

Rethinking quantifier scope in Mandarin

Keywords: quantifier scope, topicality, scope ambiguity, Scope Economy, Mandarin

Mandarin relative clauses (RCs) with quantifiers present an apparent scope puzzle. English RCs like (1a) are ambiguous (cf. 1b,c). Reading (1c), in which the embedded quantified object takes scope over the quantified head, is explained by the head raising analysis (Kayne 1994), wherein the head is restored to its original RC internal position (2a) and the quantified object takes inverse scope just as it would with the simple transitive (2b); thus under the head raising analysis, the availability of inverse scope in (1a) derives from its availability in (2b):

- (1) a. I have met three students that speak every language.
 b. ‘I have met three x ’s such that x is a student and x speaks every language’ ($3 > \forall$)
 c. ‘For every language x , I have met three y ’s such that y is a student and y speaks x ’ ($\forall > 3$)
 (2) a. [_{DP} three students [_{CP} that [_{TP} **three students** speak every language]]]
 b. Three students speak every language. ($3 > \forall$; $\forall > 3$)

Interestingly, Mandarin RCs like (3a) show the same ambiguity as their English counterparts (1a), with inverse scope possible. However, as has been widely discussed (Huang 1982, Aoun and Li 1993 amo), the corresponding simple transitive (3b) is perceived as unambiguous by Mandarin speakers.

- (3) a. Wo jian-guo [jiang **mei-zhong yuyan** de **san-ge xuesheng**].
 I meet-ASP speak every-CL language DE three-CL student
 ‘I have met three students who speak every language.’ ($3 > \forall$; $\forall > 3$)
 b. **San-ge xuesheng** jiang **mei-zhong yuyan**.
 three-CL student speak every-CL language
 ‘Three students speak every language.’ ($3 > \forall$; $*\forall > 3$)

How can scope ambiguity in (3a) be captured under head raising if the underlying transitive is unambiguous? Is the head raising account of (1a) simply wrong? Here we argue that the head raising account of (1a) is correct, and that the apparent puzzle arises from the analysis of (3b). In brief, we suggest that there is more to Mandarin “simple transitives” than meets the eye.

Fox (2000) offers a compelling account of quantifier scope assignment based on three core assumptions: (A) quantifiers not in “subject positions” (roughly, positions sister to a type $\langle e,t \rangle$ phrase) must raise to an interpretable position; (B) quantifier raising (QR) and quantifier lowering (QL) obey Shortest Move; and (C) optional QR and QL are possible only when they yield a truth-conditional (TC) difference. To illustrate these principles, in English (2b), *every language* is not interpretable *in situ* (4a) and hence must raise to an interpretable position (by A). Since vP sister is the closest such position, *every language* must raise there (4b) (by B). Without further movement, this will yield $3 > \forall$. But optional QL of *three students* is also possible since crossing *every language* will produce a TC difference (4c.i). Likewise, optional QR of *every language* is possible since crossing *three students* will produce a TC difference (4c.ii). Either option (4c.i or 4c.ii) will yield $\forall > 3$.

- (4) a. [_{TP} three students [_{VP} **three students** speak every language]].
 b. [_{TP} three students [_{VP} every language [_{VP} **three students** speak **every language**]]].
 c. i. [_{TP} --- [_{VP} every language [_{VP} three students speak **every language**]]].
 ii. [_{TP} every language [_{TP} three students [_{VP} **every language** [_{VP} **three students** speak e.l.]]]].

Suppose now that Mandarin transitives are identical to those of English up to TP, but contain an additional, higher TopP projection, to whose Spec Mandarin subjects typically raise (cf. Li and Thompson 1981, who characterize Mandarin as a “topic-prominent language”). Suppose further that Top has no TC content. Then (3b) will have the structure in (5a) at LF after *mei-zhong yuyan* ‘every language’ undergoes obligatory QR (cf. 4b). Note that *san-ge xuesheng* ‘three students’ cannot optionally lower to the closest available site (TP Spec) since this would have no TC effect (5b); likewise, *mei-zhong yuyan* ‘every language’ cannot optionally raise to the closest available site (TP sister) since this would have no TC effect (5c). In effect, scope is now frozen as $3 > \forall$.

- (5) a. [_{TopP} san-ge xuesheng TOP [_{TP} **san-ge x**. [_{VP} mei-zhong yuyan [_{VP} **san-ge x**. jiang **mei-zhong y**.]]]].
 b. $*[$ _{TopP} --- TOP [_{TP} san-ge xuesheng [_{VP} mei-zhong yuyan [_{VP} **san-ge x**. jiang **mei-zhong y**.]]]].
 c. $*[$ _{TopP} san-ge xuesheng TOP [_{TP} **mei-zhong y**. [_{TP} **san-ge x**. [_{VP} mei-zhong yuyan [_{VP} ...jiang...]]]].

If this account of fixed scope in Mandarin transitives like (3b) is correct, it makes the following simple predictions: (i) in clausal environments where TopP is unavailable, Mandarin transitives should show Q-scope ambiguity; (ii) *cetris paribus* scope freezing in Mandarin should be confined to subjects and objects. Direct objects and PP objects should show scope permutation; (iii) quantified subjects understood as non-topical should allow for inverse scope; and (iv) Mandarin subjects should show ambiguity in sentences with modals. These predictions appear correct.

RE (i): RCs like (3a) are widely held to involve a reduced left periphery that doesn't include TopP (Rizzi 1997). We ascribe the ambiguity of (3a) to this fact: minus TopP, Mandarin RCs will have essentially the same structure as English, allowing ambiguity in the same way. Likewise, Wu (2017) notes that Mandarin embedded clauses like (6a), strongly disfavor non-contrastive topicalization (6b); they also more freely admit scope ambiguity than the corresponding matrix sentences (6c):

- (6) a. Jingzhang shuo-guo Zhangsan kanshou nei-ge-chukou.
 sheriff say-ASP Zhangsan guard that-CL-exit
 'The sheriff said Zhangsan guards that exit.'
 b. ?? Jingzhang shuo-guo [**nei-ge-chukou**] Zhangsan kanshou.
 c. Jingzhang shuo-guo san-ming-jingcha kanshou mei-ge-chukou.
 sheriff say-ASP three-CL-policeman guard every-CL-exit
 'The sheriff said three policeman guard every exit.' ($3 > \forall$; $\forall > 3$)

RE (ii): Wu and Liu (2016) note that Mandarin PP Datives like (7) show both surface and inverse scope, with inverse scope even preferred in this case given the pragmatics. This is expected under Fox (2000) since both object QPs must raise by obligatory QR to vP and order of raising is free (7b,c):

- (7) a. Laoshi song-le [yi-xie pingyu] [_{PP} gei mei-ge xuesheng].
 teacher give-ASP some comment to every-CL student
 'The teacher gave some comments to every student.' $\exists > \forall$, $\forall > \exists$ (preferred)
 b. [_{vP} yi-xie pingyu [_{vP} mei-ge xuesheng [_{vP} laoshi song yi-xie pingyu gei mei-ge xuesheng]]]
 c. [_{vP} mei-ge xuesheng [_{vP} yi-xie pingyu [_{vP} laoshi song yi-xie pingyu gei mei-ge xuesheng]]]

RE (iii): Examples like (8) can be understood "thetically", i.e., as statements about a quantificational regularity that exists or is required, or "categorically", i.e., as statements about particular people, Understood thetically, Mandarin speakers do allow them to be read ambiguously wrt to scope:

- (8) (Anzhao falv guiding) san-ming jingcha kanshou meige chukou.
 (As law demand) three-CL police officer guard every exit
 'As required by law, three policemen guard every exit.' ($3 > \forall$; $\forall > 3$)

As discussed by Kuroda (1972), subjects of thetic sentences are de-topicalized. On our view Mandarin thetic sentences precisely lack TopP, hence their scopal ambiguity as in English.

RE (iv): When Mandarin embedded subjects (e.g., *heyiren* 'man in black' in 9) are understood as matrix topics, *de re* readings become possible with respect to modals and attitude verbs (e.g., *xiangxin* 'believe'):

- (9) Qinshihuang xiangxin heyiren shi cike.
 QSH believe man-in-black is assassin
de dicto: 'QSH believes for some x, MIB(x), x wants to assassinate him.'
de re: 'For some x, MIB(x), QSH believes that x wants to assassinate him.'

The scope puzzle introduced by Mandarin RCs thus leads to a wider rethinking of scope in Mandarin wherein "scope freezing" is not a general property of the language, but rather found with subjects and objects when the former function as topics. In other contexts (non-topical subjects, objects, etc.) freezing disappears and Mandarin behaves more similarly to English, as expected under Fox (2000).

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