Dynamic Questions: Evidence from Mandarin Think–"Xiang"

Anshun Zheng
School of Philosophy Psychology and Language sciences
University of Edinburgh
A.Zheng-3@sms.ed.ac.uk

Abstract

This paper investigates the clausal embedding pattern of the Mandarin verb "xiang" (think) and reveals its internal anti-interrogative nature, with the possibility of "xiang Q" in certain cases. Through various stativity tests, I establish that the results are consistent with the generalization proposed by Özyıldız (2021), with "minor" deviations observed in the stativity of "xiang P" and the correlation with neg-raising. Additionally, I employ a semantic shift perspective to explain instances of neg-raising failure. Overall, this study sheds light on the unique characteristics of the verb "xiang" and contributes to a better cross-linguistic understanding of CP selection.

1 Introduction

Predicates are able to embed different types of clausal complements. For example, "think" usually selects the declarative clauses while "wonder" takes interrogative ones only. Traditionally, this selection was attributed to syntactic factors, but since Grimshaw (1979), it has been viewed as more of a semantic choice. A series of works have been devoted to revealing the role of semantic factors in complement selection including factivity and veridicality hypotheses (Hintikka, 1975; Egré, 2008), reductive approach (Q-to-P reduction: Karttunen 1977; Lahiri et al. 2002; Spector and Egré 2015, P-to-Q reduction: Uegaki 2015), uniform approach (inquisitive semantics: Theiler et al. 2018, 2019, a systematic review see Uegaki 2019) and the stativity hypothesis (Özyıldız, 2021). Given most of the studies attended to English exclusively, the present investigation into Mandarin aims to provide more cross-linguistic evidence to the issue. In Mandarin, predicates taking CP can be classified as responsives (±Wh), anti-rogatives (-Wh), and rogatives (+Wh) as in English. Canonical examples are given below.

(1) Ask, Rogative (+Wh)

Wo wen ni mali zai na
I ask you Mary exist where

'I ask you where Mary is.'

(2) Know, Responsive (±Wh)

a. Wo zhidao mali zai na
I know Mary exist where
'I know where Mary is.'

b. Wo zhidao mali zai jia
I know Mary exist home
'I know Mary is at home.'

(3) Think, Anti-rogative (-Wh)

Wo renwei mali chi-le fan
I think Mary eat-perf rice

'I think Mary has eaten.'

Among these predicates, "think" is particularly intricate in many ways. The English word "think" can have several counterparts in Mandarin including "renwei", "juede", "ganjue", "yiwei", "xiang" and "sikao"[1]. Despite a little nuance, all of them can be used to report thoughts. However, they differ in terms of their CP selection pattern. For example, "renwei" and "xiang" are canonically anti-rogative in bare form (4a,4b), while "sikao" is rogative (4c) [2].

(4) "xiang", "renwei" cf. "sikao"

a. *Wo xiang zenme zuo ti
I think how do question

[1] Glass (2020) gave translations to some of these terms: renwei(neutral think), xiang(believe/want), juede(feel that), and she also discussed the false belief think, "yiwei". "Ganjue" is similar to "juede" with the nuance of "sensual". "Sikao" is a more formal way to say think, closer to "ponder".

[2] This bare form "sikao" plus Q in (4c) sounds not good to some informants, and an aspect marker like "zai(-prog)" will make it work better. Since it is acceptable to some informants, I suggest it may be regional. However, there is a consensus that "xiang" is less natural with an embedded Q than "sikao".

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b. *Wo renwei zenme zuo ti
I think how do questions

c. Wo sikao zenme zuo ti
I think how do questions
'I'm thinking how to solve questions.'

To make matters worse, the selection pattern is not fixed (cf. 4a, 5), as was observed in Özyıldız (2021)'s analysis of "think Q".

(5) Wo zai xiang zenme zuo ti
I -prog think how do questions
'I'm thinking how to solve questions.'

The instability in Özyıldız's account is due to stativity. I will call it the stativity hypothesis. He showed that embedding types are correlated to stativity of the event structure, so the selection is not purely lexical but is highly dependent on the environment (Table 1, see also Roberts 2019). For instance, he claimed the availability of "think Q" is from a dynamic environment[3]. His account works smoothly with English "think", but will it be safe and sound in Mandarin as well? For many reasons, this paper selects "xiang" as its primary object of study. Unlike some other equivalents (e.g., "renwei"), "xiang" shows an aspectual alternation, which is crucial, since we will use the compatibility with certain aspects to test for stativity. Additionally, "xiang" does not appear to allow for a neg-raising reading, which deviates from the correlation suggested in Özyıldız's account. Finally, "xiang" shows a very complex lexical semantics, which may reveal more intricacies and interactions for future research to consider

	Embedded Q	Neg-raising(with P)
Stative	-	+
Dynamic	+	-

Table 1: Özyıldız's idea of correlation between stativity, question embedding and neg-rasing

There are mainly two goals of this paper. Firstly, it seeks to provide empirical evidence and tests to examine the embedded question compatibility of "xiang". Secondly, it aims to probe how much the stativity hypothesis accommodates this Mandarin equivalent of *think*.

The structure is organised as follows. §2 provides a brief overview of the various meaning entries of "xiang" in Mandarin and explains how its meaning might be determined. §3 presents an analysis of the lexical selectional pattern of "xiang" [4], while §4 and §5 examine how the stativity hypothesis can be applied to explain the occurrences of "xiang Q" and how neg-raising is problematic in the case of "xiang".

2 Lexical semantics and pragmatics of "xiang"

"Xiang" can have several interpretations in different linguistic contexts. There are roughly four interpretations: (1) think and assume (2) hope and want (3) pine for, and (4) recall and remember[5]. Sometimes, the boundary between these entries are not clear-cut. (6) shows the same phrasing can lead to different readings under different contexts, namely asking for opinions and imperatives[6].

(6) Ni xiang zenme zuo
you think how do
'how do you **want** to do.'
'you **think** how to do.'

The interpretation of "xiang" is highly dependent on the its environment. Some potential factors that can trigger the semantic shift include: (1) modals and aspect markers in the embedded clause[7] (2) the presence of negation (see §5), and (3) status as an imperative (6). However, the details of these triggers are beyond the scope of this paper[8]. In the following sections, I endeavor to control for these

[3]However, Özyıldız also admitted it remains unclear where the dynamicity comes from. The reason he thinks a structure is dynamic is because it passes several dynamicity tests.

[4]By bare form, I mean there are no extra aspect markers or collocations so it is not in a sense of inflection.

[5]A summary of usages of "xiang" mentioned in (Lü, 1999).

[6]In (6), "xiang" combines with a phrase that contains the wh-word "zenme" (how), which seems to contradict with my claim that it is anti-rogative. I will explain it in §3, where I will present evidence of the question not being an embedded Q.

[7]

(7) a. Wo xiang ta chifan
I think he eat
'I **want** him to eat.'

b. Wo xiang ta chi-le-fan
I think he eat-perf
'I **think** he has eaten.'

(7a) and (7b) manifest the aspect marker being a trigger.

[8]Presenting these factors is to make readers aware that there are more interactions happening than what is described in the paper. For readers who are interested, check Xiao and McEnery (2004) and He (1992) on Mandarin aspects and Biq (1991) on second person pronoun influence to get a flavor of the details. However, in terms of selection, it is still understudied.

factors and focus on situations where "xiang" is used to mean "think"[9].

3 Plain "Xiang" does not take Q

"Xiang" alone shows significant incompatibility with question embeddings (4a). The following examples further confirm this.

(8) a. *Wo/ta xiang ta shi shei
I/He think he is who
'I/He am/is thinking who he is.'

b. *Wo/ta xiang ta hui chi shenme
I/He think he will eat what
#'I/He think(s) what he will eat.'

You may be wondering why I did not provide examples in the second person. That is because "xiang" seems to be compatible with questions when used with second person subjects (6, 9). Does it mean "xiang" is not anti-rogative but responsive? Probably not. I posit that in these second person cases, the question is not an embedded clause, but rather a root question, which is possible because Mandarin is a wh-in-situ language. Therefore, we need to first differentiate between embedded questions and root questions[10].

(9) Ni xiang ta hui chi shenme
you think he will eat what
'what do you think he will eat?'

3.1 -Ne test as a test for matrix Q

"-Ne" is a particle that is compatible with wh-questions and shares the scope with the wh-phrase in Mandarin (10a, 10b). Canonical wh-questions usually do not need "-ne" and it turns out "-ne" can serve as a matrix clause scope marker to distinguish root questions from embedded questions. Apart from the question reading, "-ne" can also lead to "emphatic" reading and "imperfective" reading.

(10) a. Ta zai na (ne)
He exist where (-ne)
'where is him?'

b. Ta zai gan shenme (ne)
He -prog do what (-ne)
'what is he doing?'

Dong (2018) pointed out that this particle is not able to take a scope of embedded questions. Rogative predicates like "wen"(ask) usually force an embedded question reading. Hence, they do not co-occur with "-ne", which is incompatible with the embedding scope. For example, (11) is ungrammatical if it intends to give an embedded question reading, while it still can have an emphatic interpretation–"Zhangsan even asked the question!"[11], or an imperfective reading–"Zhangsan is asking me the question, don't bother me".

(11) Ask (Dong, 2018, 29)

*Zhangsan wen wo shei mai-le shu ne
Zhangsan ask me who buy-perf books -ne

'Zhangsan asked me who bought books.'

According to Dong's account, anti-rogatives are limited to having only matrix clause scope, making them compatible with the "wh-ne" structure (12).

(12) Believe (Dong, 2018, 30)

Zhangsan xiangxin shei mai-le shu ne
Zhangsan believe who buy-perf books -ne

'who does Zhangsan believe bought books?'

However, in the case of responsives, which can have both matrix and embedding scope, Dong claimed that as long as the matrix clause scope is available, the structure remains well-formed[12].

In summary, "wh-ne" construction can be utilised to test for whether an in-situ question is embedded or not. As (13) shows, the second person "xiang + Q" passes the test, leading to a root question reading, indicating (13) at least has a reading as a matrix question, even though it looks on the surface like it embeds a question.

[9] One intriguing question that remained to be considered is why conceptually similar words associated with psycho-activity encompass vastly different meanings. While this paper does not thoroughly address the question, one approach is to examine it through prototype theory. For instance, words like "recall" and "miss" can be seen as prototypical of "xiang", but not of "think". Some accounts, such as Xu et al. (2013), view this issue as a distinction between cognition, emotion, and motivation (another decompositional approach see also Bondarenko (2020)). According to Xu et al.'s account, the difference between "xiang" and "think" can be attributed to a division difference between these elements.

[10] Note that (8a) and (8b) are not considered well-formed, no matter the question is embedded or not. The purpose of contrasting them with (9) is to demonstrate that in second person cases, a question interpretation is feasible. The subsequent discussion in section 3.1 aims to unravel whether "xiang" can inherently take a question complement with a person that allows for a question interpretation.

[11] The reading is possible under contexts where the speaker is surprised or acts mean to the subject.

[12] There is a minor point to mention regarding Dong's account of responsives. It is possible that his examples of responsives being ungrammatical could be due to factive islands. However, this matter is not directly pertinent to the main focus of this paper, so I won't delve into it extensively.

(13) 2nd person + "xiang"

Ni xiang ta hui chi shenme ne
you think he will eat what -ne

'what do you think he will eat?'

It is important to highlight that the root question reading with "xiang" plus "wh-ne" is not valid in other persons (e.g., *adding "-ne" to 8a,8b), implying there possibly exists a person effect that does not exist in English, but unfortunately, this paper will not address what this effect could be[13]. A detailed "-ne" test result is shown as in Table 2. Apart from the findings on question readings, I noticed the emphatic reading is more compatible with predicates that allow for [+Wh]. This implies that Mandarin wh-phrases may also be tinted with [+Excl] even if it is not used in an exclamtive construction like English.

Predicates	*Root Question*	*Emphatic*	*Imperfective*
$Renwei(think, -Wh)$	+	−	#
$Xiang(think, -Wh)$	+	#	+
$Sikao(think, +Wh)$	−	+	+
$Zhidao(know, \pm Wh)$	#	+	−
$Wen(ask, +Wh)$	−	+	+

Table 2: The available interpretations of predicates of different selectional types in "wh-ne" environment. Several trends revealed here are: (1) anti-rogatives can have root question reading[a] (2) only predicates allowing (+WH) can be emphatic.

[a]Responsives (e.g., tell) "can" have root question reading as well but most of them are under restrictions of factive islands.

3.2 Evidence from question-response pairs

The "-ne" test identifies that what are in the idiosyncratic second person cases are matrix questions, rescuing my claim that "xiang" does not take question complements. Here in this section, I intend to provide further evidence to show that the embedded scope is actually not available.

Matrix questions and matrix statements with question-complements differ in their ability to elicit responses. The former is designed to seek new information, while the latter has the capability to prompt a simple yes/no response. For instance, a sentence like "What do you think he will eat?" can elicit a response like "(I think he will eat) cake." (cf. (12)), whereas a sentence like "She knows what he will do." can elicit a response like "No, she doesn't." (cf. (11)).

According to (14), even without a particle that specifically triggers a matrix scope interpretation, the reading of the sentence still remains as a matrix question. This implies that the availability of an embedded scope is not possible, thereby supporting my argument that the bare form "xiang" does not accept wh-complements.

(14) Ni xiang ta hui chi shenme
you think he will eat what
'what do you think he will eat?'

a. *'dui, wo xiang.' (Yes, I am.)

b. 'wo xiang ta hui chi yu.'(I think he will eat fish.)

4 Influences from the environment: stative or dynamic

However, there exist certain scenarios in which the verb "xiang" can take embedded questions as its complement. These situations include imperatives, verbs that imply force, and certain aspect markers[14], which roughly mirrors what Özyıldız (2021) observed in English "think+Q".

(15) Imperatives

Ni xiang zhe ti zenme zuo (*-ne), wo
you think this question how do (*-ne), I
xiang xia yi ti
think next one question

'You think how to solve this question, I'll think about the next one.'

(16) Force

Wo ba rang wo xiang zenme zhuan
my father make me think how earn
qian (*-ne)
money (*-ne)

'My father makes me think how to make money.'

(17) Some aspect markers

Wo zai-/xiang/-le/-guo xia yi bu qi
I think-prog/-perf/-exp next one step chess
zenme zou (*-ne)
how walk (*-ne)

[13]This is in contrast to English matrix clause questions with "think", which can be formed in all persons given the appropriate context (e.g., what does he think we should do?).

[14]Some informants, including the author, found "sikao" (the possibly rogative "think") is more natural with verbs of force type. When "xiang" is under force, it just means "sikao". "Xiang" with durative marker, most informants felt, is more acceptable with declaratives such as "wo xiang-zhe ni mingtian youkong, women keyi yiqi qu guangjie" (I think-dur you are available, so we can go shopping together.).

'I am/have thinking/thought what is the next move.'

According to Özyıldız's analysis, this alternation is determined by the event structure, the environment in which the verb is used. The alternation occurred at the lexical level (e.g., within the vP) by taking different arguments (Q or P), but the effect is observed at a higher level (e.g., the AspP). This observation also applies in Mandarin. For example, the verb "wang" (forget) requires an obligatory perfective marker "le" when used alone (Figure 1), but the marker becomes optional when there is a VP complement (Figure 2). Thus, the aspectual nature of the vP could be determined by analyzing higher-level structures.

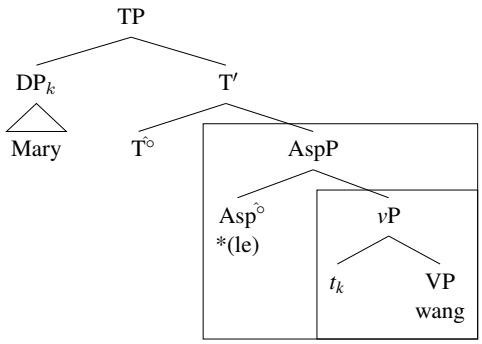

Figure 1: "Mary forgot."

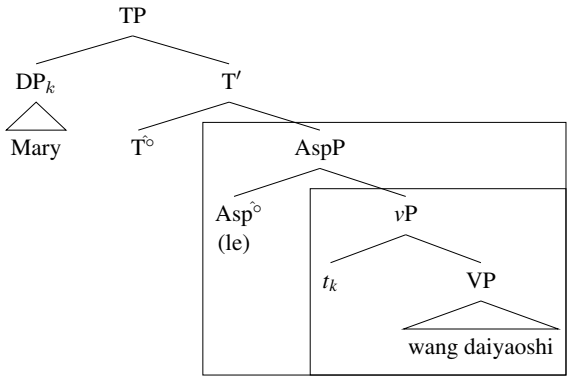

Figure 2: "Mary forgot to take the key."

In Özyıldız (2021), several tests were employed to examine the stativity of the vP (e.g., present simple and progressive interpretations, and narrative progression) to show that the resulting event description of "think Q" is dynamic while that of "think P" is either stative or dynamic. In the upcoming section, we will explore whether this generalisation holds in the case of "xiang".

Generalisation (Özyıldız, 2021, 43)

a. when 'think' composes with a question, the resulting description must be dynamic.

b. when 'think' composes with a declarative, the resulting description may be stative or it may be dynamic.

4.1 Stativity tests

-Zhe test "-Zhe" is a durative aspect marker in Mandarin. It usually combines with a dynamic verb such as "xiao"(smile) and "zou"(walk). However, the resulting situation is stative. For example, (18a-18b) describe how a person eats and enters the room, namely, the manner. Thus, there is no clear temporal contour of the events without a clear reference to the initial or the ending point.

(18) a. Ta xiao-zhe chi fan
He/she smile-dur eat rice
'He/she is eating with a smile/while smiling'

b. Ta zou-zhe jinru-le yige fangjian
He/she walk-dur enter-perf one room
'He/she entered into a room by walking'

According to He (1992), "-zhe" denotes an exclusive stative situation. He observed that "-zhe" co-occurs with some stative predicates or with action verbs to express manner or background so that the situation as a whole is stative regardless of the innate temporality of the verb itself [15]. Even if "-zhe" is not helpful in distinguishing the stativity of the lexical aspect, it hints the stativity of the situation as a whole, which is sufficient for our purpose.

(19) "Xiang-zhe + Q/P"

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

b. Wo xiang-zhe women mingtian keyi qu
I think-dur we tomorrow can go
guangjie
shopping
'I think we can go shopping tomorrow.'

[15] Xiao and McEnery (2004) has a slightly different take on "-zhe". They mentioned the same phrase "chuan-zhe" (put on/wear-zhe) can describe both dynamic and stative situation: "he is wearing the body armour all day long" (stative) and "he rushed towards the room while he was still putting on his overcoat" (dynamic). They claimed the stative situation is an extension of dynamic event. But the resulting event description is stative after all.

According to (19a), it is evident that the structure "xiang Q" cannot coexist with "-zhe", which results in a constrained stative context. This suggests that "xiang Q" may require a dynamic environment and possess the trait of non-stative. Conversely, the structure "xiang P" (see 19b) exhibits a strong compatibility with "-zhe", indicating that it can be internally stative. These findings align with the generalization in terms of stativity.

4.2 Dynamicity

In addition to looking at stativity, there are also a variety of diagnostics to test whether a sentence is dynamic, for instance, progressive, pseudo-cleft and agentive adverbials (Dowty, 1979; Olsen, 1994; Özyıldız, 2021). All of these three tests will be utilised.

Progessive -Zai In English, dynamic predicates are usually able to combine with progressives to express an on-going event (e.g., be running) and do not usually coexist with typical stative predicates (e.g., *be liking). In Mandarin, the progressive marker "-zai" also usually occurs in dynamic situations. Xiao and McEnery (2004) conducted a corpus study and found that out of 88 instances (not necessarily "zai-xiang") with "-zai", 86 of them are describing a dynamic situation[16]. From examples (17, 20a), we can roughly confirm that "xiang Q" is compatible with progressive aspect, indicating it may require a dynamic environment. On the contrary, "xiang P" resists suffixing "-zai" (20b), implying that "xiang P" may not be dynamic, which differs from English, where "think P" can be dynamic.

(20) "Zai-xiang + Q/P"

a. Wo zai-xiang ruhe zuo fan
I think-prog how make rice
'I am thinking how to cook.'

b. *Wo zai-xiang ta chi-guo fan-le
I think-prog he eat-exp rice-LE
'I am thinking he has eaten.'

Pseudo-clefting According to Dowty (1979), structures such as "what he did was..." can only be used with non-stative verbs. For instance, "what he did was run" is grammatical, whereas "what he did was like" is not. This same pattern may also exist in Mandarin, as demonstrated in examples (21a,21b). The literal translation of the original construction in (21a,21b) is "the thing that he/she did was", which differs from the English pseudo-cleft. This difference could be due to the fact that free relatives and wh-phrases are distinct in Mandarin. However, despite the structural differences, these constructions should have a similar function.

(21) What he did was...

a. Ta zuo-le de shiqing shi paobu
He/she do-perf -relative thing is run
'What he/she did was run.'

b. *Ta zuo-le de shiqing shi xihuan mao
He/she do-perf -relative thing is like cat
'what he/she did was like cats.'

Example (22a) is acceptable under a context like checking against a to-do list, while example (22b) is unacceptable under any circumstances. The results, again, show "xiang Q" is dynamic and "xiang P" is not.

(22) Clefting + "xiang + Q/P"

a. Ta zuo-le de shiqing shi xiang wanfan chi shenme
He/she do-perf -relative thing is think dinner eat what
'what he/she did was think what to eat for dinner.'

b. *Ta zuo-le de shiqing shi xiang mali chi-le wanfan
He/she do-perf -relative thing is think Mary eat-perf dinner
'what he/she did was think Mary has had dinner.'

Agentivity tests Agentivity is another feature that is considered closely related to dynamicity. Diagnostics includes "force/persuade" type verbs, imperatives, agent-oriented adverbs (Lakoff, 1966; Dowty, 1979). We have seen the compatibility of the first two in (15,16)[17]. Here, we will test against agentive adverbials. The equivalents of the agentive adverbials used in English are "jiaojide(worriedly)", "zixide"(carefully), and "guyide"(deliberately) in Mandarin.

(23) Worriedly, carefully, intentionally + "xiang + Q/P"

[16]The rest two are stage-level stative words such as "hungry", and "happy", in contrast with individual-level stative words like "clever".

[17]I should also note here "xiang P" shows ungrammaticality in these two situations.

a. Wo jiaojide/zixide/?*guyide
I worriedly/carefully/intentionally
xiang ta zai na
think he exist where
'I am worriedly/carefully/intentionally thinking where he is.'

b. Wo *worriedly/*zixide/*guyide
I worriedly/carefully/intentionally
xiang ta chi-le fan
think he eat-perf rice
'I worriedly/carefully/intentionally think he has eaten.'

Examples (23a) and (23b) demonstrate that "xiang Q" can be used with some selected adverbials, while "xiang P" cannot be used with the same adverbials. This suggests that "xiang Q" involves some degree of agency, while "xiang P" does not. This conclusion is in line with the results of the other two tests, which indicate that "xiang Q" is dynamic while "xiang P" is stative. However, this agentive adverbial test is not reliable in a few ways: (1) The acceptability of the result sentences depends on how natural the collocation is rather than the stativity. (2) They can appear with some stative words (i.e., asleep). But, essentially, all three tests lead to the same conclusion about the nature of "xiang Q" and "xiang P".

4.3 Eventive contexts

Narrative progression Before coming to the end, I would like to discuss the deviation from English "think P" that "xiang P" is not dynamic under tests in §4. In fact, there is a possibility where "xiang P" is dynamic. Under the theory of temporal discourse representation (Dowty 1986; Abusch 2014 and references therein)[18], a sequence of situations can be constructed as : Given a sequence of sentences $S_1 ... S_n$ with respective described situations as $\sigma_1 ... \sigma_n$, if a sentence S_i is stative, then temporally σ_i and σ_{i-1} is overlapping ($\sigma_i \circ_t \sigma_{i-1}$), otherwise, for any sentence S_t, its situation σ_t should show progression ($\sigma_{t-1} \leq_t \sigma_t$). That is, if "xiang P" by any chance is dynamic, the utterance containing "xiang P" should successfully show narrative progression, without showing overlapping or an oddity from overlapping[19].

(25) Zhangsan zoujin-le shitang. Ta xiang ta
Zhangsan enter-perf restaurant. He think he
yingai hui chi yu. Ta dian-le yi
probably will eat fish. He order-perf one
fen yu.
-CLS fish
'Zhangsan entered a restaurant. He thought he probably would eat fish. He ordered fish.'

(25) shows a valid progression in narration time without oddity[20], indicating "xiang P" is possibly eventive. However, I also found out that the progression also works for "know"(zhidao), a canonically stative verb. This opens several possibilities, if the test is effective in Mandarin: (1)"Xiang P" is dynamic. (2) The canonical stative "zhidao(know)" is also potentially dynamic like "xiang". (3) The incompatibility between progressive marker and potential dynamic "xiang P" suggests "-zai" may be special.

¬ think P One argument put forth by Özyıldız (2021) in favor of the dynamic "think P" is based on the observation that the negation of this expression can be used to describe an activity in which the attitude holder is not involved at the topic time. Through examples provided in Özyıldız (2021, 43), it is shown how "think P" can resist being interpreted as a background belief when negated, thereby implying an eventive interpretation.

(26) a. When Esra knocked, I was thinking that she was in Mexico. [Background belief]

b. When Ersa knocked, I wasn't think that she was in Mexico. [As activity]

However, in our analysis (see also §5), we do not observe such a change due to negation because

[18] Özyıldız (2021) also used a similar narrative progression test, which works by identifying whether an inserted simple past event advances the narrative time. Since Mandarin does not have "simple past", I reckon this test requires a bit more work.

[19] The resulting oddity was pointed out by and Lascarides and Asher (1993) and further explained by Abusch (2014). If a succession is inferred in an eventive situation followed by stative situation, there will be an oddity (24).

(24) An example adapted from Lascarides and Asher (1993)

#Zhangsan yin-le bisai. Ta zai jia.
Zhangsan win-perf competition. He at home.

'Zhangsan won the race. He was at home.'

[20] This test is not straightforward, as we can see a sentence like "when he entered the restaurant, he already knew/thought that he should order fish, then he ordered fish" can pass the progression test as well.

obtaining expressions like "¬ xiang (think) P" or "¬ xiang (think)-prog P" is nearly impossible.

In summary, "xiang Q" and "xiang P" alternates with a change in stativity in Mandarin, which supports the central view of Özyıldız (2021), with a difference that "xiang P" may not be dynamic. Because the diagnostics for stativity might be language-dependent, and the diagnostics for Mandarin is still understudied. More research is needed before arriving at a definitive conclusion.

5 Neg-raising?

Another observation of the stativity hypothesis, if not the core claim, is neg-raising property (Table 1). This connection between stativity and neg-raising was suggested by Özyıldız (2021); Jeretic and Özyıldız (2022). In addition, Theiler et al. (2019) pointed out a link between anti-rogativity and neg-rasing, which also suggested "xiang" as a potential anti-rogative predicate should allow for neg-raising. However, a thorny issue that must be addressed before establishing the connection is how neg-raising works in Mandarin.

Negation in Mandrain There are several ways to do negations in Mandarin including "bu" negation, "mei" negation, and "bie" negation[21]. Roughly, "bu" is more like English not, a pure negation, "mei" is tinted with imperfective meaning, and "bie" is an imperative negation (27).

(27) Bu/Mei/Bie zuo
-Neg do
Bu: '(I) don't do (that).'
Mei: '(I) haven't done/didn't do (that).'
Bie: '(you) don't do (that)!'

Neg-raising usually works with "bu" negator as shown below (28)[22].

(28) Bu Neg-raising

Wo bu xiang ta lai
I -NEG want he come

'I don't want him to come.'
→ I want him not to come.

If we use different negators to negate "xiang(think) P" in (29), the results are shown in examples (30a,30b). If neg-raising were possible, negating (29) would result in an inference such as "I think he is not sick". However, neither (30a) nor (30b) produces this inference even in the ideal stative and declarative setting, rather, we get a bouletic interpretation of "xiang".

(29) Wo xiang ta shengbing-le
I think he sick-LE
'I **think** he is sick.'

(30) a. "Bu" negation

Wo bu-xiang ta shengbing
I Neg-think he sick

'I don't **want** him to be sick.'

b. "Mei" negation

Wo mei-xiang ta shengbing
I Neg-think he sick

'(you think I wish he is sick, but) I don't **want** him to be sick.'

I assume this is because a meaning shift happened due to negation, from "think" to "want" (29-30b) or the opposite (31a,31b)[23]. These examples show that "xiang" meaning "think" prefers a positive environment but can tolerate a negative one if the meaning of "want" is not available such as in an imperative sentence.

(31) a. Ni xiang ta lai bangmang
You think he come help
'You **want** him to help (you).'

b. "Bie" negation

Ni bie-xiang ta hui lai bangmang
You Neg-think he will come help

'Don't **think** that he will help (you).'

The only possible scenario for testing neg-raising with "xiang"(think) is in an environment as in (31b) since "bie" does not cause meaning shift to "want". Unfortunately, "Bie" seems not to allow for neg-raising inference. Take "juede"(think) as an example since it is a valid neg-raising verb under "bu"

[21] Ernst (1995) and Xiao and McEnery (2008) investigated how "bu" and "mei" differ and their interaction. Biq (1989) explored more about pragmatics or paralinguistic usages of negation.

[22] According to Xiang (2013), the neg-raising is asymmetrical between "bu" and "mei" as she observed that "xiang"(want) gets a neg-raising inference in "bu" but not in "mei".

[23] Examples (31a,31b) are there to show the possibility of the semantic shift in the opposite way. But the meaning change is not always happening. For example, "ni xiang taiduo le" (you think too much) → "ni bie xiang taiduo le" (don't think too much). Hence, the pattern is: "want" shifts to "think" under imperative negation, while the opposite under the other two types.

negation[24]. As (32) shows, the neg-raising inference is not valid with "bie". Due to this particular sensitivity to negation, it is difficult to determine whether the entry of "think" for "xiang" allows for neg-raising or not[25].

(32) Imperative negating "xiang"

Ni bie juede zhe hen jiandan
You -NEG think this very easy

'Don't think it is easy.'
$\not\rightarrow$ Think it is not easy.

Semantic shift Figure 3 illustrated the semantic shifts that occur when negation interacts with two meaning entries of the "xiang" (represented by the upper and lower arrows, corresponding to "think" and "want" respectively). Specifically, two meaning shifts are observed: from "want ¬ P" to "think ¬ P" and from "¬ think P" to "¬ want P," when the negator is "bu". It is important to mention that this section only provides descriptive information rather than a comprehensive explanation.

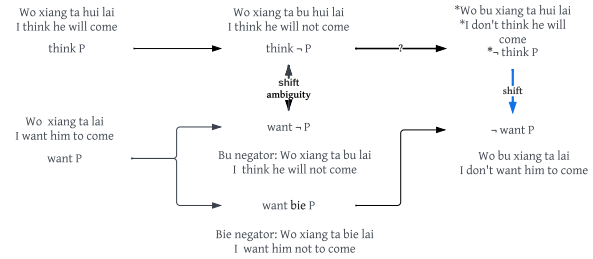

Figure 3: Semantic shift between "want" and "think"; the default negator is "bu" if there is no specification.

Figure 3 also reveals several possibilities of the failure of "¬ think P" (i.e., the neg-raising inference). First and most straightforward, the neg-raising does not happen, the negation is base-generated in the matrix clause. It is due to sensitivity to negation that "think" shifts to "want". As a by-product of this meaning shift, the auxiliary "hui" (will) is discarded because "will" and "want" are overlapping in terms of their meaning (i.e., showing future-orientation). However, this explanation faces a problem as it fails to account for why its "want" entry can have neg-raising inference. Second, neg-raising may have happened, but in the meantime, "think" changes its meaning to "want" due to negation. Third, there exists an potential meaning ambiguity between "think ¬ P" and "want ¬ P" under "bu" negation. The potential neg-raising may proceed though the "want" entry instead of the "think" entry. However, the last explanation is also unsatisfactory. For example, why does the ambiguity not work in the opposite way. Apart from that, the last possibility needs an account for the potential negator shift in " want ¬ P" (from "bu" to "bie" and then back to "bu" again).

6 Conclusion

"Xiang" shows that the stativity of vP plays a role in clausal complement selection and this is consistent with what is found with the English verb "think". This, however, is subject to many challenges, for instance, the stativity tests are limited in many ways (e.g., small in number), the existence of certain aspectual markers and modals inside the complement may influence the acceptability (20a,20b)[26]. Due to this, the conclusion that "xiang P" can only be stative may face potential challenges in the future. Given the three possibilities that lead to the failure of neg-raising, it is reasonable to maintain the potential neg-raising assumption, which is just blocked by the meaning shift due to negation. Hence "xiang" does not pose a real problem to Özyıldız (2021). The semantic shift in "xiang" is still insufficiently explained, given the focus of the paper is "xiang(think)" and its CP complement. I leave it to future research to elucidate the underlying factors that give rise to this meaning shift.

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[24]Here, I avoid using "xiang"(want) as an example because "want" shifts meaning under imperatives. In the meantime, I found out that the negators sometimes may not be the same before and after raising. "I -Bu want him to come." → "I want him -Bie/*Bu to come."

[25]My supervisor, Kajsa Djärv, also suggested that the observations made in non-neg-raising "xiang P" might undermine the applicability of Theiler et al.'s explanation for "*xiang Q" (canonically). However, the data presented by Özyıldız has already demonstrated that Theiler et al.'s account faces issues when applied to "think Q." Nevertheless, one question that arises is why we observe a pattern in English where the interpretation of the expression "¬ think" is neg-raising with P-complements varies based on whether it is stative or eventive, while in Mandarin, "¬ think" is consistently understood as "want," irrespective of stativity.

[26]cf.(20a): *I think-prog how to cook-perf or *I think-prog how to cook-LE, but "-perf" and "LE" seem to be good as in (20b). This can be syntactic constraints on finiteness as well.

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