Reciprocal scope in Mandarin

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NELS 51, 6-8 November 2020, UQAM

Introduction

Mandarin is among a group of languages that has a strategy for the expression of reciprocity in the form of an adverbial, in addition to a pronominal version.

(1) *Adverbial* RECIP *and pronominal* RECIP *can co-occur in an embedded clause:*
Luómìōu hé Zhūlìyè rènwéi [tāmen hùxiāng xǐhuān bǐcǐ].
Romeo and Juliet think [they RECIP like RECIP]

Narrow scope: 'Romeo and Juliet think, "We like each other."
Wide scope: Romeo thinks, "I like Juliet," and Juliet thinks, "I like Romeo."

In a biclausal sentence, the adverbial RECIP can also co-occur with an embedded pronominal RECIP.

(2) Luómìōu hé Zhūlìyè hùxiāng rènwéi [tāmen xǐhuān bǐcǐ].
Romeo and Juliet RECIP think [they like RECIP]

Narrow scope: 'Romeo and Juliet think, "We like each other."
Wide scope: Romeo thinks, "I like Juliet," and Juliet thinks, "I like Romeo."

- Surprisingly, both the wide and narrow scope interpretations are also available in (2).
- The availability of the narrow scope reading for (2) is unexpected on an operator-based analysis without an operation to lower the main-clause RECIP to the embedded clause.

Main claims

We argue for a relational treatment of reciprocity and reciprocal scope in Mandarin, following Haug & Dalrymple (2020) in their partial plural compositional DRT analysis of reciprocal scope.

- Like English, Mandarin reciprocals have a *coreference requirement*: cumulative identity between the reciprocal and its antecedent
- At the same time, reciprocals impose a *non-coreference requirement*: requiring distinct individuals within each assignment
- In biclausal sentences, the wide scope reading is obtained by lifting the reciprocal meaning to the main clause.
- We will show that without requiring additional machinery, the approach in Haug & Dalrymple (2020) predicts the attested scope possibilities in Mandarin.

Outline of presentation

- Overview of Haug & Dalrymple's analysis of reciprocity in a Partial Plural Compositional DRT setting
- Distribution and scope of Mandarin reciprocals
- Partial plural compositional DRT analysis of Mandarin facts
- Conclusion

Reciprocal scope ambiguity in English

(3) Romeo and Juliet think they like each other.

One possible explanation: distributive operator / covert EACH (Heim et al., 1991; Dalrymple et al., 1998)

Applied to reciprocals:

- Romeo and Juliet think [they EACH like the other].
  Narrow scope: Romeo and Juliet think, "We like each other."
- Romeo and Juliet EACH think [they like the other].
  Wide scope: Romeo thinks, "I like Juliet", and Juliet thinks, "I like Romeo."

Problems with operator-based approaches

- Many languages express reciprocals and reflexives by the same means (Murray, 2008)
- Limits to scope relative to other quantifiers and modals (Asudeh, 1998)
- Multiple reciprocals
- Certain readings are not accounted for: collective readings for reciprocal antecedents (Dotlačil, 2013), mixed individual/group readings (Dalrymple et al., 1998)
- Reciprocals pattern with plurals and unlike quantifiers in distributive and cumulative readings (Williams, 1991; Dotlačil, 2013)

Refer to Haug & Dalrymple (2020) for details.

Partial Plural Compositional Discourse Representation Theory

- Haug & Dalrymple (2020) analyse reciprocal scope ambiguity within the framework of partial plural compositional discourse representation theory.

(4) Two cats appeared.

u_1
$\mathrm{cat}(\mathrm{u}_1)$
$\text{2-atoms}(\cup \mathrm{u}_1)$
$\mathrm{appear}(\mathrm{u}_1)$

Refer to Muskens (1996) for details.

Partial Plural Compositional Discourse Representation Theory

- Haug & Dalrymple (2020) analyse reciprocal scope ambiguity within the framework of partial plural compositional discourse representation theory.

(5) Two cats appeared.

u_1
$\mathrm{cat}(\mathrm{u}_1)$
$\text{2-atoms}(\cup \mathrm{u}_1)$
$\mathrm{appear}(\mathrm{u}_1)$

	$\mathbf{u_1}$
$\mathbf{s_1}$	cat_1
$\mathbf{s_2}$	cat_2

Refer to van den Berg (1996) and Brasoveanu (2007) for details.

Partial Plural Compositional Discourse Representation Theory

- Haug & Dalrymple (2020) analyse reciprocal scope ambiguity within the framework of partial plural compositional discourse representation theory.

(6) Two cats appeared. They meowed.

u_1 u_2
$\text{cat}(\text{u}_1)$
$\text{2-atoms}(\cup\text{u}_1)$
$\text{appear}(\text{u}_1)$
$\cup\text{u}_2 \rightarrow \cup\text{u}_1$
$\text{meowed}(\text{u}_2)$

Refer to Haug (2014) for details.

A simple monoclausal example

(7) Romeo and Juliet like each other.

u_1 u_2
$\cup u_1 = \{\text{Romeo, Juliet}\}$
$\cup u_2 \rightarrow \cup u_1$
$u_2 \neq u_1$
$\text{like}(u_1, u_2)$

- Romeo and Juliet: $\cup u_1 = \{\text{Romeo, Juliet}\}$
- like: like(liker, likee)
- each other:
  - **coreference requirement**, $\cup u_2 \rightarrow \cup u_1$: cumulative identity between *each other* and its antecedent across assignments
  - **noncoreference requirement**, $u_2 \neq u_1$: distinct individuals within each assignment

A simple monoclausal example

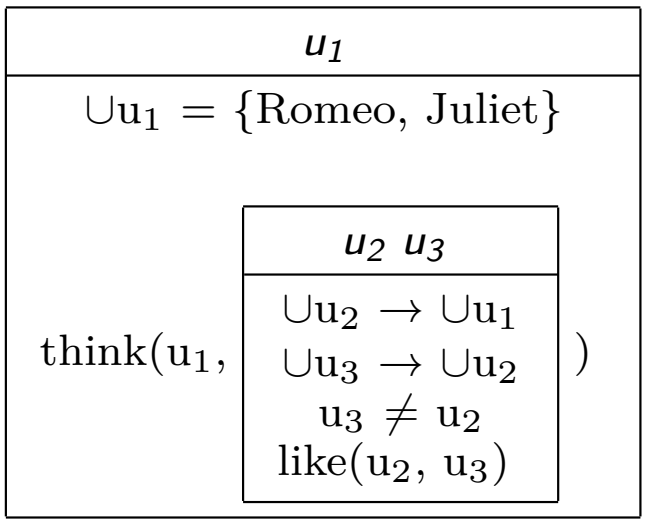
(8) Romeo and Juliet like each other.

u_1 u_2
$\cup u_1 = \{\text{Romeo, Juliet}\}$
$\cup u_2 \rightarrow \cup u_1$
$u_2 \neq u_1$
$\text{like}(u_1, u_2)$

	$\mathbf{u_1}$	$\mathbf{u_2}$
$\mathbf{s_1}$	R	J
$\mathbf{s_2}$	J	R

Embedded reciprocal → Narrow scope

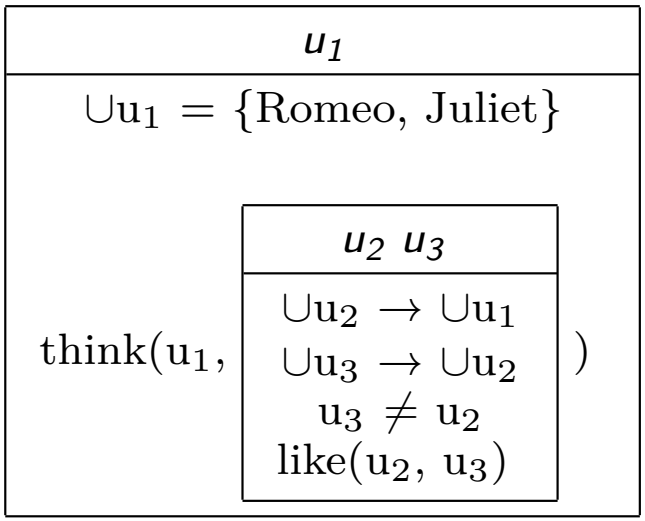
(9) Romeo and Juliet think [they like each other].
Narrow scope: Romeo and Juliet think, "We like each other."



- Romeo and Juliet: $\cup u_1 = \{\text{Romeo, Juliet}\}$
- think: think(thinker, thought)
- they: $\cup u_2 \rightarrow \cup u_1$
- like: like(liker, likee)
- each other:
  - coreference: $\cup u_3 \rightarrow \cup u_2$
  - noncoreference: $u_3 \neq u_2$

Embedded reciprocal → Narrow scope

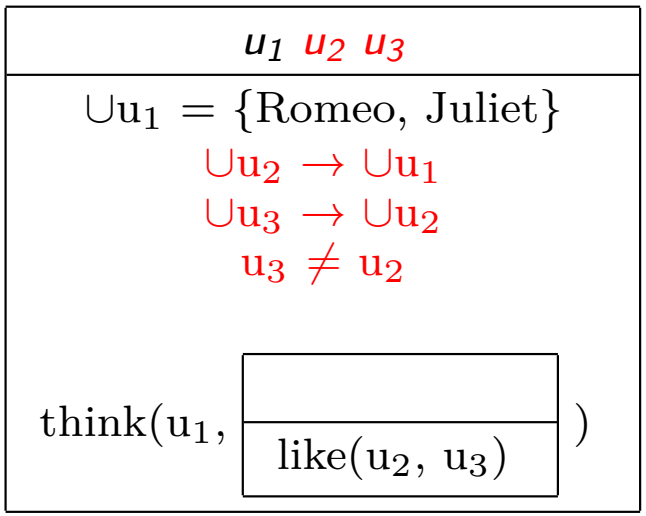
(10) Romeo and Juliet think [they like each other].
Narrow scope: Romeo and Juliet think, "We like each other."



	u_1	w	u_2	u_3
s_{1a}	R	w_1	R	J
s_{1b}	R	w_1	J	R
s_{2a}	J	w_2	R	J
s_{2b}	J	w_2	J	R

Embedded reciprocal → Wide scope

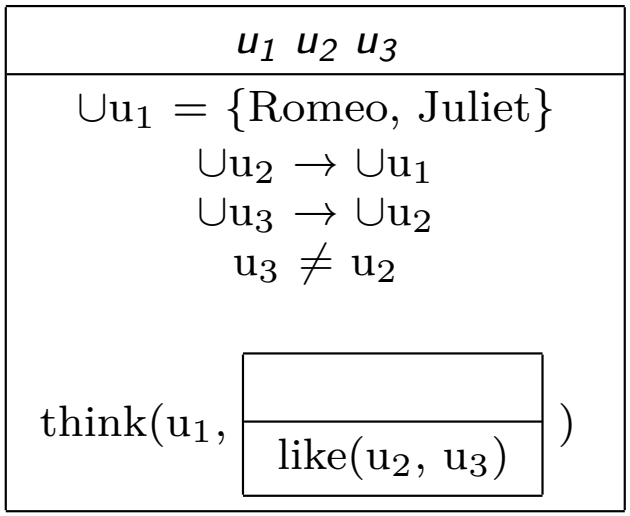
(11) Romeo and Juliet think [they like each other].
Wide scope: Romeo thinks, "I like Juliet" and Juliet thinks, "I like Romeo."



- Each element in the sentence contributes the same material to the DRS as in the previous example
- But reciprocal material moves from embedded DRS to matrix DRS

Embedded reciprocal → Wide scope

(12) Romeo and Juliet think [they like each other].
Wide scope: Romeo thinks, "I like Juliet" and Juliet thinks, "I like Romeo."



	u_1	u_2	u_3	w
s_1	R	R	J	w_1
s_2	J	J	R	w_2

(The same DRS can capture crossed readings:
Romeo thinks, "Juliet likes me" and Juliet thinks, "Romeo likes me.")

Back to Mandarin reciprocity

There are a number of strategies to express reciprocity in Mandarin using one, or a combination of, the following forms:

- 互相 hùxiāng
- 对方 duìfāng
- 彼此 bǐcǐ

Hùxiāng is adverbial: occurs pre-verbally:

(13) Luómìōu hé Zhūlìyè {✓ **hùxiāng**} xǐhuān {*__hùxiāng__}.
Romeo and Juliet {✓ HUXIANG} like {*HUXIANG}
'Romeo and Juliet like each other.'

Duìfāng is pronominal: only occurs post-verbally:

(14) Luómìōu hé Zhūlìyè {*__duìfāng__} xǐhuān {✓ **duìfāng**}.
Romeo and Juliet {*DUIFANG} like {✓ DUIFANG}
'Romeo and Juliet like each other.'

(13) and (14) are equivalent in truth conditions. However, our current suspicion is that duìfāng is not a true reciprocal even though in many contexts it gives rise to reciprocal readings. We set aside duìfāng in the rest of this talk.

Bǐcǐ seems to have both an adverbial and pronominal use:

(15) Luómìōu hé Zhūlìyè {✓ **bǐcǐ**} xǐhuān {✓ **bǐcǐ**}.
Romeo and Juliet {✓ BǏCǏ} like {✓ BǏCǏ}

'Romeo and Juliet like each other.'

Questions

- Do pronominal reciprocals in Mandarin have the same readings as "each other" in English, giving rise to scope ambiguities in biclausal sentences?
- What is the behaviour of adverbial reciprocals in biclausal sentences?

Scope of pronominal reciprocals

In biclausal sentences, pronominal reciprocals can appear in the embedded object position.

(16) L. hé Z. rènwéi [tāmen xǐhuān bǐcǐ].
R. and J. think [they like BICI]

'Romeo and Juliet think they like each other.'

While the narrow scope reading is clearly available, there are conflicting claims in the literature as to whether wide scope is available (Ping 1996;Xu 2008; see Kobayashi 2020 for non-finite clauses.)

Scope of pronominal reciprocals

But wide scope reading is available in principle, as can be seen when the narrow scope reading results in a logical contradiction...

(17) Zhāngsān hé Lǐsì rènwéi [tāmen dǎbài-le bǐcǐ].
Zhangsan and Lisi think [they defeat-PFV BICI]

"Zhangsan and Lisi think they defeated each other."

...or if the context supports a "crossed" reading.

(18) Zhāngsān hé Lǐsì huáiyí [tāmen tǎoyàn bǐcǐ]
Zhangsan and Lisi suspect [they dislike BICI]

'Zhangsan and Lisi suspect they dislike each other.

If so, pronominal reciprocals in Mandarin can be analysed in the same way as "each other" in English.

Scope of adverbial reciprocals

Adverbial reciprocals can appear pre-verbally in the embedded clause.

(19) L. hé Z. rènwéi [tāmen {hùxiāng/bǐcǐ} xǐhuān].
R. and J. think [they {HUXIANG/BICI} like]

'Romeo and Juliet think they like each other.'
✓narrow scope; ✓wide scope

Adverbial reciprocals can also appear in the matrix clause if another reciprocal is present in the embedded clause.

(20) L. hé Z. {hùxiāng/bǐcǐ} rènwéi [tāmen xǐhuān *(bǐcǐ)].
R. and J. {HUXIANG/BICI} think [they like *(BICI)]

'Romeo and Juliet think they like each other.'
✓narrow scope; ✓wide scope

Summary of scope possibilities

Matrix clause RECIP	**Embedded clause** RECIP	**Available scope**
∅	pronominal RECIP	✓narrow; ✓wide
∅	adverbial RECIP	✓narrow; ✓wide
adverbial RECIP	pronominal RECIP	✓narrow; ✓wide
adverbial RECIP	adverbial RECIP	Degraded (Wide and narrow scope available in principle)
adverbial RECIP	∅	Ungrammatical

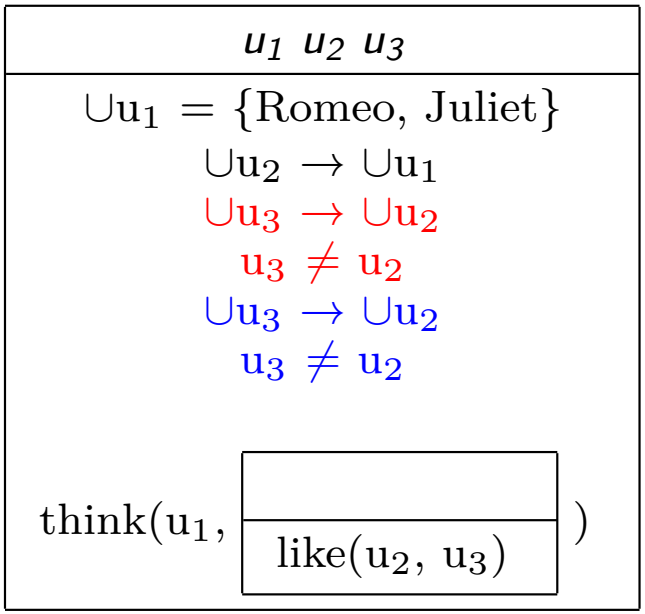
The partial plural CDRT approach extends to Mandarin straighforwardly without requiring additional assumptions or machinery:

- Pronominal RECIP behave like English 'each other', contributing a discourse referent, coreference requirement, and a non-coreference requirement in the DRS in which they appear.
- Adverbial RECIP optionally introduces a discourse referent if one is not supplied by a pronominal reciprocal in the same clause.
- Wide scope readings are obtained by *lifting* reciprocal material from the lower DRS to the higher DRS
- In the case of a narrow scope reading with a reciprocal in the matrix clause, the coreference/noncoreference requirements in the matrix clause are redundant.

Matrix reciprocal → Wide scope

(21) L. hé Z. {hùxiāng/bǐcǐ} rènwéi [tāmen xǐhuān bǐcǐ].
R. and J. {HUXIANG/BICI} think [they like BICI]

'Romeo and Juliet think they like each other.'
Wide scope: Romeo thinks, "I like Juliet" and Juliet thinks, "I like Romeo."

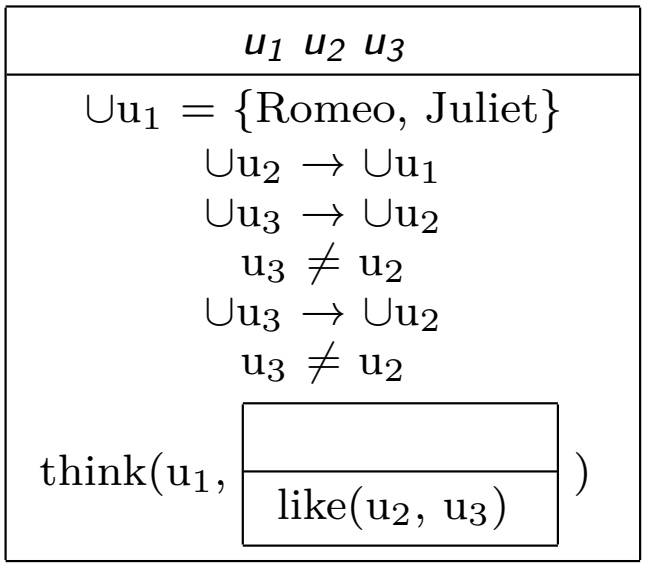


Reciprocal material moves from embedded DRS to matrix DRS.
Multiple specification of reciprocity is not a problem.

Matrix reciprocal → Wide scope

(22) L. hé Z. {hùxiāng/bǐcǐ} rènwéi [tāmen xǐhuān bǐcǐ].
R. and J. {HUXIANG/BICI} think [they like BICI]

'Romeo and Juliet think they like each other.'
Wide scope: Romeo thinks, "I like Juliet" and Juliet thinks, "I like Romeo."

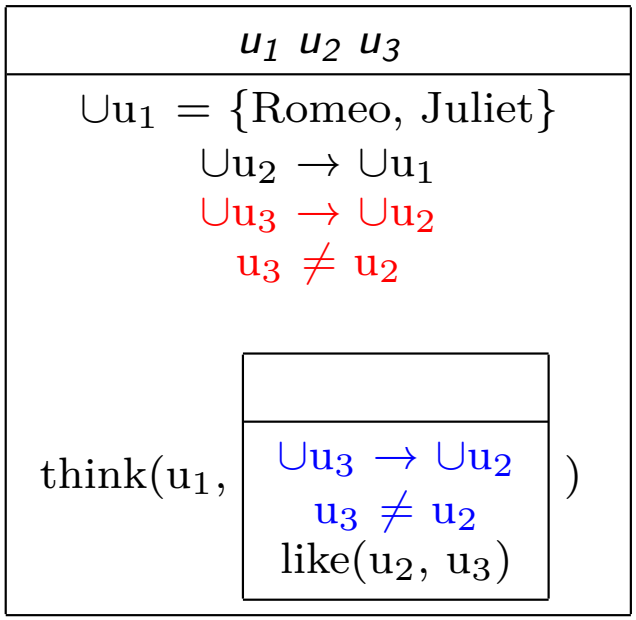


	u_1	u_2	u_3	w
s_1	R	R	J	w_1
s_2	J	J	R	w_2

Matrix reciprocal → "Narrow" scope

(23) L. hé Z. {hùxiāng/bǐcǐ} rènwéi [tāmen xǐhuān bǐcǐ].
R. and J. {HUXIANG/BICI} think [they like BICI]

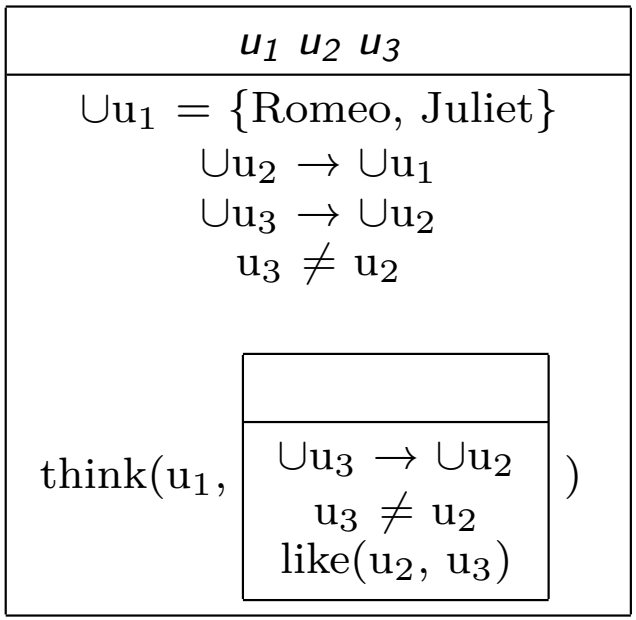
'Romeo and Juliet think they like each other.'
Narrow scope: Romeo and Juliet think, "We like each other."



Matrix reciprocal → "Narrow" scope

(24) L. hé Z. {hùxiāng/bǐcǐ} rènwéi [tāmen xǐhuān bǐcǐ].
R. and J. {HUXIANG/BICI} think [they like BICI]

'Romeo and Juliet think they like each other.'
Narrow scope: Romeo and Juliet think, "We like each other."



	u_1	u_2	u_3	w
s_{1a}	R	R	J	w_1
s_{1b}	R	J	R	w_1
s_{2a}	J	R	J	w_2
s_{2b}	J	J	R	w_2

This is the crucial case showing how the duplication of coreference and non-coreference requirements can result in a narrow scope reading.

Concluding remarks

- We have shown that pronominal and adverbial reciprocals in Mandarin exhibit scope ambiguities in biclausal sentences similar to English 'each other'.
- The approach outlined in Haug & Dalrymple (2020) straightforwardly extends to account for this behaviour, while avoiding the problems faced by operator-based accounts.
- The attested scopal possibilities in Mandarin lends support to the relational view of reciprocity, showing that it can extend to languages in which reciprocity is not expressed exclusively by pronouns (e.g. English).

Thank you!

For helpful feedback on this project, we are grateful to Michael Yoshitaka Erlewine and the members of the syntax/semantics reading group at NUS, especially Zheng Shen and Kenyon Branan. For discussion of Mandarin judgements, we thank Cheng Yuanchen, Hu Mengting, Joey Lim, Lim Junjie, Mei Yunbo, Tang Qianchen, Wei Xiaojun, Yu Zichuan, and Xia Zeng.

This research is supported by the Singapore Ministry of Education under the grant "Subjecthood in Southeast Asia: Description and Theory" (MOE2017-T2-2-094) to Michael Yoshitaka Erlewine.

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