



11-18-2022

Can the Head Quantifier Phrase Reconstruct in Doubly Embedded Chinese Relative Clauses?

Nianpo Su
Cornell University

Yunchuan Chen
Cornell University

Follow this and additional works at: <https://repository.upenn.edu/pwpl>

Recommended Citation

Su, Nianpo and Chen, Yunchuan (2022) "Can the Head Quantifier Phrase Reconstruct in Doubly Embedded Chinese Relative Clauses?," *University of Pennsylvania Working Papers in Linguistics*: Vol. 28: Iss. 1, Article 20.

Available at: <https://repository.upenn.edu/pwpl/vol28/iss1/20>

This paper is posted at ScholarlyCommons. <https://repository.upenn.edu/pwpl/vol28/iss1/20>
For more information, please contact repository@pobox.upenn.edu.

Can the Head Quantifier Phrase Reconstruct in Doubly Embedded Chinese Relative Clauses?

Abstract

Aoun and Li (2003) claimed that when a universal quantifier phrase (QP) occurs in the doubly embedded subject position of Chinese relative clauses (RCs), it cannot be raised out of the RC and thus cannot have scope over the head of the RC. This study investigated whether it is really true that when a universal QP occurs in the doubly embedded subject position of Chinese RCs, it cannot take scope over the head of the RC. With a controlled truth value judgment experiment, our findings suggest that in Chinese RCs, it is possible for the universal QP in the doubly embedded subject position to have scope over the head QP, which contradicts Aoun and Li's (2003) claim. Furthermore, our findings cast doubt upon the raising analysis (Aoun and Li 2003, Lee 1986) for the universal QP in the RC subject position of Chinese RCs. We argue that the head of Chinese RCs, regardless of whether it is a QP or an NP, can reconstruct into its base position inside the RC. There is no need to stipulate that in Chinese RCs, a head NP can reconstruct while a head QP cannot.

Can the Head Quantifier Phrase Reconstruct in Doubly Embedded Chinese Relative Clauses?

Nianpo Su and Yunchuan Chen

1 Introduction

It has long been established that whether the head of relative clauses (RCs) can reconstruct into the RC at Logical Form (LF) suggests whether there is any syntactic movement involved (e.g. Brame 1967, Chomsky 1993, Schachter 1973). There are several commonly used diagnostics to examine the head reconstruction in RCs, one of which is from scope assignment (e.g. Bianchi 1999, Aoun and Li 2003). An example is shown in (1):

- (1) I called the two patients that every doctor will examine tomorrow. (Bianchi 1999)

There are two possible interpretations of (1):

- (i) every doctor will examine the same group of two patients tomorrow and I called them (*two*>*every*).
- (ii) every doctor will examine different groups of two patients tomorrow and I called them (*every*>*two*).

The existence of (ii) indicates that the RC head *two patients* can reconstruct into the embedded clause and be interpreted in the direct object position so the universal quantifier *every* can have scope over it. Since reconstruction implies syntactic movement, the reconstruction of the head in (1) further suggests that it is raised from within the RC.

For Chinese RCs, Aoun and Li (2003) argued that whether the head can reconstruct into the RC is determined by its phrasal category. That is, when the head is a noun phrase (NP), reconstruction is possible but when it is a quantifier phrase (QP), reconstruction cannot happen. Thus, there is an NP/QP distinction concerning head reconstruction in Chinese RCs: an NP head can reconstruct into the RC but a QP head cannot. This distinction is further complicated by whether *dou* 'all' is present inside the RC. Aoun and Li (1993, 2003) observed that when there is a *dou* 'all' inside the RC, a universal QP in the RC subject position cannot have scope over a head QP. But when there is no *dou* 'all,' such universal QP can have scope over the head QP. To account for this contrast, Aoun and Li made the following proposal:

- (2) a. a head QP simply cannot reconstruct into the RC in Chinese.
b. when there is no *dou* inside the RC, a universal QP in the RC subject position can be raised out of the RC at LF and have scope over the head of the RC.
c. when there is *dou* inside the RC, a universal QP in the RC subject position cannot be raised out of the RC because *dou* has a domain requirement.

Aoun and Li (2003) further argued that this proposal is supported by doubly embedded Chinese RCs: a universal QP in a doubly embedded subject position cannot be raised outside the RC and cannot have scope over a head QP.

With a truth value judgment experiment (Crain and Thornton 1998), this paper investigated whether it is true that in doubly embedded Chinese RCs, a universal QP in the RC subject position cannot have scope over a head QP. Contrary to Aoun and Li's claim, our findings show that a universal QP in the doubly embedded subject position can indeed have scope over a head QP. Implications will be discussed.

2 Issue

Aoun and Li (2003) argued that the head NP of Chinese RCs can reconstruct into the embedded clause, with evidence from anaphor binding:

- (3)[[wo jiao Zhangsan quan [mei-ge-ren_i kai t_j lai de]] [ziji-de chezi]_i].
 I ask Zhangsan persuade every-CLF-person drive come DE self-GEN car
 ‘self’s car that I asked Zhangsan to persuade everyone to drive over.’
 (Aoun and Li, 2003:132)

In (3), the anaphor *ziji* ‘self’ within the head NP can be co-indexed with the most embedded subject *mei ge ren* ‘everyone,’ which suggests that the head NP *ziji de chezi* ‘self’s car’ can reconstruct into the RC and be interpreted in the direct object position at LF. Since reconstruction occurs only when syntactic movement is involved (Chomsky 1993), Aoun and Li concluded that the head NP must be raised from within the RC in Chinese.

However, such reconstruction is not always available when it comes to head QPs. Aoun and Li observed that (4) and (5) differ in whether the universal QP in the RC subject position can have scope over the head QP. Note that (4) has *dou* ‘all’ inside the RC while (5) does not.

- (4) wo hui zhengli [mei-ge-ren dou hui kan t_i de] [san-ben shu]_i.
 I will arrange every-CLF-person all will read DE three-CLF book
 ‘I will put the three books that everyone will read in order.’ (same three books)
 (Aoun and Li, 2003:133)

- (5) wo hui zhengli [mei-ge-ren hui kan t_i de][san-ben shu]_i.
 I will arrange every-CLF-person will read DE three-CLF book
 ‘I will put the three books that everyone will read in order.’ (same/different three books)
 (Aoun and Li, 2003:134)

Aoun and Li claimed that in (4), *san ben shu* ‘three books’ must be the same set of three books that everyone will read so the head QP always has scope over the universal QP in the RC subject position. In contrast, in (5), *san ben shu* ‘three books’ can be different sets of three books, which indicates that the head QP can reconstruct into the RC at LF so *mei ge ren* ‘everyone’ can have scope over it. Based on this observation, Aoun and Li argued that when a Chinese RC has a head QP having the form [Q+CLF+N], it simply cannot reconstruct into the RC at LF. Therefore, a universal QP in the RC subject position can never have scope over a head QP in Chinese RCs.

But how do we account for (5), where the universal QP can have scope over the head QP? Aoun and Li (1993, 2003) proposed the following analysis: when there is no *dou* ‘all’ inside the RC, the RC subject *mei ge ren* ‘everyone’ can be raised out of the RC and c-command the head QP *san ben shu* ‘three books.’ Then why can the QP in the embedded subject position be raised out of the RC? Based on the argument that QPs are raised and adjoined to an inflection phrase (IP) or a verb phrase (VP) at LF (e.g. Chomsky 1986, May 1985), Lee (1986) claimed that a QP in the subject position of Chinese RCs is raised to adjoin to the VP of the higher clause rather than the embedded IP. This is because Chinese lacks Agreement and the embedded IP cannot be a governing category for the trace of the raised QP to be properly bound. However, if there is a *dou* ‘all’ inside the RC, such as (4), the RC subject *mei ge ren* ‘everyone’ cannot be raised due to the domain requirement of *dou* ‘all.’ That is, the universal QP *mei ge ren* ‘everyone’ must be within the government domain of the particle *dou* ‘all.’

Furthermore, Aoun and Li (2003) provided another piece of evidence arguing for the raising of the QP in (5): if the embedded universal QP fails to be raised out of the RC, it cannot have scope over the head QP, which is shown in (6):

- (6) wo hui zhengli [ta xiwang [mei-ge-ren hui kan t_i de]][san-ben shu]_i.
 I will arrange he hope every-CLF-person will read DE three-CLF book
 ‘I will put the three books that he hopes that everyone will read in order.’ (same 3 books)
 (Aoun and Li, 2003:137)

In (6), the universal QP *mei ge ren* ‘everyone’ is located in a doubly embedded RC subject position. In contrast to (5), where *mei ge ren* is in a singly embedded RC subject position, the universal QP *mei ge ren* ‘everyone’ in (6) cannot have scope over the head QP *san ben shu* ‘three books,’ which means the *three books* has to be the same set of three books. This is because, according to Lee’s (1986) claim, the universal QP *mei ge ren* ‘everyone’ is raised to the higher clause and adjoined to the VP headed by *xiwang* ‘hope.’ It is still within the RC and cannot have scope over the head QP *san ben shu* ‘three books.’ In contrast, the universal QP can be raised out of the RC in (5).

However, Aoun and Li’s (2003) claim that *mei ge ren* ‘everyone’ cannot have scope over *san ben shu* ‘three books’ in (6) might be based on a few native speakers’ judgment and might not have been experimentally tested. To address this issue, this study conducted a controlled experiment to investigate the following question:

- (7) In Chinese RCs, can a universal QP in a doubly embedded subject position have scope over a head QP?

We will show that the answer is *yes* for this question, which is against Aoun and Li’s (2003) claim.

3 Experiment

3.1 Participants

A total of 30 native Chinese speakers participated in our experiment and they were all university students. Based on our background information survey, their age ranged from 19 to 25 (mean age = 20.9) and none of them had experience of living abroad before 16. All participants were compensated for their participation.

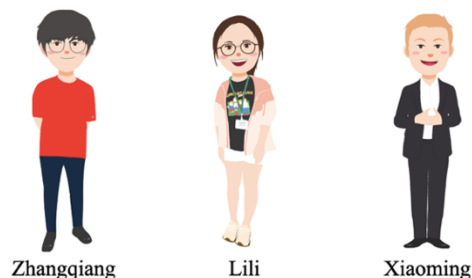
3.2 Procedure

Each participant did this experiment by using a laptop. The picture-matching truth value judgment experiment was preceded by a brief background information survey, which included age, native language, experience of living abroad, as well as an instruction session. The whole experiment took each participant approximately 30 minutes.

3.3 Design and Materials

A picture-matching truth value judgment experiment (Crain and Thornton 1998) was created to investigate whether native Chinese speakers allow a universal QP in the doubly embedded RC subject position to have scope over a head QP in Chinese RCs. Three student characters, Zhangqiang, Lili and Xiaoming, as in (8), were used in the experiment. Each experimental item began with a brief story. Below is an example: There are 6 different letters in a classroom, as illustrated in (9), and they were numbered from 1 to 6.

(8)



(9)

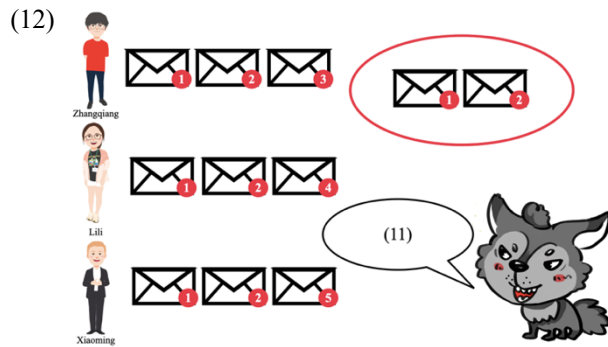


There were two experimental conditions. For the first condition, the story continued like this: One day, Zhangqiang read letter①, letter② and letter③, Lili read letter①, letter② and letter④, Xiaoming read letter①, letter② and letter⑤, as shown in (10). The whole event was seen by a wolf.



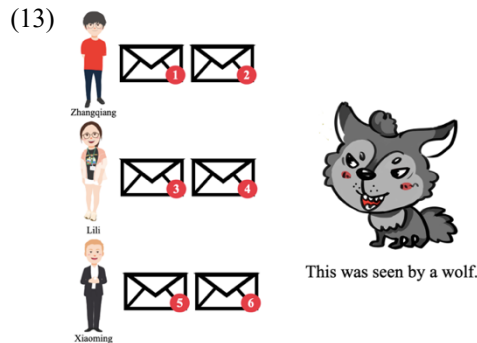
Then the wolf came out and said the sentence in (11) in the picture of (12).

- (11) [wo kanjian mei-ge xuesheng du de][liang-feng xin] zai hongquan li.
 I see every-CLF student read DE two-CLF letterexist red circle inside
 ‘The two letters that I saw every student read are inside the red circle.’

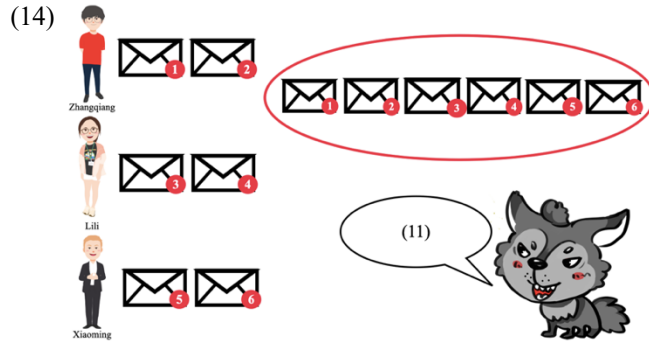


The participants read the sentence in (11) and were asked to judge whether it was correct under the context given in (12) by selecting ‘Match’ or ‘Mismatch.’ In order for (11) to match (12), the head QP *liang feng xin* ‘two letters’ should have scope over the universal QP *mei ge xue sheng* ‘every student’ and this is our ‘head QP>∀’ condition.

For the second condition, the story concerning the 6 letters shown in (9) would be like this: One day, Zhangqiang read letter① and letter②, Lili read letter③ and letter④, Xiaoming read letter⑤ and letter⑥, and the whole event was seen by a wolf, as in (13):



Then the wolf came out and said the sentence in (11) in the picture of (14) and the participants were asked to judge whether the sentence and the picture matched.



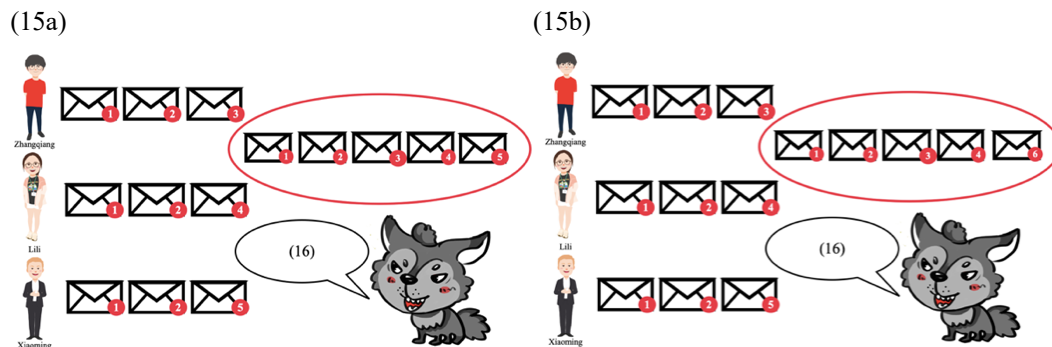
In order for (11) to match (14), the doubly-embedded universal QP *mei ge xue sheng* ‘every student’ should have scope over the head QP *liang feng xin* ‘two letters’ and this is our ‘ \forall >head QP’ condition.

If Aoun and Li’s (2003) judgment on (6) is valid, we expect native Chinese speakers to consistently accept the ‘head QP> \forall ’ items such as (11) and (12) but consistently reject the ‘ \forall >head QP’ items such as (11) and (14).

We created both the ‘head QP> \forall ’ condition and the ‘ \forall >head QP’ condition for each experimental item. There were 20 sentences of different lexicalizations, each of which was then combined with a picture to create either the ‘head QP> \forall ’ reading or the ‘ \forall >head QP’ reading condition. It resulted in 40 sentence-picture pairs, which were distributed into two lists so that each list contained only one condition from the same lexicalization. Thus, there were a total of 20 critical stimuli in each list and each condition had 10 stimuli. Moreover, 40 fillers were included in each list as a screening test to monitor whether the participants were careful enough in reading sentences or whether they made choices based on their preference.

Two types of fillers were created: 20 Type 1 fillers and 20 Type 2 fillers. The Type 1 filler always follows the item of either the ‘head QP> \forall ’ or the ‘ \forall >head QP’ condition and it has two conditions: Filler 1a and Filler 1b. Type 1 fillers were used to monitor whether participants have paid enough attention to the experimental items.

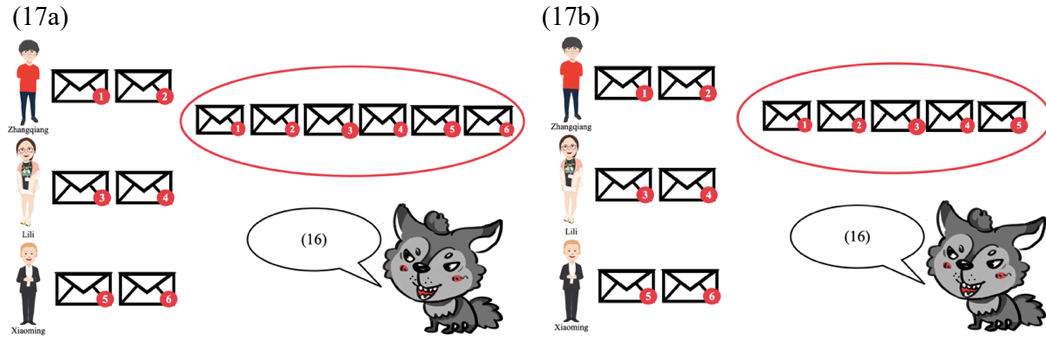
The Filler 1a condition was created in such a way that participants were expected to select ‘Match’ whereas the Filler 1b condition was where participants were expected to select ‘Mismatch.’ For example, the Type 1 filler that follows the ‘head QP> \forall ’ item shown in (11) and (12) is illustrated below:



- (16) [quanti xuesheng du de] [suoyou-de xin] zai hong quan li.
 all student read DE all-GEN letter exist red circle inside
 ‘All the letters that all the students read are inside the red circle.’

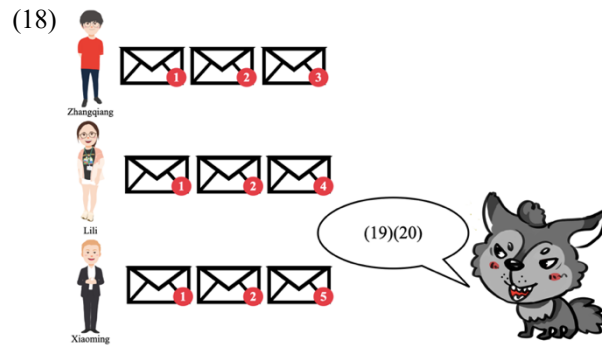
Since (16) is correct under the context in (15a), participants were expected to select ‘Match.’ The combination of (15a) and (16) is a Filler 1a item. In contrast, since (16) is incorrect under the context in (15b), participants were expected to select ‘Mismatch’ and the combination of (15b) and (16) is a Filler 1b item.

Moreover, the Type 1 filler that follows the ‘ \forall >head QP’ item shown in (11) and (14) is illustrated below:



The sentence said by the wolf is the same as (16) and participants were expected to select ‘Match’ under the context in (17a). The combination of (17a) and (16) is a Filler 1a item. In contrast, participants were expected to select ‘Mismatch’ under the context in (17b) and the combination of (17b) and (16) is a Filler 1b item. In all, there were 10 Filler 1a items and 10 Filler 1b items. If our participants have paid enough attention to the experimental items, based on the binomial distribution, we expect them to accept 8 or more items of Filler 1a and reject 8 or more items of Filler 1b. If they fail to do so, their data should be removed.

Type 2 fillers were used to examine whether the participants made judgments based on their preference rather than acceptability. Participants were expected to select ‘Match’ for all Type 2 fillers. There were two conditions: Filler 2a and Filler 2b. The sentence in Filler 2b was designed to include more information than that in Filler 2a. For instance, the Type 2 Filler that follows the ‘head QP> \forall ’ item shown in (11) and (12) is illustrated below:



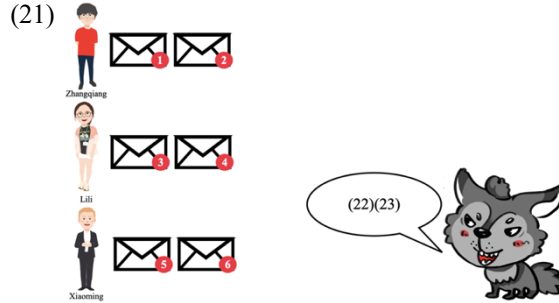
(19) Lili du-le sihao xin.
 Lili read-PST number 4 letter
 ‘Lili read #4 letter.’

The combination of (18) and (19) is a Filler 2a item. Since (19) is correct under the context in (18), participants were expected to select ‘Match’ for the Filler 2a condition. Moreover, the Filler 2b condition includes (18) and (20):

(20) Lili du-le sihao xin he yihao xin.
 Lili read-PST number 4 letter and number 1 letter
 ‘Lili read #4 letter and #1 letter.’

Since (18) is also correct under the context in (20), participants were expected to select ‘Match’ for the Filler 2b condition as well. Note that (20) provides more information than (19) as to the letters that Lili read in (18). If there are participants who consistently accept one condition but reject the other, we can infer that they may make judgments based on their preference rather than acceptability. Basically, the Type 2 fillers were used to monitor whether our participants would reject what they should not reject.

Moreover, the Type 2 filler that follows the ‘ \forall >head QP’ item shown in (11) and (14) is illustrated below:



- (22) Lili du-le sihao xin.
 Lili read-PST number 4 letter
 ‘Lili read #4 letter.’

The combination of (21) and (22) is a Filler 2a item. Since (21) is correct under the context in (22), participants were expected to select ‘Match.’ Furthermore, the Filler 2b condition includes (21) and (23):

- (23) Lili du-le sihao xin he sanhao xin.
 Lili read-PST number 4 letter and number 3 letter
 ‘Lili read #4 letter and #3 letter.’

Similarly, participants were expected to select ‘Match’ since (21) is also correct under the context in (23). Here we can see that (23) is more informative than (22) as to the letters that Lili read in (21). If there are participants who consistently accept one condition but reject the other, we can conclude that they may make judgments based on their preference rather than acceptability. Altogether, there were 10 Filler 2a and 10 Filler 2b items. If our participants have paid enough attention to the experimental items and did not make judgments based on their preference, they should accept 8 or more items in both conditions, based on the binomial distribution. The order of all items was pseudo-randomized.

3.5 Findings

Recall that Type 1 and Type 2 fillers were used to check whether our participants had paid enough attention to the experimental items and made choices based on the acceptability of items. The data showed that 3 participants failed to reject 8 items or more of Filler 1b and their data were removed.

Then we have a total of 27 participants’ data for further analysis. The mean frequencies of accepting items in the ‘head QP> \forall ’ condition and the ‘ \forall >head QP’ condition were 0.93 and 0.78, respectively. Furthermore, pairwise comparison tests showed that there is no significant difference between the two critical conditions ($t(26) = 1.57, p = .13$). This result was against Aoun and Li’s (2003) claim that in Chinese RCs, a universal QP in the doubly embedded RC subject position cannot have scope over a head QP.

Moreover, the participants’ individual data showed that 19 (70.4%) of them accepted 8 items or more in either the ‘head QP> \forall ’ or the ‘ \forall >head QP’ condition. For the ‘head QP> \forall ’ condition, 24 participants accepted all 10 items and 1 participant accepted 9 items. The remaining 2 participants

accepted 3 and 0 items respectively. In terms of the ‘ \forall >head QP’ condition, 20 participants accepted all 10 items, 1 participant accepted 9 items and 6 participants rejected 8 items or more. For the 6 participants who consistently rejected the ‘ \forall >head QP’ items, they also consistently accepted the ‘head QP> \forall ’ items. In other words, the only interpretation available to them is the ‘head QP> \forall ’ reading. Indeed, their inability to obtain the ‘ \forall >head QP’ reading is expected because in order to get it, participants have to reconstruct the head QP into the RC at LF, which requires extra processing efforts (Anderson 2004). Note, however, there is no such reconstruction involved in obtaining the ‘head QP> \forall ’ reading. Thus, the ‘head QP> \forall ’ reading should be preferred to the ‘ \forall >head QP’ reading due to the lighter processing load.

Since there were 21 participants (77.8%) who consistently accepted the ‘ \forall >head QP’ items and there was no significant difference between the ‘ \forall >head QP’ and ‘head QP> \forall ’ items, we conclude that a universal QP in the doubly embedded subject position of Chinese RCs can have scope over a head QP.

4 Discussion

Both the group and individual data of our experiment strongly indicate that in Chinese RCs, a universal QP in a doubly embedded subject position can have scope over a head QP, which goes against Aoun and Li’s (2003) claim. Recall Aoun and Li argued that in (24), the universal QP *mei ge ren* ‘everyone’ cannot have scope over the head QP *san ben shu* ‘three books’ because the universal QP cannot be raised out of the doubly embedded RC.

- (24) wo hui zhengli [ta xiwang [mei-ge-ren hui kan ti de]][san-ben shu].
 I will arrange he hope every-CLF-person will read DE three-CLFbook
 ‘I will put the three books that he hopes that everyone will read in order.’

Nevertheless, our experimental result showed that this is not true: the universal QP can have scope over the head QP. This finding casts doubt on the raising analysis. That is, is it necessary to claim that the universal QP should be raised to its higher clause at LF?

As reviewed, this raising analysis was proposed to account for the contrast between (4) and (5), repeated in (25) and (26) below:

- (25) wo hui zhengli [mei-ge-ren dou hui kan ti de][san-ben shu].
 I will arrange every-CLF-person all will read DE three-CLF book
 ‘I will put the three books that everyone will read in order.’
- (26) wo hui zhengli [mei-ge-ren hui kan ti de] [san-ben shu].
 I will arrange every-CLF-person will read DE three-CLF book
 ‘I will put the three books that everyone will read in order.’

(25) has the particle *dou* ‘all’ inside the RC while (26) does not. Aoun and Li stated that it is possible for the universal QP *mei ge ren* ‘everyone’ to have scope over the head QP *san ben shu* ‘three books’ in (26) but not in (25) because, if the head QP can reconstruct into the RC, such asymmetry between (25) and (26) cannot be accounted for. Thus, the universal QP in (26) was analyzed to be raised to the higher clause, where it can c-command and have scope over the head QP. In contrast, in (25), the universal QP cannot be raised due to the domain requirement of the particle *dou* ‘all.’

In order to investigate whether there is really a difference between (25) and (26) in terms of scope assignment, Chen (2020) conducted an experimental study and the result did not show the claimed contrast. That is, regardless of the existence of *dou* ‘all’ inside the RC, the universal QP in the RC subject position can always have scope over the head QP. Based on this finding, Chen argued that the head QP in Chinese RCs can reconstruct into the RC, the same as the head NP, and Aoun and Li’s (2003) NP/QP distinction concerning the head reconstruction in Chinese RCs is unnecessary. Following Chen’s study, the experimental finding in the current study further suggests that the head QP can reconstruct into the RC in Chinese RCs. In sentences involving a doubly embedded RC like (24), the head QP can reconstruct into its base position inside the RC and can be c-

commanded by the universal QP in the RC subject position. Thus, we argue that the head of Chinese RCs can always reconstruct into the RC, regardless of its phrasal category, and the raising analysis (Aoun and Li 2003, Lee 1986) for the universal QP in the RC subject position is unnecessary.

5 Conclusion

Aoun and Li (2003) claimed that a universal QP in the doubly embedded subject position of Chinese RCs cannot be raised out of the RC to have scope over a head QP. However, with a controlled truth value judgment experiment, this study found the opposite. That is, in Chinese RCs, a universal QP in the doubly embedded subject position can indeed have scope over a head QP. This finding casts doubt upon the raising analysis (Aoun and Li 2003, Lee 1986) for the universal QP in the RC subject position of Chinese RCs. Instead, we argue that the head of Chinese RCs, regardless of whether it is a QP or an NP, can reconstruct into its base position inside the RC. There is no need to stipulate that in Chinese RCs, a head NP can reconstruct while a head QP cannot.

References

- Anderson, Catherine. 2004. The structure and real-time comprehension of quantifier scope ambiguity. Doctoral dissertation, Northwestern University.
- Aoun, Joseph, and Li, Yen-Hui. 2003. *Essays on the Representational and Derivational Nature of Grammar: The Diversity of Wh-Constructions*. Cambridge, Mass.: MIT Press.
- Aoun, Joseph, and Li, Yen-Hui. 1993. *Syntax of Scope*. Cambridge, Mass.: MIT Press.
- Bianchi, Valentina. 1999. *Consequences of Antisymmetry: Headed Relative Clauses*. New York: Mouton de Gruyter.
- Bianchi, Valentina. 2000. The raising analysis of relative clauses: a reply to Borsley. *Linguistic Inquiry*, 31(1):123-140.
- Brame, Michael. 1967. A new analysis of the relative clause: evidence for an interpretive theory. Unpublished manuscript, MIT.
- Chen, Yunchuan. 2020. An experimental investigation of reconstruction effects of the head quantifier phrase in Chinese relative clauses. Paper presented at NACCL-32, University of Connecticut.
- Chomsky, Noam. 1986. *Knowledge of Language*. New York: Praeger Publishers.
- Chomsky, Noam. 1993. A minimalist program for linguistic theory. In *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*, ed. K. Hale and S.J. Keyser, 1-57. Cambridge, Mass.: MIT Press.
- Crain, Stephen, and Thornton, Rosalind. 1998. *Investigations in Universal Grammar: A Guide to Experiments on the Acquisition of Syntax and Semantics*. Cambridge, Mass.: MIT Press.
- Lee, Thomas Hun-Tak. 1986. Studies on quantification in Chinese. Doctoral dissertation, University of California, Los Angeles.
- May, Robert. 1985. *Logical Form: Its Structure and Derivation*. Cambridge, Mass.: MIT Press.
- Schachter, Paul. 1973. Focus and Relativization. *Language(Baltimore)*, 49(1) :19-46.

Department of Linguistics
 Cornell University
 Ithaca, NY 14853
 ns674@cornell.edu
 yunchuan.chen@duke.edu