

CP Selection at the Syntax-Semantics Interface: A Case Study in Mandarin *think* “*xiang*”

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Abstract

(Tentative)

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1 Introduction

Zheng (2023) identifies a semantic shift in the Mandarin predicate *xiang* between two interpretations: *think* and *want*. One factor he identifies as influential is the presence of aspect markers and modals within the embedded clause, indicating finiteness in Mandarin (Huang 1998, Li 2004, Lin 2011). This interaction underscores the interplay between s-selection and c-selection, suggesting potential divergence in finiteness between propositional and situational predicates. To comprehensively address the intricacies presented in the meaning shift, I present both environmental influences (stative vs. dynamic), which Zheng claimed to govern the selection of interrogative complements for *think*, along with the distinction in finiteness (Figure 1).

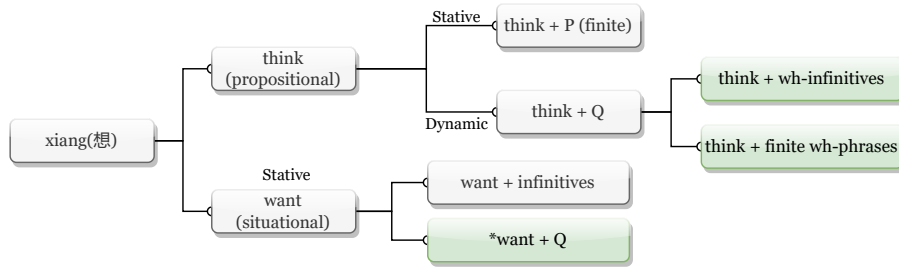


Figure 1: The meaning shift between *think* and *want* within the Mandarin predicate *xiang*. Grey blocks show the original interaction present in Zheng (2023) with extra information further added in green.

To elucidate Figure 1, I provide illustrative instances along with Zheng’s examples. Within a stative context, *xiang* can exhibit an ambiguity between *think* and *want*. One distinguishing factor

between these meanings appears to be the complement’s finiteness (cf. 1b and 2a), wherein the absence of the perfective marker “le” leads to a shift from *think* to *want*. Moreover, neither variant can accommodate a question complement (1a, 2b¹).

Conversely, within a dynamic setting (e.g., where it is coerced to be dynamic), *xiang* exclusively conveys the meaning of *think* and accepts a question embedding (3a, 4) as opposed to a declarative one (3b). Another seemingly trivial observation is that once a predicate can embed questions, the c-selection of finiteness appears to relax (e.g., Q in “xiang Q” need not be finite²). Up to this point, we have outlined a broad perspective in which stativity might impact not only the CP selection of *xiang* (think), as indicated by Zheng (2023), but also directly determine the meaning of *xiang*. Following these observations, the diverse complements seem to influence the verb meaning. The synthesis model proposed by Wurmbrand & Lohninger (2023) offers important insights of the syntax-semantics mapping, where syntax is initially freely constructed and then adjusted at the interface to meet the semantic requirements of the matrix verb.

(1) Stative *xiang* (think)

- a. *think Q (Zheng 2023: 44)

**Wo xiang-zhe xia yi bu qi zenme zou*
I think-DUR next one step chess how walk
'I am thinking what is the next move.'

- b. think P

Wo xiang ta qu-le chaoshi
I think he go-PERF supermarket
'I think he went to the supermarket.'

(2) Stative *xiang* (want)

- a. *Wo (*zai-)xiang ta qu(*-le) chaoshi* (Infinitives)

I want(*-PROG) he go(*-PERF) supermarket
'I want him to go to the supermarket.'

- b. *Wo xiang ta qu(-le) na*

I want (he) go(-PERF) where
#‘I want him to go where.’ (Wh-infinitives)
*‘I want where he went.’ (Finite wh-phrases)

(3) Dynamic *xiang* (think)

(Zheng 2023: 45)

- a. *Wo zai-xiang ruhe zuo fan* (Wh-infinitives)

I think-PROG how make rice
'I am thinking how to cook.'

¹The hash sign in (2b) denotes grammaticality if the sentence is intended to convey a matrix reading, rather than an embedded question reading.

²This mirrors a such contrast in English: “I think I will go to Paris.” vs. “I am thinking where to go.”

- b. **Wo zai-xiang ta chi-guo fan-le*
 I think-PROG he eat-EXP rice-LE
 ‘I am thinking he has eaten.’

- (4) *Wo zai-xiang ta qu-le na* (Finite *wh*-phrases)
 I think-PROG he go-PERF where
 ‘I am thinking where he went.’

Our aim is to establish a connection between syntactic structures and specific semantic requirements (e.g., proposition) to gain a deeper understanding of the semantic alternation in *xiang*. In pursuit of this goal, we draw inspiration from Wurmbrand & Lohninger (2023)’s synthesis model, aiming to provide a comprehensive account of the CP selection patterns of *xiang*, in addition to Zheng (2023). Furthermore, we seek to clarify the reasons behind the influence of the distinction in finiteness within this alternation.

In the case of situational predicates like *decide*, unlike *want*, they can accommodate interrogatives as complements. However, for eventual predicates such as *try* and *begin*, there appears to be a restriction on accepting interrogative complements. Therefore, in addition to the (declarative) semantic domains discussed in Wurmbrand & Lohninger (2023), we aspire to incorporate interrogatives into the framework.

Therefore, we ask questions as follows: (1) How do the syntax and semantics of *xiang* interact in the context of semantic alternation, following the framework of the Implicational Complementation Hierarchy (ICH) (Wurmbrand & Lohninger 2023)? (2) What role might finiteness play in influencing the observed semantic alternation? (3) How can the selection of interrogatives be incorporated into the ICH framework?

The structure of this paper is as follows: In §2, we explore potential factors contributing to the alternation within “*xiang*,” delving into environmental influences and introducing the Implicational Complementation Hierarchy (ICH) framework. §3 expands upon the synthesis model within the framework to elucidate the role of finiteness in the alternation. §4 presents our efforts to integrate interrogatives into the ICH framework.

2 Explaining Mandarin “think-want” shift

From Aktionsart *Think* and *want* exhibit distinct Aktionsart (lexical aspects). Progressives are known to be selecting the Aktionsart of the verb phrase (Dowty 1979, inter alios). As seen in (1b, 2a, 4), “*xiang* (want)” does not harmonize with the progressive, whereas “*xiang* (think)” is compatible when its complement is a question. This implies that only *think* is chosen in a dynamic environment (e.g., progressives), excluding *want*. Consequently, a stative environment yields ambiguity for *xiang*, permitting both *think* and *want* interpretations (cf. 5a, 5b), while a dynamic context rules out *want* (e.g., incompatibility with the progressive marker “-*zai*” in 2a). This divergence in Aktionsart holds true across languages (e.g., the ungrammatical *be wanting in English). Regarding the shift in (5), it appears that an additional factor must be at play, given that stativity no longer serves as the sole factor.

- (5) a. *Wo xiang ta qu-le Beijing*
 I think he go-PERF Beijing
 ‘I think that he have gone to Beijing.’
 b. *Wo xiang ta qu Beijing*
 I want he go Beijing
 ‘I want him to go to Beijing.’

Implicational Complementation Hierarchy (ICH) Drawing on the fine-grained functional hierarchy initially introduced by Givón (1980) and a more comprehensive functional hierarchy framework based on semantic containment by Ramchand & Svenonius (2014), Wurmbrand & Lohninger (2023) asserted that complement clauses can be categorized into three tiers: *Propositions*, *Situations*, and *Events*. These levels exhibit a containment (also implicational) relationship: *Propositions* entail the presence of *Situations*, while *Situations* entail that of *Events*. Varied levels on this hierarchy diverge in terms of their independence (e.g., independent time reference), transparency (e.g., restructuring ability), and integration (e.g., combinability with matrix predicates). Through cross-linguistic scrutiny of these scales (see also Wurmbrand et al. 2020, Huang 2022), they contended that the Implicational Complement Hierarchy (ICH) is an inherent/“deeper” linguistic feature, even if its syntactic manifestation doesn’t adhere to a strict one-to-one mapping. They did, however, propose a *minimal* structure for each semantic domain (see Figure 2). Given the observed syntax-semantics discrepancies across languages, they introduced a synthesis model. In this framework, complements are not syntactically chosen but rather possess freedom in their forms. The sole constraint arises at the interface, where the goal is to align with the semantic requirements of the predicates.

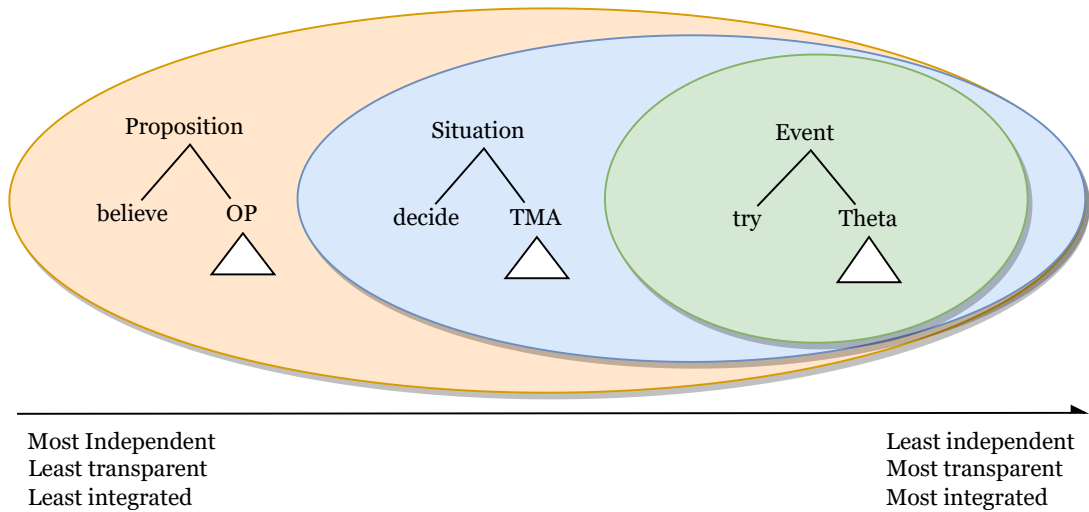


Figure 2: ICH with the minimal structure of each domain adapted from Wurmbrand & Lohninger (2023)

In the context of the stative *xiang*, its complement exhibits variation between a proposition and a situation³. This implies that the minimal structure it can accommodate is a TMA domain, typically

³For a comprehensive understanding of the distinctions or diagnostics (e.g., truth value of complements and time

realized by a TP. However, a structure as extensive as a CP is also admissible, thereby enabling the formation of a proposition. Building on these observations, several scenarios emerge. In certain cases, the availability of a larger structure correlates with the semantic changes (such as the complete shift in *xiang* or partial changes in properties like factivity, as in *forget*). However, this correlation doesn't occur in most other instances.

As per the synthesis model, semantics is characterised as flexible, with meaning being derived post-complement combination. The meaning of *xiang* is computed through complementation: (1) as observed by Zheng (2023), “*xiang P*” and “*xiang Q*” exhibit distinct stativity, leading to different compatibility with the progressive aspect (subsequently, leading to different meanings). (2) As evident in (5), “*xiang P*” can shift from *think* to *want* by omitting the perfective aspect marker in the complement. Hence, it is reasonable to assume the meaning of *xiang* is computed after complementation and transferred to further compositional process (see Figure 3) However, we still need to explain the underlying reason for the variations in semantic computation, e.g., why computation in *xiang* yields different meanings instead of uniformity as in the case of “*forget*”. In addition, the lexical semantics of predicates may still play a role, and the extent to which lexical terms store information for assistance at the interface becomes pivotal (whether it's solely about the semantic domain they belong to or more comprehensive information is needed).

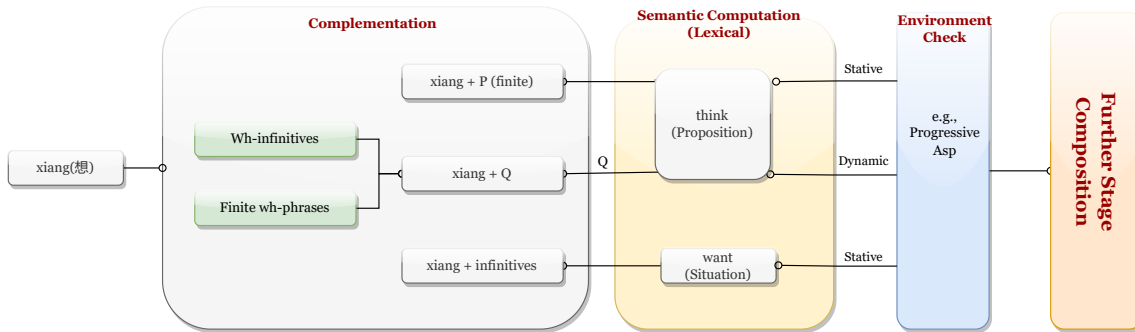


Figure 3: A synthesis model based analysis of *xiang*

3 Mapping structures onto semantics

In this section, our focus centers on the structures that are open for semantic computation and those that are chosen in the end, aiming to leverage the chosen structures for a deeper comprehension of the syntactic-semantic correspondence.

3.1 Finiteness

Finiteness as clause size Finiteness, once primarily defined by morphosyntactic features like tense and agreement, carries syntactic significance. Its association with tense, agreement, and other factors (e.g., illocutionary force) remains relevant (Nikolaeva 2007, Wurmbrand et al. 2020). In addition to

reference difference) among different domains, readers are referred to Wurmbrand & Lohninger (2023) and related sources. A parallel variation between situation and proposition is also observed in Mandarin verbs like “forget” and “remember”, resulting in two readings: factive and implicative (Huang 2022).

this string of investigations, considerations extend to clause size (Pesetsky 2019 among others, see also references in Satik 2021; For Mandarin, such view is discussed by Xue & McFetridge 1998, Grano 2015, 2017) given the arbitrariness of morphosyntactic features encoded in different languages, which found itself hard to form a uniform explanation. This view prompts queries about the critical clause size for finiteness. The conventional truncation stance (e.g., Adger 2007) posits three tiers: CP, TP, and vP⁴. Each can host non-finite forms under different predicates. Recent research by Satik (2021) delves into a nuanced non-finite clause size in terms of CP cartography, showcasing different languages differ in the maximal infinitival projection in left peripheries.

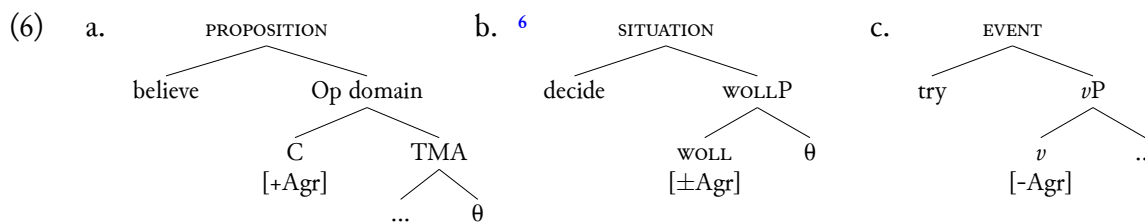
Implicational finiteness universal In conjunction with the perspective on clause size, Wurmbrand et al. (2020) and Wurmbrand & Lohninger (2023) introduced a dimension of finiteness to the ICH, asserting that:

Implicational finiteness hierarchy: (Wurmbrand & Lohninger 2023: 22)

If a language {allows/requires} finiteness in a type of complement, all types of complements further to the LEFT on ICH also {allow/require} finiteness.

For instance, if an EVENT permits finiteness, the same applies to SITUATION and PROPOSITION. They emphasized that a direct, one-to-one alignment of semantics to finiteness is lacking (e.g., every semantic domain can manifest as finite or non-finite). Instead, what exists is an implicational finiteness hierarchy, diverging from the cartographic perspective that confines finiteness within one specific domain (e.g., a Fin head). Drawing inspiration from the approach presented in Adger (2007), they associated cross-linguistic variations in finiteness with the language-specific position of agreement feature (i.e., *v*, T, or C). These morphosyntactic attributes are responsive to the structures shaped by semantic properties. The finiteness hierarchy was tested in the context of Mandarin by Huang (2022), who proposed that PROPOSITION is finite, SITUATION is versatile, and EVENT is non-finite.

Finiteness in Mandarin Building upon the ideas presented by Wurmbrand et al. (2020) as outlined above, the distinct morphosyntactic configuration for finiteness specific to Mandarin is depicted below. Nevertheless, a challenge with this proposal lies in the absence of morphological cues within Mandarin to substantiate the existence of such distinctions. Therefore, we call for further investigation into any potential evidence of agreement features, but for now we turn to syntactic indicators of finiteness grounded in the concept of clause size⁵.



⁴For Mandarin, Xue & McFetridge (1996) initially proposed a simpler binary split: clausal complement and VP complements.

⁵It is claimed in e.g., Huang (2022) and references therein, the finiteness distinction exists in Mandarin while how that is encoded is under debate, and clause size is only one way to address the distinction. In the following sections, all the examples that I claimed to be (non-)finite have been gone through the diagnostics mentioned in Huang (2022) such as “guo-lowering”, focus fronting and etc.

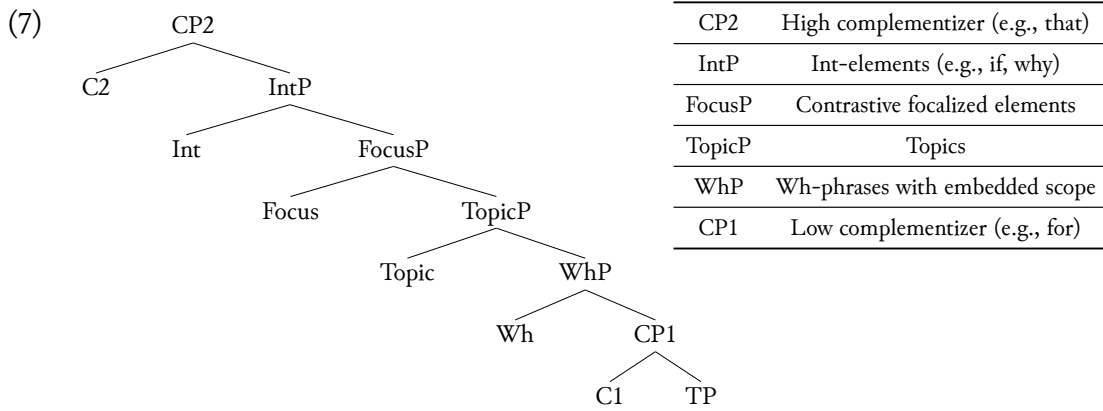
⁶WOLL is an abstract modal (Abusch 1985, 1988, Wurmbrand 2014) without specification on tense.

It is important to clarify that the primary objective of this section is to elucidate the range of available (morpho-)syntactic structures within the *Complementation* aspect of Figure 3, rather than to offer a comprehensive account for the intricacies of finiteness in Mandarin, a topic that has been widely explored (Huang 2022, Ussery et al. 2016, among others). As depicted in Figure 3, both declarative (non-)finite clauses and interrogative (non-)finite clauses are available. Our investigation commences with an exploration of the declarative category.

3.2 Declarative complements

Informed by the analysis advanced by Grano (2017) and Huang (2018), particularly their examination of “guo”-lowering, wherein the experiential marker base-generated in a non-finite clause can lead to a matrix scope reading, albeit not the same in a finite clause, and bolstered by corroborative evidence such as focus-fronting, internal topicalization, and the licensing for the focus element “ye(also)”, Huang (2022) asserts that finite clauses correspond to CPs. Conversely, non-finite clauses possess the capacity to occupy as small a domain as ν Ps (i.e., “guo”-lowering), yet they can also maintain a syntactic structure comparable to a CP or IP. This nuanced continuum of structural variation seamlessly aligns with the synthesis model expounded upon previously.

In addition to this three-way split and to complement Satik (2021)’s typology study on left peripheries of non-finite clauses, here I test, the maximal infinitival structures in Mandarin. Satik (2021) outlined a fine-grained CP structure (see Figure 7) based on Rizzi (1997) with extra functional projections relevant to infinitives i.e., InterrogativeP and WhP, following Rizzi (2001), Shlonsky & Soare (2011).



CP1 and CP2 The nomenclature CP1 and CP2, as introduced by Satik, has its roots in Rizzi’s ForceP and FinP. These categories house high complementizers (such as *that*, *che*) and low complementizers (like *for*, *di*), respectively. Notably, complementizers, irrespective of their placements, can assume the same phonetic form, a phenomenon highlighted in the context of the double complementizer construction discussed by Satik (2021). In his analysis, Satik contends that the sole means of distinction rests on scrutinizing their relative positions with regard to topics and foci.

The convention of “shuo (say)” in Mandarin is as a complementizer, often likened to the English counterpart “that” (Chappell 2008, Chappell & Peyraube 2013, Huang 2018, among others). However,

some scholars (e.g., [Paul 2014](#)) have contested this view, arguing that this grammaticalized “shuo” does not exhibit the same patterns as the English “that”,⁷ Moreover, some scholars (e.g., [Long & Deng 2023](#)) propose that “shuo” functions as a quotative particle due to the prosodic gap between “shuo” and the following clause.

More recently, [Huang \(2021\)](#) has highlighted that “shuo” consistently lacks compatibility (or is at least degraded) with factive predicates in Beijing and Taiwan Mandarin. He posits that “shuo” heads a non-referential CP (so as a semi-complementizer), drawing on the work of [De Cuba \(2017\)](#), who attributes the distinction between factive and non-factive predicates to the referentiality of the CP. Huang’s analysis provides an elucidation for idiosyncratic instances (such as subject clauses) through the [-definite] feature inherent in non-referential CPs headed by “shuo”, while Mandarin subjects necessitate definiteness. Additionally, Huang demonstrates that CPs with or without “shuo” convey different meanings in terms of whether a proposition has been introduced into the common ground. Building on the theories of [Bianchi \(2003\)](#) and [Landau \(2015\)](#), he positions “shuo” as an external logophoric center for finite clauses and an internal logophoric center for non-finite clauses. Thus, the position of “shuo” may not rigidly adhere to the CP1 and CP2 differentiation within Satik’s left peripheries⁸.

Focus and Topic In terms of Topic and Focus, [Badan & Del Gobbo \(2011\)](#) presented an analysis concerning the order of Focus and Topic in Mandarin (see 9)⁹. Additionally, they posited that only “even-focus” is permissible within the left periphery and the contrastive NP appearing in the left periphery serves as contrastive Topic. This proposition gains support from a range of tests, including the investigation of the Weak Crossover (WCO) Effect and the examination of the co-occurrence patterns with other Foci. These tests collectively demonstrate that these NPs do not exhibit the characteristics typically associated with operator-like Foci.

- (9) Aboutness Topic > Hanging Topic (HT) > Left dislocated (LD) Topic > Lian(even) Focus > IP
([Badan & Del Gobbo 2011](#): 88)

I hereby present a collection of examples that exhibit distinct categories of Topic¹⁰. These

⁷[Paul \(2014\)](#) have pointed out, for example, that “shuo” does not appear in subject clauses and does not constitute a constituent in so-called afterthought constructions. Nonetheless, [Huang \(2018\)](#) analyzed “shuo” as having two forms (i.e., with non-finite clauses) and serving as a verbal suffix at PF, thereby precluding its occurrence in the constructions mentioned by Paul.

⁸According to Landau, the structure of logophoric control is illustrated in (8). He contends that attitude verbs select complements featuring left peripheries containing contexts of evaluation. For instance, he introduces an obligatory control complementizer (C^{OC}) within FinP, which encodes a set of coordinates representing the context in its specifier, specifically (AUTHOR,ADDRESSEE,TIME,WORLD). For a comprehensive analysis of how logophoricity interacts with finiteness in Mandarin, I refer interested readers to [Liao & Wang \(2022\)](#). For the present work, this structure serves to illustrate that CP1 and CP2 differ from logophoric centers. Given this semi-complementiser (“shuo”)’s status compared to “that” is under debate, I leave the distinction between CP1 and CP2 in Mandarin for further considerations.

(8) [_{CLC} [SUBJ MATRIX predicate [_{ILC} [G_{SELF} *pro*_x] C^{OC}_{[FinP} PRO(=λx) Fin⁰ [*tx*...]]]]]


⁹In [Badan & Del Gobbo \(2011\)](#)’s analysis, Topic is categorized into two types: one linked with a trace, *pro*, or a resumptive element (HT/LD), and another that lacks a gap in the comment (Aboutness Topic).

¹⁰According to [Huang \(2022\)](#), these instances fall within the local internal topicalization, signifying their confinement

instances demonstrate the capacity of infinitives in Mandarin to allow local internal topicalization. In accordance with the hierarchy stipulated in (9), where Topic holds a higher position than Focus in Mandarin, it stands to reason that Lian-focus is also viable within infinitives (see 11). Nevertheless, as previously deliberated, the absence of the contrastive focus shifted to the left periphery in Mandarin deviates from the schematic configuration adopted by Satık for the Left Periphery (LP).

(10) TopicP

a. Before topicalization

(Adapted from Huang 2022: 39)

wo hui shefa jinkuai xie-wan zhe-pian baogao

I will try asap write-finish this-CL report

‘I will try to finish this report as soon as possible.’

b. Left dislocated Topic

wo hui shefa zhe-pian baogao_i jinkuai xie-wan t_i

I will try this-CL report asap write-finish

Int: ‘This report, I will try to finish as soon as possible.’

c. Hanging Topic

wo hui shefa zhe-pian baogao_i jinkuai xie-wan ta_i

I will try this-CL report asap write-finish it

Int: ‘This report, I will try to finish it as soon as possible.’

d. Aboutness Topic

(Li 2017)

wo zuijin kaishi shuiguo zhi chi caomei

I recently start fruit only eat strawberry

‘I recently started, fruits, only eat strawberries [I recently started to eat only strawberries among fruits/for fruit.]’

(11) Lian Focus

wo hui shefa lian zhe-pian baogao dou jinkuai xiewan

I will try even this-CL report all asap write-finish

Int: ‘Even this report, I will try to finish as soon as possible.’

3.3 Interrogative Complements

3.3.1 Non-finite Interrogative

Wh-infinitives Wh-infinitives are permissible (as seen in 12), yet consensus has not been reached on the existence of an agreed-upon infinitival complementizer, particularly in light of the prior discourse regarding “shuo”, Consequently, the extent to which this uncertainty might challenge Sabel’s generalization (Sabel 2006), where wh-infinitives presuppose the presence of infinitival complementizers, remains to be determined.

(12) Wh-infinitives

within a single clause without crossing its boundaries.

wo bu zhidaorube zuofan
 I -NEG know how cook

‘I don’t know how to cook.’

Why/if Infinitives? While many languages in Satik’s typology don’t allow for “why/if” infinitives, Mandarin seemingly permits it. For instance, according to [Huang \(2022\)](#), an experiential adverb like “congqian (before)” can only collocate with a non-finite embedded clause carrying experiential aspect (“guo”) when the adverb appears in the matrix clause, as illustrated in example (13). However, the results appear to contradict this assertion when considering other tests, such as internal topicalization and Focus fronting, as discussed by Huang. It’s noteworthy that internal topicalization can be subject to debate, and [Li \(2017\)](#) has pointed out that certain type III complements (predicates taking EVENT like “force”) may resist internal fronting¹¹.

(13) If/whether-infinitives

Zhangsan congqian wen Lisi shifou qu-guo faguo
 Zhangsan before ask Lisi whether/if go-EXP France

Lit.: ‘Zhangsan has asked Lisi whether/if to have gone to France’

(14) Why-infinitives

?Zhangsan congqian wen Lisi weishenme qu-guo faguo
 Zhangsan before ask Lisi why go-EXP France

Lit.: ‘Zhangsan has asked Lisi why to have gone to France’

(15) Internal topicalization

**Zhangsan faguo wen Lisi weishenme/shifou qu*
 Zhangsan France ask Lisi why/if go

Lit.: ‘Zhangsan [France]₁ asks Lisi why/if to go to *t₁*’

(16) Focus fronting

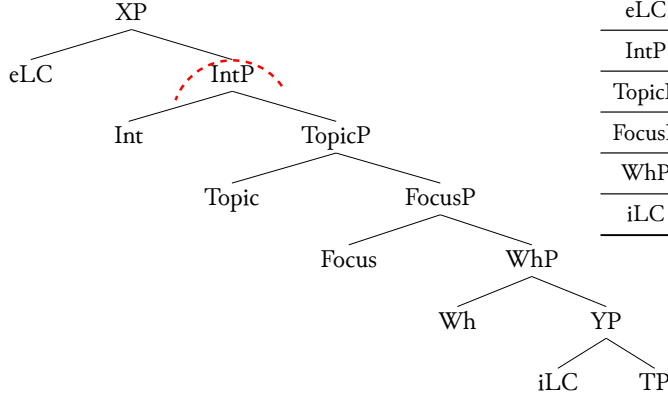
?Zhangsan lian faguo dou wen Lisi weishenme/shifou qu
 Zhangsan even France all ask Lisi why/if go

Lit.: ‘Zhangsan [even France]₁ asks Lisi why/if to go to *t₁*’

Building upon the previous discussion, the maximal left peripheries of non-finite clauses can be illustrated as in Figure 17. The boundary between non-finite and finite clauses is highlighted by the red dashed line.

¹¹The tests I’m presenting here may not provide a definitive conclusion. Another challenge that arises is that predicates taking interrogative complements allow for both finite and non-finite forms. Consequently, tests such as compatibility with the perfective marker “le”, which typically exclude finite possibilities to demonstrate non-finiteness, may not be effective in this context.

(17)



eLC	External logophoric center
IntP	Int-elements (e.g., if, why)
TopicP	Aboutness Topic, HT, LD
FocusP	“lian(even)” focus
WhP	Wh-phrases with embedded scope
iLC	Internal logophoric center

3.4 Going back to *xiang*

As discussed earlier, the verb *xiang* exhibits semantic variation, functioning as both a propositional predicate (i.e., *think*) and a situational predicate (i.e., *want*). It seems that finiteness plays a role in the semantic alternation. Furthermore, I explore the structures selected at the Complementation stage. When *xiang* embeds declarative complements, it is interpreted as *think* within a finite clause and as *want* within a non-finite clause. Structurally, as depicted in (17), finite clauses gain access to eLC while non-finite clauses do not.¹²

(19) Xiang P¹³ (Finite)

Wo xiang Lisi hui canjia na-chang huiyi
 I think Lisi will attend that-CL conference
 ‘I think Lisi will attend that conference tonight.’

(20) Xiang P (Non-finite)

a. *Wo xiang Lisi canjia na-chang huiyi*
 I want Lisi attend that-CL conference
 ‘I want Lisi to attend that conference.’

¹²For instance, considering utterance time and following the reasoning within Liao & Wang (2022), in finite clauses, *t* coincides with *t'* and *t**. However, in non-finite clauses, *t* is defined with regard to *t'*, without access to *t** (i.e., eLC).

(18) a. Xiang P (Finite)

Wo xiang Lisi huaiyun-le
 I think Lisi pregnant-PERF
 ‘I think Lisi is pregnant.’
 (I ASSERT at *t**) I think (at *t'*) that Lisi is pregnant (at *t*)

b. Xiang P (Non-finite)

Wo zuotian/mingtian xiang Lisi bang wo mai yifu
 I yesterday want Lisi help me buy clothes
 ‘Yesterday/Tomorrow, I want(ed) Lisi to help me buy clothes.’
 (I ASSERT at *t**) I want (at *t'*) Lisi to help me buy clothes (at *t*)

¹³I should note that P here refers to declarative type of complements rather than corresponds to a PROPOSITION.

b. Internal Topicalization

Wo na-chang huiyi xiang Lisi canjia

I that-CL conference want Lisi attend

Lit: ‘I [that conference]₁ want Lisi to attend t_1 .’

c. Lian Focus

Wo lian na-chang huiyi dou xiang Lisi canjia

I even that-CL conference all want Lisi attend

Lit: ‘I [even that conference]₁ want Lisi to attend t_1 .’

In terms of interrogative complements, *xiang* is interpreted exclusively as *think*, embedding both finite and non-finite clauses (21–22). However, it cannot embed non-finite IntP (22a; cf. 13)¹⁴.

(21) Xiang Q (Finite)

a. IntP

Wo zai xiang Lisi weishenme/shifou hui canjia na-chang huiyi

I -PROG think Lisi why/whether will attend that-CL conference

‘I’m thinking why/whether Lisi will attend that conference.’

b. WhP

Wo zai xiang Lisi hui canjia na-chang huiyi

I -PROG think Lisi will attend which-CL conference

‘I’m thinking which conference Lisi will attend.’

(22) Xiang Q (Non-finite)

a. *IntP

*Wo (*congqian) zai xiang Lisi ?weishenme/shifou (congqian) canjia-guo na-chang*

I before -PROG think Lisi why/whether before attend-EXP that-CL

huiyi

conference

‘I’m thinking why/whether Lisi has attend that conference before.’

b. WhP

Wo zai xiang ruhe zuofan

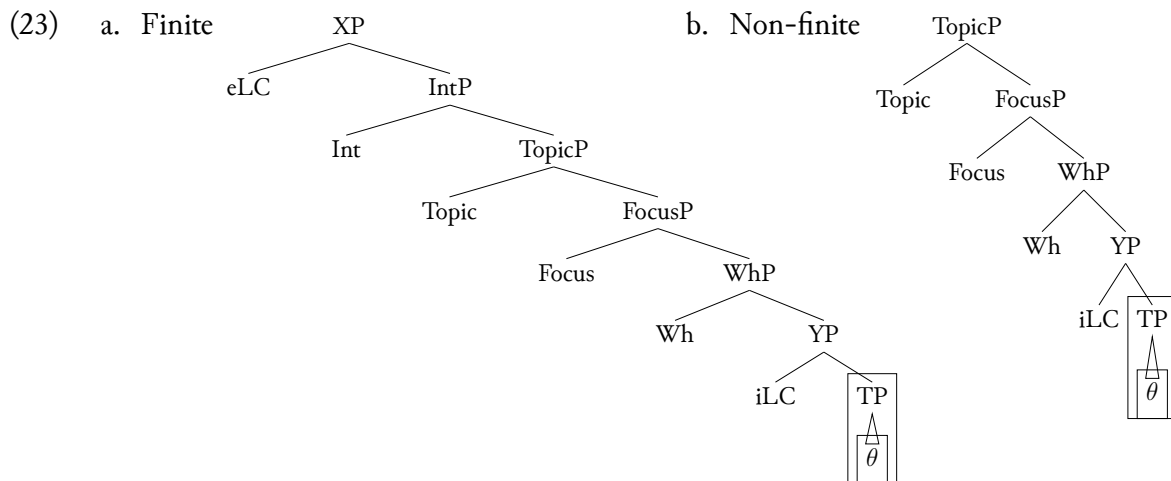
I -PROG think how cook

‘I’m thinking how to cook.’

¹⁴I only present one test, namely, the collocation with “congqian” while the “xiang IntP” also fails the internal topicalization and Focus fronting tests. This situation is analogous to the English examples “I’m thinking why to go to Paris” as opposed to “I’m thinking why I should go to Paris” (where the former is notably less acceptable). Given the constraints mentioned in note 11, it’s plausible for “think IntP” to adopt a finite structure, potentially aligning with future modal markers like “hui (will)” and other aspect markers like “le (-PERF)”. Employing these tests may not definitively discern whether a non-finite clause is viable in instances involving “xiang IntP”.

3.4.1 Complementation

Indeed, in theory, the potential structures within Mandarin are outlined in (17). Nonetheless, based on the patterns explored thus far, the selected structures specific to the case of *xiang* are depicted as in (23). Adhering to the synthesis model, syntax is flexibly constructed as long as the semantics demands are met. This naturally directs our attention to the question of how these particular structures are ultimately selected.



3.4.2 Meaning Computation

Wurmbrand’s ICH and synthesis model establish a fundamental link between the structures and the semantics. Each semantic domain corresponds to a minimal structure or Canonical Structural Realization (CSR), as pointed out in Chomsky (1986). Building on this concept, I propose that the interpretation (*want*), specified as SITUATION, selects a minimal structure like TP, while another interpretation (*think*), specified as PROPOSITION, aligns with a minimal CP structure. This elucidates the distinction between “think P” and “want P”, albeit not comprehensively. As the synthesis model grants greater syntactic flexibility, it also reveals a challenge: the need for an additional explanation regarding why certain interpretations assume specific structures. For example, the situational *want* entry solely adopts the structure found in (23b). Nevertheless, given the implications of the ICH, its structure could potentially expand to the extent shown in (23a), yet it does not. Hence, the Wurmbrand’s model provides an explanations for availability of larger structures with a residue of a lack of an account for maximal structures.

The challenge lies in explaining this overgeneralization by the model. Concerning this overgeneralization of structures, two possibilities come to light: either the structures are eliminated by the syntax of the two entries or the additional structures are ruled out by the mismatch between semantics inherent in the structures themselves and the lexical semantics of *xiang*. I will investigate these two possibilities separately.

Syntactic selection The first hypothesis aligns with the homophony hypothesis in Bogal-Allbritten (2016). In accordance with this hypothesis, we posit the existence of two homophonous attitude predicates, “think-*xiang*” and “want-*xiang*”, which share the same pronunciation but exhibit distinct

semantics and syntax. This hypothesis carries two implications. First, the choice between *want* and *think* is determined by the verb *xiang*, aligning with a verb-driven perspective of attitude reporting as explored in works such as Cresswell & Von Stechow (1982), Heim (1992). Second, it's plausible that the syntax of “want-*xiang*” necessitates non-finite clauses as its complements, while “think-*xiang*” selects finite clauses. However, in this case, syntax is not as arbitrary as the synthesis model suggests. While semantics may impose certain requirements on structure size, it's evident that it's not the sole determinant influencing the selection of clauses.

Semantics selection In addition to the syntactic selection perspective, we embrace a more semantic view. According to this view, it's the semantics of the complement structure (e.g., 23a leads to *think* instead of *want*) that determines the reported attitudes. Following this line of thought, the synthesis model's syntactic flexibility is maintained, and the surface form emerges from the combined semantics of verbs and their complements. Such view where the meaning of the embedded clauses determines the attitude reported can find its precedents in Kratzer (2006, 2013) and Moulton (2009, 2015).

The empirical insights derived from English and German in the works of Kratzer and Moulton offer a promising avenue for explaining the semantic alternation within *xiang* (i.e., different attitude reports). The challenge is how to compose meaning from the structure of the complements in order to distinguish between *think* and *want*. Additionally, the derived semantics of these complements should be compatible with both English *think* and *want* as well as Mandarin *xiang*. However, the current work does not aim to provide a compositional derivation. Unlike what Moulton has observed in English Accusative Cum Infinitivo (AcI) construction, which systematically expresses belief, the present account requires the bouletic meaning (i.e., *want*) to be derived from non-finite complements. We acknowledge the potential for future research to explore this possibility, although it appears implausible to argue that infinite clauses inherently convey bouletic meanings.

The underspecification account is appealing as it proposes a semantic strategy rather than a “brutal force” ambiguity. Such view is also shared by Grano & Lu (2021), who pointed out *xiang* does not pass the zeugma test (i.e., in 24, *xiang* conveys a dual-subject reading without zeugma)

- (24) *wo he ta xiang de bu yiyang: wo xiang likai, er ta xiang wo yinggai bu likai*
 I-SG and HE-SG *xiang* PRT -NEG same: I *xiang* leave, but he *xiang* I probably -NEG leave
 ‘He and I have different ideas: I want to leave, but he thinks I shouldn’t leave.’

It aligns with Wurmbrand's synthesis model, which provides valuable cross-linguistic insights. Furthermore, in line with Özyıldız (2021) and Zheng (2023), it has been argued that “*xiang* Q” is valid within a dynamic environment, lending extra support to the idea that syntax can exhibit significant freedom while semantics plays a “central” role in selection and filtering.

Acknowledgements

Abbreviations

TMA	Tense Modality and Aspect domain	OP	Operator domain (e.g., CP)
DUR	Durative aspect marker	PROG	Progressive aspect marker
EXP	Experiential aspect marker	PERF	Perfective aspect marker
ILC	Internal logophoric center	eLC	External logophoric center
CL	Classifier		

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