A Constraint-based Analysis of A-NOT-A Questions in Mandarin Chinese

1 Basic Properties

The present study provides a constraint-based analysis of A-NOT-A questions in Mandarin Chinese within the HPSG and MRS (Pollard and Sag, 1994; Copestake et al., 2005) framework and implements the analysis into a computational grammar for Chinese: namely, ZHONG [|]. Hereafter, the two components in the A-NOT-A structure are labelled as A_1 and A_2, respectively.

Using the A-NOT-A structure is one of the ways to express polar questions in Mandarin Chinese. The specific forms of A-NOT-A questions are exemplified below. Note that all variations presented in (1) convey almost the same meaning: "Does Zhangsan like dogs (or not like dogs)?"[1]

(1) a. Basic: A-NOT-A
张三 喜欢 不 喜欢 狗 ?
Zhāngsān xǐhuan bu xǐhuan gǒu ?
Zhangsan like NOT like dog PU

b. Contracted: A′-NOT-A
张三 喜 不 喜欢 狗 ?
Zhāngsān xǐhuan bu xǐhuan gǒu ?
Zhangsan like NOT like dog PU

c. Phrasal: AB-NOT-AB
张三 喜欢 狗 不 喜欢 狗 ?
Zhāngsān xǐhuan gǒu bu xǐhuan gǒu ?
Zhangsan like dog NOT like dog PU

d. Phrasal: AB-NOT-A
张三 喜欢 狗 不 喜欢 ?
Zhāngsān xǐhuan gǒu bu xǐhuan ?
Zhangsan like dog NOT like PU

As shown in the examples above, partial reduplication can result in either the verb being reproduced without its complement, or the verb being reduced to only its first character/syllable. As illustrated in (1b), this is not equally applicable to both A_1 and a A_2. For A_2, only one type of partial reduplication (i.e., deletion of complement) is permitted.

The lexical types capable of behaving as a syntactic head of predicates in Mandarin Chinese, such as verbs, adjectives, and prepositions, can participate in the A-NOT-A structure (Tseng, 2009). Two more examples in which adjectives and prepositions are used are provided in (2-3).

(2) 张三 高 不 高 ?
Zhāngsān gāo bu gāo ?
Zhangsan tall NOT tall PU
'Is Zhangsan tall (or not tall)?'

(3) 张三 在 不 在 家 ?
Zhāngsān zài bu zài jiā ?
Zhangsan at NOT at home PU
'Is Zhangsan at home (or not at home)?'

Mandarin Chinese employs two negative operators such as 不 *bù* and 没 *méi*, the choice of which hinges on the aspectual property of the verbal item that they are attached to.

(4) a. 去 不 去
qù bu qù
go NOT go
'Are you going?'

b. 去 没 去 ?
qù mei qù
go NOT go
'Have you gone (somewhere)'

As exemplified in (4), both of them can participate in the A-NOT-A structure with slightly different co-occurring constraints (§2.3.2).

2 Basic Constraints

2.1 Polar Questions

In the system of expressing polar questions in Mandarin Chinese, A-NOT-A questions have a sibling, in which a sentence-final particle *ma* is used (henceforth, MA-questions). For example, (5) exhibits a *prima facie* similarity to (1a).

(5) 张三 喜欢 狗 吗 ?
Zhāngsān xǐhuan gǒu ma ?
Zhangsan like dog MA PU
'Does Zhangsan like dogs?'

If these two forms of polar questions are simply allostructures of each other, the semantic representation should be almost the same in order for one form to be paraphrased into the other form. However, since there are at least three reasons for believing that they are not equivalent, there is no necessity to represent them in a common way.

First, they are semantically different. When a universal quantifier 都 *dōu* appears, a scope ambiguity happens with MA-questions but not with A-NOT-A questions, as shown in (6).

[1] Due to the page limit, this paper does not deal with the final type.

(6) a. 他们 都 喜欢 不 喜欢 开车 ?
tāmen dōu xǐhuan bu xǐhuan kāichē ?
they all like NOT like drive PU

'Do they all like to drive?'

b. 他们 都 喜欢 开车 吗 ?
tāmen dōu xǐhuan kāichē ma ?
they all like drive MA PU

'Do they all like to drive?' or
'Do all of them like to drive?'

Second, they are pragmatically different. While the asker in MA-questions has a stance to the expressed preposition (e.g., confirmation or denial), the asker in A-NOT-A questions does not (Liing, 2014). Hence, the two types of polar questions are not necessarily interchangeable.

Third, they differ in terms of information structure. In MA-questions, focus can be assigned to any constituent. For instance, in (5), either the subject 张三 *Zhāngsān*, the object 狗 *gǒu*, or the verb 喜欢 *xǐhuan* can be evaluated as containing focus. Should focus be required, the asker employs a specific prosodic clue and/or the focus marker 是 *shì*. (7) presents that different constituents in MA-questions can be freely clefted.

(7) a. 是 张三 喜欢 李四 吗 ?
shì Zhāngsān xihuān Lisì ma ?
SHI Zhangsan like Lisi MA PU

'Is it Zhangsan (and not anyone else) who likes Lisi?'

b. 张三 是 喜欢 李四 吗 ?
Zhāngsān shì xihuān Lisì ma ?
Zhangsan SHI like Lisi MA PU

'Is it that Zhangsan likes Lisi?'

c. 张三 喜欢 的 是 李四 吗 ?
Zhāngsān xihuān dè shì Lisì ma ?
Zhangsan like DE SHI Lisi MA PU

'Is it Lisi whom Zhangsan likes?'

This is mainly because the scope of *mā* is not explicitly observable from the sentence itself. By contrast, A-NOT-A does not signal focus to any other elements but the structure itself (i.e., no ambiguity): The subject and the object in A-NOT-A questions cannot pass the cleft test exemplified in (7). In other words, A-NOT-A always bears focus (i.e., predicate focus).

2.2 Headedness

The presence of two semantically identical elements (even if only partially reduplicated) in A-NOT-A makes it difficult to convincingly determine whether A_1 or A_2 should be the head. As the components within A-NOT-A cannot be individually shifted or modified, nor can other elements be inserted between, headedness tests that make use of methods such as modification or movement cannot be easily applied.

This "monolithic" property of A-NOT-A means that it could be seen as a single morphological word, and therefore the entire phrase is the head, and not its sub-components. Such an analysis will thus require that we approach A-NOT-A from the lexicon, and include the possible A-NOT-A forms of lexical entries that can serve as the A elements. This means a lexical entry will have three variants: (i) its normal form, (ii) its basic A-NOT-A form, and (iii) its single-character contracted A-NOT-A form.

2.3 Co-occurring Constraints

2.3.1 Sentence-final Particles

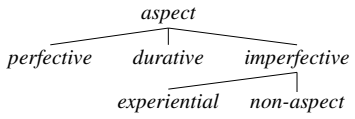
A-NOT-A questions are not permitted to occur with certain sentence-final particles. In the cases of 了 *lè*, 吗 *ma*, 吧 *ba*, 哦 *o* and 耶 *yé*, it is because only propositions can be used with these SFPs, whereas A-NOT-A is a question.

Other sentence-final particles like the emphatic markers 嘛 *ma*, 呀 *ya* and 呢 *nē* do not, however, restrict themselves to only propositions and are therefore permitted to be used with A-NOT-A.

2.3.2 Aspectual Markers

As is well-known, Chinese is one of the aspect-based languages, in which aspect is linguistically and necessarily expressed and plays a pivotal role in syntax. The aspect hierarchy of Chinese is roughly sketched out in (8).

(8)



The grammatical aspect in Chinese is largely expressed by verbal markers. There are three aspectual markers in Mandarin Chinese: 了 *lè*, 着 *zhè* and 过 *guò*. They are respectively responsible for perfective, durative, and experiential. Since each verb lexically selects these markers, not all these three items can be necessarily attached to all verbs. For example, 去 qù 'go' does not canonically co-occur with zhè. These markers are collectively know as LE-ZHE-GUO or LZG, and they are hierarchically constrained as descibed in (9).

(9)
```
+vjp :+ [ LZG lzg ].
lzg := avm.
le := lzg.
zhe := lzg.
guo := lzg.
no-lzg := lzg.
le+zhe := le & zhe.
le+guo := le & guo.
zhe+guo := zhe & guo.
le+zhe+guo := le & zhe & guo.
```

The LE-ZHE-GUO markers are also restricted in their co-occurrence with A-NOT-A, either with the entire A-NOT-A phrase, or with the individual A elements. The first two markers are not allowed to co-occur with A-NOT-A at all, while *guò* can only occur with A-NOT-A if the NOT element is 没 *méi*. Using Type Definition Language (TDL), LZG is

2.4 Character

To recall from §1, the A elements in A-NOT-A are full or partial reduplicates of each other. One such form is that only the first character of A_1 is reduplicated. With this in mind, we introduced four new feature types to the lexicon entries, as presented in (10):

(10)
$$\begin{bmatrix} +vjp & \\ \text{STEM} & \boxed{1} \\ \text{BOUND} & luk \\ \text{HEAD} & \begin{bmatrix} \text{CHAR} & \begin{bmatrix} char & \\ \text{FCHAR} & string \\ \text{WCHAR} & \boxed{1} \\ \text{LENGTH} & length \end{bmatrix} \\ \text{P-KEY} & \boxed{2} \end{bmatrix} \\ \text{PRED} & \boxed{2} \end{bmatrix}$$

The feature types WCHAR and FCHAR specify the whole character and the first character of a lexical entry, respectively. The feature WCHAR is identical to the STEM of the lexical entry. Next, the LENGTH specifies that an entry has *one* or *more-than-one* character. Finally, the *luk* feature BOUND specifies if an entry is a bound or non-bound form.[2] This is to ensure that one-character A_1 forms of a multi-character word are used outside of A-NOT-A, as they are not independent morphemes.

To provide a clearer idea, the entries in (11) illustrate the bound and non-bound forms of 喜欢, respectively. As they are identical to each other apart from length, they take the same PRED value.

[2]The *luk* constraint consists of three components, such as +, −, and *na* (not-applicable).

(11) a.
$$\begin{bmatrix} 喜 & \\ \text{STEM} & \boxed{1}\langle \text{‘喜’} \rangle \\ \text{BOUND} & + \\ \text{CHAR} & \begin{bmatrix} \text{FCHAR} & \text{‘喜’} \\ \text{WCHAR} & \boxed{1} \\ \text{LENGTH} & one \end{bmatrix} \\ \text{PRED} & _喜欢_v_rel \end{bmatrix}$$

b.
$$\begin{bmatrix} 喜欢 & \\ \text{STEM} & \boxed{1}\langle \text{‘喜欢’} \rangle \\ \text{CHAR} & \begin{bmatrix} \text{FCHAR} & \text{‘喜’} \\ \text{WCHAR} & \boxed{1} \\ \text{LENGTH} & more\text{-}than\text{-}one \end{bmatrix} \\ \text{PRED} & _喜欢_v_rel \end{bmatrix}$$

2.5 AVM

(12)
$$\begin{bmatrix} a\text{-}not\text{-}a\text{-}adv\text{-}lex & \\ \text{INDEX} & \boxed{1} \\ \text{POSTHEAD} & + \\ \text{MOD} & \left\langle \begin{bmatrix} +vjp & \\ \text{SF} & ques \\ \text{P-KEY} & \boxed{2} \\ \text{ASPECT} & \boxed{3} \\ \text{SUBJ} & \boxed{4} \\ \text{COMPS} & \boxed{5} \\ \text{LZG} & \boxed{6} \end{bmatrix} \right\rangle \\ \text{COMPS} & \left\langle \begin{bmatrix} +vjp & \\ \text{P-KEY} & \boxed{2} \\ \text{ASPECT} & \boxed{3} \\ \text{SUBJ} & \boxed{4} \\ \text{COMPS} & \boxed{5} \\ \text{LZG} & \boxed{6} \end{bmatrix} \right\rangle \\ \text{ICONS} & \left\langle ! \begin{bmatrix} focus & \\ \text{IARG1} & \boxed{1} \\ \text{IARG2} & \boxed{1} \end{bmatrix} ! \right\rangle \end{bmatrix}$$

(13) a.
$$\begin{bmatrix} 不_polar_basic & \\ \text{STEM} & \langle \text{‘不’} \rangle \\ \text{COMPS} & \left\langle \begin{bmatrix} \text{ASPECT} & non\text{-}aspect \\ \text{LZG} & no\text{-}lzg \end{bmatrix} \right\rangle \end{bmatrix}$$

b.
$$\begin{bmatrix} 没_polar_basic & \\ \text{STEM} & \langle \text{‘没’} \rangle \\ \text{COMPS} & \left\langle \begin{bmatrix} \text{ASPECT} & imperfective \\ \text{LZG} & guo \end{bmatrix} \right\rangle \end{bmatrix}$$

3 Different Forms of A-NOT-A Questions

3.1 A-NOT-A

(14)

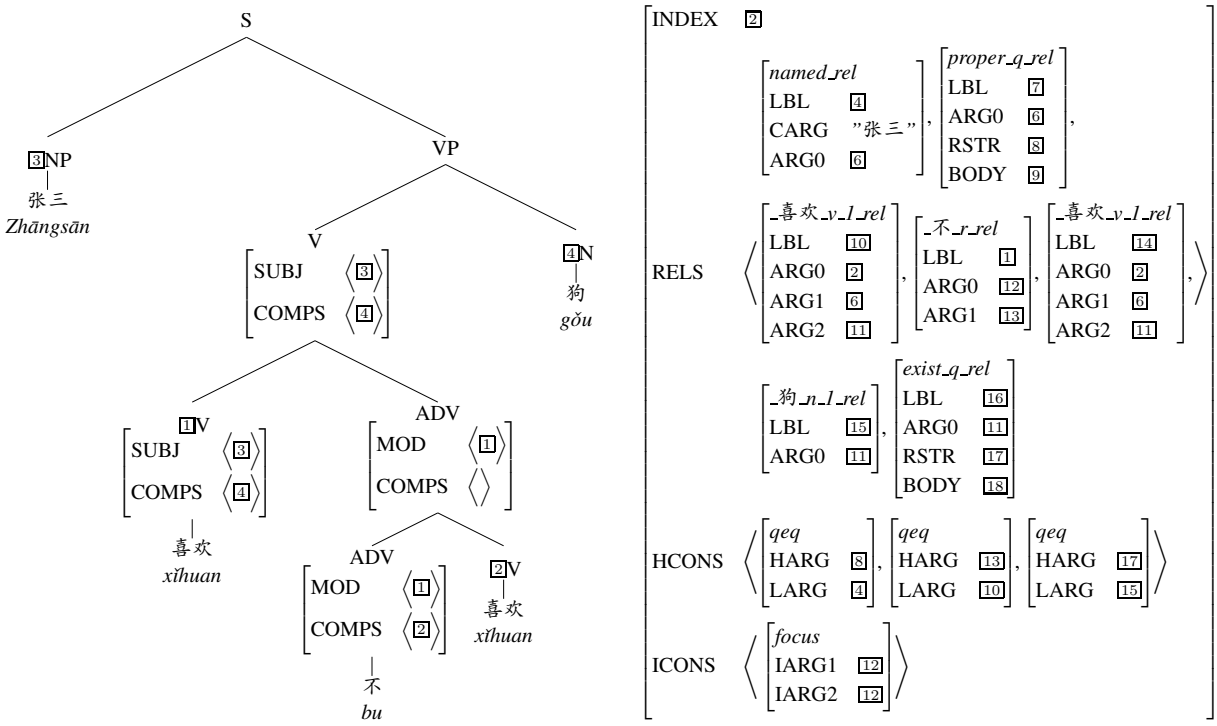


Figure 1: A sample derivation

$$\begin{bmatrix} \textit{a-not-a-basic-adv-lex} \\ \text{MOD} \left\langle \begin{bmatrix} \text{LIGHT} & + \\ \text{WCHAR} & \boxed{1} \\ \text{BOUND} & - \end{bmatrix} \right\rangle \\ \text{COMPS} \left\langle \begin{bmatrix} \text{LIGHT} & + \\ \text{WCHAR} & \boxed{1} \end{bmatrix} \right\rangle \end{bmatrix}$$

(15) a. * 张三 讨厌 不 喜欢 狗 ?
Zhāngsān taoyàn bù xihuān gou ?
Zhangsan hate NOT like dog PU

'(lit.) Does Zhangsan hate or not like dogs?'

b. * 张三 喜 不 喜 狗 ?
Zhāngsān xi bù xi gou ?
Zhangsan like NOT like dog PU

'Does Zhangsan like or not like dogs?'

3.2 A′-NOT-A

(16)
$$\begin{bmatrix} \textit{a-not-a-contracted-adv-lex} \\ \text{MOD} \left\langle \begin{bmatrix} \text{LIGHT} & + \\ \text{WCHAR} & \boxed{1} \\ \text{BOUND} & + \\ \text{LENGTH} & \textit{one} \end{bmatrix} \right\rangle \\ \text{COMPS} \left\langle \begin{bmatrix} \text{LIGHT} & + \\ \text{FCHAR} & \boxed{1} \\ \text{LENGTH} & \textit{more-than-one} \end{bmatrix} \right\rangle \end{bmatrix}$$

3.3 AB-NOT-AB

(17)
$$\begin{bmatrix} \textit{ab-not-ab-adv-lex} \\ \text{MOD} \left\langle \begin{bmatrix} \textit{verb} \\ \text{LIGHT} & - \\ \text{WCHAR} & \boxed{1} \end{bmatrix} \right\rangle \\ \text{COMPS} \left\langle \begin{bmatrix} \textit{verb} \\ \text{LIGHT} & - \\ \text{WCHAR} & \boxed{1} \end{bmatrix} \right\rangle \end{bmatrix}$$

4 Implementation

5 Evaluation

gTest pyDelphin
HELD-OUT TEST

References

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