

# Dynamic Questions: Evidence from Mandarin Think—"Xiang"

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# Roadmap

## Background

Bare form "xiang" does not take Q

Influences from the environment: stative or dynamic

Neg-raising in "xiang"

Conclusions

## Clausal complement selection

- ▶ Observation: Different predicates have different CP selectional restrictions.

In English (e.g., Grimshaw 1979):

1. Mary  $\left\{ \begin{array}{l} \text{*thinks} \\ \text{knows} \\ \text{wonders} \end{array} \right\}$  which books John bought.
2. Mary  $\left\{ \begin{array}{l} \text{thinks} \\ \text{knows} \\ \text{*wonders} \end{array} \right\}$  that John bought these books.

- ▶ Taxonomy: Anti-rogative (-Wh), Responsive ( $\pm$  Wh), Rogative (+Wh)

- ▶ The observation also holds in Mandarin.

### In Mandarin:

- Zhangsan  $\left\{ \begin{array}{l} *renwei(think) \\ zhidao(know) \\ wen(ask) \end{array} \right\}$  Lisi mai-le shenme.  
'Zhangsan *V* what Lisi bought.<sup>1</sup>'
- Zhangsan  $\left\{ \begin{array}{l} renwei(think) \\ zhidao(know) \\ *wen(ask) \end{array} \right\}$  Lisi mai-le shu.  
'Zhangsan *V* that Lisi bought books.'

<sup>1</sup>Mandarin is a wh-in-situ language.

## Theoretical accounts

- ▶ Since Grimshaw (1979), CP selection is driven by semantic factors.
  1. Factivity and veridicality hypotheses:  
Hintikka (1975); Egré (2008)
  2. Reductive approach:
    - a. Q-to-P reduction: Karttunen (1977); Lahiri et al. (2002); Spector and Egré (2015)
    - b. P-to-Q reduction: Uegaki et al. (2015)
  3. Uniform approach: Theiler et al. (2018, 2019)
  4. The stativity hypothesis (for "think wh"): Özyıldız (2021)

# The stativity hypothesis I

- ▶ Özyıldız (2021) observed that "think" (a canonical anti-rogative verb) can embed questions.

## Özyıldız (2021, 28)

- (1) a. #Anna thinks who she should invite.  
b. Anna is thinking who she should invite.

## Possible bare "think wh"

- What does Anna do whenever she's planning a party?
- She thinks who she should invite.

## The stativity hypothesis II

- ▶ He argued that the selectional pattern is not solely determined by lexical factors, but influenced by the environment (stative or dynamic). The contrast he presented is summarized as follows:

	Think Q	Think P
Stative	-	+
Dynamic	+	+

# Today's goals

1. Examining the selectional pattern of Mandarin verb "xiang" (think).
  - a. Lexical semantics of "xiang"
  - b. Clarify embedded questions in Mandarin
2. Assessing the compatibility of the stativity hypothesis (Özyıldız, 2021) with the Mandarin counterpart "xiang".
  - a. Stativity tests
  - b. Dynamicity tests
  - c. Evidence from discourse(omitted, see Appendix)
3. Investigating whether there is a potential correlation between neg-raising and stativity with "xiang".



## Main Conclusions

- ▶ "Xiang" P is stative; "xiang Q" is dynamic.
- ▶ "Xiang" still allows for neg-raising but we have to reconsider how to apply Theiler et al. (2019); Mayr (2019)'s account.

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# Lexical semantics of "xiang"

"Xiang" can have several interpretations:

- ▶ think, assume
  - ▶ hope, want
  - ▶ pine for, miss
  - ▶ recall, remember
- (Lü, 1999)

The meaning shift trigger can be:

- ▶ Modals and aspect markers in the embedded clause
- ▶ Type of the embedded clauses.
- ▶ Negation
- ▶ Imperativeness
- ▶ Maybe more...

## "Xiang"(think) being anti-rogative

- ▶ Most of cases, "xiang" behaves like an anti-rogative verb.

- (2) a. Wo xiang ta        hui chi yu<sup>2</sup>  
I think he/she will eat fish  
'I think he/she will eat fish.'
- b. \*Wo/ta xiang ta        hui chi shenme  
I/He think he/she will eat what  
'#I/He think(s) what he will eat.'

- ▶ However, we can also see "xiang Q" in second person cases.

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

<sup>2</sup>There seems to be dialectal variation wrt. the availability of xiang P (to mean think P).

## Evidence from Q-A pairs

- ▶ Matrix clause questions and embedded questions differ in terms of elicitable responses.
  - (4) a. Where does she think John will go?  
She thinks John will go to...
  - b. She knows where John will go.  
Yes, she does/No, she doesn't.

### 2<sup>nd</sup> person + "xiang" + Q

- (5) Ni xiang ta hui chi shenme  
you think he will eat what  
'what do you think he will eat?'  
(you're thinking what he'll eat.)
  - a. 'wo xiang ta hui chi yu' (I think he will eat fish.)
  - b. \*'dui, wo xiang' (Yes, I am.)

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## "Xiang" can in fact embed Q

### (6) Imperatives

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

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

### (7) Force

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

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

### (8) Some aspect markers

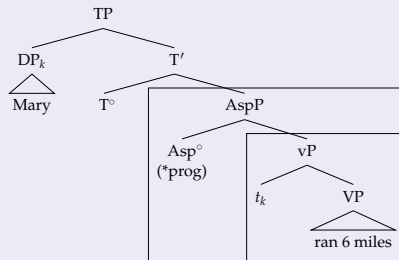
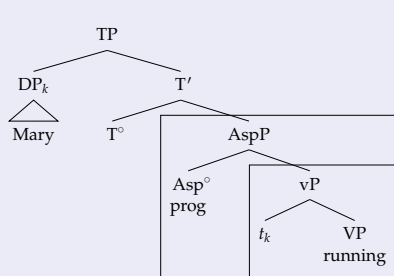
Wo zai-/xiang/-le/-guo xia yi bu qi zenme zou (\*-ne)  
I think-prog/-perf/-exp next one step chess how walk (\*-ne)

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

# Grammatical aspect

## Run vs. Run 6 miles

Changes inside the vP can be observed in somewhere higher (i.e., AspP).

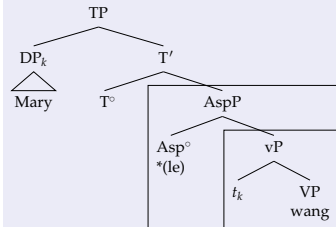




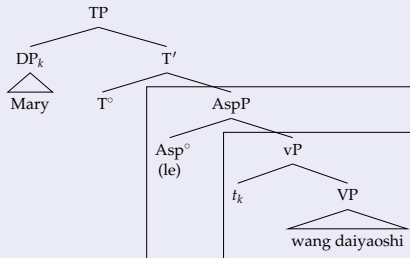
# Grammatical aspect

## Forgot vs. Forgot to take keys (in Mandarin)

"Mary forgot."



"Mary forgot to take keys."



- ▶ Examining the stativity of a vP by the existence of aspect markers.

## Test stativity: "-Zhe" test

- ▶ "-Zhe" is a durative aspect marker that requires the resulting event to be stative regardless of the internal temporality of the predicate itself. (He 1992; Xiao and McEnery 2004).

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

### "Xiang-zhe + \*Q/P"

- (10) a. \*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. Wo xiang-**zhe** women mingtian    keyi qu guangjie  
 I    think-dur we        tomorrow can go shopping  
 'I think we can go shopping tomorrow.'

- ▶ Conclusion: "Xiang Q" cannot be stative while "xiang P" can.

## Test dynamicity: "-Zai" test

Progressives usually show great incompatibility with stative verbs (i.e., \*be liking)<sup>3</sup>. According to Xiao and McEnery (2004)'s corpus study, 86 out of 88 instances, "-zai" is describing dynamic situations.

### "Zai-xiang + Q/\*P"

- (11) 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.'

- ▶ Conclusion: "Xiang Q" is dynamic while "xiang P" is not.

<sup>3</sup>However, the resulting event does not have to be eventive (e.g., New Orleans is lying/lies at the mouth of the Mississippi. (Dowty, 1979))

## Test dynamicity 2: Pseudo-clefting I

- ▶ Since we noticed a difference in the dynamicity of "xiang P", we can use further tests to confirm it, including pseudo-clefting, and agentive adverbials (Dowty, 1979; Olsen, 1994).
- ▶ Pseudo-clefting in Mandarin:

(12) What he did was...

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

## Test dynamicity 2: Pseudo-clefting II

### Clefting + "xiang + Q/\*P"

(13) a. Ta        zuo-le de        shiqing shi xiang wanfan chi  
He/she do-perf -relative thing is think dinner eat  
shenme  
what

‘what he/she did was think what to eat for dinner.’

b. \*Ta        zuo-le de        shiqing shi xiang mali chi-le  
He/she do-perf -relative thing is think Mary eat-perf  
wanfan  
dinner

‘what he/she did was think Mary has had dinner.’

▶ Conclusion: "Xiang Q" is dynamic while "xiang P" is not.

## Test dynamicity 3: Agentive adverbials

- Agentivity is another feature that possibly differentiates eventive situations and stative ones<sup>4</sup>. Here, I used classic agentive adverbials such as worriedly, carefully and intentionally (Lakoff, 1966; Dowty, 1979; Özyıldız, 2021).

### Worriedly, carefully, intentionally + "xiang + Q/\*P"

- (14) a. Wo jiaojide/zixide/?\*guyide            xiang ta zai na  
I worriedly/carefully/intentionally think he exist where  
'I am worriedly/carefully/intentionally thinking where he is.'
- b. Wo \*worriedly/\*zixide/\*guyide            xiang ta chi-le fan  
I worriedly/carefully/intentionally think he eat-perf rice  
'I worriedly/carefully/intentionally think he has eaten.'

- Conclusion: "Xiang Q" is dynamic while "xiang P" is not.

So far, "xiang Q" and "xiang P" seem to be exclusively dynamic and stative respectively.

<sup>4</sup>Force verbs, imperatives are self-evident and are not compatible with "xiang P".

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# Neg-raising in Mandarin I: Theoretical background

- ▶ Zuber's generalisation: a predicate is anti-rogative if it is neg-raising (Zuber, 1982).
- ▶ Mayr (2019) and Theiler et al. (2019) account for the **anti-rogativity of neg-raising verbs** like **believe and think** by appealing to systematic triviality and thereby perceived ungrammaticality (in the sense of Gajewski 2002), stemming from the **excluded middle presupposition** of these verbs when they combine with question-complements.
- ▶ Crucially, the evidence that these verbs have such an EM presupposition comes from the **neg-raising inference**.
- ▶ Xiang (2013) and Bervoets (2014, 2020) point out that eventive predicates are not neg-raising.
- ▶ Özyıldız (2021) and Jeretic and Özyıldız (2022) argue that there is no direct link between neg-raising and question-embedding for "think"; instead, **these properties are mediated by the same common factor, which is stativity/dynamicity**.  
→ Ambiguity approach: English "think" is ambiguous between an anti-rogative and a responsive predicate; EM only exists in the anti-rogative variant.



# Neg-raising in Mandarin II

## Negation in Mandarin

(15) Bu/Mei/Bie zuo  
-Neg do

Bu: '(I) don't do (that).'; Pure negation

Mei: '(I) haven't done/didn't do (that).'; Perfective

Bie: '(you) don't do (that)!'; Imperative

Neg-raising inference is valid under "bu" negation (not in others see Xiang 2013).

(16) Bu Neg-raising

Wo **bu** juede ta hui lai  
I -NEG think he will come

'I don't think he will come.'

→ 'Wo juede ta **bu** hui lai' (I think he will not come).

## Neg-raising in Mandarin III

But for now, let's consider all negators so as not to lose any possibilities.

- ▶ "I  $\neg$  think P" ?  $\rightarrow$  "I think  $\neg$  P"

### "Think to want" shift("bu", "mei")

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

(18) 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 wished he is sick, but) I didn't **want** him to be sick.'

## Neg-raising in Mandarin IV

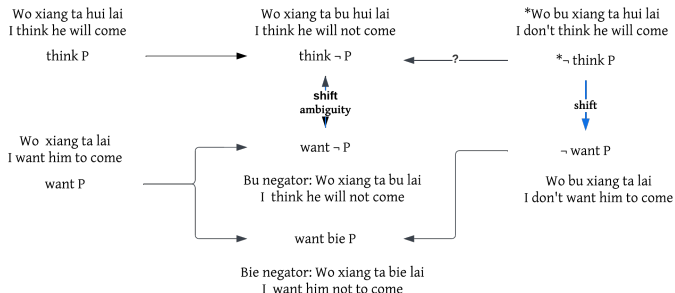
### "Bie"

- (19) a. Ni xiang ta hui lai bangmang  
You think he will come help  
'You **think** he will come 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).'

- ▶ At least, "xiang(think)" survives under "bie" negation. However, "bie" does not show the ability to induce a neg-raising inference.

## Semantic shift observed in neg-raising I

- For future research to better understand, I'd like to provide more descriptive information (N.B.: this section is not meant to be an explanation).



**Figure:** The default negator is "bu" if there is no specification.

## Semantic shift observed in neg-raising II

Several possibilities for the failure of neg-raising:

1. Neg-raising does not exist in "xiang-think".
  - a. "Juede"/"xiang-want" allows for EM presupposition, while "xiang-think" does not.
  - b. "Xiang" is lexically ambiguous.
2. "Xiang-think" also allows for neg-raising.
  - a. "Xiang" is not ambiguous.
  - b. "Invisible" inference.

## Semantic shift observed in neg-raising III

Theoretical implications of not seeing neg-raising inference in "xiang-think":

- ▶ Since "xiang-think" doesn't seem to show neg-raising inference at all, there's no evidence that "xiang-think" in Mandarin has an EM presupposition.
  - No evidence to support the ambiguity hypothesis.
  - An additional issue for using the Theiler et al/Mayr account to capture \*xiang wh.
- ▶ A pattern contrast between English and Mandarin

<i>Dynamic think</i>	<i>Responsive</i>	<i>*neg – raising</i>
<i>Stative think</i>	<i>Anti – rogative</i>	<i>neg – raising</i>
<i>Dynamic xiang</i>	<i>Rogative</i>	<i>?neg – raising</i>
<i>Stative xiang</i>	<i>Anti – rogative</i>	<i>?neg – raising</i>

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## Takeaways from this paper

- ▶ "Xiang"'s selection pattern varies with the stativity of vP (as a combinatory restriction).
- ▶ "Xiang Q" is dynamic and "xiang P" is stative.

	Think Q	Think P
Stative	-	+
Dynamic	+	+

	Xiang Q	Xiang P
Stative	-	+
Dynamic	+	-

- ▶ "Xiang" is sensitive to negation, which leads to neg-raising inference failure. However, given the data and discussion so far, it's possible that "xiang" still allows for neg-raising.

### Further questions

1. Whether "xiang P" is indeed stative (more tests needed and a theoretical account).
2. If it is, how P excludes the dynamic possibility?
3. Person effect we see in "second person xiang matrix Q" cases.
4. How to deal with negation sensitivity and meaning shift.



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## Appendix I: Matrix Q test: "-Ne test"

- ▶ "-Ne" is a particle that's compatible with wh-questions (not obligatory).

(20) Ta zai na (ne)  
He exist where (-ne)  
'where is him?'

- ▶ Dong (2018) claimed "-ne" serves as a matrix clause scope marker.

- (21) a. 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.'
- b. Believe (Dong, 2018, 30)  
Zhangsan xiangxin shei mai-le shu ne  
Zhangsan believe who buy-perf books -ne  
'who does Zhangsan believe bought books?'

## Appendix I: "-Ne test" results

- ▶ This suggests: (1) The second person cases show a matrix question. (2) The availability of matrix scope for "xiang".

### 2<sup>nd</sup> person + "xiang" + Q -ne<sup>5</sup>

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

- ▶ Other predicates:

<i>Predicates</i>	<i>Root Question</i>	<i>Emphatic</i>	<i>Imperfective</i>
<i>Renwei</i> (think, -Wh)	+	-	#
<i>Xiang</i> (think, -Wh)	+	#	+
<i>Sikao</i> (think, +Wh)	-	+	+
<i>Zhidao</i> (know, ±Wh)	#	+	-
<i>Wen</i> (ask, +Wh)	-	+	+

<sup>5</sup>Note that the root question reading with "xiang" plus "wh-ne" is not valid in other persons.

## Appendix II: Eventive contexts: test from discourse I

The eventive situation after an eventive situation advances the narration time, while the stative situation does not but temporally extends over the preceding situation (Dowty, 1986; Abusch, 2014; Özyıldız, 2021).

- (23)
- a. John entered a restaurant. John put down his phone. (After that) John ordered fish.
  - b. #John entered a restaurant. John loved fish. (After that) John ordered fish.
  - c. John entered a restaurant. John loved fish. He told me this morning.
  - d. # John finished his classes. He was at home. (oddtity)

## Appendix II: Eventive contexts: test from discourse II

### Narration advancement in “xiang Q/P”

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



## Appendix II: Eventive contexts: test from discourse III

- ▶ The results show that "xiang P" seems to be dynamic, pushing the narration time forward. However, I also found "know" can do the same as "xiang" in terms of narrative progression.
- ▶ This opens several possibilities:
  - ▶ "xiang P" is dynamic.
  - ▶ "zhidao" (know) works dynamically as "xiang".
  - ▶ "-zai" is special (so are other previous tests) so that not compatible with potential dynamic "xiang P".