Different ways of deriving Hamblin alternatives: Mandarin *ma* questions and A-not-A questions

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Abstract

This study investigates the similarities and differences between Mandarin *ma* questions and A-not-A questions. Both of these two questions can be used in neutral contexts, but only *ma* questions can be used in biased contexts. Furthermore, A-not-A questions can be embedded whereas *ma* questions cannot. We propose that MAQs and ANAQs both denote a Hamblin set of propositions, but they are composed differently, which explains their different behaviors in embeddability. MAQs and ANAQs are also different in that the latter ends with the L% tone that introduces an exhaustivity requirement, which explains why ANAQs cannot be used in biased contexts.

1 Introduction

According to Hamblin (1973), a polar question denotes a set containing two possible answers $\{p, \neg p\}$. Mandarin has at least two constructions that function as a polar question. (1) is an example of *ma* questions (henceforth MAQs) which are obligatorily marked by the particle *ma* and make one answer syntactically explicit.

(1) Ni he jiu ma?
you drink wine ma
'Do you drink wine?' (MAQ)

A-not-A questions (henceforth ANAQs) like (2) spell out both answers in the syntax.

(2) Ni he-bu-he jiu?
you drink-not-drink wine
'Do you drink wine or not?' (ANAQ)

This study accounts for the similarities and differences of the two questions by deriving their semantics compositionally from each construction.

2 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 and Thompson, 1981). MAQs can be responded by verb-echo answers and the answer particles *(bu)shide* '(not) be'[1] (Guo, 2000).

(3) Biased context: A visits B's home for the first time and sees some wine bottles in B's refrigerator.)
A1: ✓Ni he jiu ma? (MAQ)
'Do you drink wine?'
A2: #Ni he-bu-he jiu? (ANAQ)
#'Do you drink wine or not?'
B: wo (bu) he. / Shide./ Bu-shide.
'I (don't) drink.'/'Yes.'/'No.'

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 (by the addressee) and the commitment to $\neg p$. So the speaker of a MAQ proposes only one legal continuation to the addressee. This explains why the MAQ can be used in (3), where A is suggesting the commitment to p 'B drinks wine' by B. In contrast, the speaker of an ANAQ is suggesting both the commitment to p by B and the commitment to ¬p by B. The latter suggestion is inconsistent with the fact that A has observed evidence supporting p, therefore the ANAQ cannot be used in (3).

Krifka's analysis, however, cannot explain why MAQs behave just like ANAQs in a neutral context

[1]The particles *(bu) shide* cannot be simply translated to English 'yes/no'. When *(bu) shide* is used to answer a positive MAQ *p-ma*?, *shide* confirms the positive proposition p and *bu shide* rejects p. When *(bu) shide* is used to answer a negative MAQ *¬p-ma*?, *shide* confirms the negative proposition $\neg p$ and *bu shide* rejects $\neg p$.

like (4). Here, both MAQs and ANAQs can be used and can be answered with p 'I drink wine' and ¬p. That is, MAQs in neutral contexts allow both continuations, i.e., the commitment to p by the addressee and the commitment to ¬p by the addressee, just like bipolar neutral questions. This contradicts Krifka's proposal that MAQs only allow one legal continuation.

(4) Neutral context: before preparing dinner for a guest B, A wants to find out whether B drinks wine.
A1: ✓Ni he jiu ma? (MAQ)
'Do you drink wine?'
A2: ✓Ni he-bu-he jiu? (ANAQ)
'Do you drink wine or not?'
B1: wo (bu) he.
'I (don't) drink.'
B2: #Shide./ #Bu-shide.
#'Yes.'/ #'No.'

To explain the contrast in (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. That is, the MAQ in (3) is syntactically and semantically equal to the tag question in (5), both composed of a declarative clause *Ni he jiu* 'You drink wine' and an interrogative clause *shi ma?* 'Is it right?'.

(5) Ni he jiu, shi ma?
you drink wine be ma
'You drink wine, right?'

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 (6).

(6) a. Bijing, ta yijing lai le, shi ma?
after-all he already come PERF be ma
'After all, he has already arrived, right?'
b. #Bijing, ta yijing lai le ma?
after-all he already come PERF ma
'After all, has he already arrived?'

Also, the adverb *nandao*, which literally means 'difficult-say' and marks the speaker's incredulity towards the presented proposition, collocates with biased MAQs but not with tag questions, as in (7), which contradicts Ma's analysis.

(7) a. Ni nandao he jiu ma?
you nandao drink wine ma
'Do you mean that you drink wine?'
b. #Ni nandao he jiu, shi ma?
you nandao drink wine be ma
'Do you mean that you drink wine?'

To recapitulate, Dong (2009) treats MAQs and ANAQs as having the same semantics, which cannot explain their different contextual requirements. Krifka (2015) analyzes MAQs as biased monopolar questions and ANAQs as neutral bipolar questions, which fails to account for their similarity in neutral contexts. Ma (2018) claims that MAQs have the same syntax and semantics as tag questions. This cannot explain why these two questions co-occur with different adverbs.

3 Embeddability

Another difference between MAQs and ANAQs is that MAQs cannot be embedded while ANAQs can. For example, a MAQ cannot be embedded under the verb *zhidao* 'know', as in (8), whereas an ANAQ can, as in (9).

(8) *Wu zhidao [Li he jiu ma.]
Wu know Li drink wine ma
Intended: 'Wu knows if Li drinks wine.'

(9) Wu zhidao [Li he-bu-he jiu.]
Wu know Li drink-not-drink wine
'Wu knows if Li drinks wine or not.'

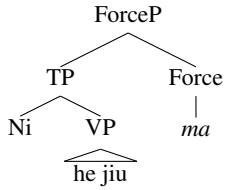
However, if a sentence-final particle *ne* is attached to the ANAQ, the ANAQ cannot be embedded:

(10) *Wu zhidao [Li he-bu-he jiu ne.]
Wu know Li drink-not-drink wine ne
Intended: 'Wu knows if Li drinks wine or not.'

4 Semantics of MAQs

We propose that the *ma* particle in MAQs is a force marker, which introduces a question force head and occupies the head position of a ForceP. Thus, (1) has the structure depicted in (11).

(11)



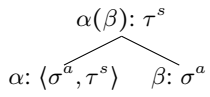
This correctly predicts that MAQs cannot be embedded, as we have seen in (8), since clauses indicating sentential forces cannot be embedded in Mandarin. As pointed out by Han (1998), there are many languages in which embedded clauses cannot express force. This is indeed the case in Mandarin. Mandarin clauses marked as questions or commands cannot be embedded. (12) can be grammatical but what is embedded is not a MAQ.

Rather, the declarative clause *Wu zhidao Li he jiu* 'Wu knows that Li drinks wine' combines with the particle *ma* to form a root MAQ. In (13), it appears that the clause *ni lai wo jia ba* is embedded, but it is in fact a direct quotation of the command 'Come to my home' uttered by Li.

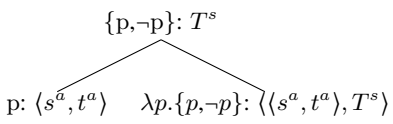
(12) [Wu zhidao Li he jiu] ma
Wu know Li drink wine Q
✓ Does Wu know that Li drinks wine?
Wu knows if Li drinks wine.

(13) Li yaoqiu [ni lai wo jia ba]
Li request you come my home BA
Li requests: '(You) come to my home!'
('my home' = Li's home)

We adopt McCready's (2010) type system for conventional implicatures to formalize the composition of MAQs and ANAQs. In this system, there are semantic objects of at-issue type (which are marked by the superscript a) and objects of shunting type (which are marked by the superscript s). Shunting types are for the semantic objects that 'shunt' information from one meaning dimension to another. We propose that the force-marker *ma* is an expressive that changes an at-issue type of its argument to expressive shunting type. *Ma* combines with an at-issue expression, i.e., a proposition p, by McCready's shunting-type functional application (14) and creates a shunting-type expressive, i.e., a Hamblin set containing p and its negation, as in (15), where $T = \langle\langle s, t\rangle, t\rangle$. The semantic composition of (1) is depicted in the typed tree in (16). Given that expressives cannot be embedded, this correctly predicts that MAQs cannot be embedded.

(14)


(15) $[\![ma]\!] \in D_{\langle\langle s^a, t^a\rangle, T^s\rangle}$
$[\![ma]\!] = \lambda p.\{p, \neg p\}$

(16)


The analysis in (15) is motivated by the fact that *ma* is historically derived from a negative word *bu* 'not' (Ota, 1958). Given that the denotation of a question corresponds to its possible answers, this correctly predicts that MAQs in all contexts can be responded by the verb-echo answers p or ¬p, as we have seen in (3) and (4).

In a biased context like (3), the MAQ, together with the contextual information, expresses a bias towards the proposition 'B drinks wine'. Here, the bias meaning is not encoded in the MAQ, but contributed by the contextual compelling evidence (Büring and Gunlogson, 2000):[2]

(17) Contextual Evidence: Evidence that has just become mutually available to the participants in the current discourse situation.
Compelling: Evidence for p is compelling if, considered in isolation, it would allow the participants to assume p (i.e. the evidence could reasonably be considered to justify the inference that p). (Büring & Gunlogson 2000: 7)

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 explains why MAQs in biased contexts like (3) can be answered by *(bu) shide* while MAQs in neutral contexts like (4) cannot. We treat the answer particles *(bu) shide* '(not) be' as sentential anaphors that need to pick up one recently introduced salient proposition (see Kramer and Rawlins, 2011). Following Biezma and Rawlins (2012), the set of the salient alternatives, i.e., SalAlts, is defined as in (18).

(18) SalAlts is the set of propositional alternatives that are salient in the context of interpretation. p ∈ SalAlts if and only if there is contextually compelling evidence for p or p is asserted by some discourse participant.
(Modified from Biezma & Rawlins, 2012: 288)

Since there is compelling evidence for p 'B drinks wine' in (3), p is salient and thus the answer particles can be used. In (4), with no compelling evidence for p, p is not salient and the particles cannot be used.

Our proposal can also explain (6) and (7). A tag question is composed of a declarative and an interrogative (Asher and 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). We therefore assume that *bijing* requires a declarative as an argument. A tag question like (6-a) involves a declarative, hence can co-occur with *bijing*, while a MAQ like (6-b)

[2] See Davis & Hara (2014) and Hara (2017) for a formalization of the notion of evidence based on causation.

does not involve a declarative and cannot combine with it. In contrast, the adverb *nandao* can occur in interrogatives but not in declaratives. According to Xu (2017), *nandao* takes the interrogative denotation of $\{\mathrm{p}, \neg\mathrm{p}\}$ as an argument and creates an epistemic preorder of the two on the part of the speaker by conveying that $\neg\mathrm{p}$ is more likely to be the true answer than p. Since *nandao* requires an interrogative as an argument, it cannot combine with the declarative in (7-b).

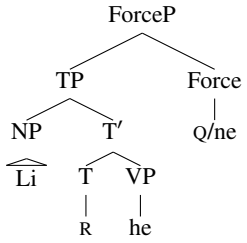
In summary, the particle *ma*, as an expressive force head, cannot be embedded, thus MAQs cannot be embedded. A MAQ denotes a Hamblin-set of propositions, which explains why MAQs can always be responded by the verb-echo answers p or $\neg\mathrm{p}$. When a MAQ occurs in a biased context, the contextual compelling evidence contributes to the bias meaning by introducing a salient proposition into the context. Since the answer particle *(bu) shide* needs to pick up a salient proposition, the MAQ in the biased context can be responded by the answer particle.

5 Semantics of ANAQs

Following Huang (1991), we assume that the ANAQ (19) is derived from the deep structure in (20). The feature R is realized by a reduplication rule, which copies a sequence following T and inserts *bu* 'not' between the original and its copy. The question operator Q, which can be optionally realized as the sentence-final particle *ne*, introduces the question force, and thus occupies the head position of a ForceP.

(19) Li he-bu-he (ne)?
Li drink-not-drink Q
'Does Li drink or not?'

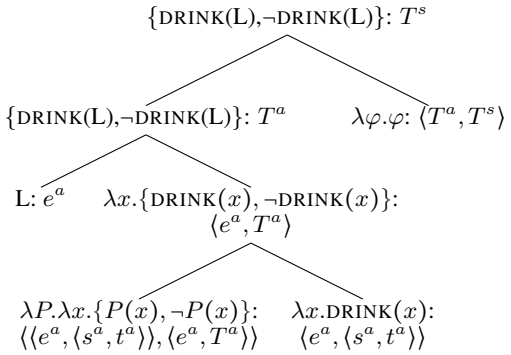
(20)



The semantics of the feature R, as defined in (21-a), is derived from the reduplication rule and creates an at-issue Hamblin-set containing a proposition and its negative counterpart. The particle *ne*, just like the particle *ma*, changes the type of its argument to expressive shunting type. *Ne* combines with an at-issue Hamblin set and creates a shunting-type Hamblin set, as defined in (21-b). The semantic composition of (19) can be depicted in the typed tree (22).

(21) a. $[\![\mathrm{R}]\!] \in D_{\langle\langle e^a,\langle s^a,t^a\rangle\rangle,\langle e^a,T^a\rangle\rangle}$
$[\![\mathrm{R}]\!] = \lambda P.\lambda x.\{P(x), \neg P(x)\}$
b. $[\![ne]\!] \in D_{\langle T^a,T^s\rangle}$
$[\![ne]\!] = \lambda\varphi.\varphi$

(22)



The A-not-A construction, i.e., the TP in (20) does not require a force head to create a Hamblin-set, hence the A-not-A construction, which is an at-issue type, $\langle\langle s^a, t^a\rangle, t^a\rangle$, can be embedded, as we have seen in (9). However, once the particle *ne* is attached as in (10), it cannot be embedded since it is an expressive of type $\langle\langle s^s, t^s\rangle, t^s\rangle$.

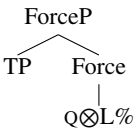
Furthermore, ANAQs end with a falling tone L% (Shen, 1990). Following Biezma and Rawlins' (2012) analysis of English alternative questions, we propose that the final falling tone on ANAQs indicates the presence of a closure operator (Zimmermann 2000) which expresses exhaustivity. According to Zimmermann (2000), the closure operator, signalled by the final falling intonation, generally applies to a list and indicates that nothing but the list items has the property in question. For example, in (23), the closure operator, signalled by the falling tone ↓, indicates that the listed stations are each one stop from Oxford Circus, and no other stations are one stop from Oxford Circus.

(23) A: Which tube stations are one stop from Oxford Circus?
B: Piccadilly Circus, Bond Street, Tottenham Court Road, Green Park, Warren Street, Regent's Park ↓ (Zimmermann, 2000: 261)

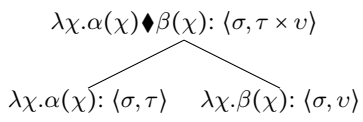
Biezma and Rawlins (2012) propose that an alternative question, which ends with a falling tone, also has a closure operator which indicates that nothing but the listed alternatives are the salient alternatives in the context of utterance, i.e., the listed alternatives have exhaust all the possibilities of the salient alternatives. Similarly, the closure operator in a Mandarin ANAQ also

indicates that only the presented two alternatives, i.e., p and ¬p are salient. We propose that the closure operator L% is paratactically associated (indicated by '⊗', see Bartels, 1997) to the force head, as shown in (24). We adopt a composition rule of paratactic association (25) proposed by Hara (2019), which merges two functions into one by abstracting over the argument type of the two functions (⧫ is a metalogical operator that combines expressions of different types). The resulting function, $\lambda\chi.\alpha(\chi)⧫\beta(\chi)$, is combined with an at-issue expression χ of type σ^a by the shunting-type functional application (14) and outputs a pair of shunting-type expressions $\alpha(\chi)⧫\beta(\chi)$ of type $\tau^s \times \upsilon^s$.

(24)



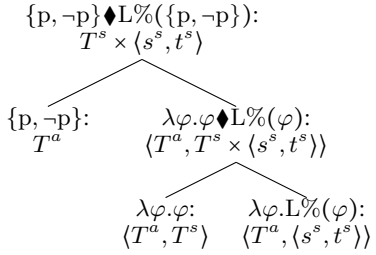
(25)



As shown in (26), L% combines with an at-issue Hamblin set (e.g., $\{p, \neg p\}$) and creates an expressive proposition which says that the SalAlts is exactly the set $\{p, \neg p\}$ (that is, both p and $\neg p$ are salient and no other ones are salient in the context) or that SalAlts is empty (when the ANAQ occurs at discourse-initial position). The paratactic association of L% with the ANAQ is depicted in (27).

(26) $[\![\text{L\%}]\!] \in \langle T^a, \langle s^s, t^s\rangle\rangle$
$[\![\text{L\%}]\!] = \lambda\varphi.\ (\text{SalAlts} = \varphi \vee \text{SalAlts} = \varnothing)$

(27)



Our analysis of ANAQs correctly predicts that the ANAQ is felicitous in (28), where both p 'Xiaoli drinks wine' and ¬p have been asserted thus became salient.

(28) 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?'

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 requirement, hence the use of ANAQs is infelicitous. In contrast, MAQs lack the falling tone and does not express this exhaustivity. Therefore, MAQs can occur in both neutral context and biased contexts.

ANAQs cannot be responded by the answer particles *(bu) shide*, as shown in (4), since the particles need to pick up one salient proposition whereas ANAQs introduce two salient propositions.

In summary, the A-not-A construction denotes an at-issue Hamblin set of propositions, which can be embedded. The force head *ne* combines with the at-issue Hamblin set and creates an expressive Hamblin set, hence ANAQs followed by *ne* cannot be embedded. The falling tone L% on ANAQs contributes to an expressive proposition which says that all and only the listed alternatives are salient. This explains why ANAQs cannot be used in biased contexts where only one alternative is salient.

6 Conclusion

This study accounts for the similarities and differences between Mandarin MAQs and ANAQs. Both MAQs and ANAQs denote a Hamblin set of propositions, but they are composed in different ways. Since the force-marker *ma* is an expressive that changes the at-issue type of its argument to expressive shunting type, it creates a shunting type Hamblin-set, which explains why MAQs cannot be embedded. The A-not-A construction denotes an at-issue Hamblin-set, which is embeddable. The force head *ne*, as an expressive, changes the at-issue Hamblin-set to an expressive shunting type one, thus ANAQs with *ne* cannot be embedded. MAQs and ANAQs are also different in that the latter ends with the L% tone that introduces an exhaustivity requirement, which explains why ANAQs cannot be used in a biased context where only one of the alternatives is salient. When MAQs occur in biased contexts, the contextual compelling evidence introduces a salient proposition, thus MAQs in biased contexts can be responded by the answer particles *(bu) shide* '(not) be'.

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