

## A discourse model for Mandarin *ba*-interrogatives

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*ba* is an unembeddable utterance-final particle, which can attach to morphosyntactically-marked declaratives (DEC) or interrogatives (INT) in Mandarin. We focus on *ba*-INTs and present novel data regarding the contextual conditions licensing *ba*-INTs. We argue that *ba*-INTs are licensed under the preconditions that (i) the addressee has been committed to the presupposition of the question under discussion (QUD) in the previous context, i.e. the QUD is answerable, and (ii) the previous conversation signals that the QUD might not be answerable. We show that *ba*-INTs traverse the discourse trees (d-trees) backward, i.e. *ba*-INTs either ask the contextual salient QUD explicitly, or challenge the presupposition of the QUD.

**Data** It has been observed in the literature that *ba*-DECs show effects such as confirmation-seeking and uncertainty (Han 1995, Chu 2009 a.o.). Ettinger & Malamud (2015) argue that when *ba* attaches to DEC, *ba* serves to weaken the force of an assertion or a directive (some DEC are considered as imperatives, according to E&M).

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|------------------------|---------------------------|
| (1) ni chi <b>ba</b>   | (2) ting hao de <b>ba</b> |
| you eat BA             | very good DE BA           |
| ‘(How about you) eat.’ | ‘(Maybe) very good.’      |

While capturing some crucial intuitions about the meaning of *ba* these generalizations fail to describe the so-called ‘unfriendly’ effect of *ba*-INTs, i.e. the speaker is impatient or angry. (3) exemplifies a context where two kinds of *ba*-INTs are felicitous: in (3) the QUD (*what cake do you eat*) is broken down into two simpler questions (3ii, 3iv), and the addressee has been committed to the presupposition of the QUD, i.e. *I eat cake*, by uttering (3i). In this context, *ba* can attach to either the QUD (3vi), or a polar question challenging the presupposition of the QUD (3vii). Note that the underlined part in (3vi) and (3vii) signals that they are syntactically-marked interrogatives: *shenme* is a wh-word, and *chi-bu-chi* is an A-not-A construction, marking one type of polar question in Mandarin.

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|---|--|
| (3) i. B: wo xiang chi dangao.                      | B: I want to eat cake.                   |
| ii. A: hao, ni chi bu chi caomei dangao?            | A: Okay, do you eat strawberry cake?     |
| iii. B: bu.   | B: No.                                   |
| iv. A: ni chi bu chi qiaokeli dangao?               | A: Do you eat chocolate cake?            |
| v. B: bu.   | B: No.                                   |
| vi. A: na ni chi <u>shenme</u> dangao <b>ba</b> ?   | A: Then what cake do you eat <b>ba</b> ? |
| vii. A’: na ni <u>chi bu chi</u> dangao <b>ba</b> ? | A’: Then do you eat cake <b>ba</b> ?     |

*ba*-INTs are infelicitous if no commitment to the presupposition of the QUD has been made previously, or if there is no sign in the previous conversation showing that the QUD might not be answerable. (4) exemplifies that *ba*-INTs cannot be uttered out-of-blue.

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|---|-------------------------------------|
| (4) Context: B is having dinner in A’s house. A plans to serve cake as dessert now. |                                     |
| a. A doesn’t know if B eats cake:   |                                     |
| A: # ni <u>chi bu chi</u> dangao <b>ba</b> ?  | A: Do you eat cake <b>ba</b> ?      |
| b. A doesn’t know if B eats cake, but she assumes that B does:                      |                                     |
| A: # ni chi <u>shenme</u> dangao <b>ba</b> ?  | A: What cake do you eat <b>ba</b> ? |

**Analysis** We argue that *ba*-INTs traverse d-trees backward as follows. To resolve a complex question (the QUD), interlocutors in a conversation may proceed from the complex question to several subquestions, i.e. simpler questions providing complete or partial answers to the complex question. The QUDs and their subquestions together form a discourse hierarchy, a d-tree, which contains a sequence of nodes of questions. The standard traversal rule of a d-tree corresponds to the linear order of the nodes, i.e. interlocutors may move from a node to its sister or daughter (cf. Büring 2003, Rojas-Esponda 2014). We argue that a *ba*-INT marks

a move from a node to its predecessors, which requires a conflict to exist in the context: the addressee has been committed to the presupposition that the QUD is answerable, whereas the unsuccessful attempts of resolving the QUD in the previous conversation signal that the QUD might not be answerable. The implied impatience or anger of a *ba*-INT is thus generated from this conflict.

We propose the contextual preconditions of *ba*-INTs as follows. We assume the question operator proposed in Farkas & Bruce (2010) for *ba*-INTs in (5). We assume that a context  $c$  is a tuple  $\langle A, T, DC_x, CG, PS \rangle$ .  $A$  is a set of discourse participants.  $DC_x$  represents a set of propositions that the participant  $x$  is publicly committed to.  $T$ ,  $CG$  and  $PS$  correspond to F&B (2010)'s Table, *common ground* and *projected set* separately (assuming usual stack operations:  $PUSH(e, T)$  adds  $e$  to stack  $T$ ;  $POP(T)$  pops off the top item;  $TOP(T)$  gives the top item.  $i$ =input,  $o$ =output.  $Q$  represents a *ba*-INT, assuming that a question denotes a set of propositions that count as possible answers to the question).

(5)  $QUEST(S[I], K_i) = K_o$  such that:

a.  $T_o = PUSH(\langle S[I], Q \rangle, T_i)$

b.  $PS_o = PS_i \cup Q$

(Modified from F&B)

In addition to (5), we propose two preconditions on the input context for *ba*-INTs in (6). In (6),  $s$  and  $a$  represent the speaker and the addressee separately,  $ps$  represents a potential update of  $CG$  in  $PS$ , and  $Q^+$  represents the QUD.

(6) A *ba*-INT can be uttered only if the input context satisfies:

a.  $[\exists p \in Q^+] \in DC_{a,i}$ , and

b.  $\forall ps \in PS_i [\bigcup ps \cap \bigcup Q^+ = \emptyset]$

(6a) accounts for our first observation that the addressee must commit herself to the presupposition of the QUD before uttering *ba*-INTs: the presupposition is already in addressee's input DC. The formula in (6a) tells us there is some answer  $p$  in  $Q^+$ . This is similar to say that  $Q^+$  is answerable. (6b) sets a condition on the input  $PS$  such that the worlds in each potential update of  $CG$  in the input  $PS$  are not the worlds in  $Q^+$ . This accounts for our second observation that before uttering *ba*-INTs the previous discourse seems to entail that  $Q^+$  is not answerable.

***ba* and *a*** It has been noted in the literature (e.g. Han) that particle *a* can also attach to the host questions of *ba*-INTs in Mandarin, e.g. *a* can attach to *what cake do you eat* and *do you eat cake* from (3vi) and (3vii), but only when the addressee is never committed to the presupposition of the QUD before (i.e. if the context in (3) starts from (3ii) without 'okay', *a*-questions will be felicitous in (3)). Therefore, unlike *ba*-INTs, *a*-questions do not have 'unfriendly' effects. Contrary to *ba*-INTs, these *a*-questions are like real 'strategy' questions, i.e. the speaker uses an *a*-question to step back for a while and politely ask if her implicit assumption is valid, otherwise the previous conversation built on the speaker's assumption would be pointless.

**Compare *ba* with *überhaupt*** Rojas-Esponda (2014) observes similar effects of the German particle *überhaupt*, which also marks an "ascending move" upward in a d-tree (or, in her term, an S-tree), i.e. *überhaupt*-marked questions can also be used to doubt the presupposition of the QUD. Interestingly, *überhaupt*-marked questions behave systematically different from *ba*-INTs: first, *überhaupt*-questions do not require the addressee's commitment, and hence they do not exhibit unfriendly effects, parallel with *a*-questions in Mandarin; second, Rojas-Esponda defines the S-tree for *überhaupt* in a way that any answer to a subquestion  $q$  provides a partial answer to the higher QUD, whereas as we see in (3), the answer to a subquestion of a *ba*-INT provides a complete answer to the QUD (i.e. the answer to a subquestion directly resolves the QUD). We leave the detailed comparison between *ba* and *überhaupt* for future research.

**Selected references** Büring.2003. 'On D-trees, beans, and B-accents'. *L&P*. Ettinger & Malamud.2015. 'Mandarin utterance-final particle *ba* in the conversational scoreboard'. *SuB*. Farkas & Bruce.2010. 'On reacting to assertions and polar questions'. Han.1995. A pragmatic analysis of the BA particle in Mandarin Chinese. Rojas-Esponda.2014. 'A discourse model for *überhaupt*'. *S&P*