

Licensing of Mandarin NPI *renhe* in a relative clause environment

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Introduction

Mandarin *renhe* needs to be in the scope of a proper licensor such as negative markers (1), modals, conditionals, *yes/no* questions (Wang 1993; Wang & Hsieh 1996; Kuo 2003; Cheng & Giannakidou 2013; Shyu 2016).

- (1) *Zhangsan *(mei) kan-guo renhe geju.*
Zhangsan not watch-PFV any opera
'John hasn't watched any opera.'

In a relative clause environment, however, the licensing conditions of *renhe* are not expected to be the same.

(i): potential NPI illusion effect

- A relative clause creates an intruding licensing environment for polarity items (e.g., Parker & Phillips 2016).

- (2) **The book [that editors did not recommend] received any official acknowledgement.*

- Wang (1993) and Yang (2008) mention that the matrix negation licensor can license *renhe* in a relative clause.
- BUT** there is no discussion on the licensing effects of *renhe* when the scope of the negation licensor is limited to a relative clause (c.f.(2)), to the best of our knowledge.

(ii): potential subtriggering effect

- Subtriggering effect refers to the phenomenon that a polarity item can be triggered by a subordinate clause (LeGrand 1975:54-69; Dayal 1998, 2004).

- (3) *She bought anything *(she needed) at Carson's.*

- Wang (1993) and Giannakidou & Lin (2016) mention that *renhe* is an FCI while being modified by a relative clause.
- BUT** supporting examples given in those papers involve other factors (e.g., *renhe* in the scope of modals or non-action verbs). It is not clear whether the subtriggering effect still hold when other potential licensors are absent.

Methodology

We conducted two untimed, offline experiments.

- through the Qualtrics online survey tool.
- acceptability judgment tasks using a 7-point scale.
- data were processed in R using lme4 package.
- a linear mixed-effects model with a fixed factor 'Condition' and random effects 'participant' and 'set' was performed to check the statistical significance of differences among conditions (Winter 2013).

Experiment Design and Results

Condition	Position of NEG	Position of <i>renhe</i>	Structure of the target sentence
CON1	Emb.	Emb.	NP V [_ NEG V <i>renhe</i> NP] <i>de</i> NP
CON2	Matrix	Emb.	NP NEG V [_ V <i>renhe</i> NP] <i>de</i> NP
*CON3	None	Emb.	NP V [_ V <i>renhe</i> NP] <i>de</i> NP
CON4	Both	Emb.	NP NEG V [_ NEG V <i>renhe</i> NP] <i>de</i> NP
*CON5	Emb.	Matrix	[_ NP NEG V] <i>de</i> DP V <i>renhe</i> NP
CON6	Matrix	Matrix	[_ NP V] <i>de</i> DP NEG V <i>renhe</i> NP
*CON7	None	Matrix	[_ NP V] <i>de</i> DP V <i>renhe</i> NP
CON8	Both	Matrix	[_ NP NEG V] <i>de</i> DP NEG V <i>renhe</i> NP

Figure 1: Stimuli Design of Experiment 1

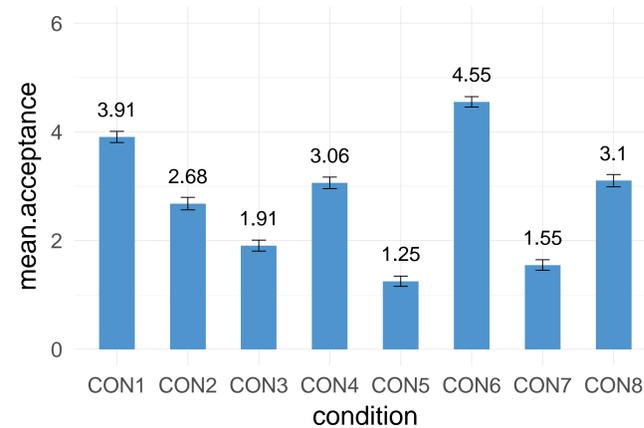


Figure 3: Mean acceptability rates of Experiment 1 (N=322, avg. age: 25.6)

- The acceptance rates of the unlicensed conditions, CON3 and CON7, were significantly lower than their corresponding minimal pairs, CON1 and CON6, respectively ($p < 0.001$). Hence, a negation licensor is required (e.g. Wang 1993).
- The acceptance rate of the illusive condition (CON5) was significantly lower than all other seven conditions ($p < 0.005$). Hence, in an untimed task, sentential negation and *renhe* do not elicit an illusory licensing effect.
- The acceptance rates of CON2, CON4 and CON8 were significantly lower than CON1 and CON6, although all of them were properly licensed by *c*-commanding negation.

Condition	RC gap	Position of NEG	Matrix verb	Structure of the target sentence
P1	Obj.	Emb.	perfective	NP V [NP NEG V _] <i>de renhe</i> NP
P2	Obj.	Matrix	perfective	NP NEG V [NP V _] <i>de renhe</i> NP
P3	Obj.	None	perfective	NP V [NP V _] <i>de renhe</i> NP
D1	Sub.	Emb.	declarative	NP V [_ NEG V NP] <i>de renhe</i> NP
D2	Sub.	Matrix	declarative	NP NEG V [_ V NP] <i>de renhe</i> NP
D3	Sub.	None	declarative	NP V [_ V NP] <i>de renhe</i> NP
P4	/	Matrix	perfective	NP NEG V <i>renhe</i> NP
D4	/	Matrix	declarative	NP NEG V <i>renhe</i> NP
P5	/	None	perfective	NP V <i>renhe</i> NP
D5	/	None	declarative	NP V <i>renhe</i> NP

Figure 2: Stimuli Design of Experiment 2

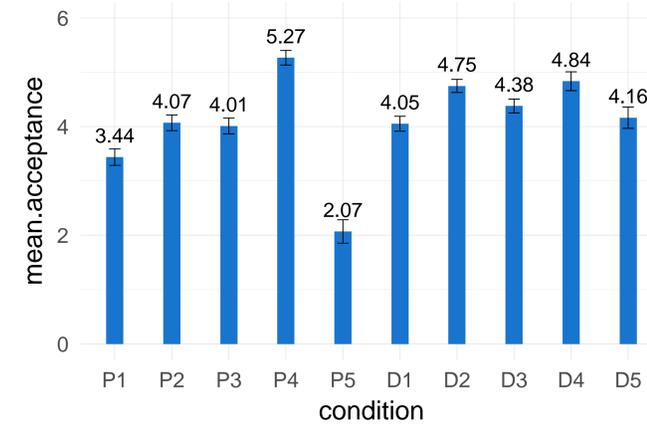


Figure 4: Mean acceptability rates of Experiment 2 (N=177, avg. age: 24)

- The mean acceptability rate of P3 was significantly higher than P5 ($p < 0.001$), but not significantly lower than P2 ($p < 0.05$). It shows that *renhe* improves when modified by a relative clause and confirms the existence of the subtriggering effect of *renhe*.
- The influence of structural complexity on the acceptance rate is also shown in the results of P1 and P2, P3, P4.
- The high acceptability rate of D5 shows that non-factive verbs (declarative verbs, e.g. *tongyi* 'agree', *zancheng* 'approve') can trigger *renhe*, which has not been reported in the literature, to the best of our knowledge.

Discussion

No illusion effect of *renhe* was found in an offline task. The absence of the NPI illusion effect of *renhe* shown by Experiment 1 is consistent with a claim regarding the processing of *any* in English: the NPI *any* and sentential negation *not* do not trigger an NPI illusion effect in an untimed offline task (Parker & Phillips 2011, 2016; de Dios-Flores et al. 2017; cf. Yun et al 2017).

- Further research:** whether the NPI types, the negation types, and the task types are responsible for the existence of NPI illusion in Mandarin.

Locality and structural complexity affect processing of *renhe* even in an offline task.

- The acceptance rate of the non-clausal-local licensing condition (CON2) was much lower than the clausal-local licensing condition (CON1), which is consistent with the findings of a recent ERP study on Turkish NPI processing (Yanilmaz & Drury 2017).
- Sentences with double negation (CON4 and CON8) were rated much lower than the sentences with single negation (CON1 and CON6), which is expected under the argument that negation by itself increases processing difficulty (Kaup, Zwaan & Ludtke 2007; Tian & Breheny 2016). However, the influence of locality on processing seems more significant than that of double negation, though, because CON2 shows a significantly lower acceptance rate than CON4 ($p < 0.01$).
- The divergence in acceptability rates between CON1 and CON6 suggests an asymmetry between embedded relative clause environment and matrix clause environment for NPI licensing processing (c.f. Yanilmaz & Drury (2017)).

The existence of the subtriggering effect of *renhe* was confirmed. This suggests that the claim that *renhe* must be licensed in non-veridical environments is too strict (cf. Cheng & Giannakidou 2013).

- Further research:** whether the subtriggering effect can also be found in adjectives and prepositional phrases (Dayal 1998, 2004; Jayez & Tovena 2005); whether subtriggered sentences of *renhe* are derived from conditional meanings (LeGrand 1975; Quer 1998; Giannakidou 2001).

***Renhe* can be licensed by declarative verbs.** The results provide experimental evidence showing that the distinction made in the literature between licensed and unlicensed contexts for *renhe*, such as non-factive verbs versus factive verbs, or negative verbs versus non-negative verbs, was too broad (Wang 1993; Cheng & Giannakidou 2013; Lin & Giannakidou 2015).