Rethinking quantifier scope in Mandarin*

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1. Introduction

Mandarin relative clauses with quantifiers present an apparent scope puzzle. English relative clauses like (1) are ambiguous. Reading (1b), in which the embedded quantified object takes scope over the quantified head, is explained by the head raising analysis of English relative clauses (Kayne 1994, esp. Bianchi 1999), wherein the head is restored to its original relative clause 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 (1) derives from its availability in (2b).

(1) I have met three students that speak every language.
   a. 'I have met three *x*'s such that *x* is a student and *x* speaks every language'. (3 > ∀)
   b. 'For every language *x*, I have met three *y*'s such that *y* is a student and *y* speaks *x*'. (∀ > 3)

(2) a. [$_{DP}$ three students [$_{CP}$ that [$_{TP}$ **three students** speak every language]]]
   b. Three students speak every language. (3 > ∀; ∀ > 3)

Interestingly, Mandarin relative clauses like (3a) (cited from Huang 1982: 214) and (4a) show the same ambiguity as their English counterparts like (1), with inverse scope possible.

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(3) a. Wo mai-le [**san-ge-ren** xie de **mei-ben-shu**].[1]
I buy- asp **three- cl-man** write DE **every- cl-book**
'I bought every book that three men wrote.' (3 > ∀; ∀ > 3)

b. **San-ge-ren** xie-le **mei-ben-shu**
three- cl-man write-asp **every- cl-book**
'Three student wrote every book.' (3 > ∀; *∀ > 3)

(4) 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 > ∀; ∀ > 3)

b. **San-ge-xuesheng** jiang **mei-zhong-yuyan.**
three-cl-student speak every-cl-language
'Three students speak every language'. (3 > ∀; *∀ > 3)

Aoun & Li (2003: 132-138), Hsiao (2003: 111) and Wu (2018) strongly argue that Mandarin prenominal relative clauses should receive a head raising analysis. However, as has been widely discussed (Huang 1982, Aoun & Li 1993), Mandarin is a scope rigid language where the corresponding simple transitives like (3b) and (4b) are perceived as unambiguous by Mandarin speakers.

How can scope ambiguity in (3a) and (4a) be captured under head raising if the underlying transitive is unambiguous? Is the head raising account of relative clauses simply wrong? Here, we argue that the head raising account of (1) is correct, and that the apparent puzzle arises from the analysis of (3b) and (4b). In brief, we suggest that there is more to Mandarin "simple transitives" than meets the eye and that the scope puzzle of Mandarin relative clauses can be resolved under the Scope Economy theory proposed in Fox (2000).

2. Fox (2000) on scope interpretation

Fox (2000) offers a compelling account of quantifier scope interpretation based on three core assumptions: (A) quantifiers not in "subject positions" (roughly, positions sister to a type <e,t> phrase) must raise to an interpretable position; (B) quantifier raising and quantifier lowering must move a quantifier phrase to the closest position at which it is semantically interpretable, obeying Shortest Move. (C) optional quantifier raising and quantifier lowering are possible only when they yield a truth-conditional difference.

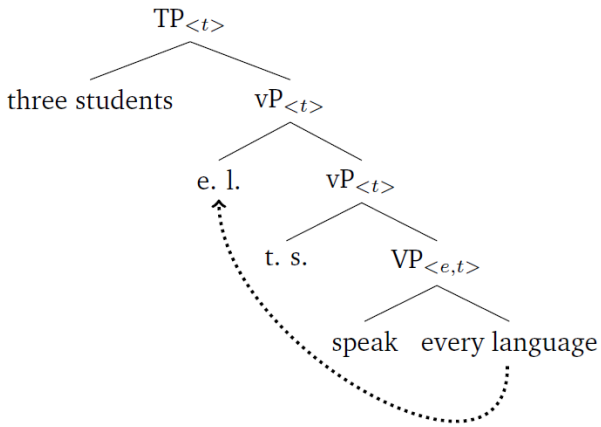
Under Fox (2000), the surface scope reading (3 > ∀) of English transitives *"Three students speak every language"* is derived as follows: first, *every language* is not interpretable in situ and hence must undergo obligatory quantifier raising to an interpretable position (by A); second, since *v*P sister is the closest such position, *every language* must raise there (by B); without further movement, the surface reading is derived, as in (5a). However, optional quantifier lowering of *three students* is also

[1] "cl", "asp" and "DE" refer to classifier, aspectual marker and relative clause marker respectively.

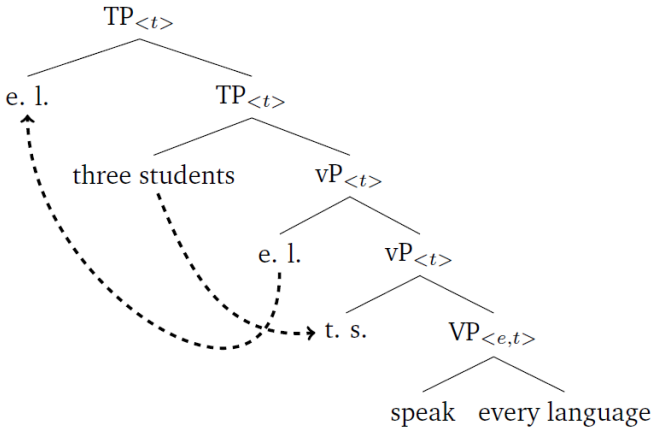
possible since crossing *every language* will produce a truth-conditional difference. Likewise, optional quantifier raising of *every language* is possible since crossing *three students* will produce a truth-conditional difference. Either way will yield ∀ > 3, as in (5b).

(5) *Derivations for "Three students speak every language" under Fox (2000)*

a.



b.



3. TopP projection of Mandarin simple transitives

Following the spirit that Mandarin is a "topic-prominent" language instead of a subject-object language (Chao 1968, Li & Thompson 1981, LaPolla 2009, etc.), we propose 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. Suppose further that Top has no truth-conditional content.

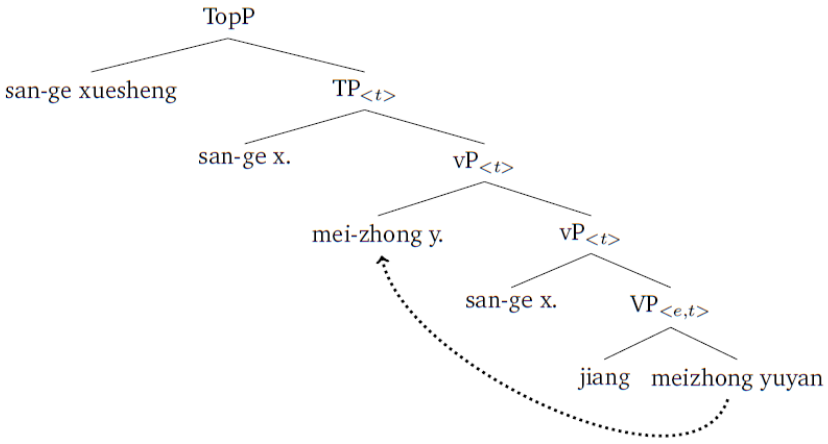
Under Fox (2000), (4b) (repeated here as (6)) will have the structure in (7a) at LF with the surface scope reading 3 > ∀ available, after *mei-zhong yuyan* 'every language' undergoes obligatory quantifier raising. However, restrained by the Scope Economy principle, as shown in (7b), neither optional quantifier lowering of *san-ge xuesheng* 'three students' to the closet interpretable position (Spec TP) nor optional quantifier raising of *mei-zhong yuyan* 'every language' to the closet interpretable position (adjoining to TP) is possible because neither operation can yield a truth-conditional difference. Since every single scope operation needs to be licensed by the three

principles of Fox (2000), it is illicit to simultaneously apply optional quantifier lowering of *san-ge xuesheng* and quantifier raising of *mei-zhong yuyan*. Hence, scope frozenness of (6) is expected.

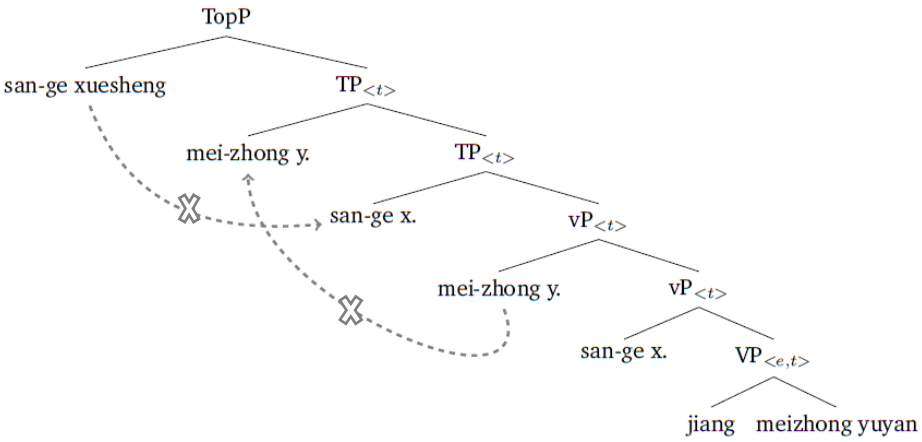
(6) **San-ge-xuesheng** jiang **mei-zhong-yuyan.**
three-cl-student speak every-cl-language
'Three students speak every language'. (3 > ∀; *∀ > 3)

(7) *Derivations for Mandarin simple transitives (6) under Fox (2000)*

a.



b.

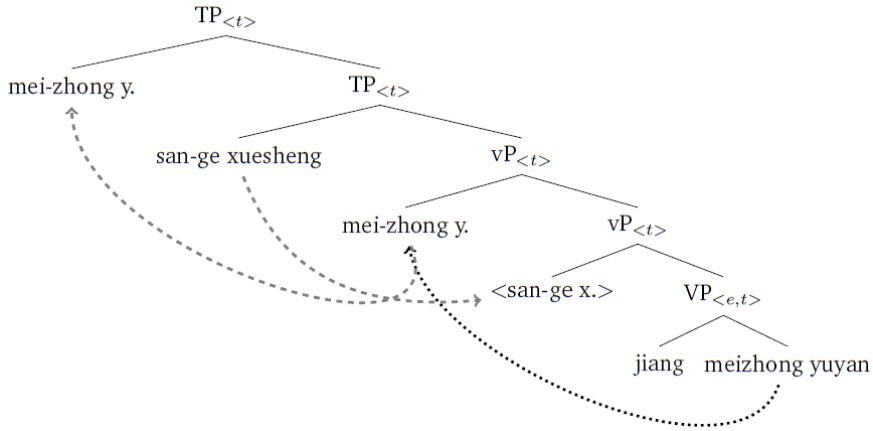


Under the head raising analysis of Mandarin relative clauses, the head of the relative clauses in (4a), *san-ge xuesheng* 'three students', is restored to its original relative clause internal position (8a), and as opposed to Mandarin matrix simple transitives like (6) which involve a TopP projection, the relative clause in (8a) does not have a TopP projection (8b), since it is widely held that relative clauses involve a reduced left-periphery that does not include TopP (Rizzi 1997). Thus, deriving the quantifier scope relations between *san-ge xuesheng* 'three students' and *mei-zhong yuyan* 'every language' will be just as in the English simple transitives (as in (9)), and the scope ambiguity for the Mandarin relative clauses with quantifiers like (3a) and (4a) is correctly predicted under Fox (2000).

(8) a. [$_{DP}$ [$_{CP}$ **san-ge-xuesheng** jiang mei-zhong-yuyan] de [$_{DP}$ san-ge-x.]]
three-cl-student speak every-cl-language DE three-cl-student
'three students that speak every language'

b. [$_{TP}$ san-ge-xuesheng jiang mei-zhong-yuyan]

(9) *Derivations for (8b) under Fox (2000)*



If the proposal that TopP projection prevents scope ambiguity in Mandarin simple transitives like (6) is correct, it implies the following two simple predictions: (i) quantified matrix subjects understood as non-topical should allow for inverse scope, while their topical counterparts do not; and (ii) quantified embedded subjects understood as topical should be able to interact with matrix modals and intentional verbs scopally. These predictions seem to be borne out.

4. Predictions and language data

Kuroda (1972) notes that a declarative sentence such as (10) can be either a thetic judgement, i.e., as a statement about a quantificational regularity that exists or is required, or a categorical judgement, i.e., as a statement about particular things. The former one ("thetic") is referring to a situation that there is an event of running and the agent of this action is recognized as a dog but whose identity has not been established in previous contexts, while the later one ("categorical") is a judgment with subject-predicate structure referring to a certain specific event of a certain definite dog whose identity has been established in previous contexts.

(10) A dog is running. (Kuroda 1972, example 9)

A thetic sentence is a de-topicalized sentence. Suppose thetic sentences lack a TopP projection. Understood "thetically", (11a) refers to a statement about a quantificational regularity that exists or is required, which can be expressed by a parenthetical phrase (*anzhao falü guiding* 'as required by law'), as in (11b). Mandarin native speakers do allow (11b) to be interpreted as ambiguous with respect to scope.

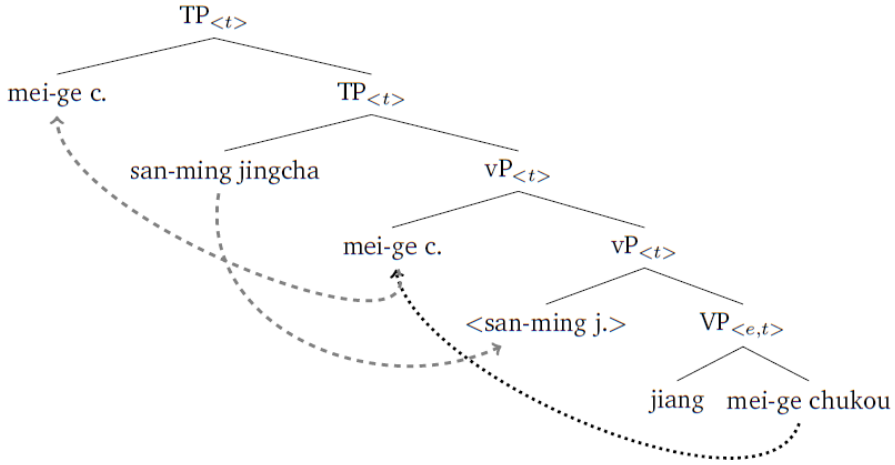
(11) a. san-ming-jingcha kanshou mei-ge-chukou.

three-cl-policeman guard every-cl-exit

b. (Anzhao falü guiding) san-ming-jingcha kanshou mei-ge-chukou.
(as law demand three-cl-policeman guard every-cl-exit
'As quired by law, three policeman guard every exit.' (3 > ∀; ∀ > 3)

Thus, (11b) will have the derivation at LF as in (12) under Fox (2000): the reading of 3 > ∀ is derived after *mei-zhong yuyan* 'every language' undergoes obligatory quantifier raising to vP sister position, and the reading of ∀ > 3 becomes available after either *san-ge xuesheng* 'three students' undergoes optional quantifier lowering to its trace position (vP Spec) or *mei-zhong yuyan* 'every language' undergoes optional quantifier raising to TP sister position.

(12) *Derivations for (11a) under Fox (2000)*



Likewise, when Mandarin embedded subjects (e.g. *heiyiren* 'man in black' in (13)) are understood as matrix topics, *de re* readings become possible with respect to modals and attitude verbs (e.g. *xiangxin* 'believe'):

(13) Qinshihuang xiangxin heiyiren shi cike.
Qinshihuang believe man-in-black is assassin
de dicto: 'Qinshihuang believes for some *x*, *x* is a man in black and *x* wants to assassinate him.'
de re: 'For some *x* and *x* is a man in black, Qinshihuang believes that *x* wants to assassinate him.'

5. Summary

The main proposal of this paper is that the TopP projection of Mandarin matrix clauses provides an explanation for the scope frozenness of simple transitives and the scope flexibility of relative clauses with a quantified head and a quantified NP inside.

The scope puzzle introduced by Mandarin relative clauses leads to a wider rethinking of scope in Mandarin wherein "scope freezing" or "scope rigid" is not a general property of the language, but rather found with subjects and objects when the

former function as topics. In other contexts, like thetic sentences, non-topical subjects and objects, scope freezing disappears and Mandarin behaves more similarly to English with respect to scope, as expected under Fox (2000).

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