Mandarin Chinese has a variety of ways to construct polar questions. The goal of this paper is to propose a unified structure to account for well-formed polar questions, and at the same time exclude ill-formed sentences. In Section 1, I survey some of the more common types of polar questions in Mandarin, beginning with \textit{ma}-questions (§1.2) and \textit{bu}-questions (§1.2), then the dialectally restricted \textit{ke}-questions (§1.3). In Section 2, I discuss observations made of the presented data (§2.1), then the structural frame I propose to account for \textit{ma}- and \textit{bu}-questions as well as how they may be derived (§2.2), and finally some predictions made by this analysis (§2.3). Lastly in Section 3, I will show how \textit{ke}-questions fit into the structure established for \textit{ma}- and \textit{bu}-questions.

1 Data

In this section, I will present minimal sets of polar questions with various different constructions. Questions may differ slightly in their meaning interpretations, but the focus will be on their syntactic similarities (and dissimilarities). I in addition to discussing the questions themselves, I will also provide possible answers so that the reader can follow up, though this will also not be expanded upon in the analysis.

1.1 \textit{ma}-questions

I begin with polar questions in which the particle \textit{ma} is the main question forming component. Three such examples are given in (1) below.

(1) a. ni-men (bu) xiang chi-fan ma?
   you-PL (NEG) want eat Q
   ‘Do you want to eat?’

b. ni-men <shi> (bu) xiang chi-fan <shi> ma?
   you-PL <COP> (NEG) want eat <COP> Q
   ‘Is it that you (don’t) want to eat?’

c. ni-men <bu-shi> xiang chi-fan <bu-shi> ma?
   you-PL <NEG-COP> want eat <NEG-COP> Q
   ‘Isn’t it that you want to eat?/You want to eat, isn’t it?’
In the sentence in (1-a), the ma particle occurs sentence-finally, and the sentence can be negated by a preverbal bu particle. This form is most typical of northern Mandarin dialects and is the neutral polar question in the standard variety. Acceptable answers to this question include wo-men (bu) xiang chi-fan ‘We (don’t) want to eat.’, wo-men xiang (ah) ‘We want.’, (bu) xiang (ah) ‘(Don’t) want.’, and hao (ah/bah) ‘Okay.’. (1-b) shows that the copula shi can be added to the sentence either preverbally or just before the sentence-final ma. These sentences can also be negated by addition of the negation particle bu. Also note the slightly marked meaning. Such questions can be answered with wo-men shiFOC xiang chi-fan ‘Yes, we want to eat.’, shi ‘Yes.’, xiang ‘Want.’, and also dui/mei cuo ‘Correct/not wrong.’. The final ma-type question is given in (1-c). This last example is formed by the addition of a negated copula to the neutral question in a preverbal position or just before sentence-final ma. One might answer this polar question with wo-men shiFOC xiang chi-fan (ah) ‘Yes, we want to eat.’, shi (ah) ‘Yes.’, and xiang (ah) ‘Want.’. The answers for (1-b) and (1-c) are very similar.

1.2 bu-questions

The next set of sentences are polar questions in which the negation particle bu is the main question forming component.

(2)  
   a.  ni-men xiang chi-fan bu?  
       you-PL want eat NEG  
       ‘Do you want to eat?’  
   b.  ni-men xiang-bu-xiang  
       you-PL want-NEG-want eat  
       ‘Do you want or not want to eat?’  
   c.  <shi-bu-shi>  ni-men <shi-bu-shi>  xiang chi-fan <shi-bu-shi>?  
       <COP-NEG-COP> you-PL <COP-NEG-COP> want eat <COP-NEG-COP>  
       ‘Is it or not that you want to eat?’

The question in (2-a) parallels the neutral question in (1-a) since i) the main question-forming element bu also occurs sentence-finally, ii) there are no meaning differences between the two, and iii) they can be answered by the same responses. The question in (2-b) is typically referred to as a Verb-not-Verb type question. In this type of question, the verb appears on either side of the negation particle bu. In some dialects where ma-questions are not used, V-not-V questions act as the neutral question form. Answers to this questions are identical to those for (1-a) and (2-a) except for hao (ah) ‘Okay.’, which is not a well-formed option in this case. The sentence in (2-c) is similar to the one in (2-b) since it also involves bu being straddled by a verbal element. However, I include it as a separate example, since when the verbal element is the copula shi, the V-not-V construction can occur sentence-initially, sentence-medially, and sentence-finally. Acceptable answers to this question include wo-men shiFOC xiang chi-fan ‘Yes, we want to eat.’ and shi ‘Yes.’, but not wo-men xiang chi-fan ‘We want to eat.’ or xiang ‘Want.’.

1 The bracketed ah (also bah, and later mah and neh) have no meaning. I include them because in some cases, they make the answers sound more natural, probably for phonological reasons.


1.3 *ke*-questions

The final set of sentences presented here are questions in which the *ke* particle is the main question-forming component. The use of this particle for most Mandarin speakers is archaic, but it has been preserved in some dialects such as Kunming, a Southwestern variety of Mandarin.

(3)  a. ni-men ke xiang chi-fan?
   you-PL Q want eat
   ‘Do you want to eat?’

b. <ke-shi> ni-men <ke-shi> xiang chi-fan <ke-shi>?
   <Q-COP> you-PL <Q-COP> want eat <Q-COP>
   ‘Is it that you want to eat?’

In dialects such as Kunming, the sentences of the type in (3-a) are used as the neutral polar question, where the question particle *ke* occurs after the subject and before the verb. Answers to this question may include *wo-men xiang chi-fan* ‘We want to eat.’, *xiang* ‘Want.’, and *hao* (mah) ‘Okay.’. In (3-b), the question is formed with *ke* and an additional copula *shi*, which together can occur sentence-initially, sentence-medially, and sentence-finally much like the example in (2-c). One might answer this question with *wo-men shi_{FOC} xiang chi-fan* ‘Yes, we want to eat.’ and *shi* (neh) ‘Yes.’, but not *xiang* ‘Want.’ or *hao* (mah) ‘Okay.’.

2 Analysis

In this section, I focus on the analysis of the *ma*- and *bu*-questions given in (1) and (2) respectively since they are used in Standard Mandarin. (See §3 for analysis of *ke*-questions.).

First, I outline some syntactic observations made of the examples above. I then propose an analysis that accounts for these question forms and explain how each sentence type can be structurally derived. Lastly, I discuss some predictions that my analysis makes and whether they hold true.

2.1 Observations

Before I present my proposed syntactic structure, it is important to provide some motivation for the direction of my analysis.

Firstly, as we have seen in Section 1, components in many of the question forms can have multiple positions, and, all other things being equal, the change in position of these components do not result in meaning changes between sets of sentences. This suggests that there is a single underlying structure for each set of sentence and that surface forms are derived from movement, many of which are optional. The forms with *shi-bu-shi* and *xiang-bu-xiang*, though similar, differ on their movement possibilities. That is, while *shi-bu-shi* can have multiple positions (see §1.2), *xiang-bu-xiang* can only occur sentence-medially.

(4)  a. *xiang-bu-xiang ni-men chi-fan?
    want-NEG-want you-PL eat
    ‘Do you want or not want to eat?’
Examples in (4) show that questions with *xiang-bu-xiang* in sentence-initial and sentence-final positions are ill-formed. Thus, the copula must have a different status compared to other verbs.

An additional source of evidence for differentiating the two V-not-V type questions comes from their position relative to the floated quantifier *dou*. Observe the examples in (5).

\[
\begin{align*}
(5) \quad a. & \quad \text{ni-men dou xiang-bu-xiang chi-fan?} \\
& \quad \text{you-PL all want-NEG-want eat} \\
& \quad \text{‘Do you all want to eat?’}
\end{align*}
\]

\[
\begin{align*}
b. & \quad *\text{ni-men xiang-bu-xiang dou chi-fan?} \\
& \quad \text{you-PL want-NEG-want all eat} \\
& \quad \text{‘Do you all want to eat?’}
\end{align*}
\]

\[
\begin{align*}
c. & \quad \text{ni-men shi-bu-shi dou xiang chi-fan?} \\
& \quad \text{you-PL COP-NEG-COP all want eat} \\
& \quad \text{‘Is it that you all want to eat?’}
\end{align*}
\]

\[
\begin{align*}
d. & \quad *\text{ni-men dou shi-bu-shi xiang chi-fan?} \\
& \quad \text{you-PL all COP-NEG-COP want eat} \\
& \quad \text{‘Is it that you all want to eat?’}
\end{align*}
\]

From the sentences in (5-a) and (5-b), we can see that *xiang-bu-xiang* must occur to the right of *dou*. Sentences in (5-c) and (5-d) on the other hand show that *shi-bu-shi* must occur to the left of *dou*. This difference in positioning relative to the floated quantifier suggests that these two V-not-V components must be in different parts of the structure. Specifically, the construction with the copula must be structurally higher than the one with *xiang*. However, the two constructions seem to have a common element, the negation particle *bu*. To reconcile these two observations, I propose splitting the negation particle into two different heads that merge in different parts of the structure. Additional motivation for this will be provided in Section 2.3. As we will see in Section 2.2, this split will also help to account for the behaviour or the negation particle in examples in (1).

A last observation is that many of the questions discussed in Section 1 have components with multiple morphemes (e.g. *shi-bu-shi*, *xiang-bu-xiang*, *bu-shi*, etc.). However, these components seem to move as a unit (when there is movement) and also cannot have other intervening elements. For these reasons, I analyzed the sub-components of these structures as separate heads, and surface structures are derived from head movement and incorporation.

### 2.2 Structural frame and question derivations

To account for the descriptive facts outlined above, I propose the following syntactic tree as the underlying structural frame for Mandarin polar questions.
In the tree in (6), heads enclosed in curly brackets contribute to the formation of Mandarin polar questions, and depending on the question type, they may or may not be a part of the underlying structure. The DP *dou ni-men* merges as the subject of the verb *xiang* in [Spec,VP]. However, the quantifier can only be floated after the DP moves out of its initial merge position. Also note that [Spec,CP] can be filled by either a DP or the TP, or it can remain empty. This will be dependent on the selection properties of the *C* head.

The question particle *ma* has been analyzed as a C head (Huang et al. 2009). I incorporate this into my own analysis. The neutral question in Standard Mandarin, previously presented as (1-a), is given again below in (7).

(7)  

*ni-men (bu) xiang chi-fan ma?*  
you-PL (NEG) want eat Q  
‘Do you want to eat?’

The surface structure of this question sentence is derived by raising the TP into [Spec,CP] position. This raising operation seems to be obligatory for *ma* as linearly it can only occur sentence-finally. In this sentence, the T head is silent and the selection of the negation head *bu* is optional.

Continuing with questions constructed with the *ma* particle, let us look at the example in (8), previously presented as (1-b).

(8)  

*ni-men <shi> (bu) xiang chi-fan <shi> ma?*  
you-PL <COP> (NEG) want eat <COP> Q  
‘Is it that you (don’t) want to eat?’
Unlike in the previous question, there is an overt T head, the copula *shi*. When *shi* appears preverbally, it remains in-situ, and the TP is obligatorily raised into [Spec,CP]. When *shi* appears before the question particle *ma*, it undergoes head movement up to C to be incorporated with the C head *ma*. Again, the TP is obligatorily raised into [Spec,CP], and the selection of the negation head is optional.

The final *ma*-type question we discussed is re-presented below in (9).

(9) ni-men <bu-shi> xiang chi-fan <bu-shi> ma?
    you-PL <NEG-COP> want eat <NEG-COP> Q
    ‘Isn’t it that you want to eat?/You want to eat, isn’t it?’

In the derivation of this type of question, the negation head *bu* moves up to merge with the T head *shi*. When *bu-shi* occurs preverbally, T remains in-situ, and the TP is raised into [Spec,CP]. Similar to the question in (8), the T head can also optionally move up to merge with the C head. In this case, it appears before the question particle *ma* after the TP has raised into [Spec,CP].

Since some constructions with *bu* seem to be in different structural positions than others, I have proposed that there are two heads that are phonologically realized as *bu*. Specifically, in addition to the negation head *bu* which we have already seen in action in the *ma*-questions, I propose that there is also a *CQ* head *bu*. I propose that the structurally higher *bu* is involved in the V-not-V structures with the copula *shi* such as the question in (10) below.

(10) <shi-bu-shi> ni-men <shi-bu-shi> xiang chi-fan <shi-bu-shi>?
    <COP-NEG-COP> you-PL <COP-NEG-COP> want eat <COP-NEG-COP>
    ‘Is it or not that you want to eat?’

I propose that this question is derived by head movement of the T head *shi* up to C, where it gets incorporated with the C head *bu*. The *bu* head requires additional phonological material to be realized and therefore reduplicates the verbal element it has just merged with. This is shown below in (11).

(11)

```
CP
   /\      /
/   \    /   \  
/     \  /     \ /
/     / /     / /
/     //     / /  

CQ
  /\    /
 / \  / \  
/   \ /   \\  
/     /     \\
/     /     \\
/     /     \\
/     /     \\
/     /     \\
/     /     \\
/     /     \\\ni-men xiang chi-fan
```

After head movement and reduplication have taken place, there is optional raising of either the closest DP or the TP in [Spec,CP]. When *shi-bu-shi* occurs in sentence initial position,
[Spec,CP] remains empty. When it appears preverbally, the nearest DP _ni-men_ is raised into [Spec,CP]. When it occurs sentence-finally, the TP is raised into [Spec,CP].

Unlike V-not-V questions formed with the copula _shi_, V-not-V questions formed with lexical verbs do not involved any C head. The example question given in (2-b) is presented again below as (12).

(12) _ni-men_ xiang-bu-xiang _chi-fan_?

you-PL want-NEG-want eat

‘Do you want or not want to eat?’

To derive this question, the V head _xiang_ undergoes head movement up to NEG where it incorporates with _bu_. Much like the copula V-not-V construction, NEG _bu_ here also requires additional phonological material, reduplicating the verbal element it just merged with. This kind of derivation for V-not-V questions is desirable for two reasons. First, it addresses the point I made in Section 2.1 that V-not-V constructions seem to behave as single units. Also, the resulting sub-structure of the C head or NEG head seems to conform to native intuitions of speakers (i.e. \([V[bu V]]\) rather than \([[V bu[V]]\)).

Finally, the last type of _bu_-question, where the _bu_ particle occurs on the right periphery of the sentence, can be analyzed in two ways, both of which involve the C head _bu_. The example provided in (2-a) is repeated below in (13).

(13) _ni-men_ xiang _chi-fan_ _bu_?

you-PL want eat NEG

‘Do you want to eat?’

The simplest analysis of this sentence is to say that the C head _bu_ behaves much like _ma_ when it occurs alone, obligatorily raising TP into [Spec,CP]. However, native speakers intuitively feel that the sentence-final _bu_ is just an elided form of _shi-bu-shi_. Thus, an alternate analysis would be that this question also falls under the V-not-V type. In this case, when _shi-bu-shi_ occurs sentence-finally, the copula can remain silent.

Note: Though I have omitted sentences with _dou_ in this section, the above derivations also give the correct linear relation of all the moving constituents to the floated quantifier.

2.3 Further predictions

Thus far I have mostly limited the scope of my discussion to the derivation of well-formed polar questions. In this section, I will expand on the analysis by examining some predictions this structure makes. In particular, I am interested in whether or not the proposed structure excludes certain ill-formed questions.

First, this analysis can exclude the ill-formed lexical V-not-V structures in which the V-not-V constituent occurs sentence-initially and sentence-finally. The examples given in (4) are repeated below in (14).

(14) a. *xiang-bu-xiang _ni-men_ _chi-fan_?

want-NEG-want you-PL eat
‘Do you want or not want to eat?’

b. *ni-men chi-fan xiang-bu-xiang?
you-PL eat want-NEG-want
‘Do you want or not want to eat?’

The sentence in (14-a) is excluded because the DP ni-men must raise past NEG into [Spec,TP]. The sentence in (14-b) is excluded because the NEG head cannot raise its syntactic object into its Spec position.

Second, this analysis predicts that structures with the CQ head bu should be able to have additional negation, but structures with NEG bu should not be able to have additional negation. I will show that this holds true by comparing the two types of V-not-V questions. Observe the following examples.

(15) a. ni-men shi-bu-shi bu xiang-chi-fan?
you-PL COP-Q-COP NEG want eat
‘Is it that you don’t want to eat?’

b. ni-men xiang-bu-xiang (*bu) chi-fan?
you-PL want-NEG-want (*NEG) eat
‘Do you (not?) want or not want to eat?’

Negating the V-not-V question in (15-a) creates a well-formed sentence. This is because shi-bu-shi is formed using the CQ head bu, which can freely co-occur with the negation particle lower in the structure. However, in a construction that is formed using the negation head bu adding another negation particle creates an ill-formed sentence, since there can only be one negation head in the structure.

Finally, since both ma and bu are C heads, the analysis predicts that they should be in complementary distribution. Indeed, sentences like the one given in (16) below are ill formed.

(16) *ni-men xiang chi-fan bu ma?
you-PL want eat Q Q
‘Do you want to eat?’

It is also possible to analyze the bu as the negation head, in which case they should be able to co-occur. However, under this analysis, the sentence in (16) is still excluded since there is a T head between the negation head and C, thus a movement of the negation particle up to C would violate the Head Movement Constraint.

3 Situating ke-questions

Now that an analysis has been established for common ma and bu questions in Standard Mandarin, we can situate the question particle ke within that framework. Since ke occurs sentence medially, it may appear to differ quite a lot from ma and bu. If we pair the ke sentence with the xiang-bu-xiang sentence however, there appears to be a parallel.
In the pair of sentences given in (17), *ke* and *xiang-bu* seem to be in complementary distribution. This is the claim made by Zhu (1990) and Huang (1991). However, if we probe the *ke* sentence with the floated quantifier *dou*, we find that the *ke* particle has a different relative position to *dou* than *xiang-bu-xiang*. This is shown in (18) below.

(18)  
   a. *ni-men* *dou* *xiang-bu-xiang* *chi-fan?*  
       *you-PL all want-NEG-want eat*  
       ‘Do you all want or not want to eat?’

   b. *ni-men* *dou* *ge* *xiang* *chi-fan?*  
       *you-PL all Q want eat*  
       ‘Do you all want to eat?’

   c. *ni-men* *ge* *dou* *xiang* *chi-fan?*  
       *you-PL Q all want eat*  
       ‘Do you all want to eat?’

The pair of sentences in (18-b) and (18-c) show that *dou* must be to the right of *ge* and not to the left. Additionally, in the other *ke*-type question where *ke* is followed by a copula *shi*, the *ke-shi* constituent can appear sentence-initially, sentence-medially, and sentence-finally. This distribution parallels that of *shi-bu-shi* (see examples (5) and (2-c)). For these reasons, I analyze the *ke* question particle as another \( C_Q \) head.

Under this analysis, questions such as *ni-men ke xiang chi fan?* ‘Do you want to eat’ are derived by raising the closest DP *ni-men* into \([\text{Spec,CP}]\). The question particle *ke*, when occurring alone, restricts the options for raising such that it requires its Spec position to be filled, but only by a DP and not by the TP.

As for *ke-shi* questions, I analyze the *shi* as an optional supporting particle, much like English *do*-support. This parallels the reduplication process required for V-not-V questions. When *ke* is supported by *shi*, it can optionally raise the closest DP or the TP to \([\text{Spec,CP}]\). When *ke-shi* appears sentence-initially, its Spec position remains empty. When *ke-shi* appears sentence-medially, it raises the nearest DP subject to \([\text{Spec,CP}]\). Finally, when *ke-shi* occurs sentence-finally, the TP is raised to \([\text{Spec,CP}]\).

### 4 Conclusion

In this paper, I presented a range of data, illustrating the various different polar questions in Mandarin Chinese, including those that are common in Standard Mandarin and some that are dialectally restricted. In addition, I proposed a structural analysis that could account for the forms discussed. Crucially, this analysis was supported by tests probing relative positions of relevant structures as well as evidence that ill-formed sentences can be correctly excluded.
References

