

# Negative Yes/No Questions in Mandarin: Evidence for VERUM<sup>1</sup>

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## 1. Introduction

A negative yes/no question in English can be interpreted with two distinct biases, depending on the scope of negation. Ladd (1981) made the observation that (1) is ambiguous between a positive bias reading and a negative bias reading. The positive bias reading is elicited in the context of (2), where the speaker is seeking confirmation for her positive bias that there is a vegetarian restaurant. The context of (2) leads to the negative bias reading, in which the speaker is seeking confirmation for a negative bias that there is no vegetarian restaurant. The contexts presented in (2) are adapted from the original situations in Ladd (1981).

(1) Isn't there a vegetarian restaurant around here?

(Ladd 1981)

(2) a. Context A: *The speaker is visiting a friend in a different city. The two are looking for a place to eat. The speaker, having visited the neighborhood a few years ago, remembers that there is a vegetarian restaurant around. She says the sentence in (1) to seek confirmation for the existence of such a restaurant.*

Isn't there a vegetarian restaurant around here?

**Positive bias reading**

b. Context B: *Similar to Context A, the speaker remembers a vegetarian restaurant from a previous trip. But this time, the friend says that they only have barbecue and burger places in the neighborhood. The speaker, having inferred that there is no vegetarian restaurant here anymore, utters (1) in surprise, to seek confirmation for this new piece of information.*

Isn't there a vegetarian restaurant around here?

**Negative bias reading**

In (2), the speaker has a private belief, or EPISTEMIC BIAS, for  $p$ , that there is a vegetarian restaurant around here. She utters the biased question to seek confirmation for  $p$ . This is the positive bias reading, or the  $p$ -READING, a name used by Romero & Han (2004). In (2), the speaker's epistemic bias remains unchanged, but she now also has an EVIDENTIAL BIAS for  $\neg p$ , which is a bias gained from contextual evidence. In this case, the evidential bias for  $\neg p$  comes from what the addressee has said about barbecue and burger places. The speaker uses the biased question to seek confirmation for the new evidential bias  $\neg p$ . And this is the negative bias reading, or the  $\neg p$ -READING.

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Ladd (1981) observes that when the speaker is seeking confirmation for  $\neg p$  in (2), negation is found inside the prejacent of the biased questions. In other words, the question is about  $\neg p$ . Hence Ladd names it the INSIDE-NEG READING. In (2), on the other hand, the proposition of the question is  $p$ , with negation on the outside of the prejacent. Therefore it is termed the OUTSIDE-NEG READING.

The  $p$ -reading (Romero & Han 2004) and outside-NEG reading (Ladd 1981) both refer to the same reading with a positive bias. The names “ $\neg p$ -reading” and “inside-NEG reading” are interchangeable as well. In this paper, for consistency, I refer to the two readings as the  $p$ -reading and the  $\neg p$ -reading, following Romero & Han.

For some speakers, (1), repeated in (3), only conveys the  $p$ -reading (see Northrup 2014, AnderBois 2019). And to express the  $\neg p$ -reading, (3) is used instead. If anything, pronouncing the negation at a lower position at PHONOLOGICAL FORM (PF) further confirms Ladd’s analysis that negation is somehow inside. For ease of presentation, I use (3) as the baseline for translating  $\neg p$ -readings.

- (3) a. Isn’t there a vegetarian restaurant around here?  **$p$ -reading**  
 b. Is there not a vegetarian restaurant around here?  **$\neg p$ -reading**

Romero & Han (2004) flesh out the analysis in Ladd (1981) by engaging a silent epistemic operator VERUM below a question morpheme that helps create a biased reading. The VERUM operator can scope higher or lower than negation at LOGICAL FORM (LF), to derive the two readings. VERUM scopes below negation in the  $p$ -reading. And it scopes above negation in the  $\neg p$ -reading. The mechanism of VERUM is explained in more detail in section 2. The LF and biases corresponding to the two readings are summarized in Table 1.

READING	LF	SEEKING CONFIRMATION FOR	ALTERNATIVE NAMES
$p$ -reading	Q [ $\neg$ VERUM [ $p$ ]]	$p$	Outside-NEG reading
$\neg p$ -reading	Q [VERUM [ $\neg p$ ]]	$\neg p$	Inside-NEG reading

**Table 1:** LF and biases of the two readings

Romero & Han’s VERUM account has been criticized by Holmberg (2015) for the silent nature of VERUM in English negative yes/no questions. If VERUM has no PF representation, then there is no evidence for its presence at LF either. Holmberg points out that there has been no known report of a systematically spelled-out version of VERUM in negative yes/no questions in any language.

In this paper, I show that there is indeed a pronounced VERUM in Mandarin, adding support to Romero & Han’s (2004) account of biased questions. The Mandarin VERUM operator, pronounced as *shi* (not to be confused with the homophonous copula verb *shi*), can produce the exact bias contrast as predicted by Romero & Han’s LF. This is shown in the two negative yes/no questions in (4). (4) has negation scoping over VERUM, producing the  $p$ -reading. And (4), with its negation scoping lower than VERUM, produces the  $\neg p$ -reading. *shi* can optionally be silent, just like English. But when it is, the two readings are disambiguated by prosodic difference<sup>2</sup>, despite displaying the same linear word order.

- (4) a. mali bu (shi) xihuan he cha ma?  
 Mary NEG VERUM like drink tea Q  
 ‘Doesn’t Mary like to drink tea?’  **$p$ -reading**

<sup>2</sup> The two readings can also be disambiguated with prosody in English, see Arnhold, Braun & Romero (2020).

- b. mali (shi) bu xihuan he cha ma?  
 Mary VERUM NEG like drink tea Q  
 ‘Does Mary not like to drink tea?’ **¬*p*-reading**

The VERUM operator not only serves to account for the two readings of Mandarin biased questions, but also provides insight to an unexpected assertion reading of the negative yes/no question. This assertion reading is achieved via changing the boundary tone, or sentence-final intonation, of the question from a high one to a low one. The boundary tone transcriptions, H% and L%, are based on ToBI (Pierrehumbert 1980, Beckman & Elam 1997). The *p*-reading question of (5) ends in a high boundary tone H%. In (5), merely by changing the high boundary tone into a low one, an assertion reading is derived. The assertion of (5), with negation scoping high, asserts *p*, as opposed to the expected ¬*p*. I have decided to name (5) the GHOST NEG READING, as befitting the ghostly nature of its negation, which contributes nothing to the surface meaning. Adding more to the puzzle is the DOGMATIC ASSERTION (see Chao 1968) of (5), which is essentially ghost NEG assertion without the negation. Between (5) and (c), the same positive assertion *p* is made, regardless of whether negation is present or not.

- (5) a. mali bu shi xihuan he cha ma? H%  
 Mary NEG VERUM like drink tea Q  
 ‘Doesn’t Mary like to drink tea?’ ***p*-reading question**
- b. mali bu shi xihuan he cha ma L%  
 Mary NEG VERUM like drink tea Q  
 ‘Mary likes to drink tea.’ **Ghost NEG assertion**
- c. mali shi xihuan he cha ma L%  
 Mary VERUM like drink tea Q  
 ‘Mary likes to drink tea.’ **Dogmatic assertion**

The goal of this paper is to present a uniform analysis for both the ghost NEG assertion and the dogmatic assertion, by enlisting the VERUM operator. Essentially, the two *ma*-assertions are self-answering questions, in which VERUM is present in both the pronounced question component and the silent answer component. Therefore the unexpected assertion readings of negative yes/no questions in Mandarin provide further support for the existence of Romero & Han’s (2004) VERUM operator.

The paper is structured as follows. In section 2, I provide an overview of Romero & Han’s (2004) VERUM operator account for English biased questions. Section 3 details the syntax and semantics of the two biased question readings of negative yes/no questions in Mandarin. Section 4 is an investigation of the ghost NEG assertion reading. In Section 5, I discuss the pattern of another negation marker *mei*, which provides further evidence for negation scoping. Section 6 is a brief discussion of remaining questions and Section 7 is the conclusion.

## 2. The VERUM Operator

To account for the existence of bias in negative yes/no questions in English, Romero & Han (2004) propose an epistemic operator VERUM. It works in tandem with the question morpheme Q to create an unbalanced partition that favors one proposition.

In a regular yes/no question without any bias, the question morpheme takes in a proposition *p* as its argument, and creates a set of propositions that includes the negative alternative ¬*p* (Hamblin 1973). This is called a PARTITION, written as {*p*, ¬*p*}. By asking the yes/no question, the speaker seeks information on

whether  $p$  or  $\neg p$  is true. And depending on the subsequent answer provided by the addressee, the speaker and the addressee can add one of the propositions to the COMMON GROUND (CG) (Stalnaker 1978). If the addressee has given an affirmative answer, then  $p$  is added to the CG. Whereas if the answer is negative,  $\neg p$  is added to the CG instead.

In a biased yes/no question, on the other hand, the speaker is no longer simply asking which one of the two opposing propositions they should add to the CG. Instead, the speaker is particularly concerned with one of the propositions, say,  $p$ . By uttering a biased yes/no question, the speaker is actually asking whether it is for sure that they should add  $p$  to the CG. To put this intuitive generalization in concrete forms, the VERUM operator is invoked at LF. As an operator, it takes in a proposition  $p$  as its argument, and modifies it into “it is for sure that we should add  $p$  to the CG”, which Romero & Han abbreviate as “FOR-SURE-CG <sub>$x$</sub>  $p$ ”, where the subscript  $x$  refers to the speaker and the addressee as a collective entity. The question morpheme Q scopes above VERUM. It takes in the newly-created complex proposition FOR-SURE-CG <sub>$x$</sub>  $p$  and creates the partition {FOR-SURE-CG <sub>$x$</sub>  $p$ ,  $\neg$ FOR-SURE-CG <sub>$x$</sub>  $p$ }. Romero & Han describe it as an unbalanced partition. A balanced partition is one that contains both the positive proposition  $p$  and the negative proposition  $\neg p$ , like the partition  $\{p, \neg p\}$  created in a regular yes/no question. The partition created by the biased question, {FOR-SURE-CG <sub>$x$</sub>  $p$ ,  $\neg$ FOR-SURE-CG <sub>$x$</sub>  $p$ }, on the other hand, makes no mention of  $\neg p$ . Therefore it is an unbalanced partition, tilted towards  $p$ .

The definition of the question morpheme Q is provided in (6). And Romero & Han’s (2004) definition of VERUM is stated in (7).

$$(6) \llbracket Q \rrbracket = \lambda p_{\langle s,t \rangle} \lambda w_s \lambda q_{\langle s,t \rangle} [q = p \vee q = \neg p]$$

$$(7) \llbracket \text{VERUM}_i \rrbracket^{gvi} = \lambda p_{\langle s,t \rangle} \lambda w. \forall w' \in \text{Epi}_x(w) [\forall w'' \in \text{Conv}_x(w') [p \in \text{CG}_{w''}]]$$

(Romero & Han 2004)

In (7),  $\text{Epi}_x(w)$  is the set of worlds that conform to  $x$ ’s (the speaker) knowledge in the world  $w$  where the conversation is taking place. And  $\text{Conv}_x(w')$  is the set of worlds where all the conversational goal of  $x$  in  $x$ ’s knowledge world  $w'$  are fulfilled. Finally,  $\text{CG}_{w''}$  is the set of propositions that the speaker assumes to be true in the conversational-goal-fulfilling world  $w''$ . The act of adding the input proposition  $p$  into the CG is written as  $[p \in \text{CG}_{w''}]$ . To put the layered definition of VERUM into more intuitive prose, it would go like this: the speaker in the world  $w$  is confronted with a proposition  $p$ . And in the set of worlds  $w'$  that conform to her knowledge in  $w$ , there is a subset of worlds  $w''$  that can fulfill the conversational goal. In this subset of worlds  $w''$ , the proposition  $p$  is added to the CG. In simpler terms, the speaker knows that to fulfill the goal of the conversation,  $p$  needs to be added to the CG.

To see VERUM in action, compare the unbiased question in (8) and the biased question in (8). In (8), VERUM is pronounced as the adverb *really*. One might wonder why the supposedly silent VERUM operator can be pronounced at PF here. Romero & Han (2004) point out that VERUM is only silent in negative yes/no questions. In a positive biased yes/no question like (8), VERUM can indeed be pronounced at PF. The LF of the two questions and their calculations, taken from Romero & Han, are shown as well.

$$\begin{aligned} (8) \text{ a. } & \text{Does John drink?} \\ & \text{LF: } [\text{CP } Q [\text{IP } \textit{John drinks}]] \\ & \llbracket Q \textit{John drinks} \rrbracket (w_0) \\ & = \lambda q [q = \lambda w. \textit{drink}(j, w) \vee q = \lambda w. \neg \textit{drink}(j, w)] \\ & = \{ \textit{John drinks}, \textit{John doesn't drink} \} \end{aligned}$$

- b. Does John really drink?  
 LF: [<sub>CP</sub> Q [VERUM [<sub>IP</sub> *John drinks*]]]

$$\begin{aligned} & \llbracket \text{Q VERUM } John \text{ drinks} \rrbracket (w_0) \\ & = \lambda q [q = \lambda w. \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w''' . drink(j, w''') \in CG_{w''}]]] \\ & \vee q = \lambda w. \neg \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w''' . drink(j, w''') \in CG_{w''}]]] \\ & = \{ \text{'it is for sure that we should add to CG that John drinks'}, \\ & \quad \text{'it is not for sure that we should add to CG that John drinks'} \} \end{aligned}$$

(Romero & Han 2004)

In the VERUM-less question of (8), the partition is built around whether John drinks or not. By adding VERUM between Q and the prejacent, the question in (8) is no longer seeking information on whether John drinks or not. Instead, the speaker is asking whether the participants of the conversation should add *p* (that John drinks) to the CG or not. And this is reflected in the partition that only makes mention of *p*.

In (8), VERUM is represented at PF as the adverb *really*. But in a biased negative yes/no question, VERUM appears at LF without correspondence at PF. The silent VERUM can scope above negation or below it, deriving the two biased readings. (9) has the *p*-reading, where negation scopes above VERUM. VERUM takes in the proposition *p* and modifies it into FOR-SURE-CG<sub>x</sub>*p*. The high negation further modifies it into  $\neg$ FOR-SURE-CG<sub>x</sub>*p*. Finally, Q takes in  $\neg$ FOR-SURE-CG<sub>x</sub>*p* and creates a partition with its negative alternative, which happens to be FOR-SURE-CG<sub>x</sub>*p*. The question is about *p*. Note that this high negation above VERUM is seemingly vacuous, in that (9) creates the same partition as (8), where there is no negation. The  $\neg$ *p*-reading and its calculation can be found in (9). Here, negation is part of the proposition taken in by VERUM. Therefore the question is about  $\neg$ *p*. The two readings and their scoping relations are summarized in (10).

- (9) a. Doesn't John drink? ***p*-reading**  
 LF: [<sub>CP</sub> Q [ $\neg$ [VERUM [<sub>IP</sub> *John drinks*]]]]

$$\begin{aligned} & \llbracket \text{Q } \neg \text{VERUM } John \text{ drinks} \rrbracket (w_0) \\ & = \lambda q [q = \lambda w. \neg \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w''' . drink(j, w''') \in CG_{w''}]]] \\ & \vee q = \lambda w. \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w''' . drink(j, w''') \in CG_{w''}]]] \\ & = \{ \text{'it is not for sure that we should add to CG that John drinks'}, \\ & \quad \text{'it is for sure that we should add to CG that John drinks'} \} \end{aligned}$$

- b. Doesn't John drink?/Does John not drink?  **$\neg$ *p*-reading**

$$\begin{aligned} & \text{LF: } [<sub>CP</sub> \text{Q } [\text{VERUM } [<sub>IP</sub> \neg [John \text{ drinks}]]]] \\ & \llbracket \text{Q VERUM } \neg John \text{ drinks} \rrbracket (w_0) \\ & = \lambda q [q = \lambda w. \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w''' . \neg drink(j, w''') \in CG_{w''}]]] \\ & \vee q = \lambda w. \neg \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w''' . \neg drink(j, w''') \in CG_{w''}]]] \\ & = \{ \text{'it is for sure that we should add to CG that John doesn't drink'}, \\ & \quad \text{'it is not for sure that we should add to CG that John doesn't drink'} \} \end{aligned}$$

- (10) a. ***p*-reading:**  
 LF: [Q [ $\neg$ [VERUM [*p*]]]]  
 Partition: { $\neg$ FOR-SURE-CG<sub>x</sub>*p*, FOR-SURE-CG<sub>x</sub>*p*}

- b.  **$\neg$ *p*-reading:**  
 LF: [Q [VERUM [ $\neg$ *p*]]]  
 Partition: {FOR-SURE-CG<sub>x</sub> $\neg$ *p*,  $\neg$ FOR-SURE-CG<sub>x</sub> $\neg$ *p*}

## 2.1 Polarity Items in Biased Question

Romero & Han (2004) use negative yes/no questions involving polarity items as syntactic evidence for the negation scoping difference between the two readings. According to them, the positive polarity item enforces the  $p$ -reading, whereas the negative polarity item (NPI) *either* can only elicit the  $\neg p$ -reading. This is illustrated in the pair of examples of (11), taken from Romero & Han. In their notation, “A” stands for addressee, and “S” for speaker.

- (11)
- a. A: OK, now that Stephan has come, we are all here. Let’s go!  
S: Isn’t Jane coming **too**?  **$p$ -reading**
- b. Scenario: Pat and Jane are two phonologists who are supposed to be speaking in our workshop on optimality and acquisition.  
A: Pat is not coming. So we don’t have any phonologists in the program.  
S: Isn’t Jane coming **either**?  **$\neg p$ -reading**

(Romero & Han 2004)

In (11), the speaker has an epistemic bias for  $p$  (that Jane is coming). She seeks confirmation for  $p$  by uttering the biased question using the PPI *too*. The appearance of a PPI in spite of the presence of negation indicates that the negation is too high to license an NPI, as shown in (12)). In (11), the speaker also has an epistemic bias for  $p$ . But after the addressee has suggested that there is no phonologist at the workshop, the speaker has inferred  $\neg p$  instead. She uses (11) to seek confirmation for the new evidential bias for  $\neg p$ , employing the NPI *either*. The fact that the NPI is chosen here shows that negation is low enough to license it, as seen in (12).

- (12)
- a. Isn’t Jane coming **too**?  **$p$ -reading**  
LF: [Q [ $\neg$ [VERUM [Jane is coming **too**]]]]
- b. Isn’t Jane coming **either**?  **$\neg p$ -reading**  
LF: [Q [VERUM [ $\neg$ [Jane is coming **either**]]]]

Recall that the judgement on the  $p$ -reading vs.  $\neg p$ -reading contrast in English is not without controversy. Ladd’s (1981) vegetarian restaurant sentence is said to have the outside-NEG reading only for many speakers (see Northrup 2014, AnderBois 2019). And for many speakers, both the PPI question of (11) and the NPI question of (11) have the  $p$ -reading. And to express the  $\neg p$ -reading, they opt for the question formatted in (13) instead, where negation is low at PF as well.

- (13)
- a. Isn’t Jane coming **too**?  **$p$ -reading**  
b. Is Jane not coming **either**?  **$\neg p$ -reading**

Interestingly, the objection to the reading contrast described in Ladd (1981) and Romero & Han (2004) actually lends more support for their analysis on negation scoping. The negation of the inside-NEG reading/ $\neg p$ -reading is indeed found at a low position. And in the next section, I show that the negation scoping difference is even more clear-cut at PF in Mandarin.

## 2.2 Summary

Romero & Han (2004) propose a silent VERUM operator to account for the two biases seen in English negatives yes/no questions. VERUM scopes below negation to derive the positive bias in the *p*-reading. And it scopes above negation to manifest the negative bias in the  $\neg p$ -reading. Syntactic evidence for the scoping of negation can be found in biased questions with PPI or NPIs.

The VERUM account has received criticisms both for the lack of consensus on the reading contrast between the two readings, and for the operator's silent nature that makes one question its existence. The former criticism works in favor of the negation scoping analysis, since the  $\neg p$ -reading is indeed pronounced with a low negation at PF. The latter concern is voiced by Holmberg (2015), who points out that there is yet to be a language reported that has a pronounced VERUM operator systematically appearing in negative yes/no questions. Holmberg adds that "if such languages can be found, we may need to revise our verdict of Romero & Han (2004)". In Section 3, I present data from Mandarin negative yes/no questions, showing that it is indeed such a language where VERUM is spelled out at PF, at the very locations predicted by Romero & Han.

## 3. Mandarin Negative Yes/No Questions

In a negative yes/no question in Mandarin, the VERUM operator is pronounced as *shi*, as seen in the pair of examples in (4), repeated here in (14) and (15), with added context. *shi* can appear on either side of the negation marker *bu* to derive the different readings.

(14) Context A: *Two friends of Mary are trying to figure out what to gift her for her birthday. The speaker, vaguely remembers that she has seen Mary drink tea at work. So she says the following to make a suggestion for the line of gift searching they could pursue.*

a. mali bu shi xihuan he cha ma?  
Mary NEG VERUM like drink tea Q  
'Doesn't Mary like to drink tea?'

***p*-reading**

b. #mali shi bu xihuan he cha ma?  
Mary VERUM NEG like drink tea Q  
'Does Mary not like to drink tea?'

(15) Context B: *The speaker is talking to Mary's wife after the couple returned from a trip to London. Her wife has just mentioned how Mary finds it annoying that the hotel room only provided tea and that there was no coffee. The speaker is surprised to hear this. Just last month, when the couple visited, she was serving tea to them. And Mary looked like she was enjoying herself. Suddenly paranoid that Mary was only drinking the tea out of politeness, she asks the following.*

a. mali shi bu xihuan he cha ma?  
Mary VERUM NEG like drink tea Q  
'Does Mary not like to drink tea?'

**$\neg p$ -reading**

b. #mali bu shi xihuan he cha ma?  
Mary NEG VERUM like drink tea Q  
'Doesn't Mary like to drink tea?'

In (14), the speaker has an epistemic bias for  $p$  (that Mary likes drinking tea), and is double-checking for  $p$ . In (15), the speaker also has an epistemic bias for  $p$ , but this time, there is a new evidential bias for  $\neg p$ , which she has inferred from what the addressee has said. Therefore the speaker is double checking the new bias for  $\neg p$ .

In Romero & Han's (2004) analysis, negation scopes above VERUM to derive the reading that double-checks for  $p$ . And VERUM scopes above negation for the question to be interpreted as a double-check for  $\neg p$ . This is indeed what is observed in the Mandarin. To express the bias for  $p$ , negation scopes above VERUM in (14). And if one were to switch the order of the two, as in (14), the sentence is no longer felicitous in the context of (14). (Note that “#” is used for sentences that are not felicitous in a specific context, but are still well-formed elsewhere.) To convey a bias for  $\neg p$ , the speaker uses (15), where VERUM scopes above negation. And again, switching the two (15) ends up being infelicitous.

The rest of this section is organized as follows, in 3.1, I present arguments for identifying *shi* as the VERUM operator. A compositional analysis for Mandarin negative yes/no questions is provided in 3.2. In 3.3, I examine the difference between LF and PF, drawing on the syntax of the sentence-final *ma* particle (3.3.1) and DP movement (3.3.2). In 3.4, I show that there is high negation in Mandarin, which challenges Holmberg's (2015) generalization. 3.5 is a discussion on how speakers disambiguate between the two readings when *shi* is not pronounced.

### 3.1 *shi* Is VERUM

I argue that *shi*, although homophonous with the copula verb, is in fact the phonological realization of the VERUM operator in Mandarin negative yes/no questions. Hole (2012) identifies *shi* as the verum focus marker, usually used in tag questions.

In a positive yes/no question, *shi* appears in the same position as the English adverb *really*, which Romero & Han (2004) have identified as a rare case of pronounced VERUM in the language. Consider the pair of Mandarin yes/no questions in (16). (16) is an unbiased<sup>3</sup> neutral *ma*-question, where the speaker is seeking information on whether the addressee's father cooks a lot or not. In (16), the speaker has heard in advance that the addressee's father cooks a lot, and wants to find out if it is indeed true. She asks the biased question with *shi* to double-check this piece of information.

- (16) *shi* creates bias in positive yes/no questions:
- |    |                                    |      |              |           |      |      |                         |
|----|------------------------------------|------|--------------|-----------|------|------|-------------------------|
| a. | ni                                 | baba | jingchang    | zuo       | fan  | ma?  |                         |
|    | you                                | dad  | often        | make      | meal | Q    |                         |
|    | 'Does your dad cook a lot?'        |      |              |           |      |      | <b>Neutral question</b> |
|    |                                    |      |              |           |      |      |                         |
| b. | ni                                 | baba | <b>SHI</b>   | jingchang | zuo  | fan  | ma?                     |
|    | you                                | dad  | <b>VERUM</b> | often     | make | meal | Q                       |
|    | 'Does your dad really cook a lot?' |      |              |           |      |      | <b>Biased question</b>  |

*shi* can also be used as VERUM in a declarative like (17). Without *shi*, (17) is a straightforward declarative that can be used out of the blue. Whereas (17) is used in a context where the addressee has shown that he does not fully believe the speaker's mum has fixed the TV. So the speaker has to use *shi* to emphasize that the statement is indeed true.

<sup>3</sup> It is claimed by many (see Chao 1968, Y.Fang 1992, L.Cheng, Huang & Tang 1996) that a yes/no question with *ma* is always biased. However, Lee (2000) have shown that it can be neutral.



(17) *shi* conveys *verum focus*:

- a. wo    mama   ba    dianshiji            xiu    hao    le  
 I        mum   BA    TV                    fix    good   PERF  
 ‘My mum fixed the TV.’
- b. wo    mama   **SHI**                    ba    dianshiji            xiu    hao    le  
 I        mum   **VERUM**                BA    TV                    fix    good   PERF  
 ‘My mum fixed the TV.’ **Verum focus**

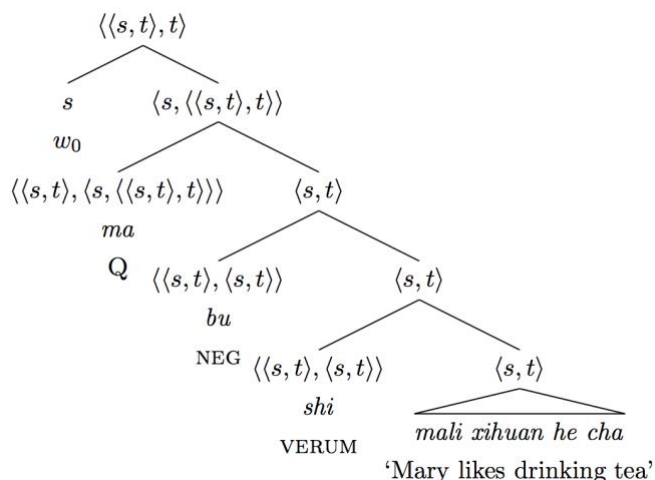
In both (16) and (17), *shi* has sentential prominence and conveys *verum focus* (as first described in Höhle 1988, and for a survey of *verum focus*, see Lohnstein 2016). The two sentences emphasize on the truth of a proposition in the context, with the help of *shi*. And this is exactly what one would expect a phonological manifestation of the VERUM operator to be able to do.

### 3.2 The Analysis

The relative positions of negation and VERUM at LF are evident from their PF linear word order, as illustrated in (14) and (15). Negation scopes above VERUM to derive the *p*-reading (14), and below VERUM to elicit the  $\neg p$ -reading (15). However, there are two discrepancies between the PF and LF of Mandarin negative yes/no questions. One is the location of the subject DP ‘Mary’, and the other is the question particle *ma*. The subject DP is found at the left edge of the PF, which Romero & Han (2004) predict to be in the TP within the scope of VERUM at LF. The question particle *ma* is pronounced at the end of the utterance at PF, which ought to scope over every other constituent in the question according to Romero & Han’s LF. I take it that the discrepancies between LF and PF are a result of syntactic movement, which I discuss in more detail in 3.3. And for my analysis, I assume that both the subject DP and the question particle *ma* are, or at least can be, interpreted in their base positions at LF. The subject DP is interpreted as part of the TP below VERUM and negation, and the question particle *ma* is the question morpheme that scopes above VERUM and negation. The LF of the two biased questions, repeated in (18) and (19), are shown in (18) and (19), respectively.

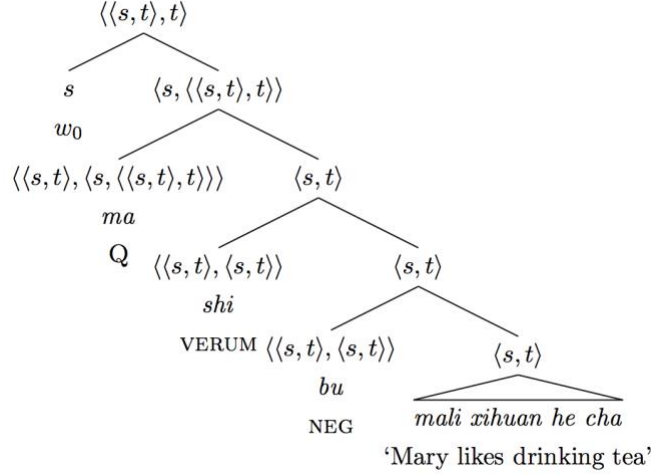
(18) *p*-reading:

- a. mali   bu   shi        xihuan   he    cha   ma?  
 Mary   NEG   VERUM   like    drink   tea   Q  
 ‘Doesn’t Mary like to drink tea?’
- b.



(19)  $\neg p$ -reading:

- a. mali shi bu xihuan he cha ma?  
 Mary VERUM NEG like drink tea Q  
 ‘Does Mary not like to drink tea?’
- b.



The Mandarin *ma* and *shi* have the same definitions as Q (6) and VERUM (7), respectively. This is shown in (20) and (21).

$$(20) \quad \llbracket ma \rrbracket = \llbracket Q \rrbracket = \lambda p_{\langle s, t \rangle} \lambda w_s \lambda q_{\langle s, t \rangle} [q = p \vee q = \neg p]$$

$$(21) \quad \llbracket shi_i \rrbracket = \llbracket VERUM_i \rrbracket^{gvi} = \lambda p_{\langle s, t \rangle} \lambda w. \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [p \in CG_{w''}]]$$

To illustrate how the LF of the  $p$ -reading in (18) and that of the  $\neg p$ -reading in (19), can derive their biased readings, I show their calculations in (22)<sup>4</sup> and .

(22) *Calculations of the p-reading:*

- a.  $\llbracket shi\ mali\ xihuan\ he\ cha \rrbracket$  *Function Application*  
 $= \llbracket VERUM_i \rrbracket^{gvi} (\llbracket Mary\ likes\ drinking\ tea \rrbracket)$   
 $= \lambda w. \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w''' . like(m, t, w''') \in CG_{w''}]]$
- b.  $\llbracket bu\ shi\ mali\ xihuan\ he\ cha \rrbracket$  *Function Application*  
 $= \llbracket \neg \rrbracket (\llbracket VERUM\ Mary\ likes\ drinking\ tea \rrbracket)$   
 $= \lambda w. \neg \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w''' . like(m, t, w''') \in CG_{w''}]]$
- c.  $\llbracket ma\ bu\ shi\ mali\ xihuan\ he\ cha \rrbracket (w_0)$  *Function Application*  
 $= \llbracket Q \rrbracket (\llbracket \neg VERUM\ Mary\ likes\ drinking\ tea \rrbracket) (w_0)$   
 $= \lambda q [q = \lambda w. \neg \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w''' . like(m, t, w''') \in CG_{w''}]]$   
 $\vee q = \lambda w. \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w''' . like(m, t, w''') \in CG_{w''}]]]$   
 $= \{ \text{'it is not for sure that we should add to CG that Mary likes drinking tea'},$   
 $\text{'it is for sure that we should add to CG that Mary likes drinking tea'} \}$

<sup>4</sup> The semantics within the proposition is simplified as a three-place predicate  $\llbracket like \rrbracket$ , whose arguments are the agent, the theme, and a world variable. I include a world variable, following the practice in Romero & Han (2004), which can be observed in (8) and (9). It is very likely that a habitual reading requires a more sophisticated semantics, but the matter is put aside here to highlight the workings of VERUM, negation and the question particle.

(23) *Calculations of the  $\neg p$ -reading:*

- a.  $\llbracket bu\ mali\ xihuan\ he\ cha \rrbracket$  *Function Application*  
 $= \llbracket \neg \rrbracket (\llbracket Mary\ likes\ drinking\ tea \rrbracket)$   
 $= \lambda w. \neg like(m, t, w)$
- b.  $\llbracket shi\ bu\ mali\ xihuan\ he\ cha \rrbracket$  *Function Application*  
 $= \llbracket VERUM_i \rrbracket^{gvi} (\llbracket \neg Mary\ likes\ drinking\ tea \rrbracket)$   
 $= \lambda w. \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w'''. \neg like(m, t, w''') \in CG_{w''}]]$
- c.  $\llbracket ma\ shi\ bu\ mali\ xihuan\ he\ cha \rrbracket (w_0)$  *Function Application*  
 $= \llbracket Q \rrbracket (\llbracket VERUM \neg Mary\ likes\ drinking\ tea \rrbracket) (w_0)$   
 $= \lambda q [q = \lambda w. \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w'''. \neg like(m, t, w''') \in CG_{w''}]]]$   
 $\vee q = \lambda w. \neg \forall w' \in Epi_x(w) [\forall w'' \in Conv_x(w') [\lambda w'''. \neg like(m, t, w''') \in CG_{w''}]]]$   
 $= \{ \text{'it is for sure that we should add to CG that Mary doesn't like drinking tea'},$   
 $\text{'it is not for sure that we should add to CG that Mary doesn't like drinking tea'} \}$

As shown in the calculations of the  $p$ -reading in (22), a high negation in a biased yes/no question produces an unbalanced partition that addresses the question of what to do with the positive proposition (that Mary likes drinking tea). And the calculations of the  $\neg p$ -reading in (23) shows that a low negation results in a partition that is only concerned with the negative proposition.

### 3.3. Syntactic Movements

The compositional analysis presented here are based on the assumptions that the surface positions of subject DP and the *ma* particle are a result of syntactic movements. In this subsection, I discuss some evidence for these syntactic movements.

#### 3.3.1 The *ma* Particle


The sentence-final question particle *ma* poses a problem for the FINAL-OVER-FINAL CONDITION (FOFC) (Holmberg 2000). As the question particle, it ought to be the head of CP (see Chao 1968, Lin 1985, Chappell 1991, Ernst 1994, Hagstrom 2017). But given that Mandarin is a head-initial language, the appearance of the C head *ma* at a sentence-final position seems to be a violation of FOFC. There are two competing accounts that resolve this violation. One is the movement account, and the other is the ellipsis account. I discuss both solutions below, and argue in favor of the movement account.

Hagstrom (2017) points out that the literature is “essentially unanimous” in positing the *ma* particle as head of CP, where it scopes over the rest of the clause. In the movement account, the *ma* particle is base-generated at the left periphery of the sentence. As an initial head, *ma* takes as its complement the entire TP. Subsequently the TP moves to SpecCP position, deriving the surface word order, as illustrated in the neutral *ma*-question of (24) .

(24) *TP Movement:*

- a. Wulan xihuan huahua ma?  
 Ulaan<sup>5</sup> like draw Q  
 ‘Does Ulaan like to draw?’

<sup>5</sup> Ulaan is a Mongolian name, sinicized as *Wulan* in Mandarin.

b. [[Ulaan like draw<sub>t</sub>] [Q [t]]]  


An alternative analysis that also resolves the FOFC violation is one that posits the *ma* particle as the head of a clause that has undergone ellipsis. In this approach, *ma*-questions are said to be derived from alternative questions like the English *whether...or not* construction, where *ma* heads the negative alternative clause that ends up being elided (Bailey 2013). This is illustrated in (25), for the sentence in (24). The disjunction marker is silent and the *ma* particle is a negation marker.

(25) [[Ulaan like draw] OR [MA[Ulaan like draw]]]

There is typological and diachronic support for this view. According to Heine & Kuteva (2002), many languages have grammaticalized the negation marker or disjunction marker in an alternative question into a question particle. For instance, the sentence-final question particle in Estonian, *või*, is homophonous with the marker of disjunction. And in Vietnamese, *không* is simultaneously the final question particle and the negation marker. *máy* in Thai has the same feature (Bailey 2013).

From a historical perspective, Wang (1958) and Aldridge (2011) argue that the Mandarin question particle *ma* originates from a negation marker in alternative questions. According to Aldridge, in Middle Chinese, the negation marker \*/mwa/<sup>6</sup> started to appear at the end of yes/no questions, as a result of ellipsis of the negative alternative clause. The sentence-final negation marker went through grammaticalization and phonological lenition to become the question particle pronounced as /ma/ in modern Mandarin. Similar processes have also taken place in Min Chinese, or Taiwanese, where *bô* is both the question particle and the negative modal verb (R. Cheng 1977). And in Shanghaiese, a dialect of Wu Chinese, the question particle *va* and the negation marker *və* are similar in their phonetic form.

I argue that the historical account of the *ma* particle, albeit insightful, should not be mistaken for the actual grammar of modern Mandarin. For a Mandarin-learning child to acquire the ellipsis structure, she will have to discover the base structure where *ma* is the head of a negative alternative clause. And this is not possible if the child has never been exposed to data that require the analysis of *ma* as a marker of negation. Therefore I believe the TP movement account is the right analysis for the sentence-final *ma* particle. The TP, base-generated as the complement of the C head *ma*, moves to SpecCP to derive the surface word order. And this is why the question particle *ma* appears at the right periphery of the sentence, despite being an initial head.

### 3.3.2 DP Movement

To show that the subject DP's left periphery position is a result of movement from inside the TP, I draw evidence from split partivity constructions in Mandarin (Chen, to appear). (26) is a split partivity construction, where quantifiers are found in two locations within the sentence. On the left edge of the sentence, there is 'six CLAS monster', and on the right edge, 'three CLAS'.

<sup>6</sup> The asterisk is for reconstructed forms, used by historical linguists. It does not in anyway suggest ungrammaticality.

(26) *Split partivity:*

liu ge guaishou bei wo dabai le san ge  
 six CLAS monster BEI I defeat PERF three CLAS  
 ‘Of the six monsters, I have defeated three.’

(Chen, to appear)

This construction is akin to floating quantifiers seen in many languages including English, where a quantifier like *all* can appear in its base-generated position, even though the NP it modifies has already moved to a higher position (Sportiche 1988). This is shown in (27). *All* acts like a trace that indicates where the entire quantifier phrase [*all kids*] is generated and has subsequently moved to.

(27) *Floating quantifiers:*

- a. [All kids] like ice-cream.
- b. Kids [all kids] like ice-cream.

The quantifier ‘three CLAS’ in (26) works in a similar way. (28) illustrates a sentence in which the quantifier phrase ‘three CLAS monster’ is base-generated as the complement of the verb ‘to defeat’<sup>7</sup>. This quantifier phrase can move wholesale to the left edge of the sentence in a passive *bei* construction, as shown in (28). Another option is to leave the quantifier behind at its base-generated position, and to move the NP ‘monster’ only. This is seen in (28). Additionally, in Mandarin, the moved NP ‘monster’ can be modified by a different quantifier, for instance, ‘six CLAS’. This is the split partivity construction, shown in (28), as a repeat of (26).

(28) *Movement of quantifier and NP:*

- a. wo dabai le [san ge guaishou]  
 I defeat PERF three CLAS monster  
 ‘I have defeated three monsters.’
- b. [san ge guaishou] bei wo dabai le [~~san ge guaishou~~]  
 three CLAS monster BEI I defeat PERF three CLAS monster  
 ‘Three monsters have been defeated by me.’
- c. [guaishou] wo dabai le [san ge guaishou]  
 monster I defeat PERF three CLAS monster  
 ‘Monsters, I have defeated three.’
- d. [liu ge guaishou] bei wo dabai le [san ge guaishou]  
 six CLAS monster BEI I defeat PERF three CLAS monster  
 ‘Of the six monsters, I have defeated three.’

In a split partivity construction, even though the NP ‘monster’ appears near the left periphery of the sentence, it is actually base-generated at a lower position, as indicated by the location of the quantifier ‘three CLAS’. Split partivity constructions can be used as a test for the negative yes/no questions as well. In (29), the lower quantifier ‘three CLAS’ is a trace indicating that the NP ‘student’ is base-generated at a position lower than negation and VERUM. It is the subject of the TP ‘three students have seen Titanic’, even though it appears as part of the quantifier phrase on the left periphery of the biased question. And just like a passive *bei* construction, negative yes/no questions also require movement of the subject DP

<sup>7</sup> As the complement of the verb ‘to defeat’, ‘three (monsters)’ is not to its immediate right hand side. They are separated by the perfective affix *le*. This is of no concern because *le* is base-generated above the verb, and ends up to its right hand side via affix-hopping (Xiang 2014).

to the left edge of the sentence at PF. The analysis can be extended to negative yes/no questions with no split partivity as well. This is shown in (30). The subject DP ‘Ulaan’ at the left edge of the PF is base-generated at SpecTP, and undergoes movement to the positions of SpecNegP and SpecVerumP. As to the exact motivation for the movement of this subject DP, I do not have an answer at the movement. And I leave this puzzle for future research on the syntax of Mandarin.

- (29) [liu ge xuesheng] bu shi [san ge xuesheng] kan  
 six CLAS student NEG VERUM three CLAS student see

guo taitannikehao ma?  
 PERF Titanic Q

‘Isn’t it the case that of the six students, three have seen *Titanic*?’

- (30) *Subject DP movement:*

Wulan [bu shi [~~Wulan~~ xihuan huahua ma]]?

Ulaan NEG VERUM Ulaan like draw Q

‘Doesn’t Ulaan like to draw?’

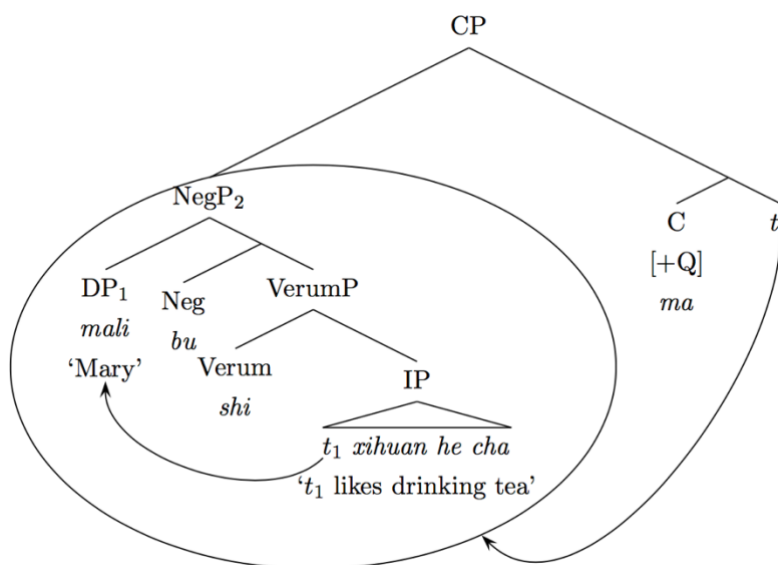
The syntactic structures of the *p*-reading question (14) and the  $\neg p$ -reading question (15) are shown in (31) and (32), respectively. The movements of the subject DP and the entire NegP or VerumP are included.

- (31) *p*-reading:

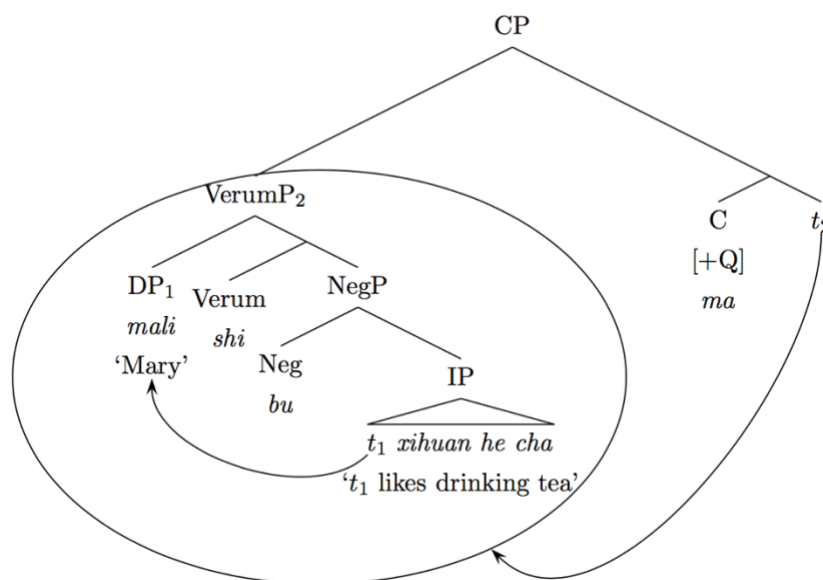
a. mali bu shi xihuan he cha ma?  
 Mary NEG VERUM like drink tea Q

‘Doesn’t Mary like to drink tea?’

b.



- (32)  $\neg p$ -reading:  
 a. mali shi bu xihuan he cha ma?  
 Mary VERUM NEG like drink tea Q  
 ‘Does Mary not like to drink tea?’  
 b.



### 3.4 High Negation

In my analysis of the  $p$ -reading of a Mandarin negative yes/no question, there is a high negation above VERUM. The existence of such a high negation found in biased questions challenges Holmberg’s (2015) statement that Mandarin does not have high negation.

According to Holmberg (2015), there is only middle negation (which corresponds to the low negation in the  $\neg p$ -reading in this paper) and low negation (predicate level negation). The pair of sentences in (33), taken from Holmberg’s book, are examples of the so-called “middle” negation (33) and the “low” negation (33).

- (33) “Middle” and “Low” negation:  
 a. Lao Cheng bu keyi qu ma?  
 Lao Cheng NEG can go Q  
 ‘Is Lao Cheng not allowed to go?’  
 b. Lao Cheng keyi bu qu ma?  
 Lao Cheng can NEG go Q  
 ‘Is Lao Cheng allowed not to go?’

“Middle” Negation

“Low” Negation  
 (Holmberg 2015)

In (33), the “middle” negation modifies the auxiliary verb *keyi* ‘can’. And in (33), the “low” negation directly modifies the verb *qu* ‘to go’. Both of these sentences are instances of low negation as defined in this paper. Because in both cases, the negation really contributes to the meaning of the preajcent, deriving the  $\neg p$  reading.

Following the template of (33), I show a question with a high negation in (34). This is a biased question with the *p*-reading, where the high negation does not form part of the prejacent.

(34) *High negation:*

Lao Cheng bu (shi) keyi qu ma?  
 Lao Cheng NEG VERUM can go Q  
 ‘Isn’t Lao Cheng allowed to go?’

***p*-reading**

Further illustrating the existence of a high negation in Mandarin is the sentence in (35). This is a sentence where all three levels of negation are present and embedded within each other. It has a felicitous interpretation that the speaker is under the impression that Lao Cheng is obligated to attend an event, and therefore not allowed to not go. She uses (35) to double-check her belief regarding Lao Cheng’s obligation. The lowest predicate negation modifies the verb ‘to go’. The middle negation modifies the auxiliary verb ‘can’. Both these two negations contribute to the meaning of the prejacent. But the highest negation, corresponding to the English ...*n*’t, scopes above the prejacent, as well as VERUM, and does not change the polarity of the prejacent.

(35) *Three embedded negations:*

Lao Cheng bu (shi) bu keyi bu qu ma?  
 Lao Cheng NEG VERUM NEG can NEG go Q  
 ‘Isn’t Lao Cheng not allowed to not go?’

It is easy to see why high negation in Mandarin is not obvious to the eye. When VERUM is silent (more on this in 3.5), the high negation occurs in the same surface position as the “middle” negation, between the subject and the auxiliary verb. The scope of a negation in this position is hard to detect. In addition, the fact that the subject of the prejacent, Lao Cheng, precedes negation, adds further complications. A high negation is usually expected to scope above the entirety of the prejacent, as seen in the English translation of (35), where *isn’t* precedes the subject. So when one is confronted with a negation that appears on the right hand side of the subject in the surface form, it is only natural to conclude that the negation is contained within the prejacent, and therefore not high. In 3.3.2, I have shown that the subject is actually base-generated below high negation, and only surfaces to its left hand side due to syntactic movement. Therefore I conclude that high negation indeed exists in Mandarin, contrary to Holmberg’s (2015) observation.

### 3.5 Silent VERUM

Even though the Mandarin *shi* is the systematically pronounced VERUM that supports Romero & Han (2004), it can still be silent in a negative yes/no question. When *shi* is omitted, the *p*-reading and the  $\neg p$ -reading become neutralized, displaying the same linear word order, as seen in (36).

- (36) mali bu xihuan he cha ma?  
 Mary NEG like drink tea Q  
 a. ‘Doesn’t Mary like to drink tea?’  
 b. ‘Does Mary not like to drink tea?’

***p*-reading**  
 **$\neg p$ -reading**

Judgingly solely by the linear word order, the utterance in (36) is ambiguous between the *p*-reading and the  $\neg p$ -reading. But this does not mean that the two readings are completely identical at PF, for they can be disambiguated by prosody. Mandarin speakers use prominence placement as a cue to differentiate between the two readings. To express the *p*-reading, the speaker can use broad focus, or place a sentential



prominence on any constituent of [like drink tea], depending on the context. This is shown in the various prosodic configurations that derives the *p*-reading of (37). But to convey that question is to be interpreted with a low negation, the sentential prominence can only be placed on the negation marker *bu*, as shown in (38). If the speaker attempts to use any of the prosodic patterns in (37) to express the  $\neg p$ -reading, the sentence will get interpreted by the listener as the *p*-reading, with a high negation, and vice versa.

(37) *Prosodic configurations of the p-reading:*

- a. mali bu [xihuan he cha] ma?  
Mary NEG like drink tea Q  
'Doesn't Mary like to drink tea?' ***p*-reading**
- b. mali bu [**XIHUAN** he cha] ma?  
Mary NEG **LIKE** drink tea Q  
'Doesn't Mary **LIKE** to drink tea?' ***p*-reading**
- c. mali bu [xihuan **HE** cha] ma?  
Mary NEG like **DRINK** tea Q  
'Doesn't Mary like to **DRINK** tea?' ***p*-reading**
- d. mali bu [xihuan he **CHA**] ma?  
Mary NEG like drink **TEA** Q  
'Doesn't Mary like to drink **TEA**?' ***p*-reading**

(38) *Prosodic configuration of the  $\neg p$ -reading:*

- mali [**BU** xihuan he cha] ma?  
Mary NEG like drink tea Q  
'Does Mary **NOT** like to drink tea?'  **$\neg p$ -reading**

As a tonal language, Mandarin cannot use pitch accent like English to express sentential prominence. Instead, prominence is expressed by expanding the pitch range of the tone (Shih 1988, Xu 1999), and lengthening the duration of the syllable (Xu 1999). For example, the negation marker *bu* has a falling tone<sup>8</sup>. And when it receives sentential prominence, as in (38), it has a larger pitch range in which to complete the fall, and lasts longer. In other words, the fall in pitch is more dramatic.

As a tonal language, Mandarin cannot use pitch accent like English to express sentential prominence. Instead, prominence is expressed by expanding the pitch range of the tone (Shih 1988, Xu 1999), and lengthening the duration of the syllable (Xu 1999). For example, the negation marker *bu* has a falling tone. And when it receives sentential prominence, as in (37), it has a larger pitch range in which to complete the fall, and lasts longer. In other words, the fall is more dramatic.

The bracketed constituents in (37) and (38) form the prejacent of each question, which scopes under the silent VERUM. It can be observed that it is only constituents within the scope of VERUM that can receive sentential prominence. Therefore high negation, which scopes above VERUM, can never be pronounced with prominence. Whenever a negation marker *bu* has sentential prominence in a question, the listener will infer that it is a low negation. By tuning into whether negation has prominence or not, speakers of Mandarin can disambiguate between the two readings even when the VERUM operator *shi* is silent.

<sup>8</sup> *bu* can also surface as a rising tone, when it precedes another syllable of falling tone. This is a lexically-restricted tone sandhi process.

### 3.6 Summary

Mandarin has a VERUM operator *shi* that is spelled out at PF. It displays a scoping relation with negation that is predicted by Romero & Han (2004). When negation *bu* scopes above VERUM *shi*, a Mandarin negative yes/no question has the *p*-reading. And when negation is below VERUM, the question is interpreted with the  $\neg p$ -reading. The VERUM operator *shi* can also be optionally omitted in a negative yes/no question. And when it is silent, its position at LF, relative to negation, is cued by sentential prominence. Only the low negation can receive sentential prominence.

It is also shown that Mandarin has high negation, when a negative yes/no question is interpreted with the *p*-reading, which disproves Holmberg's (2015) generalization that the language has no high negation.

Some discrepancy between PF and LF of Mandarin negative yes/no questions can be accounted for by syntactic movements. The subject DP moves from its base-generated position inside TP to the left periphery of the sentence, preceding both negation and VERUM. And the head of CP question particle *ma* is found at the right periphery of the sentence, not because it is a violation of FOFC, but simply because its complement has moved to SpecCP, leaving it as a sentence-final particle.

### 4. Assertion Readings

It has been demonstrated that the presence of a VERUM operator can account for the two readings of a negative yes/no question in Mandarin. In this section, I show that VERUM can provide insight into an unexpected assertion reading of Mandarin negative yes/no questions as well.

The *p*-reading question, with high negation, in (39), ends in a high boundary tone, or H% (per Beckman & Elam's (1997) ToBI transcriptions). The string-identical sentence in (39), on the other hand, ends in a low boundary tone, or L%. And now the sentence has an unexpected assertion reading, asserting that Ulaan wants to learn drawing.

- (39)
- |    |  |    |                                  |
|----|--|----|----------------------------------|
| a. | Wulan bu (shi) xiang xue huahua ma?    | H% |                                  |
|    | Ulaan NEG VERUM want learn draw Q      |    |                                  |
|    | 'Doesn't Ulaan want to learn drawing?' |    | <b><i>p</i>-reading question</b> |
|    |  |    |                                  |
| b. | Wulan bu (shi) xiang xue huahua ma.    | L% |                                  |
|    | Ulaan NEG VERUM want learn draw Q      |    |                                  |
|    | 'Ulaan wants to learn drawing.'        |    | <b>Ghost NEG assertion</b>       |

The ghost NEG assertion is so named for the "ghostly" nature of its high negation. One would expect (39) to assert  $\neg p$  (that Ulaan does not want to learn drawing), but it asserts *p* instead. The negation does not seem to contribute to the meaning of the sentence. And when negation is left out, as shown in the dogmatic assertion of (40), the polarity of the assertion remains the same. (40), without negation, also asserts *p*.

- (40)
- |  |                                  |    |                           |
|--|----------------------------------|----|---------------------------|
|  | Wulan (shi) xiang xue huahua ma. | L% |                           |
|  | Ulaan VERUM want learn draw Q    |    |                           |
|  | 'Ulaan wants to learn drawing.'  |    | <b>Dogmatic assertion</b> |

Dogmatic assertion is the name Chao (1968) gave to positive assertions made with a sentence-final *ma* particle<sup>9</sup>. These utterances tend to convey a condescending, lecturing tone, hence the name “dogmatic”. The ghost NEG assertion is equally guilty of betraying the speaker’s condescending attitude at times. In this section, I propose a tentative analysis for the two assertions ending in a *ma* question particle: both ghost NEG assertions and dogmatic assertions are self-answering questions with a positive answer component. And I argue it is by engaging a VERUM operator, that a uniform analysis for these two *ma*-assertions is possible. In 4.1, I briefly discuss the parallel between the question/assertion contrast in Mandarin negative yes/no questions and English tag questions. I introduce how yes/no questions are answered in Mandarin 4.2. In 4.3, a tentative account of *ma*-assertion readings as self-answering questions is presented. 4.4 is a brief discussion of the 4-way readings of a negative yes/no question.

#### 4.1 English Tag Questions

The difference between the pair of sentences in (39) is akin to that between the two intonational configurations of *isn't it* TAG QUESTIONS (TQ) in English. Ladd (1981) noted that an English TQ can end with either a rising intonation or a falling intonation. (41) is a rising intonation TQ. It is similar to a *p*-reading question. The speaker is seeking confirmation for her bias for *p* (that it is raining) (Reese & Asher 2009). (41), on the other hand, ends with a falling intonation on the tag, and Ladd uses a period to mark its difference from the rising intonation TQ. Here, the speaker is much more confident about her bias for *p*. And instead of seeking confirmation, the speaker is actually seeking acknowledgement of her bias (Reese & Asher 2009). The two utterances differ in the degree of certainty the speaker has about her bias. The rising intonation corresponds to some degree of uncertainty, whereas the falling intonation signals that there is no uncertainty on the speaker’s part, to the point that it is as good as an assertion for *p*.

(41) *English tag questions:*

- a. Context: *Two people share an office in a windowless basement. The speaker is heading out to get lunch. She remembers that she has seen the weather report saying that it will rain today. To double-check that it is indeed raining, she asks the co-worker:*

It’s raining, isn’t it?

**Rising intonation TQ**

- b. Context: *Now the two people are in an office with windows. The speaker’s co-worker says the first thing she is going to do when she gets home is to water her flowers in the garden. The speaker, looking at the pouring rain outside the window, finds her co-worker’s plan perplexing. So she says to the co-worker:*

It’s raining, isn’t it.

**Falling intonation TQ**

(Scenarios inspired by Gunlogson 2002)

The *p*-reading question of Mandarin, which ends in a high boundary tone, corresponds to the rising intonation TQ in English. And the ghost NEG assertion with its low boundary tone, is similar to the English falling intonation TQ. In the rest of the paper, I will use English TQ as translations for the relevant Mandarin sentences.

It is no surprise that Mandarin high negation question constructions pattern with English TQs. Ladd (1981), as well as Romero & Han (2004), have all noticed a similarity between English biased questions and TQs. Ladd suggested that the semantics of rising intonation TQ might be similar to that of the

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<sup>9</sup> Chao (1968) transcribed the assertion *ma* particle as *me* to differentiate it from the question particle, but he stated that the two particles are phonetically the same.

outside-NEG question. Romero & Han claim that their VERUM operator analysis can also be extended to rising intonation TQs. In neither of these works was a compositional analysis for English TQ proposed. I do not plan to offer an account for English TQ in this paper, but I hope the discussion of Mandarin ghost NEG assertion can offer insight into the study of English falling intonation TQ, which I leave for future research.

#### 4.2 Answers to A Yes/No Question

A *ma*-question in Mandarin can elicit 3 types of responses. I illustrate how they are used by speakers with the  $\neg p$ -reading question in (42). A question with a low negation chose because this is where languages tend to show their different patterns in answers (see Holmberg 2015, Roelofsen & Farkas 2015). Three pairs of responses are listed in

- (42) -wulan **BU** xiang xue huahua ma?  
 Ulaan **NEG** want learn draw Q  
 ‘Does Ulaan not want to learn drawing?’  **$\neg p$ -reading question**
- (43) ‘Correct’ responses:  
 a. -dui.  
 correct  
 ‘Correct. (She doesn’t)’  
 b. -bu dui.  
 NEG correct  
 ‘Incorrect. (She does.)’
- (44) *VERUM* responses:  
 a. -shi.  
 VERUM  
 ‘Yes. (She doesn’t.)’  
 b. bu shi.  
 NEG VERUM  
 ‘No. (She doesn’t.)’
- (45) *Main verb* responses:  
 a. -xiang  
 want  
 ‘Yes, she wants to.’  
 b. -bu xiang  
 NEG want  
 ‘No, she doesn’t want to.’

The first pair of responses are (43) *dui* ‘correct’ and (b) *bu dui* ‘incorrect’. They directly address the truthfulness of the negative prejacent, and are not sensitive to the polarity of the prejacent itself. In other words, a positive answer (43) in response to a question with negative prejacent suggests that the speaker agrees with the prejacent. And this can be seen in the follow up *she doesn’t*, listed in parenthesis.

A second way to answer the question is by employing *shi*, as in (44) *shi*, for ‘yes’, and (b) *bu shi*, for ‘no’. They pattern with *dui* responses, in that they address the truthfulness of the prejacent, and does not heed the polarity of the prejacent itself. This is the pair of responses that are of interest to the analysis of *ma*-assertions.

A final way to respond to the question is by repeating the main verb, as in (45) ‘want’, or with added negation ‘not want’ as in (45). Here, the responses are sensitive to the polarity of the prejacent itself. To agree with the negative prejacent in the question, the speaker uses (45) *bu xiang* ‘not want’, with negation built in.

### 4.3 Self-Answering Questions

I argue that the ghost NEG assertion is a self-answering question, where the question component is a biased question with the *p*-reading, and the answer component is a positive VERUM answer like the one in (44). The analysis I present here is a tentative one.

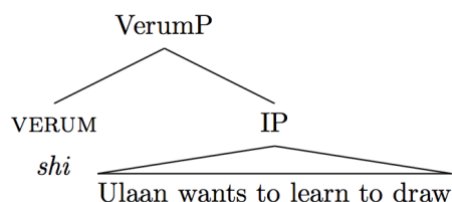
Essentially, only the question component of a ghost NEG assertion gets pronounced. And its answer component, a positive VERUM answer that says FOR-SURE-CG<sub>x</sub>*p* is completely elided, its presence only cued by the low boundary tone.

A low boundary tone is exactly the opposite of a high boundary tone, which is a universal indicator of a lack of speaker commitment (see Gussenhoven 1984, Steedman 2000, Gunlogson 2003). Chuang & Fon (2016) have found that higher boundary tones are associated with a greater degree of incredulity in Mandarin questions. Therefore I take it that a low boundary tone indicates certainty from the speaker.

The certainty conveyed by the low boundary tone coincides with the meaning of VERUM. Even though the low boundary tone itself is semantically vacuous, it is a prosodic cue for the presence of a VERUM answer, which can be elided. The argument of this answer VERUM operator is a proposition, and it has to have a unique antecedent in the context for it to be elided (Roelofsen & Farkas 2015). In the question component of the ghost NEG assertion, only the positive proposition *p* is ever under discussion. It appears on both sides of the partition {FOR-SURE-CG<sub>x</sub>*p*, ¬FOR-SURE-CG<sub>x</sub>*p*}. And its negative alternative ¬*p* is never mentioned. So if the argument of the answer VERUM were ¬*p*, it would not be licensed to be elided, for it has no antecedent in the context. Therefore the silent argument of VERUM is *p*.

The structure of an elided VERUM answer is shown in (46). This is the answer component in both the ghost NEG assertion of (39) and the dogmatic assertion of (40). And this is how a uniform meaning can be derived for the two sentences, despite a difference in the presence of negation.

(46) *Elided VERUM answer:*



In addition to the silent VERUM answer, my analysis for the *ma*-assertions also rely on the partition created by the question component, as well as the VERUM operator within the question component. In

4.3.1, I argue against an alternative analysis with no question component. And in 4.3.2, I show that VERUM is a necessary part of the question component.

### 4.3.1 The Question Component

An alternative way to derive a positive reading from the ghost NEG assertion is to do so without including the question component. In this approach, there is a silent negation higher up than the pronounced ghost negation. It takes in the pronounced  $\neg$ VERUM  $p$  as its argument and reverses its polarity, producing VERUM  $p$  as the assertion reading.

But this account runs into problems when the positive dogmatic assertion is taken in to consideration. If a silent higher negation is present in the ghost NEG assertion to flip the polarity, then surely it ought to be present in the positive dogmatic assertion as well. The two types of assertions have the same intonation, and share the same sentence-final *ma* particle. A uniform account for both constructions is surely to be preferred. And if it is indeed the case that a silent negation is also found in the dogmatic assertion, then the sentence would be interpreted with a negative meaning. The pronounced VERUM  $p$  would be modified into  $\neg$ VERUM  $p$  by the silent negation, contrary to what the sentence actually means.

In fact, any account of the ghost NEG assertion that does not include a question component has this problem. The presence of negation in the ghost NEG assertion and the lack of one in the dogmatic assertion would always lead the two constructions to have opposite polarities in their readings.

What the question component contributes to the interpretation of the two *ma*-assertions is a level playing field. The question morpheme in both the ghost NEG assertion and the dogmatic assertion, despite taking in arguments with different polarities, creates the same partition. This is shown in Table 2. In a ghost NEG assertion, the argument Q takes in is the negative  $\neg$ VERUM  $p$ , whereas it is the positive VERUM  $p$  in the dogmatic assertion. Yet the partition created, {FOR-SURE-CG<sub>x</sub> $p$ ,  $\neg$ FOR-SURE-CG<sub>x</sub> $p$ } is identical across the two constructions.

ASSERTION TYPE	QUESTION COMPONENT	PARTITION	ANSWER COMPONENT
Ghost NEG Assertion	Q[ $\neg$ VERUM $p$ ]	{FOR-SURE-CG <sub>x</sub> $p$ , $\neg$ FOR-SURE-CG <sub>x</sub> $p$ }	FOR-SURE-CG <sub>x</sub> $p$
Dogmatic Assertion	Q[VERUM $p$ ]	{FOR-SURE-CG <sub>x</sub> $p$ , $\neg$ FOR-SURE-CG <sub>x</sub> $p$ }	FOR-SURE-CG <sub>x</sub> $p$

**Table 2:** Question and answer components of *ma*-assertions

### 4.3.2 The Role of VERUM

It is not only the question component that is crucial in providing a uniform account for the two *ma*-assertions, the VERUM operator in the question component is necessary as well. The unexpected assertion readings of Mandarin negative yes/no questions thus provide additional support for Romero & Han's (2004) VERUM account.

If the question component of a *ma*-assertion does not contain VERUM, it would result in a partition of the shape:  $\{p, \neg p\}$ . Recall that for the argument in the answer component to be elided, a unique antecedent

must be provided by the context. Here, the partition  $\{p, \neg p\}$  creates two antecedents with opposite meanings, and neither is unique. Therefore the proposition argument of the answer VERUM is not licensed to be elided, otherwise ambiguity between  $p$  and  $\neg p$  would ensue.

One might point out that in an alternative analysis where there is no VERUM in the question component, there should not be any VERUM in the answer component either. And that it could be stipulated in the grammar that the default answer to a yes/no question, if unpronounced, is a positive one. This would indeed derive the same positive meaning  $p$  for both the ghost NEG assertion and the dogmatic assertion by default, ignoring the negation in the question component of the ghost NEG assertion.

However, the default positive answer account runs into problems with the  $\neg p$ -reading assertion, seen in (47). This is the assertion counterpart of the string-identical  $\neg p$ -reading question (47). The contrast between the two constructions is parallel to that between the  $p$ -reading question (39) and the ghost NEG assertion (39). The  $\neg p$ -reading assertion of (47) is essentially a dogmatic assertion with a low negation as part of its prejacent.

- (47)
- |    |  |           |       |      |        |      |    |  |
|----|--|-----------|-------|------|--------|------|----|--|
| a. | Wulan (shi)                                      | <b>BU</b> | xiang | xue  | huahua | ma?  | H% |  |
|    | Ulaan  | VERUM     | NEG   | want | learn  | draw | Q  |  |
|    | 'Ulaan doesn't want to learn drawing, does she?' |           |       |      |        |      |    | <b><math>\neg p</math>-reading question</b>  |
|    |  |           |       |      |        |      |    |  |
| b. | Wulan (shi)                                      | <b>BU</b> | xiang | xue  | huahua | ma.  | L% |  |
|    | Ulaan  | VERUM     | NEG   | want | learn  | draw | Q  |  |
|    | 'Ulaan doesn't want to learn to draw, does she.' |           |       |      |        |      |    | <b><math>\neg p</math>-reading assertion</b> |

If there is no VERUM operator in the LF of a *ma*-assertion, then the question component of (47) would create a partition  $\{p, \neg p\}$ . And if the default silent answer is a positive one, then the sentence ought to have a positive reading that asserts  $p$ . But as can be seen in the translation of (47), the sentence asserts the opposite,  $\neg p$ .

However, if VERUM is included in both the question component and the answer component of the  $\neg p$ -reading assertion, the correct reading can be derived. First, the question morpheme takes in VERUM $\neg p$  as its argument, and outputs the partition  $\{\text{FOR-SURE-CG}_x\neg p, \neg\text{FOR-SURE-CG}_x\neg p\}$ , just like in a  $\neg p$ -reading question. The answer component is headed by VERUM, as cued by the low boundary tone. The argument of the answer VERUM operator is  $\neg p$ , which has a unique antecedent in the context, and therefore can be elided. Thus the answer component of a  $\neg p$ -reading assertion is VERUM $\neg p$ , which signifies that 'it is for sure we should add  $\neg p$  to the CG'.

In order to provide a uniform account for all three *ma*-assertions: ghost NEG assertion, dogmatic assertion, and  $\neg p$ -reading assertion, both the question component and the VERUM operator are indispensable.

#### 4.4 The 4 Readings of A Negative Yes/No Question

The optionality of the VERUM operator *shi* at PF, as well as the two boundary tones, makes it possible that the same surface string in (48) can have 4 different readings, as listed below.

- (48) lili bu yang mao ma  
Lily NEG keep cat Q
- |   |                    |           |  |
|---|--------------------|-----------|--|
| a. ‘Doesn’t Lily keep a cat?’           | <i>Broad focus</i> | <i>H%</i> | <b><i>p</i>-reading question</b>                   |
| b. ‘Does Lily not keep a cat?’          | <b><i>NEG</i></b>  | <i>H%</i> | <b><math>\neg</math><i>p</i>-reading question</b>  |
| c. ‘Lily keeps a cat, doesn’t she.’     | <i>Broad focus</i> | <i>L%</i> | <b>Ghost <i>NEG</i> assertion</b>                  |
| d. ‘Lily doesn’t keep a cat, does she.’ | <b><i>NEG</i></b>  | <i>L%</i> | <b><math>\neg</math><i>p</i>-reading assertion</b> |

The 4 readings are disambiguated by two prosodic cues: sentential prominence and boundary tone. A negation is interpreted to be low when it has sentential prominence. And when there is no prominence on negation, it is parsed to be high, since a high negation outside the scope of the silent VERUM operator cannot receive prominence. The other prosodic cue, boundary tone, indicates whether a sentence is a real question or an assertion. A high boundary tone corresponds to a real question. And a low boundary tone points to an assertion, or self-answering question.

When the sentence is uttered with a broad focus and a high boundary tone, as in (48), it is interpreted as a *p*-reading question. In (b), the sentential prominence falls on the negation marker *bu*. And with a high boundary tone, the sentence is read as a  $\neg$ *p*-reading question. In the ghost *NEG* assertion reading of (c), the sentence has broad focus, but ends in a low boundary tone. And finally in (d), the low boundary tone utterance places a sentential prominence on negation, and is therefore a  $\neg$ *p*-reading assertion.

#### 4.5 Summary

The unexpected positive assertion reading of a Mandarin negative yes/no question can be accounted for by a self-answering question analysis. The ghost *NEG* assertion is composed of a *p*-reading question with a high negation, and an elided positive VERUM answer cued by the low boundary tone. The same self-answering structure can also account for the positive dogmatic assertion. The question component ensures that the two *ma*-assertions can create the same partition, despite their difference in the polarity at PF. The presence of the VERUM operator in the question component makes sure that only *p* features in the partition. The unique antecedent *p* licenses the argument in the answer component to be elided. And *p* is added to the CG.

#### 5. Another Negation: *mei*

The discussion on negative yes/no questions up until now has focused on the negation marker *bu*, but there is another negation marker in Mandarin, *mei*, which can only be interpreted with the  $\neg$ *p*-reading. I argue that *mei* provides further support for the VERUM and negation scoping analysis. Without VERUM, there is no way to account for the different behaviors of the two negation markers *bu* and *mei* in a negative yes/no question.

*mei* is used to negate relations of possession (49) or perfective aspect (50). In other words, it is used before ‘have’, to express meanings equivalent to *don’t have...* and *haven’t done...* in English. *bu*, on the other hand, is used alongside bare verbs, modals (Cheng, Huang & Tang 1996), and statives (McCawley 1995). The two negation markers are in complementary distribution. (49) and (50) show that *bu* cannot be used alongside ‘have’ like *mei*.



(49) *mei* negates relations of possession:

- a. wo mei you shoubiao  
I MEI have watch  
'I don't have a watch.'
- b. \*wo bu you shoubiao  
I BU have watch

(50) *mei* negates perfective aspect:

- a. wo mei zhaodao shoubiao  
I MEI find watch  
'I haven't found the watch.'
- b. \*wo bu zhaodao shoubiao  
I BU find watch

When *mei* appears in a negative yes/no question, only the  $\neg p$ -readings are available. (51) cannot be interpreted as a  $p$ -reading question, no matter the location of sentential prominence. And (51) can only elicit the  $\neg p$ -reading assertion.

(51) *mei* only has  $\neg p$ -readings (possession relations):

- a. yuehan mei you biyeheng ma? H%  
John MEI have diploma Q  
\*'Doesn't John have a diploma?' **\* $p$ -reading question**  
'Does John not have a diploma?'  **$\neg p$ -reading question**
- b. yuehan mei you biyeheng ma. L%  
John MEI have diploma Q  
\*'John has a diploma, doesn't he.' **\*Ghost NEG assertion**  
'John doesn't have a diploma, does he.'  **$\neg p$ -reading assertion**

In (51), *mei* is used in possession relations. When it is used to negate perfective aspect, it also cannot generate  $p$ -readings, as shown in (52).

(52) *mei* only has  $\neg p$ -readings (perfective aspect):

- a. mali mei (you) qu kaoshi ma? H%  
Mary MEI PERF go exam Q  
\*'Didn't Mary go to the exam?' **\* $p$ -reading question**  
'Did Mary not go to the exam?'  **$\neg p$ -reading question**
- b. mali mei (you) qu kaoshi ma. L%  
Mary MEI PERF go exam Q  
\*'Mary went to the exam, didn't she.' **\*Ghost NEG assertion**  
'Mary didn't go to the exam, did she.'  **$\neg p$ -reading assertion**

I argue that *mei* sentences can only have  $\neg p$ -readings because it cannot be used to modify VERUM. In other words, it is always lower than VERUM. In (51), *mei* modifies the main verb 'to have', therefore it is inside the prejacent and lower than the silent VERUM. In (52), *mei* modifies aspect, which is also part of the prejacent. This analysis is supported by the location of VERUM when it is pronounced alongside *mei* in a sentence. As shown in (53) and (54), VERUM can only precede *mei*, but not follow it. In other words, *mei* is always lower than VERUM.

- (53) *mei* is always lower than *VERUM* (possession relation):
- a. yuehan shi mei you biyeheng ma? H%  
 John VERUM MEI have diploma Q  
 ‘Does John not have a diploma?’
- b. \*yuehan mei shi you biyeheng ma? H%  
 John MEI VERUM have diploma Q
- (54) *mei* is always lower than *VERUM* (perfective aspect):
- a. mali shi mei (you) qu kaoshi ma? H%  
 Mary VERUM MEI PERF go exam Q  
 ‘Did Mary not go to the exam?’
- b. \*mali mei shi (you) qu kaoshi ma? H%  
 Mary MEI VERUM PERF go exam Q

## 6. Discussion

In this section, I discuss a few remaining issues and suggest some areas for future research. The first point of discussion is the status of the *ma* particle.

Even though the sentence-final particle *ma* has identical pinyin transcription in both question and assertion readings, this is not the case in written Chinese. The *ma* particle is written with two different Chinese characters, depending on the boundary tone. This is shown in Table 3.

PHONOLOGICAL REPRESENTATION	LEXICAL TONE	BOUNDARY TONE	TRADITIONAL CHINESE	SIMPLIFIED CHINESE
/ma/	Neutral tone	H%	嗎	吗
/ma/	Neutral tone	L%	嘛	嘛

**Table 3:** Orthography of the *ma* particle

The contrast in orthography has led many scholars to draw the conclusion that there are two *ma* particles: one as a question particle, and the other as an assertion particle (see Liu 1964, Chao 1968, Liang et al. 1982, Kubler & Ho 1984, Chappell 1991, Paul & Pan 2016). But a contrast in orthography does not necessarily correspond to a difference in their semantic meaning. A good example is the genderless pronouns of Mandarin, *ta*. It has two different orthographical forms when appearing in writing for the two genders. But in the spoken language, there is no gender distinction for pronouns, which goes to show that the orthography is not an accurate representation of the actual grammar.

There have been a few attempts to analyze the two orthographical *ma* forms as the same *ma* particle (see B. Li 2006, H. Fang & Hengeveld submitted). But these accounts usually involve defining *ma* as something other than the question particle. The analysis for *ma*-assertions proposed in this paper, on the other hand, not only includes a uniform *ma* particle throughout question and assertion constructions, but also does not deviate from the consensus that it is a question particle. This is achieved by treating *ma*-assertions as self-answering *ma*-questions.

It is worth pointing out that the low boundary tone *ma* particle is also used in non-assertion constructions like imperatives and contrastive topic. Whether the single *ma* question particle approach can be extended to these constructions as well, is a question for future research.

Another remaining puzzle is the role of negation in the two *p*-readings. It is true that the ghost NEG assertion has the same meaning as the dogmatic assertion, but it is not clear why the ghost NEG assertion is chosen by the speaker when a dogmatic assertion would suffice. In other words, if the negation-less assertion can do the same job, then why bother with negation at all? This is not a puzzle unique to Mandarin ghost NEG assertions, but also to any biased negative questions. Romero & Han's (2004) VERUM analysis can indeed make sure the high negation does not interfere with the positive bias, but it does not explain why the negation is inserted in the first place.

One account of biased questions that can justify the appearance of negation in the *p*-reading has been proposed by Krifka (2017). In this analysis, a biased question with high negation should be interpreted as a request to the addressee for them to refrain from asserting the bias *p*. It is argued that when the speaker asks a biased question, she is not really seeking information on whether *p* or  $\neg p$  is true. Instead, she wishes to find out whether the addressee agrees with her belief *p*. And counterintuitively, by requesting the addressee to refrain from asserting *p*, the speaker achieves the desired result. Because only when the addressee believes *p* as well, will they reject this request. And the role of negation in this highly complex speech act is to express the meaning of "refrain". This is a mechanism that works well for *p*-reading questions, but it cannot be easily adapted to account for the ghost NEG assertion in Mandarin.

## 7. Conclusion

This paper presents data from Mandarin negative yes/no questions that lend support to Romero & Han's (2004) VERUM operator account for biased questions. The operator's absence from English PF has led many to believe that it is a dubious creation (see Holmberg 2015). But Mandarin negative yes/no questions are evidence that VERUM can be systematically spelled out at PF. Appearing as *shi*, VERUM scopes below negation to derive the *p*-reading, and it scopes above negation to elicit the  $\neg p$ -reading. The scoping between negation and *shi* observed at Mandarin PF is exactly what Romero & Han (2004) predicts for their silent VERUM operator at English LF. The high negation question in Mandarin also has an unexpected assertion reading when it ends in a low boundary tone. This is the puzzling ghost NEG assertion which asserts a positive proposition despite the presence of negation. By incorporating VERUM, one can provide a uniform account for the ghost NEG assertion and the dogmatic assertion. The two *ma*-assertions, despite the contrast in their polarities at PF, both makes a positive assertion. A tentative analysis is proposed for these constructions, in which *ma*-assertions are treated as self-answering questions. They contain a pronounced question component that includes VERUM, and an elided VERUM answer component cued by the presence of the low boundary tone. VERUM can also be omitted in questions and assertions in Mandarin, which results in 4 different readings for one string-identical negative yes/no question construction. The 4 readings are cued by two prosodic cues. Sentential prominence indicates the scoping of negation, and boundary tone disambiguates between questions and assertions. Finally, it is shown that a second negation marker in the language, *mei*, can only be interpreted with  $\neg p$ -readings. This is because unlike *bu*, *mei* cannot scope above VERUM, which adds further support for the VERUM and negation scoping analysis.

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