A unified analysis of the semantic licensing conditions for *huxiang* in Chinese

1

SHEN YUAN

Fudan University, Shanghai, China
Email: yshen8@fudan.edu.cn

Subtypes of reciprocals

- Reciprocals exhibit great diversity across languages. (Nedjalkov 2007, Evans 2010)
- Subtype **A:** a doubling of clauses or verb phrases with the concomitant inversion of the arguments

    (1) *My **father** respected his **neighbour** and the*

    neighbour** respected my **father.

- Subtype **B** (lexico-syntactic)**:** composed of a verb and a component:

    1. A reciprocal (pro)noun like English *each other*

    2. A reciprocal adverb like Chinese *hùxiāng* 'mutually'.

huxiang

（2） *Zhangsan he Lisi huxiang maiyuan.*
      Zhangsan and Lisi mutually complain
      "Zhangsan and lisi complained about each other."

Symmetry Constraint

- Some symmetric predicates do not co-occur with *huxiang*. （Guo 2013）

Symmetry

- Given a set *A* and a relation *R* in *A, R* is *symmetric* iff for every ordered pair *<x,y>*, if *<x,y>* is in *R,* then the pair *<y,x>* is also in *R*.

- If for some *<x,y>* in *R*, the pair *<y,x>* is not in *R*, then *R* is *nonsymmetric*.

- If it is never the case that for any *<x,y>* in *R*, the pair *<y,x>* is in *R* then the relation is called *asymmetric*.

(3) *Liang ge laotou zai (*huxiang) xiaqi.*
two CL old men PROG mutually play chess
"The two old men are playing chess."

- *xiaqi* is symmetric:
  a plays chess with b, b necessarily plays chess with a.

Roadmap

- Start with the "symmetry constraint" on *huxiang*;
- Consider the varied uses of *huxiang,* with special focus on the improved cases which are otherwise unacceptable;
- Identify the factors that contribute to the (non-)use of *huxiang*;
- Seek a unified analysis of the semantic licensing conditions for *huxiang*.

Three parameters

The use of *huxiang* is sensitive to:

- the number of reciprocants
- the logical properties of predicates
- partitions

NUMBER matters

Acceptability with *huxiang* varies with the number of participants (reciprocants).

NUMBER matters

=2 (number of reciprocants) *huxiang* ✘
≥3 (number of reciprocants) *huxiang* ✔

chaojia ('quarrel')

（4）*Wang he   Li (*huxiang) chaojia.*
   (literally, "*Wang and Li* mutually quarreled.")
（5）*Wode ji ge tongshimen zhengde huxiang chaojia.*
   (literally, "My several colleagues mutually quarreled.")

dazhang ('fight')

(6) *Na liang ge guojia (*huxiang) dazhang le.*

   (literally, "*The two countries mutually fought.*")

(7) *Ji ge guojia huxiang dazhang.*

   (literally, "*The several countries mutually fought.*")

dajia ('fight')

(8) *Wang he Li (*huxiang) daj*ia.

   (literally, "Wang and Li *mutually fought.*")

(9) *Zhexie liumang jingchang huxiang dajia.*

   (literally, "*These hooligans often mutually fought.*")

bisai ('compete')

(10) *Zhe liang zhi qiudui jingchang (*huxiang) bisai.*

(literally, "*The two teams often mutually compete.*")

(11) *Zhe ji zhi qiudui jingchang huxiang bisai.*

(literally, "*The several teams often mutually compete.*")

liaotian ('chat')

(12) *Tamen liang ge zai (*huxiang) liaotian.*

(literally, "*They two are mutually chatting.*")

(13) *Tamen ji ge zai huxiang liaotian.*

(literally, "*They several are mutually chatting.*")

shi pengyou ('be friends')

（14） *Tamen liang ge (*huxiang) shi pengyou.*

(literally, "They two are mutually friends.")

（15） *Tamen ji ge huxiang shi pengyou.*

(literally, "They several are mutually friends.")

Stubborn cases

=2 *huxiang* ✖

≥3 *huxiang* ✖ (in contrast to the previous cases)

Shi 1978 ji tongxue ("be classmates of the year 1978")

（16） *Tamen liang ge (*huxiang) shi 1978 ji tongxue.*

(literally, "They two are mutually classmates of the year 1978.")

（17） *Tamen ji ge (*huxiang) shi 1978 ji tongxue.*

(literally, "They several are mutually classmates of the year 1978.")

yiyang ("be the same")

（18） Zhe *liang zhang zhaopian (*huxiang) yiyang.*

(literally, "The two pictures are mutually the same.")

（19） Zhe *ji zhang zhaopian (*huxiang) yiyang.*

(literally, "The several pictures are mutually the same.")

The role of logical properties

=2   *huxiang*   symmetry

≥3   *huxiang; *huxiang*   ?

Transitivity

- A relation *R* is *transitive* iff for all ordered pairs <*x,y*> and <*y,z*> in *R*, the pair <*x,z*> is in *R*.

- If a relation fails to meet the definition of transitivity, it is *nontransitive*.

- If for no pairs <*x,y*> and <*y,z*> in *R*, the pair <*x,z*> is in *R*, then the relation is *intransitive*.

The role of logical properties

≥3 Symmetry+transitivity ➜ *huxiang*

Shi 1978 ji tongxue ("be classmates of the year 1978")
 （20） *Tamen ji ge (*huxiang) shi 1978 ji tongxue.*
        (literally, "They several are mutually classmates of the year 1978.")
yiyang ("be the same")
 （21） *Na ji zhang zhaopian (*huxiang) yiyang.*
        (literally, "The several pictures are mutually the same.")

(22) *Tamen ji ge zai huxiang liaotian.*

(literally, "*They several are mutually chatting.*")

{a,b,c}

(22) is acceptable: Chat' (a,b)^ Chat'' (b,c)^ Chat''' (a,c) (separate events)

(22) becomes unacceptable if the intended meaning is "They are chatting (together)" Chat (a,b,c)(a single event)

Cumulativity

(23) CML(P) ↔ ∀x,y[P(x) ∧ P(y) → P(x ⊕ y)]

A predicate P is cumulative if and only if, whenever P applies to any x and y, it also applies to the sum of x and y.

R(x,y) ∧ R(y,z) → R(x,y,z)

symmetric + transitive predicates ⇒ cumulativity

- *shi 1978 ji tongxue* ("be classmates of the year 1978")

1978 Classmate'(a,b) ∧ 1978 Classmate'(b,c) ⇒ 1978 Classmate'(a,c)
1978 Classmate'(a,b) ∧ 1978 Classmate'(b,c) ⇒ 1978 Classmate (a,b,c)

- *Yiyang* ("be the same")

same'(a,b) ∧ same'(b,c) ⇒ same'(a,c)
same'(a,b) ∧ same'(b,c) ⇒ same'(a,b,c)

Cumulative---*huxiang

Two distinct relations or one single relation?

- Reciprocal relations: binary relations
- Strong reciprocity (R holds between any two member of the set)

Scenario:

A: a,b collaborate on Project A; b,c collaborate on
   Project B; a,c collaborate on Project C;
   (24) *Tamen huxiang shi hezuohuoban.*
        (Literally, "They are mutually collaborative partners.)
        strong reciprocity
        R(a,b) $\wedge$ R(b,c) /$\Rightarrow$R(a,c)
        R(a,b) $\wedge$ R(b,c) /$\Rightarrow$R(a,b,c)   non-cumulative – huxiang allowed

B: a,b,c collaborate on Project A
   (25) *Tamen (*huxiang) shi hezuohuoban.*
        strong reciprocity
        symmetric + <u>transitive</u>
        R(a,b) $\wedge$ R(b,c) $\Rightarrow$R(a,c)
        R(a,b) $\wedge$ R(b,c) $\Rightarrow$R(a,b,c)   cumulative – *huxiang

（26）*Tamen ji ge huxiang shi pengyou.*
        (literally, "They several are mutually friends.")

Friend'(a,b)^Friend'(b,c) /⟹ Friend'(a,c)

Friend'(a,b)^Friend'(b,c) /⟹ Friend'(a,b,c)

Non-cumulative---huxiang allowed

Summary

Cumulativity ➔ *huxiang*

symmetry + transitivity ⇒ cumulative ➔ *huxiang*

Cumulativity vs. divisiveness/distributivity

Cumulativity → *huxiang*

A property of predicate that is closely related to cumulativity is divisiveness (Higginbotham 1994, Moltmann 1997).

(27) DIV(P) ↔ $\forall$x,y [P(x) $\wedge$ y<x → P(y)]

A predicate is divisive if and only if whenever P applies to x, it must also apply to any y properly included in x.

The possibility of a non-triviality account

A non-triviality account correctly predicts the unacceptability of *huxiang* in (28):

(28) a. *Zhe liang ge (*huxiang) yiyang.*
      (literally, "These two are mutually the same.")
   b. *Zhe ji ge (*huxiang) yiyang.*
      (literally, "These several are mutually the same.")

non-cumulativity analysis vs. *non-triviality analysis*

(29) a. Zhe *liang ge (*huxiang) yiyang.*
      (literally, "These two are mutually the same.")
    b. Zhe *ji ge (*huxiang) yiyang.*
      (literally, "These several are mutually the same.")

(30) *a. Tamen liang ge (*huxiang) shi pengyou.*
      (literally, "They two are mutually friends.")
    b. *Tamen   ji   ge (huxiang) shi pengyou.*
      (literally, "They several are mutually friends.")

(31) a. *Tamen liang ge (huxiang) renshi.*
      (literally, "They two mutually know.")
     b. *Tamen ji ge (huxiang) renshi.*
       (literally, "They several mutually know.")

Semantic licensing conditions for *huxiang*

- Semantic licensing conditions:

  Distinct R Condition (Cardinality of relations >1)

Partition

shi fuqi

- Compare

(32) a. *Xiaozhang he Xiao Wang (*huxiang) shi fuqi.*

     Zhang   and Wang   mutually BE couple

   b. *Zhe dui shuangbaotai he na dui shuangbaotai*

     this pair twin   and that pair twin

      huxiang shi fuqi.
      mutually BE couple

die zai yiqi

(33) *Beijing lai   de youbao he   shanghai lai   de   youbao*
    Beijing come DE package AND Shanghai come DE package
    huxiang die   zai yiqi.
    mutually stack in together
    literally, "Package(s) from Beijing and package(s) from
    Shanghai are stacked on top of each other."

Scenario A: B   *? Huxiang*
                    S

Scenarion B: B   B   *huxiang*
                  S   S

Covers and partitions

C is a cover of P if and only if:

1. C is a set of subsets of P

2. Every member of P belongs to some set in C.

3. Φ is not in C

C is a partition of P if, and only if, C covers P and no two members of C overlap.
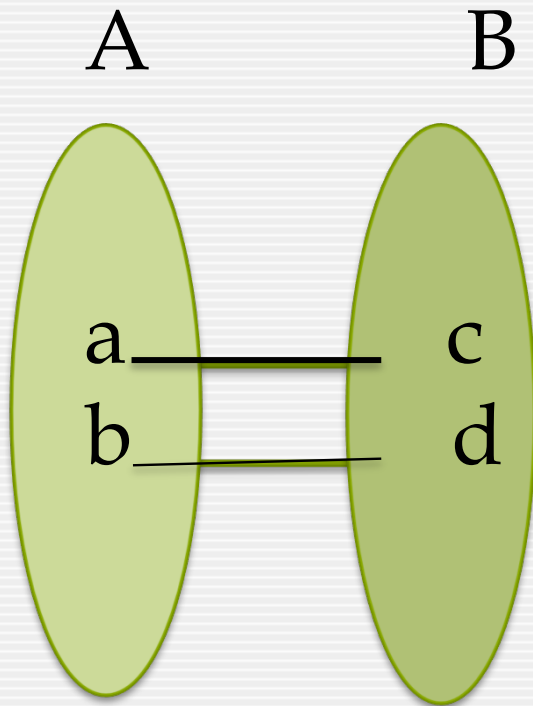
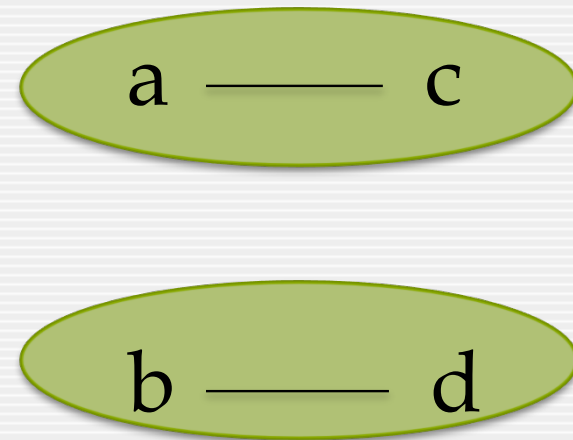**jointly exhaustive; mutually exclusive**

The notion of *Inter-Partition*

- The use of *huxiang* with symmetric predicates: inter-partition readings rather than partitioned readings

  - a, b, c, d

  {{a,b}, {c,d} }: *huxiang* is about relationship BETWEEN the two subpluralities {a,b} and {c,d} rather than relationship within the subpluralities.

Partitions

A   B

a ——— c

b ——— d

a ——— c

b ——— d

Inter-partition reading   partitioned reading

Fenbie ("respectively")

- Insensitivity to types of plural NPs
  (allows different partitions; relies more on context)

(34) *Tamen fenbie   shi tongbantongxue.*
     they   respectively BE   classmate
(35) *A,b,c,d fenbie   shi tongbantongxue.*
      A,b,c,d respectively BE   classmate
(36) Wo bama   he   ta bama   *fenbie shi tongbantongxue.*
      my parents and his parents respectively BE classmate

Sensitivity to types of plural NPs

Types of plural NPs determines partitions and hence inter-partition readings

(37) *Tamen huxiang shi tongbantongxue.
    they   mutually BE classmate
(38) *A,b,c,d huxiang shi tongbantongxue.
    a,b,c,d mutually BE classmate
(39) Wo bama   he   ta   bama huxiang shi tongbantongxue.
    my parent AND his/her parent mutually BE classmate
    Possible interpretation: Classmates (m1,m2); Classmates (f1,f2), …
    Impossible interpretation：Classmates (m1, f1); Classmate (m2, f2) …

Semantic licensing conditions for *huxiang*

- Semantic licensing conditions for the use of *huxiang*: Distinct R Condition (Cardinality of relations >1)

Subtype II symmetric predicates

- Subtype II symmetric predicates allow the use of *huxiang*.
  (huxiang) pingxing ("mutually parallel");
  (huxiang) chuizhi ("mutally perpendicular");
  (huxiang) maodun ("mutually contradict(ory));
  (huxiang) tongyi ("mutually unified)…

  " … not clear what causes the distinction between these two categories of intrinsic reciprocal verbs."（Guo 2013）

Number doesn't matter

- The number (of reciprocants) doesn't matter with Subtype II symmmetic verbs, neither do logical properties of predicates. (*huxiang* is acceptable with Subtype II in all cases.)

- *pingxing* ("parallel") (symmetric+transitive)
  (40) *Zhe liang tiao xian huxiang pingxing.*
      (Literally, "These two lines are mutually parallel")
  (41) *Zhe ji tiao xian huxiang pingxing.*
      (Literally, "these several lines are mutually parallel")

What is peculiar about Subtype II symmetric predicates:

hu is optional with all Subtype II symmetric predicates. This is not the case with Subtype I symmetric predicates.

Compare：
- Subtype I:

 *(hu)xiang yiyang ("mutually the same")；

 *(hu)xiang chaojia ("mutually quarrel");

 *(hu)xiang dazhang ("mutually fight");

 *(hu)xiang liaotian ("mutually chat")…

- Subtype II:

 (hu)xiang pingxing ("mutually parallel");

 (hu)xiang chuizhi ("mutally perpendicular");

 (hu)xiang maodun ("mutually contradict(ory));

 (hu)xiang tongyi ("mutually unified)…

huxiang2

- xiang → huxiang2

  *huxiang*2 is derived from *xiang*;

- *huxiang2* is not a lexical unit (at least in Classical Chinese).

huxiang2: derived from *xiang*

- The addition of *hu* to *xiang* typically took place during Wei and Jin Dynasty;

Altogether 153 cases of *huxiang* are found in Cncorpus (of Wei, Jin, Six Dynasties, Sui, Tang, Five Dynasties).

For the 153 cases, we find 120 *xiang* counterparts, which all appeared earlier than or in the same period as *huxiang*

(Note: the 33 cases of *huxiang* for which we find no *xiang* counterparts are all singular cases in Cncorpus; the absence of their *xiang* counterparts might be due to the size of the corpus.)

- The development of *huxiang* didn't result in the disappearance of the use of *xiang*.（The two forms often coexist as alternatives.）

huxiang2: not a lexical unit

Evidence:
- ***The optionality of hu***: *hu* cannot be omitted in *huxiang*1, but may be omitted in *huxiang*2.
- ***The distribution of bu***: *bu* appears after *huxiang1* in Modern Chinese, but appears between *hu* and *xiang* in Classical Chinese;

hu bu xiang rong (literally, "mutually not the other allow for")*;*
(*hu) xiang bu rong(literally, "mutually not allow for")

Summary:

1) *Huxiang2* is derived from *xiang.*
2) The development of *huxiang*2 didn't result in the disappearance of the use of *xiang.*
   The fact that *huxiang2* has *xiang* as counterpart can be used as a criterion to determine between pronominal reciprocals (*huxiang*2) and verbal reciprocals (*huxiang*1).
3) The use of *xiang* is not constrained by logical properties of the predicate.
4) It follows that the use of *huxiang2* is similar to that of *xiang* in being not constrained by logical properties of the predicate (e.g., *(hu)xiang maodun* ("mutually contradictory"); *(hu)xiang jiaobing* ("mutually at war"))

Summary

- Subtype I: *huxiang*（**adverb**）
- Subtype II: *hu* (adverb) + *xiang*（**pronoun**）

English reciprocal pronoun *each other*

The use of pronominal reciprocals in English (*each other*) is not constrained by logical properties.

be the same (as each other); differ (from each other); conflict (with each other); be in love (with each other); be at war (with each other); fight/quarrel/argue/compete/chat (with each other)…

Difference between pronominal and verbal reciprocals

- Summary:
  - *Huxiang*1: sensitive to logical properties of the predicate /cumulativity
  - *Huxiang*2；English *each other*：not sensitive to logical properties of the predicate /cumulativity.

- the difference (i.e., (in)sensitivity to logical properties/ cumulativity) between pronominal reciprocals and verbal reciprocals

- the transparency vs. uniformity view at the syntax-semantics interface, i.e., whether morphosyntactic differences reflect variation in semantics (Talmy 1972, 1985, 2000, Chierchia 1998a, 1998b, Matthewson 2001) or mask underlying semantic uniformity (Son and Svenonius 2008, Menon and Pancheva 2014)

- The English *each other* and the Chinese *huxiang1* fall, respectively, under the two broad categories of nominal and verbal strategy of reciprocity, as defined in König & Kokutani (2006). Although this paper settles for a more modest objective than reveal the general semantics of the nominal and verbal category of reciprocity, the discussion may provide insights for further discussion on the semantic variation of reciprocity, and relationship between morphosyntax and semantics in general.

Thank you for your attention!