

# Quantifier scope in Mandarin thetic sentences

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# Outline

**1** Introduction

**2** Research question

**3** Experiment

**4** Discussion

## What we've known about Mandarin quantifier scope

As widely noted and experimentally attested to, Mandarin simple transitives (1) and (2) are unambiguous. ( (Huang 1982, Aoun and Li 1993 and subsequent literature).

- (1) Yi-zhi-xiaogou chidiao-le mei-kuai-dangao.  
 a-CL-doggy eat-ASP every-CL-cake  
 'A dog ate every cake.' ( $\exists > \forall$ ,  $*\forall > \exists$ ) (Su 2001: 61)
- (2) Turan, yi-ge-jingcha zhuazou-le mei-ge-xuesheng.  
 suddenly one-CL-cop arrest-ASP every-CL-student  
 'Suddenly, a cop arrested every student.' ( $\exists > \forall$ ,  $*\forall > \exists$ ) (Lee 1989, ex. 3)

## What if simple transitives in a **thetic** environment

According to an empirical observation made in Larson and Wu (2018, ex. 30), examples like (3), although a simple transitive, can be read ambiguously wrt to scope.

- (3) San-ming-jingcha    kanshou mei-ge-chukou.  
three-CL-policeman guard    every-CL-exit  
'Three policemen guard every exit.' ( $\exists > \forall$ ,  $\forall > \exists$ ) (Larson and Wu 2018, ex. 30)

Following Kuroda 1972's thetic-categorical distinction, Larson and Wu (2018) argues that, understood thetically, the inverse scope reading of is even pragmatically preferred and this interpretation is enhanced by a parenthetical like *anzhao falü guiding* 'as law demand'.

## What isthetic-categorical distinction

Kuroda (1972) (following Brentano) proposes that sentences can be understood categorically or thetically.

Categorical predications attribute properties to individuals.

Thetic predications assert general regularities or the existence of events.

Understood categorically, (4) predicates running of a certain definite dog. Understood thetically, (4) describes an event of running whose agent is recognized as a dog, but whose identity is neither established in previous contexts or at issue.

(4) A dog is running.

## Research questions

Mandarin sentences with thetic judgments have been reported in quite a few studies (Shyu 1995, ch.4; C.-T. J. Huang, Y.-H. A. Li and Y.-F. Li 2009, ch. 8; Liu 2013, ch.3; Li 2014).

However, no studies have done a large-scale experiment on whether doubly-quantified thetic sentences allow inverse scope reading, or on whether Mandarin matrix transitives could potentially be ambiguous with proper contexts, to the best of my knowledge.

### Question

How native speakers interpret thetic sentences like (5)?

- (5) San-ming-jingcha    kanshou mei-ge-chukou.  
three-CL-policeman guard    every-CL-exit  
'Three policemen guard every exit.'

## Methodology

- ▶ The task in this experiment was a multiple-choice task based on the “How many” task (Anderson 2004), and the contexts given for each target sentence did not favor a particular scope reading. Each target sentence was followed by a comprehension question with four possible answers, as shown in (6)-(8).
- (6) *Context:* The person in charge of the stadium security asked the Assistant to the Chief at the Police Station about specific arrangements of the security working for the stadium. The bold sentence below is the reply of the Assistant to the Chief.
- (7) *Target sentence:* **Four policemen guard every exit.**
- (8) *Comprehension question and four possible answers:* Assume that there is a total of five exits in the stadium. How many policemen are needed to undertake the security tasks of guarding the stadium?  
A. 4 B. 4 to 20 C.  $5 \times 4 = 20$  D. more than 20

## Methodology (cont.)

- ▶ An untimed, offline experiment was conducted through the Qualtrics online survey tool.
- ▶ All sentences including instructions were fully displayed on the screen with simplified Chinese characters.
- ▶ Participants were recruited through advertisements in social media and emails. Participation in this experiment was anonymous. They were asked to choose all appropriate answers based on their understanding of the given contexts and the target sentences.



## Stimuli design

- ▶ One factor for the stimuli: the presence of *hui* (modal, or future-tense marker, see Huang 1982:350-351, and Y.-H. A. Li 1990:21-22).
- ▶ 8 sets of 2 sentences (one sentence with *hui* and one sentence without *hui* in each set) were created as the target sentences.
- ▶ The verbs used for the stimuli were all disyllabic verbs such as *kanshou* 'guard', and *pingshen* 'review'. For the stimuli, the existential quantificational phrase (subject position) linearly precedes the universal quantificational phrase (object position).
- ▶ 16 target sentences were randomized with 128 fillers and distributed across 8 lists in a Latin Square Design.
- ▶ Each participant was presented with 2 target sentences (one sentence for each condition) intermingled with 16 fillers.

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## Experiment: Stimuli design

Condition	Structure of the target sentences	Type of clause	Presence of <i>hui</i>
<u>matrix_no_hui</u>	Existential QNP+ Verb + Universal QNP	Matrix	NO
<u>matrix_hui</u>	Existential QNP+ <i>hui</i> + Verb + Universal QNP	Matrix	YES

Figure: Stimuli design

(情境:  
苹果电视台“未来歌星”选拔赛的工作人员向副导演询问总导演对于聘请公证员监督比赛的具体要求。下面加黑加粗的句子是副导演的答复。)

.....**三名公证员监督每场比赛。**

Target sentence

请问: 假设该项选拔赛下周有6场小组赛, 那么, 需要多少名公证员来参加下周的小组赛监督工作? (多选题, 请选择你觉得正确的所有选项)

Comprehension question (& instructions for multiple-choice questions)

A. 18名 (=6\*3)  B. 3名  C. 3名到18名之间  D. 多于18名

Possible answers

Go to next item

Figure: The display sample of the online survey

# Stimuli design

## Sample of target sentences used in the stimuli

- 四名警察看守每个出口。
- 四名警察会看守每个出口。
- 三位教授评审每篇博士论文。
- 三位教授会评审每篇博士论文。
- 两名护士照看每个重症监护室。
- 两名护士会照看每个重症监护室。
- 一名志愿者协助每个外方展台。
- 一名志愿者会协助每个外方展台。

# Participants

134 native Mandarin speakers participated in this experiment. 89 out of the 134 participants completed the survey and only their data were included in the analysis and results reported below.

Among the 89 participants, the number of female participants was 68 and the average age was 30.78 (the age range was 17-65).

## Data analysis and results

Condition	Surface scope only	Inverse scope only	Both surface and inverse scope	Sum
<u>Matrix no hui</u>	30 (34%)	37 (42%)	22 (25%)	89 (100%)
<u>Matrix hui</u>	42 (47%)	25 (28%)	22 (25%)	89 (100%)

**Figure:** The distribution of intra-participant variation (N=89)

Although the presence of *hui* seems to cause a significant increase in the number of participants who chose surface scope only, the results in general confirm Larson and Wu's (2018) empirical observation: about half of the participants considered an inverse scope reading available for simple transitives.

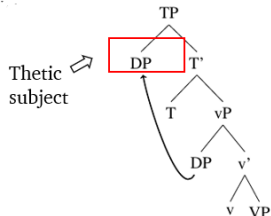
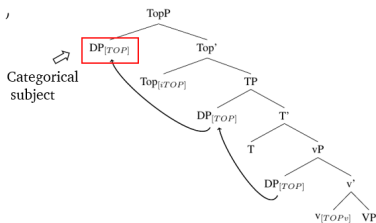
# Empirical challenge for isomorphism

The confirmation of the availability of inverse scope reading in simple transitives and complement clauses poses an empirical challenge for

- 1 isomorphism as a language parameter
- 2 approaches that consider linearity or overt movement as a decisive factor for Mandarin scope interpretation

## Scope ambiguity and thematic-categorial distinction

Following Kuroda's insights that categorial judgments are thematic judgments plus an additional component, Wu and Larson (2019) adopts a view that there are two notions of subjects and categorial subjects are enhanced versions of thematic subjects. The three-way intra-participant variances shown in the results are then expected under the proposed matrix structures along with Fox (2000).





## The influence of *hui* on scope interpretation

With *hui*, more participants chose surface scope only and less participants chose inverse scope only for the matrix transitives, similar to the empirical observations. But, the results do not fully support the empirical observation that modal *hui* will block the inverse scope reading for simple transitives.

- 1 *hui*'s "law-like" generalization meaning (Hsieh 2004, Tsai 2015)
- 2 *Hui* contributes a law-like sense to the sentence. In this sense, i.e., when participants interpreted *hui* as a law-like requirement reading (similarly to English "essentially"), *hui* is not surprisingly compatible with thethetic judgment

## Selected references

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