

According to Hamblin (1973), a polar question denotes a set of two answers  $\{p, \neg p\}$ . Mandarin has two constructions that function as a polar question, *ma* questions (henceforth MAQs) like (1) and A-not-A questions (henceforth ANAQs) like (2). This study explains the similarities and differences of the two questions by deriving the compositional semantics from each.

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| (1) Ni he jiu ma?<br>you drink wine ma<br>'Do you drink wine?' (MAQ) | (2) Ni he-bu-he jiu?<br>you drink-not-drink wine<br>'Do you drink wine or not?' (ANAQ) |
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**PREVIOUS STUDIES** Dong (2009) argues that MAQs and ANAQs denote the same Hamblin set of propositions, which cannot explain the contrast in a biased context like (3). Here, MAQs are felicitous but ANAQs are not (Li & Thompson, 1981). MAQs can be responded by verb-echo answers and the answer particles (*bu*)*shide* 'yes/no' (Guo, 2000).

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| (3) Biased: A visits B's home for the first time and sees some wine bottles in B's refrigerator.<br>A: ✓MAQ(1) / #ANAQ(2)<br>B: wo (bu) he./ Shide./ Bu-shide.<br>'I (don't) drink./ 'Yes./ 'No.' | (4) Neutral: before preparing dinner for a guest B, A wants to find out whether B drinks wine.<br>A: ✓MAQ(1) / ✓ANAQ(2)<br>B: wo (bu) he./ #Shide./ #Bu-shide.<br>'I (don't) drink./ #'Yes./ #'No.' |
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On the other hand, Krifka (2015) proposes that a MAQ *p-ma?* is a biased monopolar question which restricts the future development of the context in such a way that the only legal continuation is the commitment to *p* by the addressee, whereas ANAQs are neutral bipolar questions which allow two legal continuations, i.e., the commitment to *p* and the commitment to  $\neg p$ . However, Krifka's analysis cannot explain why MAQs behave just like ANAQs in a neutral context like (4). Here, both MAQs and ANAQs can be used and can be answered with *p* 'I drink wine' and  $\neg p$ . That is, MAQs in neutral contexts allow both continuations, just like bipolar questions.

To explain (3) and (4), Ma (2018) argues that MAQs in neutral contexts, just like ANAQs, denote a Hamblin set, whereas MAQs in biased contexts have the same syntax and semantics as tag questions (*shi ma?*), both composed of a declarative and an interrogative clause. Given that tag questions can co-occur with the adverb *bijing* 'after-all', however, this wrongly predicts that MAQs in biased contexts could also combine with *bijing*, as in (5). Also, the adverb *nandao*, which literally means 'difficult-say' and marks the speaker's incredulity, collocates with biased MAQs but not with tag questions, as in (6), which contradicts Ma's analysis.

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| (5) a. Bijing, ta yijing lai le, shi ma?<br>after-all he already come PERF be ma<br>'After all, he has already arrived, right?'<br>b. #Bijing, ta yijing lai le ma?<br>after-all he already come PERF ma<br>'After all, has he already arrived?' | (6) a. #Ni nandao he jiu, shi ma?<br>you nandao drink wine be ma<br>'Do you mean that you drink wine?'<br>b. Ni nandao he jiu ma?<br>you nandao drink wine ma<br>'Do you mean that you drink wine?' |
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**EMBEDDABILITY** Another difference is that MAQs cannot be embedded while ANAQ can:

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| (7) *Wang wen [ni he jiu ma.]<br>Wang ask you drink wine ma<br>Intended: 'Wang asks if you drink wine.' | (8) Wang wen [ni he-bu-he jiu.]<br>Wang ask you drink-not-drink wine<br>'Wang asks if you drink wine or not.' |
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**SEMANTICS OF MAQS** We propose that the *ma* particle in MAQs is a force marker, which introduces a question force head. This correctly predicts that MAQs cannot be embedded, since clauses indicating sentential forces cannot be embedded in Mandarin. Motivated by the fact that *ma* is historically derived from a negative word *bu* 'not' (Ota, 1958; Wang, 1980), we propose that *ma* takes in a proposition *p* and creates a set containing *p* and its negation, as in (9). This correctly predicts that MAQs in all contexts can be responded by the verb-echo answers *p* or  $\neg p$ .

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| (9) a. $\llbracket ma \rrbracket = \lambda p. \{p, \neg p\}$ | b. $\llbracket ma(p) \rrbracket = \{p, \neg p\}$ |
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In a biased context like (3), the MAQ, together with the contextual information, expresses a bias towards ‘B drinks wine’. Here, the bias meaning is not encoded in the MAQ, but contributed by the contextual compelling evidence (Büring & Gunlogson, 2000). In (3), ‘A sees some wine bottles in B’s refrigerator’ is a piece of compelling evidence for p ‘B drinks wine’, because this evidence is mutually available to the participants and it would allow the participants to assume p. This explained why MAQs in biased contexts like (3) can be answered by ‘yes/no’ while MAQs in neutral contexts like (4) cannot. We treat the answer particles (*bu shide* ‘yes/no’ as sentential anaphors that need to pick up one recently introduced proposition (see Kramer & Rawlins, 2009). Since there is compelling evidence for p ‘B drinks wine’ in (3), p is introduced and the answer particles can be used. In (4), in contrast, with no compelling evidence for p, p is not introduced and the particles cannot be used.

Our proposal can also explain (5) and (6). Unlike MAQs, a tag question is composed of a declarative and an interrogative (Asher & Reese 2007), and the bias meaning of a tag question is encoded in the declarative. The adverb *bijing* ‘after all’, like its English equivalent, can co-occur with declaratives but not with interrogatives (cf. Sadock, 1971). Semantically, we can say that *bijing* requires a declarative as an argument. A tag question like (5-a) involves a declarative, and hence can co-occur with *bijing*, while a MAQ like (5-b) does not involve a declarative and cannot combine with it. In contrast, *nandao* can occur in interrogatives but not in declaratives. According to Xu (2017), *nandao* takes the interrogative denotation of  $\{p, \neg p\}$  as an argument and creates an epistemic preorder of the two by conveying that  $\neg p$  is more likely than p. Since *nandao* requires an interrogative as an argument, it cannot combine with the declarative in (6-a).

**SEMANTICS OF ANAQs** We propose that ANAQs denote a Hamblin set of two propositions  $\{p, \neg p\}$  (see also Yuan & Hara, 2013) directly composed from its syntax. Unlike MAQs, ANAQs do not require a force head to create a Hamblin-set, hence they can be embedded. ANAQs cannot be responded by the answer particles (*bu shide*, since the particles are used to confirm/reject an introduced proposition and confirming or rejecting a non-singleton set would not count as an answer to a question. Furthermore, ANAQs end with a falling tone L% (Shen, 1990). Following Biezma & Rawlins’ (2012) analysis of English alternative questions, we propose that the final falling tone on ANAQs has an exhaustivity presupposition, i.e., indicates that all alternatives spelled out are salient and no other ones are salient in the context, as shown in (10). When an ANAQ occurs discourse-initially, there are no salient alternatives, i.e., the salient set is empty.

(10)  $\llbracket (\{p, \neg p\})L\% \rrbracket$  defined only if  $\text{SalientAlts} = \{p, \neg p\}$  or if  $\text{SalientAlts} = \emptyset$ .  $\text{SalientAlts}$  is the set of propositional alternatives that are salient in the context. When defined,  $\llbracket (\{p, \neg p\})L\% \rrbracket = \{p, \neg p\}$

This correctly predicts that the ANAQ is felicitous in (11), where both p ‘Xiaoli drinks wine’ and  $\neg p$  have been asserted and hence became salient. It also correctly predicts that the ANAQ is felicitous in (4), where no alternative is salient. In (3), only one proposition ‘B drinks wine’ is salient, which does not meet the exhaustivity presupposition, and hence the use of ANAQs is infelicitous. In contrast, MAQs lack the falling tone and does not have this exhaustivity presupposition. Hence, MAQs can occur in both neutral context and biased contexts.

(11) A: Li he jiu. ‘Li drinks wine.’      B: Bu, Li bu he jiu. ‘No, Li does not.’  
C: Li he-bu-he jiu? ‘Did Li drink wine or not?’

**CONCLUSION** Both MAQs and ANAQs denote a Hamblin set of propositions, but they are composed differently. The Hamblin-set of MAQs is derived by the force head thus it cannot be embedded, while the one of ANAQs is derived below a force head so it is embeddable. MAQs and ANAQs are also different in that the latter ends with the L% tone that introduces an exhaustivity presupposition, which explains why ANAQs cannot be used in biased contexts.

**SELECTED REFERENCES:** Biezma & Rawlins. 2012. Responding to alternative and polar questions. Büring & Gunlogson. 2000. Aren’t positive and negative polar questions the same? Guo. 2000. *Ma Wenju de Quexindu he Huida Fangshi*. Krifka. 2015. Bias in commitment space semantics. Ma. 2018. Two types of *ma*-question.