'

(49) xiaoming {**shuo/faxian/baozheng/xiangxin/huaiyi/jianchi/xiwang**}
     Xiaoming say /discover/guarantee /believe   /doubt /insist /hope
     (ta) yijing wancheng-le gongzuo
     3SG already finish-PFV   work
     'Xiaoming says/discovers/guarantees/believes/doubts/insists/hopes that he has
      already finished work.'

Control verbs are generally more restricted in terms of temporal sequence between t_m and t_{embed}. For example, *qing* 'invite', *quan* 'persuade', and *jiao* 'ask' require the sequence $t_m < t_{embed}$. (50) is semantically anomalous because the time adverbial *zhengzai* 'at the moment' forces the matrix event to be simultaneous with the embedded event.

(50) #xiaoming {**qing**/**quan** /**jiao**} zhangsan zhengzai yiqi chifan
Xiaoming {invite/persuade/ask } Zhangsan at.the.moment together eat
'#Xiaoming invites/persuades/asks Zhangsan to be having a meal at the moment together.'

Some control verbs (e.g., *pei* 'accompany', *dailing* 'lead') require $t_m = t_{embed}$, whereas others (e.g., *yuanliang* 'forgive') require $t_{embed} < t_m$. The former allows both matrix and embedded events to happen in the future with a future modal in the complement clause, while the complement clause of the latter is incompatible with future modals and modification by the time adverbial *zhengzai* 'at the moment' often causes semantic anomaly.

(51) #xiaoming **yuanliang** zhangsan zhengzai qipian ta
Xiaoming forgive Zhangsan at.the.moment lie 3SG
Intended: 'Xiaoming gives his forgiveness to Zhangsan at the moment that Zhangsan is lying to him.'

In other words, Chinese control verbs often restrict the temporal sequence between t_m and t_{embed}, while non-control verbs generally do not impose such restrictions.[29] The temporal reference of the complement clause is anchored by the complementation verb in the former, but rather independent of it in the latter. This dichotomy in Chinese resembles the situation in other languages which employ visible grammatical markers for finiteness:

"... in the case of non-finite verb forms like participles, whose temporal reference is usually anchored by the main clause. The temporal reference of a finite verb, on the other hand, is independent within its clause, depending rather on discourse and extra-linguistic context for its interpretation." (Dalrymple et al., 2019: 317)

The temporal nature of the two classes of Chinese complement clauses parallel overtly marked finite vs non-finite clauses in other languages. This gives another motivation for labelling the two clauses in finiteness terminology for Chinese: a non-control verb selects for a finite complement, which is less susceptible to semantic influence from the matrix clause and its temporal reference is independent of the non-control verb; a control/raising verb selects for a non-finite complement, which is susceptible to semantic influence from the matrix clause and its temporal reference is anchored by the control verb, restricting the sequence between t_m and t_{embed}.[30]

Returning to the aspectual markers, when *-le/-guo* is affixed to the embedded verb of a non-finite clause, we posit that two possible effects may occur, depending on the complementation verb. The first effect is that *-le/-guo* modifies the relationship between t_{embed} and t_m, but this often causes semantic anomaly. This happens to few control verbs such as *dasuan* 'intend' and *jinzhi* 'prohibit' in (41) and (42). The second effect is that *-le/-guo* modifies the relationship between t_{embed} and t_{speech}, indicating that the embedded event has been completed or experienced before t_{speech}. This effect is experienced by most complementation verbs in Table 5 which demonstrate compatibility with post-V_{embed} *-le/-guo* without causing semantic anomaly.

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[29] See C.-T. J. Huang (2022: 61-68) for an exception regarding temporal sequence in non-control constructions.

[30] C.-T. J. Huang (2022: 24-25, 61-68) has provided some discussion regarding the temporal (in)dependence of finite and non-finite complements in Chinese and English. The range of data he examines and the discussion itself are different from ours. See also Nikolaeva (2010: 1185) for issues of temporal anchoring pertinent to finiteness in cross-linguistic research.

This explains why the control/raising constructions in (43)a and (44)a (repeated as (52) below) with *-le* affixed to the embedded verb *xiuhao* 'repair' are incompatible with the follow-up sentence *keshi xianzai diannao haishi huaide* 'however, now the computer is still not working', where *xiànzài* 'now' indicates t_{speech}. Our view thus contradicts Grano's (2015: 155) that *-le/-guo* affixed to the embedded verb of a non-finite complement modifies the relationship between t_m and t_{speech}.

(52) a. xiaoming {**shefa**/**changshi**/**zhiyi**}
     Xiaoming try /try   /persist
     xiuhao-**le** jiu diannao (#keshi xianzai diannao   haishi   huaide)
     repair-PFV old computer but   now   computer still.be   not.working
     'Xiaoming tried to repair the old computer./
      Xiaoming persisted in repairing the old computer./
     (With the computer repaired,) #however, now the computer is still not working.'
    b. xiaoming {**guli**   /**jiao** /**rang**}
     Xiaoming encourage /ask /let
     zhangsan xiuhao-**le** jiu diannao   (#keshi xianzai diannao haishi huaide)
     Zhangsan repair-PFV old computer   but now   computer still.be not.working
     'Xiaoming encouraged/asked/let Zhangsan to repair the old computer.
     (With the computer repaired,) #however, now the computer is still not working.'

Note that Grano (2015: 155) refutes a plausible argumentation that the lexical semantics of a complementation verb overrides the temporal contribution of an embedded *-le/-guo*. It is important to point out that our proposed view is nothing of the same sort. Instead, we propose that *-le/-guo* modifies the relationship between t_{embed} and t_{speech} such that the embedded event needs to be completed or experienced before t_{speech}. So far, we are not aware of other existing studies which have proposed the same view to understand this empirical puzzle. On the other hand, when *-le/-guo* is affixed to the embedded verb of the complement of a non-control verb, such as those listed in Table 4, we agree with Grano (2015) and J.-W. Lin (2003; 2006) that *-le/-guo* modifies the relationship between t_{embed} and t_m such that the embedded event precedes the matrix event.

     To sum up, this section has tested Hypothesis Two, the process of which has revealed complex empirical patterns more intricate than what Hypothesis Two predicts. The distributional patterns in Tables 4 and 5 suggest that Chinese has two types of complement clauses, one of which is permeable to temporal restrictions imposed by the complementation verb whereas the other complement type is relatively inert to such restrictions. Using the methodological criterion in (3), the former can be labelled as "non-finite" while the latter "finite". With this finiteness terminology, our empirical findings suggest that Chinese control/raising verbs subcategorise for non-finite complement clauses, while non-control verbs subcategorise for finite complement clauses. (53) further summarises our view regarding the distribution of *-le/-guo*.

(53) <u>Finiteness and *-le/-guo* distribution</u>

      Finiteness in the complement clause can be conceptualised as susceptibility to semantic influence (or restrictions) from the matrix clause. The non-finite class is more susceptible to semantic influence from the matrix clause with its temporal reference anchored by the complementation verb, restricting the sequence between t_m and t_{embed}. When *-le/-guo* is affixed to the embedded verb, for those complementation verbs that allow such affixation, the aspectual marker modifies the relationship between t_{embed} and t_{speech} to express the meaning that the embedded event has been completed or experienced before t_{speech}. On the contrary, the temporal reference of a finite complement is relatively independent of the complementation verb. Thus, the temporal sequence is flexible between t_m and t_{embed}, which is often context-dependent and influenced by the presence of, for example, time adverbials. When *-le/-guo* is affixed to the embedded verb, *-le/-guo* places t_{embed} before t_m.

4   Final remarks and future research

Concerning the semantics of finiteness, Lowe (2019) writes:

> "Finiteness is correlated with semantic independence, while a reduction in finiteness is correlated with a reduction in independently specified semantic properties, and an increase in number of semantic properties which are unspecified or derive from the superordinate clause."
>
> (Lowe 2019: 321-322; see also Nikolaeva 2010: 1179)

An important difference between finite and non-finite complements lies in their semantic dependency on the matrix clause. Our previous discussion has revealed certain properties of finiteness echoing Lowe's (2019) concept of "semantic (in)dependence": a non-finite complement is more susceptible to semantic influence from the matrix clause, meaning that a non-finite complement is more "semantically dependent" on the matrix clause. In contrast, a finite complement is less susceptible to such semantic influence, making it more "semantically independent" from the matrix clause. Since our paper focuses on the empirical side, we leave for future research a formal characterisation of this semantic dependency in relation to *hui/yao* and *-le/-guo* distributions.

      Since non-finite clauses are analysed as those deviating from the prototypical finite clause (i.e., unembedded, declarative, non-modal, non-negative clause), in principle, there can be more than one type of non-finite clause in a language, each embodying a different degree of deviation. In other words, finiteness does not have to be binary (see also Nikolaeva 2010: 1179). Nevertheless, there needs to be convincing evidence for each degree of deviation. C.-T. J. Huang (2022) implements Chinese finiteness along Wurmbrand and Lohninger's (2019) cross-linguistic implicational complementation hierarchy (ICH), which proposes three types of complement clauses differing in degrees of independence, transparency, and integration (see also He 2020).[31] Following Wurmbrand and Lohninger (2019), C.-T. J. Huang (2022: 24) recognises three types of verbal complement, each selected by a specific verb class: Type I (e.g., *shuo* 'say'), Type II (e.g., *dasuan* 'intend'), and Type III (e.g., *shefa* 'try'). Type I is characterised as finite, whereas Types II and Type III as non-finite (with Type III being more non-finite than Type II). In other words, there is a tripartite distinction, with two degrees of non-finiteness. That being said, some finiteness-related phenomena discussed in his paper, for example, the distribution of *-le/-guo*, still illustrate a binary rather than tripartite distribution since there is no difference between Type II and Type III (C.-T. J. Huang 2022:

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[31] He (2020) also has a similar proposal in following Wurmbrand and Lohninger's (2019) ICH. Our discussion here focuses on C.-T. J. Huang (2022).

31-32). C.-T. J. Huang (2022: 25) argues that the distribution of the modals *hui/yao* in the complement clause evidences a tripartite distribution. His claim relies on his observation that the complement clause of a Type III verb (e.g., *changshi* 'try') is incompatible with *yao*, as he argues that the reference time encoded by the complement of a Type III verb must be identical with the reference time of the matrix clause (C.-T. J. Huang 2022: 25). However, our data in § 3.2 already show that *try*-verbs are compatible with *yao* and the complement clause of a *try*-verb is capable of encoding future reference time relative to the matrix clause; as such, it seems that the *hui/yao* distribution is better explained under a binary finiteness distinction. Therefore, while we are open to the possibility of a tripartite characterisation of finiteness especially in cross-linguistic settings, our current findings regarding the distributions of *hui/yao* and *-le/-guo* do not provide sufficient empirical evidence to support this view for Mandarin Chinese.

Before concluding this paper, returning to the distribution of embedded *-le/-guo*, § 3.3 has shown that the interpretational diagnostic adapted from Hu et al. (2001) and Xu (1985) is a rather straightforward way of empirically testing the claim of Aspectual Lowering. Our discussion has shown that this claim is not empirically sustainable. It is worth noting that Minimalist studies in recent years have regarded Aspectual Lowering as a restructuring phenomenon (Grano 2015; N. Huang 2018), where the entire control construction takes on a mono-clausal configuration with the control complement being reduced to a non-clausal vP projection (N. Huang 2018: 360). Following the clausal reduction is an Agree operation between an unpronounced matrix Asp morpheme and the embedded *-le/-guo* for feature valuation, thus licensing Aspectual Lowering (N. Huang 2018: 360). In other words, the matrix semantic construal in Aspectual Lowering is a consequence of a syntactic structural mechanism. Working within a different theoretical framework, namely Lexical-Functional Grammar (LFG), Lam (2022: 204-210) employs a set of empirical diagnostics, arriving at the same conclusion that there is clausal reduction at the phrase-structure level. However, different from the two Minimalist proposals, LFG assumes a modular grammatical architecture (see e.g., Dalrymple et al. 2019) where syntactic structural reduction in the complement clause does not entail matrix semantic construal for the embedded *-le/-guo*. As Lam (2022) suggests, if he is on the right track, it implies that any impression of "semantic closeness" between the embedded *-le/-guo* and complementation verb is likely to be an illusion caused by syntactic restructuring effects. The employment of empirical diagnostics can help dispel such an illusion to reveal the true empirical picture; the occurrence of any clausal restructuring and the postulation of any semantic association are separate issues pertaining to different levels of linguistic information, namely syntax and semantics

5   Conclusions

Mandarin presents an intriguing case for the study of finiteness, given the decades-long debate over whether the language distinguishes finiteness and, if it does, the nature of this distinction. This paper has focused on the distributions of two modals (*hui/yao*) and two aspectual markers (*-le/-guo*) in Mandarin complement clauses to address the finiteness conundrum. The contributions of this paper are threefold: methodologically, empirically, and conceptually. Methodologically, we have presented systematic testing, starting from the setup of testable hypotheses to the rigorous testing process, where each of the complementation verbs undergoes the same diagnostics. Empirically, we have illustrated a wider empirical picture with nuanced intricacies; as such, we were able to identify various empirical inadequacies in past studies. Conceptually, our methodological criterion of finiteness was inspired by Lowe (2019), which is based on cross-linguistic research, and we have presented an integrated approach to the Chinese finiteness puzzle, combining insights from Generative studies and the Non-Distinction camp, contrary to other existing studies, which only rely on either of them. An advantage of our integrated approach is its ability to account for a wider range of new empirical data. Finally, we have concluded that under a broader concept of finiteness, the distributions of *hui/yao* and *-le/-guo* reveal aspects of Chinese finiteness as semantic dependency where non-finite complements are more semantically dependent on the matrix clause than

finite complements. Overall, we have employed a descriptive, evidence-based approach to address the Chinese finiteness conundrum.

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