Scope Issues

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V-NYI 3

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Outline

1. Why scope matters?

Let's start with something we've known outside linguistics.

- $a + b + c = (a + b) + c = a + (b + c)$
- $a \times b \times c = (a \times b) \times c = a \times (b \times c)$
- $a \div b \div c = (a \div b) \div c \neq a \div (b \div c)$

1. Why scope matters?

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- a + b + c = (a + b) + c = a + (b + c)
- a x b x c = (a x b) x c = a x (b x c)
- a ÷ b ÷ c = (a ÷ b) ÷ c ≠ *a*÷ (b ÷ c)

conjunctions and disjunctions

	p	q	r	(p ∧ q) ∨ r	p ∧ (q ∨ r)
1	t	t	t	t	t
2	t	t	f	t	t
3	t	f	t	t	t
4	t	f	f	f	f
5	**f**	**t**	**t**	**t**	**f** ☜
6	f	t	f	f	f
7	**f**	**f**	**t**	**t**	**f** ☜
8	f	f	f	f	f

1. Why scope matters?

Let's then get into some basic semantics.

- Linda smiles.
  smiles (Linda)
- Mary saw John.
  saw(Mary, John)
- Mary read every book.
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Observations:

- There is something behind "surface appearance".
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2 Quantification and quantifier scope

Some boy visited every city.

- 'There is a particular boy that visited every city'
  $\exists y$ [boy(y) & $\forall x$[city(x) $\rightarrow$ visited(y,x)]]

- 'For every city, there is a boy who visited it.'
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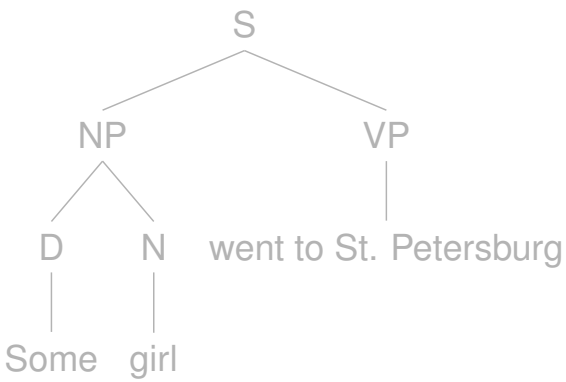
3. Relational View of Determiners, Grammatical Form and Logical Form

(1) Some girl went to St. Petersburg.

- SOME(Y)(X) iff $X \cap Y \neq \emptyset$
  $|\{z: \text{girl}(z)\} \cap \{x: \text{went-to}(x, \text{St. Petersburg})\}| > 0$

- Syntactic Structure



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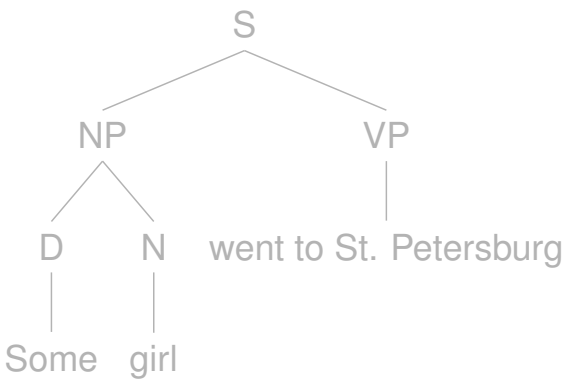

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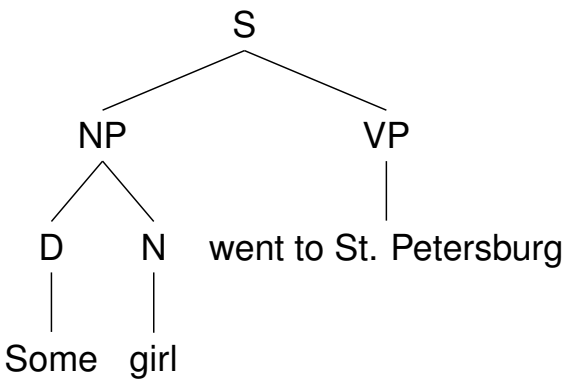

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(2) John saw every movie.

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   | **{w: girl(w)}** ∩ {x : | {z: movie(z)} – {y: saw(x , y)} | = 0} | > 0

Quantifying out an argument of a predicate

In set approach, scope ambiguity results from alternative sequences in quantifying out the arguments of a predicate.

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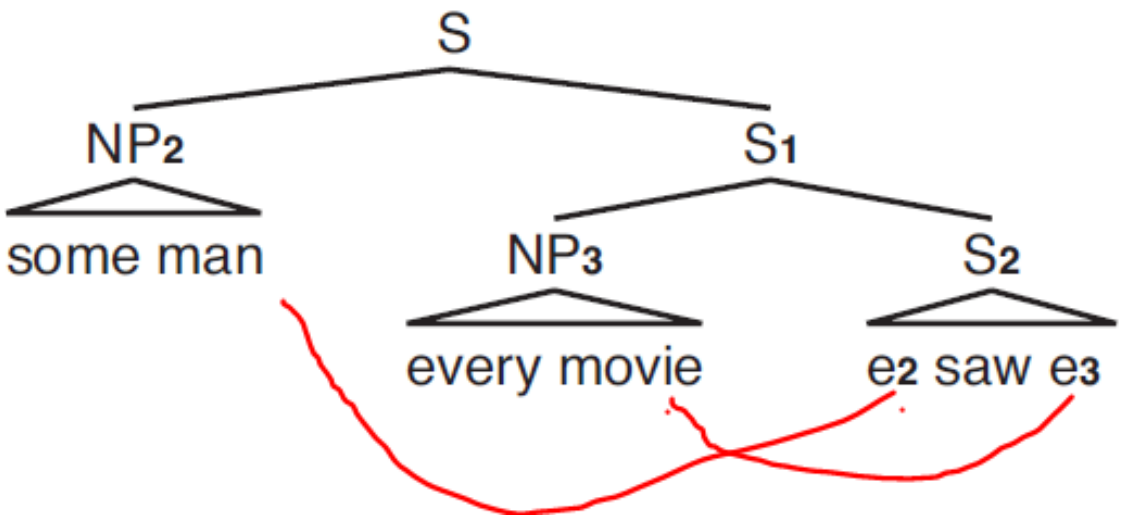
4 Quantifier Raising

May (1977), to some extent, is interpreting quantifying out operation in syntactic terms.

- quantified nominals originate in argument positions (subj, obj, indirect obj, etc.)
- quantified nominals are moved out by an operation of QR (Quantifier Raising), which:
  1. adjoins the nominal to S
  2. leaves a variable in the position vacated by movement
  3. coindexes the nominal and variable.
  4. is covert - representations produced by QR are not phonologically interpreted.

4 Quantifier Raising

Some man saw every movie.



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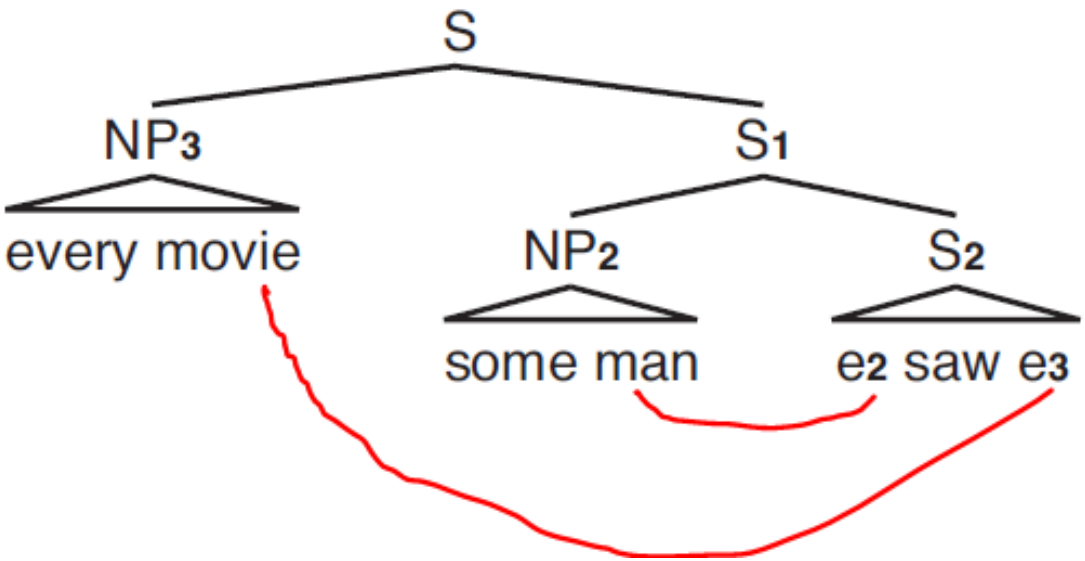

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Why are these wide scope readings blocked?

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f	**t**	**f**	**f**	**t**	☜
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- There is something behind "surface appearance".
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1 Review

Quantifiers are sentential operators that are associated with variables (Frege).

(7) Jess saw Star Wars.
saw(Jess, StarWars)

(8) Some girl saw Star Wars."

1. replace argument with variable (x): **saw(x , StarWars)**
2. form a set: **x: saw(x , StarWars)**
3. form the set of individuals that satisfy the noun predicate: **z: girl(z)**
4. relate by $[[some]]$: **| z: girl(z) ∩ x: saw(x , StarWars) | > 0**

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2 Quantifier Raising (May 1977)

Conditions on Logical Forms produced by QR:

1. Predication Condition
   Every argument position of a predicate must either be a referring expression or a variable.
2. Condition on Proper Binding:
   Every variable in argument position of a predicate must be properly bound.
3. Proper Binding: A variable is properly bound by a binding phrase ϕ iff it is c-commanded by ψ.
4. C-command:
   A node ϕ c-commands a node ψ iff the first branching node dominating ψ dominates ϕ and ϕ does not dominate ψ.
5. Scope:
   The scope of a quantified phrase ϕ is everything it c-commands.

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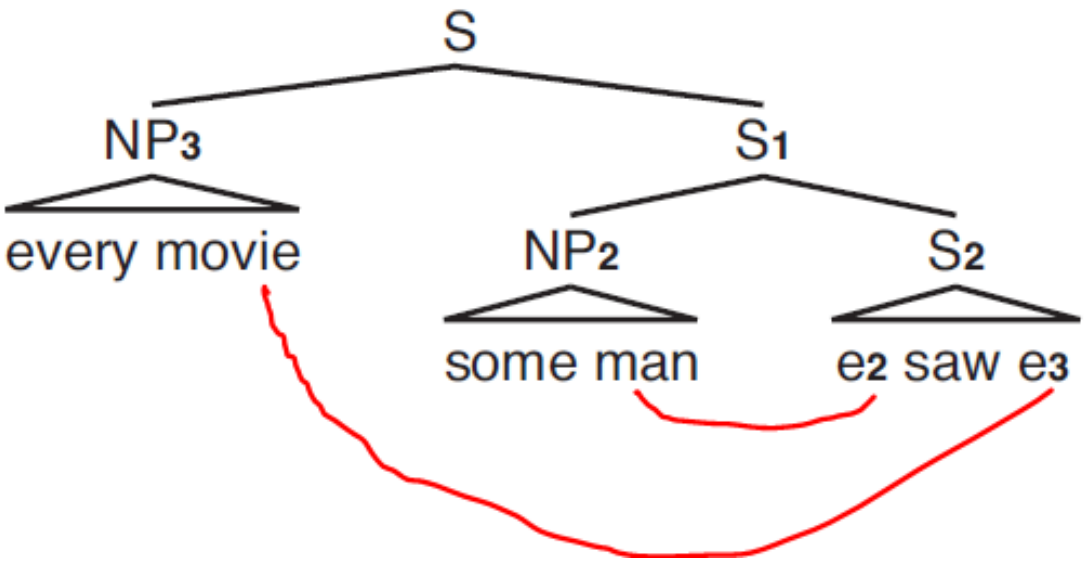

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- Inversely linked logical forms (May 1985, Larson 1985, May and Bale 2005)

  (10) Some exists from every freeway to a large California city are badly constructed.

  (11) Someone from every city despises it.

- "Marked Case"

  (12) John hopes to marry a linguist.

  (13) Alice is seeking a unicorn.

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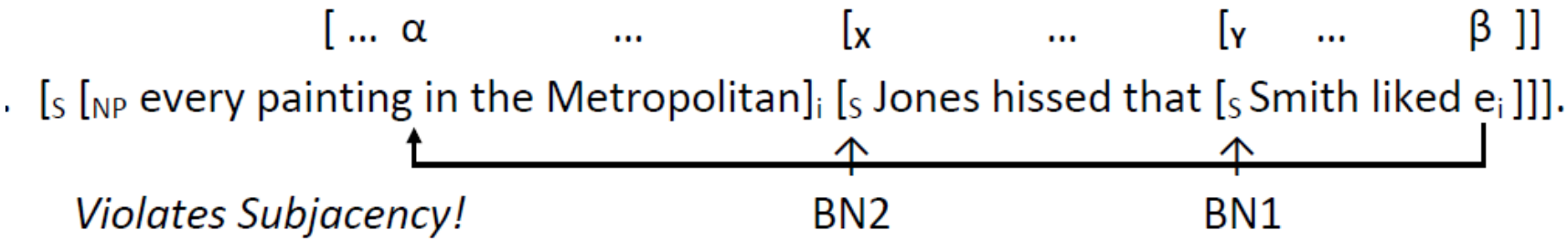

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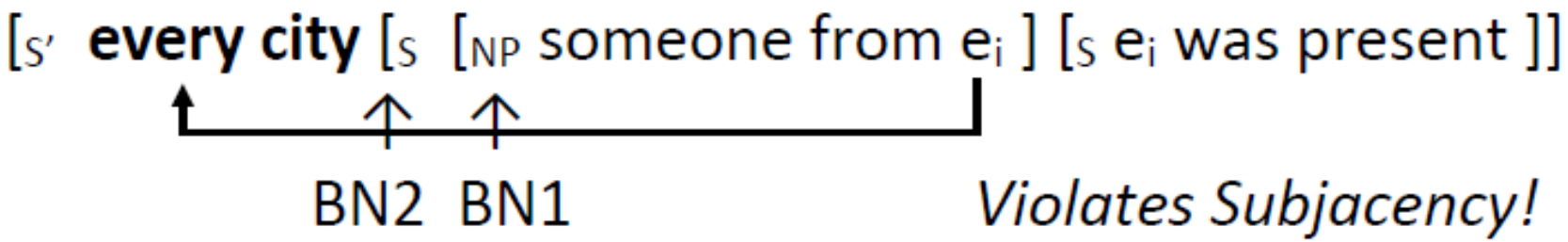

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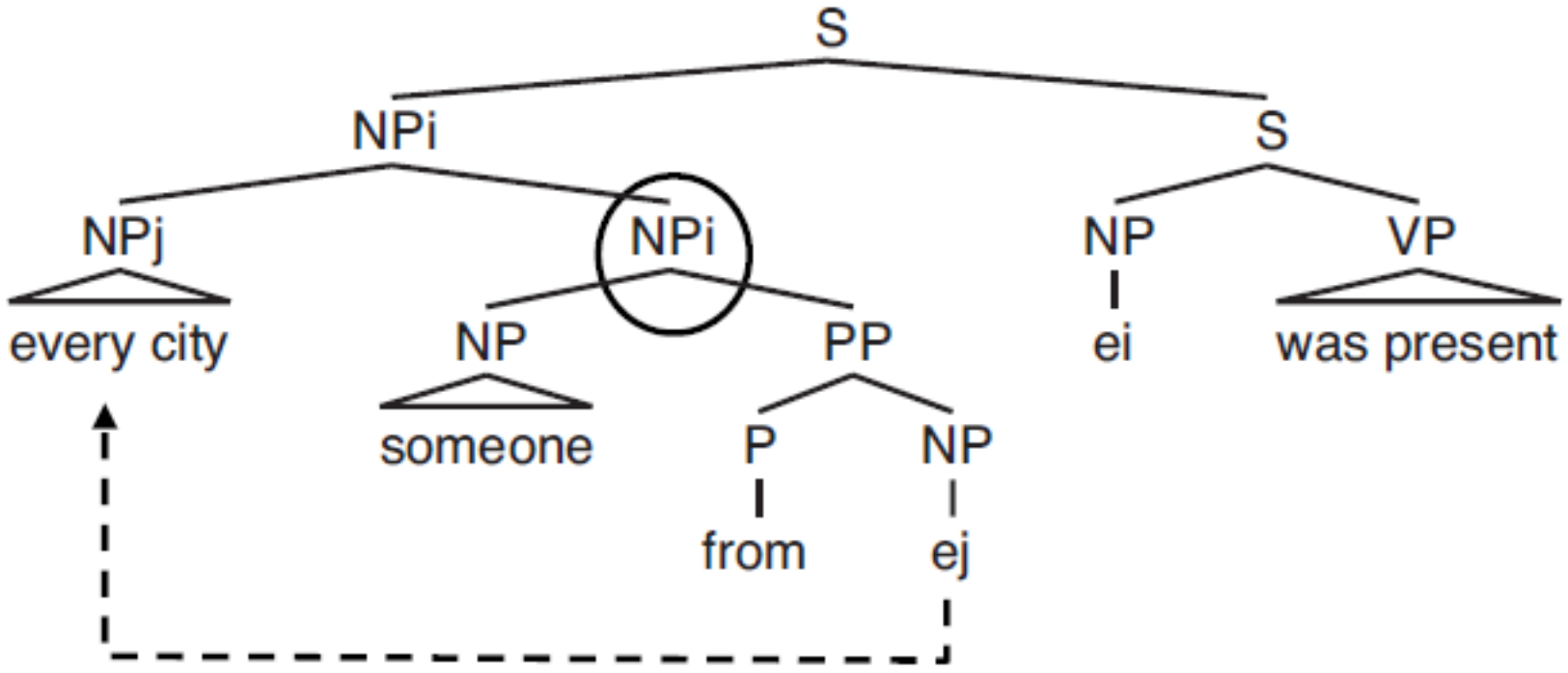

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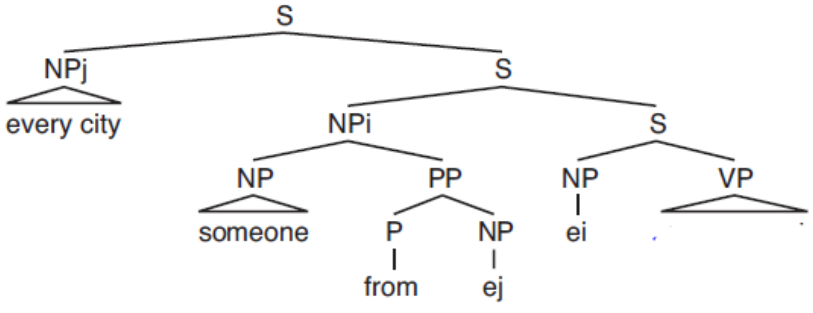

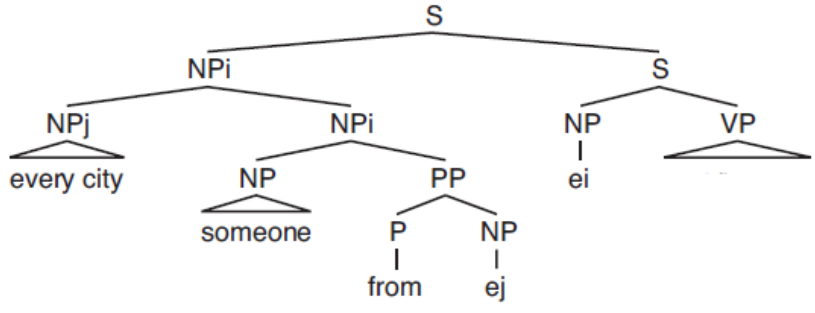

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3 Scope Principle (May 1985)

The scope of an operator is its m-command domain.

m-command

A node α m-commands a node β if and only if every maximal projection that dominates α also dominates β, and neither dominates the other.

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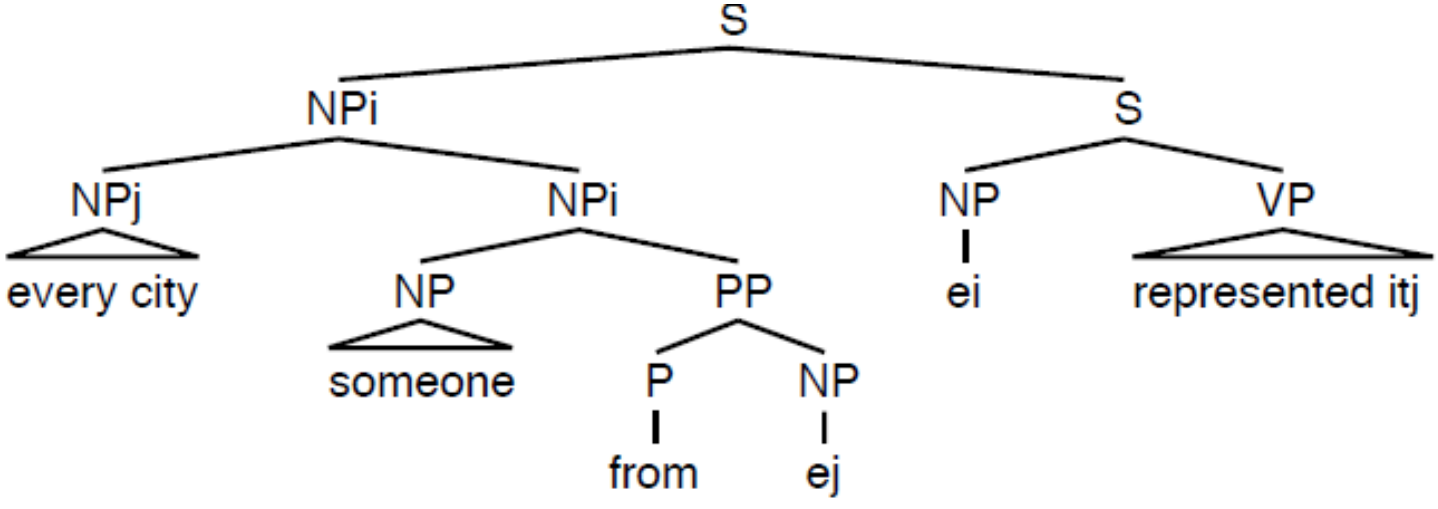

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Meaning 1: 'John wants to visit every city you visit.'

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QR

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Meaning 2: 'John wants to visit every city you want visit'

a. [$_{S}$ [$_{NP}$ every city you do [$_{VP}$ ∅]] [$_{S}$ John [$_{VP}$ wants [$_{S}$ to [$_{VP}$ visit e_i]]]]].

QR

b. [$_{S}$ [$_{NP}$ every city you do **[$_{VP}$ visit e_i]**] [$_{S}$ John [$_{VP}$ wants [$_{S}$ to [$_{VP}$ visit e_i]]]]]. VP Copying1

c. [$_{S}$ [$_{NP}$ every city you do **[$_{VP}$ want [$_{S}$ to [$_{VP}$ visit** e_i**]]]**] VP Copying2
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1 Review

(21) Two boys read every book.

1. existential over universal
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2 Cross-Linguistic Scope Variation: Kuroda (1970), Kuno (1973), Hoji (1985)

(22) (Kono ie-no) dareka-ga (kono heya-no) subete-no
this house-gen someone-nom this room-gen all-gen
hon-o yonda
book-acc read
'Someone (in this house) read all the books (in this room).'
(Kuroda 1970, ex. 54)

(23) (Kono ie-no) subete-no hon-o (kono heya-no)
this house-gen all-gen book-acc this room-gen
dareka-ga yonda
someone-nom read
'for each book (in this room) there is someone (in the house) who has read it.' or 'Someone (in this house) read all the books (in this room)' (Kuroda 1970, ex. 59)

3 Cross-Linguistic Scope Variation: Huang (1982), Aoun and Li (1989, 1993), Lee (1986, 1991), Lin (2013, 2015)

(24) You liang-ge xuesheng nian-le mei yi-ben shu
there.be two-CLASS student read-PERF every one-CLASS book
'Two students read every book' (2 > every; *every > 2)

(25) Two students read every book. (2 > every; every > 2)

4 Cross-Linguistic Scope Variation: How to account for scope variation?

Key Question

how does this scope contrast between languages arise?

1. Languages differ in LF with the same semantic compositional rules
2. Languages have same structure in LF with different semantic compositional rules

5 Cross-Linguistic Scope Variation: Kuroda (1970), Kuno (1973), Hoji (1985)

(26) Scope contrast found in Japanese constructions
a. QP-ga QP-o V (unambiguous)
b. QP-o QP-ga V (ambiguous)

- **Generalization on quantifier scope in Japanese**
  If a predicate corresponds to a sentence frame with the "preferred" word order, the semantic order of quantifiers is given by their linear order; if a predicate corresponds to a sentence frame with "inverted" word order, the semantic order of quantifiers is ambiguous. (Kuroda: 1970, 138)

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- **Rule 2.** If Q1-Q2 reverses [obtains H.H.] its word order because of the preposing of Q1, assign "the same Q2, the same Q1" interpretation.
- **Rule 3.** If Q1-Q2 reverses [obtains H.H.] its word order because of the postposing of Q2, retain interpretation that obtained before word order changes.Kuno (1973, 384)

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- **Rule 1.** If a simple sentence contains two quantifiers Q1 and Q2 in that order in the basic word order representation, assign to Q1 "the same Q1" interpretation, and to Q2 the "different Q2 for each member of Q1" interpretation.
- **Rule 2.** If Q1-Q2 reverses [obtains H.H.] its word order because of the preposing of Q1, assign "the same Q2, the same Q1" interpretation.
- **Rule 3.** If Q1-Q2 reverses [obtains H.H.] its word order because of the postposing of Q2, retain interpretation that obtained before word order changes.Kuno (1973, 384)

6 Cross-Linguistic Scope Variation: Huang (1982), Aoun and Li (1989, 1993), Lee (1986, 1991), Lin (2013, 2015)

(27) Scope contrast found in between Mandarin and English
a. English: QP-subject V QP-object (ambiguous)
b. Mandarin: QP-subject V QP-object (unambiguous)

- **General Condition on Scope Interpretation**
  Suppose A and B are both QPs (quantifier phrases) or both Q-NPs or Q-expressions; then if A c-commands B at S-Structure (SS), A also c-commands B at the Logical Form (LF). (Huang 1982:220, ex. 70)
  - English: allows restructuring the object QP to "the right of a VP or to the right of an entire sentence" at LF (Huang 1982:149)
  - Mandarin: has a special X-bar structure restriction, which does not allow a restructuring process.

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- **Isomorphic Principle (reproduced by Aoun and Li 1989, ex.3** Suppose A and B are both QPs (quantifier phrases) or both Q-NPs or Q-expressions; then if A c-commands B at S-Structure (SS), A also c-commands B at the Logical Form (LF).
  - Is there anything odd conceptually about this principle?

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  - **Is there anything odd conceptually about this principle?**

6 Cross-Linguistic Scope Variation: Huang (1982), Aoun and Li (1989, 1993), Lee (1986, 1991), Lin (2013, 2015)

- **What does this Isomorphic Principle imply about the possibility of inverse scope in English (28)-(31)?**

(28) Two students read every book. 2 > ∀, ∀ > 2

(29) John loaded something into every truck. ∃ > ∀, ∀ > ∃

(30) Someone blamed John for every problem. ∃ > ∀, ∀ > ∃

(31) John gave some credit to every student. ∃ > ∀, ∀ > ∃

6 Cross-Linguistic Scope Variation: Huang (1982), Aoun and Li (1989, 1993), Lee (1986, 1991), Lin (2013, 2015)

- **What does this Isomorphic Principle imply about the scope frozenness in the Japanese example (22), the German example (32) and the Russian example (38)?**

(32) DASS mindestens ein Student fast jeden
that at.least one student.nom almost every
Roman gelesen hat.
novel.acc read has
(∃ > ∀, *∀ > ∃) (Frey 1993)

(33) [Odin mal'čk] poceloval [každuju devočku].
[one boy-NOM] kissed [every girl-ACC]
(∃ > ∀, *∀ > ∃) (Ionin 2003, ex.2a)

6 Cross-Linguistic Scope Variation: Huang (1982), Aoun and Li (1989, 1993), Lee (1986, 1991), Lin (2013, 2015)

(34) Yaoshi liang-ge-xiansuo bei mei-ge-ren zhaodao . . .
if two-CL-clues by every-CL-person found
(2 > ∀, ∀ > 2) (Aoun and Li 1989, ex. 4b)

(35) **Scope contrast found in between Mandarin actives and passives**

a. active: QP-subject V QP-object (unambiguous)

b. passive: QP-object by QP-subject V (ambiguous)

6 Cross-Linguistic Scope Variation: Huang (1982), Aoun and Li (1989, 1993), Lee (1986, 1991), Lin (2013, 2015)

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6 Cross-Linguistic Scope Variation: Huang (1982), Aoun and Li (1989, 1993), Lee (1986, 1991), Lin (2013, 2015)

- **Minimal Binding Requirement**
  Variables must be bound by the most local potential antecedent (Ā-binder). (Aoun and Li 1989, ex. 12)
- **Scope Principle**
  A quantifier A has scope over a quantifier B in case A c-commands a member of the chain containing B. (Aoun and Li 1989, ex. 20)

6 Cross-Linguistic Scope Variation: Huang (1982), Aoun and Li (1989, 1993), Lee (1986, 1991), Lin (2013, 2015)

1. The illustration of scope contrast between Mandarin actives and passives
   a. QP1 x1 QP2 x2 (active)
   b. QP2 x2 QP1 x1 t2 (passive) (Aoun and Li 1989, ex. 23)
2. The illustration of scope contrast between Mandarin actives and English actives
   a. [I" two men [I' I [VP found every clue]]] (Mandarin)
   b. [I" someonei [I' I [VP ti loves everyone]]] (English) (Aoun and Li 1989, ex. 35, 36)

6 Cross-Linguistic Scope Variation: Huang (1982), Aoun and Li (1989, 1993), Lee (1986, 1991), Lin (2013, 2015)

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6 Cross-Linguistic Scope Variation: Huang (1982), Aoun and Li (1989, 1993), Lee (1986, 1991), Lin (2013, 2015)

- **What does Aoun and Li's proposal imply the scope interpretation in (36)-(39)?**

(36) John forced two faculty to serve on every committee.

(37) A senator on every committee attended today's meeting.

(38) Someone is likely [to win].

(39) Someone seems [to love everyone].

1 Review

1. How does scope contrast between language arise?
2. Scope contrast found in Japanese constructions
   a. QP-ga QP-o V (unambiguous)
   b. QP-o QP-ga V (ambiguous
3. Scope contrast found in between Mandarin and English
   a. English: QP-subject V QP-object (ambiguous)
   b. Mandarin: QP-subject V QP-object (unambiguous)
4. Scope contrast found in between Mandarin actives and passives
   a. active: QP-subject V QP-object (unambiguous)
   b. passive: QP-object by QP-subject V (ambiguous)

1 Review

1. Proposals to account for the scope contrasts
2. Kuroda (1970), Kuno(1973), Hoji (1985)
3. Huang (1982), Aoun andLi (1989, 1993), Lee (1986, 1991), Lin (2013, 2015)
4. Wurmbrand (2008) and/or Bobaljik Wurmbrand (2012)

1 Review

(40) John wants to visit the city you do.
   a. For the city you visit, John wants to visit.
   b. For the city you want to visit, John wants to visit.

1. only b reading for (1) : 6 persons
2. both readings available for (1) but b is preferred: 3 persons
3. only b available even changing to "every": 2 persons
4. Kennedy (1997)

2 Fox (2000): Scope Economy

1. Scope Economy:
   Scope-shifting operations (QR: quantifier raising and QL: quantifier lowering) cannot be semantically vacuous.
2. Shortest Move:
   QR must move a quantificational phrase (QP) to the closest position in which it is interpretable.
3. Type Disparity:
   QPs must occur sister to a node of semantic type <e,t> for interpretation. QPs not sister to a node of type <e,t> (e.g., objects) must undergo QR to a position sister to a node of type <t>, where an <e,t> can be created by lambda abstraction.

2 Fox (2000): Scope Economy

(41) a. A boy loves every girl.

b. Many boys love every girl.

2 Fox (2000): Scope Economy

(41) a. A boy loves every girl.

b. Many boys love every girl.

Obligatory instance of QR

a. $[_{IP}$ a boy$_1$ ... $[_{VP}$ every girl$_2$ $[_{VP}$ t$_1$ loves t$_2$]]]

b. $[_{IP}$ many boys$_1$ ... $[_{VP}$ every girl$_2$ $[_{VP}$ t$_1$ love t$_2$]]]

2 Fox (2000): Scope Economy

(41) a. A boy loves every girl.

b. Many boys love every girl.

Obligatory instance of QR

a. $[_{IP}$ a boy$_1$ ... $[_{VP}$ every girl$_2$ $[_{VP}$ t_1 loves $t_2]]]$

b. $[_{IP}$ many boys$_1$ ... $[_{VP}$ every girl$_2$ $[_{VP}$ t_1 love $t_2]]]$

Optional instance of QR

a. $[_{IP}$ every girl$_2$ $[_{IP}$ a boy$_1$ ... $[_{VP}$ t_2, $[_{VP}$ t_1 loves $t_2]]]]$

b. $[_{IP}$ every girl$_2$ $[_{IP}$ many boys$_1$ ... $[_{VP}$ t_2 $[_{VP}$ t_1 love $t_2]]]]$

Optional instance of QL

a. $[_{IP}$ ___ ... $[_{VP}$ every girl$_2$ $[_{VP}$ **a boy$_1$** loves $t_2]]]$

b. $[_{IP}$ ___ ... $[_{VP}$ every girl$_2$ $[_{VP}$ **many boys$_1$** love $t_2]]]$

2 Fox (2000): Scope Economy

(42) a. John loves every girl.

b. Every boy love every girl.

2 Fox (2000): Scope Economy

(42) a. John loves every girl.

b. Every boy love every girl.

Obligatory instance of QR

a. $[_{IP}$ John$_1$... $[_{VP}$ every girl$_2$ $[_{VP}$ t_1 loves $t_2]]]$

b. $[_{IP}$ every boy$_1$ ... $[_{VP}$ every girl$_2$ $[_{VP}$ t_1 loves $t_2]]]$

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b. $[_{IP}$ every boy$_1$ ... $[_{VP}$ every girl$_2$ $[_{VP}$ t_1 loves $t_2]]]$

a. $*[_{IP}$ every girl$_2$ $[_{IP}$ John$_1$ ... $[_{VP}$ t_2 $[_{VP}$ t_1 loves $t_2]]]]$

b. $*[_{IP}$ every girl$_2$ $[_{IP}$ every boy$_1$ ... $[_{VP}$ t_2 $[_{VP}$ t_1 loves $t_2]]]]$

a. $*[_{IP}$ ___ ... $[_{VP}$ every girl$_2$ $[_{VP}$ **John$_1$** loves $t_2]]]$

b. $*[_{IP}$ ___ ... $[_{VP}$ every girl$_2$ $[_{VP}$ **every boy$_1$** loves $t_2]]]$

2 Fox (2000): Scope Economy

(43) a. An American runner seems to Bill [to have won a gold medal].

b. John seems to Bill [to have won a gold medal].

(44) a. A senator must/may visit St. Petersburg.

b. John must/may visit St. Petersburg.

(45) Norvin Richards doesn't speak more than three languages.

2 Fox (2000): Scope Economy

what counts as having a semantic effect

Crossing a QP over negation or an intensional element or another non-commutative QP.

When does a scope shifting operation count as meaning-affecting wrt Scope Economy?

when it affects truth-conditions.

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When does a scope shifting operation count as meaning-affecting wrt Scope Economy?

when it affects truth-conditions.

Scope Economy is a constraint on logical syntax.

3 Fox (2000): Scope Parallelism

(46) **Parallelism:**
In an ellipsis/phonological reduction construction involving paired structures X, and Y, the scopal relationships among the elements in X must be identical to the scopal relationships among the parallel elements in Y.

3 Fox (2000): Scope Parallelism

(46) **Parallelism:**
In an ellipsis/phonological reduction construction involving paired structures X, and Y, the scopal relationships among the elements in X must be identical to the scopal relationships among the parallel elements in Y.

(47) John [VP studied the whole year] and Mary did [VP STUDIED THE WHOLE YEAR] too.

(48) An Austrian delegate greeted every visitor and a German delegate [VP GREETED EVERY VISITOR too.
(a > every a > every; every > a every > a;
*every > a a > every or a > every every > a)

3 Fox (2000): Scope Parallelism

(49) **A delegate greeted every visitor** and Mary did too.

(50) **A delegate greeted every visitor** and Mary GREETED EVERY VISITOR too. (a > every; * every > a)

3 Fox (2000): Scope Parallelism

(49) **A delegate greeted every visitor** and Mary did too.

(50) **A delegate greeted every visitor** and Mary GREETED EVERY VISITOR too. (a > every; * every > a)

This is evidence that optional QR is NOT available in sentence "Mary greeted every visitor" – i.e., evidence for Scope Economy.

3 Fox (2000): Scope Parallelism

(49) **A delegate greeted every visitor** and Mary did too.

(50) **A delegate greeted every visitor** and Mary GREETED EVERY VISITOR too. (a > every; * every > a)

This is evidence that optional QR is NOT available in sentence "Mary greeted every visitor" – i.e., evidence for Scope Economy.

(51) John seems to Bill [to have won a gold medal]

Show that the quantifier lowering of John in (51) is unavailable using parallelism:

3 Fox (2000): Scope Parallelism

(52) **Ellipsis Scope Generalization (ESG)**
A sentence S will disambiguate its syntactic image S' (in favor of surface scope), whenever S is semantically equivalent under surface and inverse scope (i.e., whenever S is scopally uninformative).

3 Fox (2000): Scope Parallelism

(52) **Ellipsis Scope Generalization (ESG)**
A sentence S will disambiguate its syntactic image S' (in favor of surface scope), whenever S is semantically equivalent under surface and inverse scope (i.e., whenever S is scopally uninformative).

(53) Someone in the audience knows the capital of every country. The lecturer does too. (a> every; * every> a)

(54) **Someone in the audience** knows the capital of **every country**. **The person who was invited to talk about it** does too
(a > every ; every > a)

4 Scope Frozen Languages and Scope Rigid Languages under Fox(2000)

(55) Three students speak every language. (three > every; every > three)

(56) Tases holangi-ka motun thokki-lul capa mekessta
five tiger-NOM every rabbit-ACC ate
'Five tigers ate every rabbit.' (five > every; * every > five)

4 Scope Frozen Languages and Scope Rigid Languages under Fox(2000)

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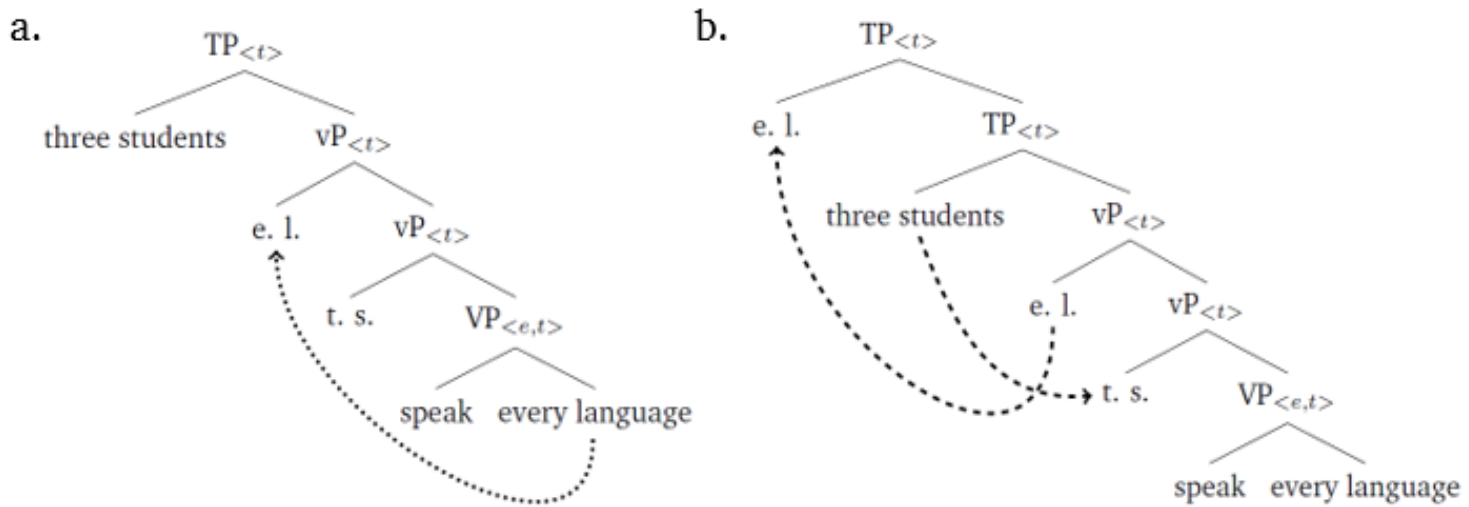

1 Review

(57) Kazhdogo posetitelya-ACC poprivetstvovali dva-NOM
every visitor-ACC two delegate-NOM
delegata, i kazhdogo vystupayushchego-ACC tozhe
greeted and every spokespersons-ACC too
'Every visitor, two delegates greeted; every spokespersons too.'
(Russian example provided by Evgeniya Inshakova)

Question: how to derive scope interpretations in paired structures when overt movement of a quantificational phrase is involved?

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Question: how to derive scope interpretations in paired structures when overt movement of a quantificational phrase is involved?

2 Methodological Preliminaries: Quantifier Order

(58) Meige xuesheng dou maile yiben shu
every student all bought one book
'Every student bought a book'

(59) Every student bought a book.

(60) Every student bought one book each.

2 Methodological Preliminaries: Quantifier Order

(58) Meige xuesheng dou maile yiben shu
every student all bought one book
'Every student bought a book'

(59) Every student bought a book.

(60) Every student bought one book each.

- What concerns might you have about comparing (58) with (59) or (60) in evaluating scope possibilities in Mandarin vs. English ?
  1. What is *dou* doing here?
  2. Why the numeral phrase "one book" is translated as an indefinite "a book"?
  3. What counts as a book/one book here? Is it natural to think everyone bought one book?
  4. What are the truth conditions for the given sentences?

2 Methodological Preliminaries: Quantifier Order

(61) $\forall x[\text{student}(x) \rightarrow \exists y[\text{book}(y) \,\&\, \text{bought}(x,y)]]$

(62) $\exists y[\text{book}(y) \,\&\, \forall x[\text{student}(x) \rightarrow \text{bought}(x,y)]]$

2 Methodological Preliminaries: Quantifier Order

(61) $\forall x[student(x) \rightarrow \exists y[book(y) \ \& \ bought(x,y)]]$

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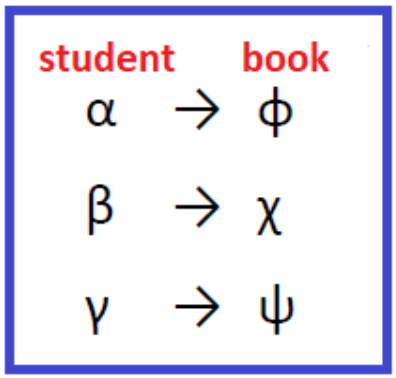

Fig. 1

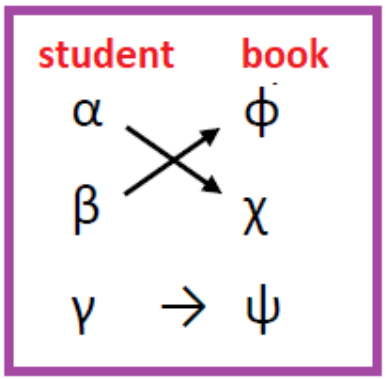

Fig 2

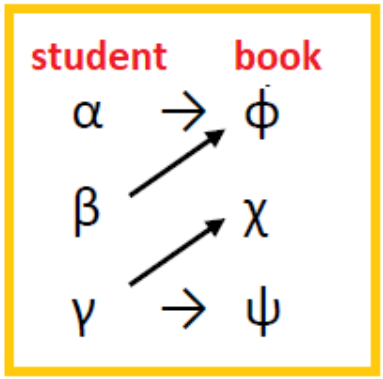

Fig. 3

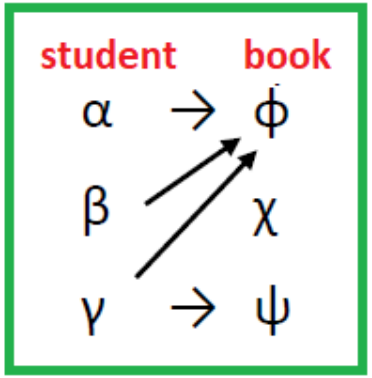

Fig. 4

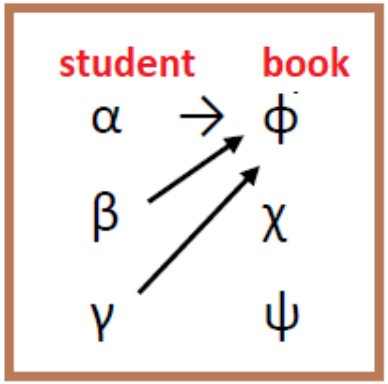

Fig. 5

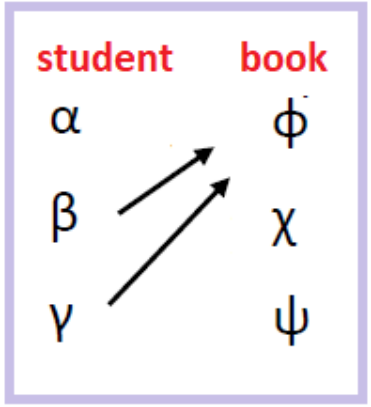

Fig. 6

2 Methodological Preliminaries: Quantifier Order

(63) A student bought every book.

2 Methodological Preliminaries: Quantifier Order

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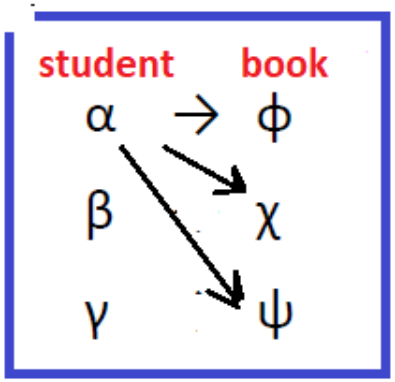

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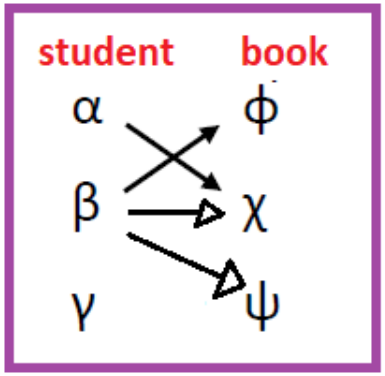


Fig 2

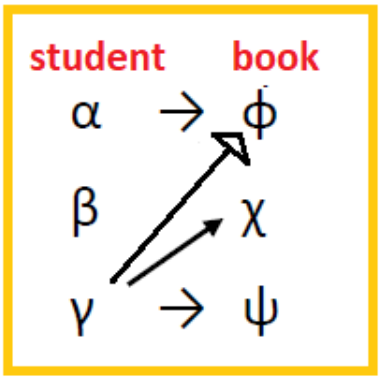


Fig. 3

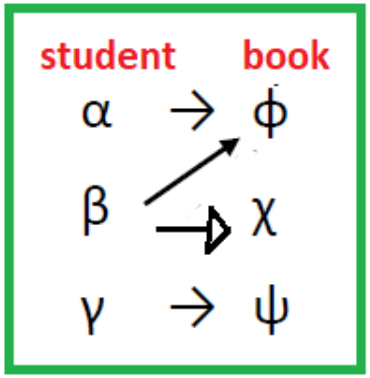


Fig. 4

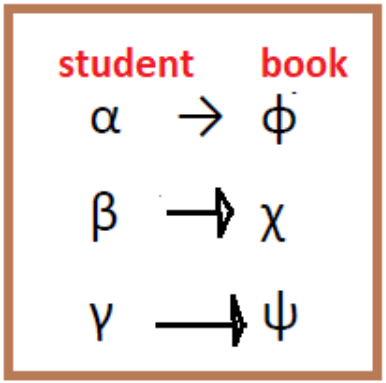


Fig. 5

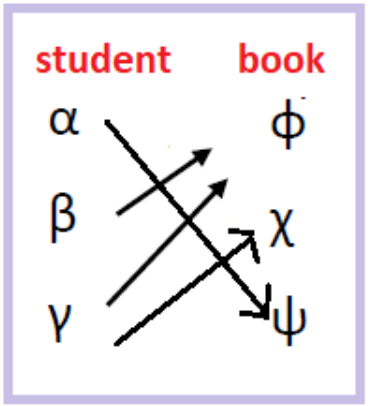


Fig. 6

2 Methodological Preliminaries: Quantifier Order

choose ∃ - ∀ order to test the scope!

1. With the order ∃ - ∀ , when you ask about the availability of inverse scope you are asking whether a set of situations **wider** than those allowed under surface scope will make it true. A “yes” answer is thus informative: things that wouldn’t make the surface scope true make the inverse scope true.
2. With the order ∀ - ∃, the inverse scope reading is entailed by the surface scope reading. When you ask about the availability of inverse scope, a “yes” answer is uninformative because you are not sure whether the sentence licenses inverse scope reading because those situations are included in what makes the surface scope reading true. uninformative:

2 Methodological Preliminaries: testing scope

1. Acting out task (Chien and Wexler 1989, Lee 1991)
2. Continuation Task (Kurtzman and MacDonald 1993)
3. Truth-Value Judgment Task (Crain and McKee 1985; Crain and Thornton 1998)
   - Story-telling
   - Picture-matching
   - Written descriptive contexts
   - Line-drawings

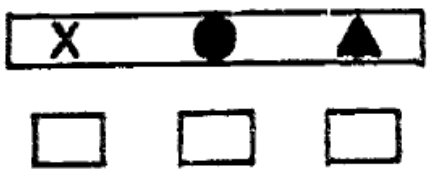
3 Methodological Preliminaries: Acting out task

- Acting out task (Chien and Wexler 1989)

THE EXPERIMENT

In the experiment, an act-out task was used to test Chinese-speaking children and adults' interpretation of sentences involving two quantificational NPs. The subject was first presented with a sheet of paper with an array of three equally sized squares and a card with an array of three di'ferent figures (or numbers), or a set of three markers of different colors. The subject was then presented with a test sentence (e.g., "Draw every figure in one box") and asked to perform the action prescribed in the presented sentence. An example of the layout of the experimental materials is illustrated in (13).

(13)



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3 Methodological Preliminaries: Truth-Value Judgment task

- **Story-telling** (Su 2001)

Characters and Crucial Props
Snow White, three ladies, and two boys
Three flowers, three balloons, three toy swords, and one toy gun
Protocol

Exp:	Snow White is having a Halloween party at her house, but some of her guests don't know how to dress up for the party.
Lady1:	Snow White, we don't know how to dress up for your party. Can you help us?
SW:	No problem. I have a lot of great stuff for a party. Let me check what I have. Here I have three beautiful flowers, three balloons, three swords, and a toy gun. I think each of you ladies can have a balloon. They look good.
Lady2:	No, I want a flower. The balloons look more like children's things.
Lady3:	Yes, I agree with you. I want a flower, too. The balloons should be for kids.
Lady1:	I want a flower, too. They are really beautiful.
SW:	OK. You can have this flower. You can have this one. And this one is yours. How about you boys?
Boy1:	I want the toy gun. I want to dress up like a cowboy.

3 Methodological Preliminaries: Truth-Value Judgment task

- **Story-telling** (Su 2001)

SW: And you, little boy? Do you want the three balloons? You can dress up like a clown.
Boy2: The balloons look great. But, I like the three swords more than the balloons. I can dress up like a knight to fight with enemies.
Lady1: If no one wants the balloons, I can have them. I think it will be fun for me to dress up like a clown with the balloons.
SW: OK, now everybody has made a decision. This is your toy gun. The swords are yours. And the balloons are yours.

Kermit: This is a really long and complicated story. It's a story about some people going to a party, and Snow White was helping them to dress up. I know what happened. "Snow White gave a boy every balloon."
Child: No, she gave the balloons to this lady.

Kermit: Oh, it's too bad I was wrong. Let me try another one. "Snow White gave a boy every sword."
Child: Yes.
Or No, only this boy got all the swords. (Symmetrical interpretation)

Kermit: There is another thing I want to make sure. "Snow White gave a lady every flower."
Child: No, each of them only got one flower.
Or Yes. (Symmetrical interpretation)

3 Methodological Preliminaries: Truth-Value Judgment task

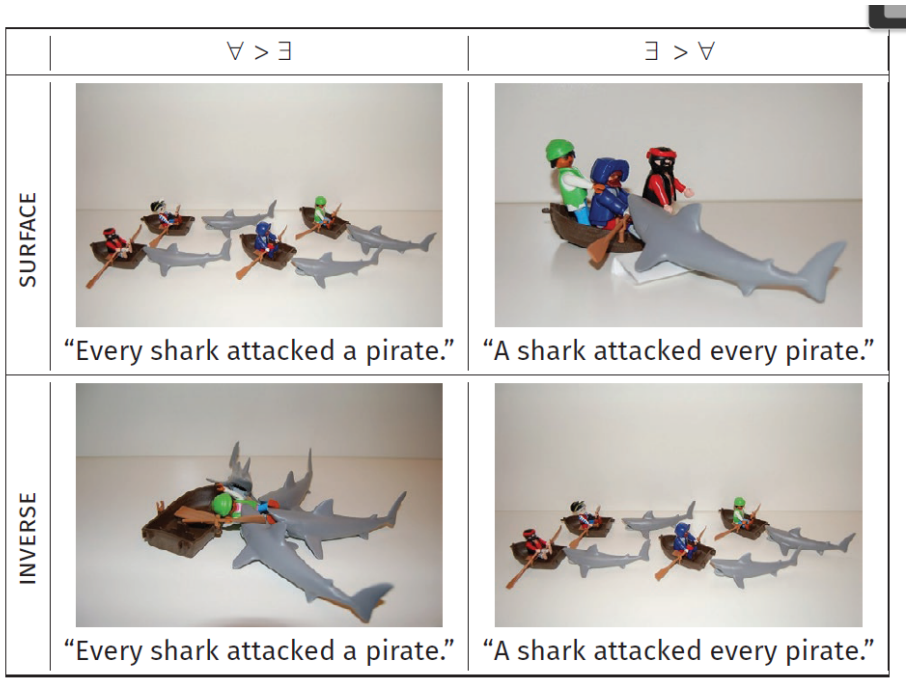
- **Story-telling** (Su 2001)

1. one of the two experimenters acted out the story with toys and props, the puppet (Kermit the Frog, played by the other experimenter) would say something about what he thought happened in the story.
2. Children group: tested individually
   - If the child thought what the puppet said was true in the story, he/she could feed the puppet with something as a reward.
   - If the child thought the puppet was wrong, he/she could ask the puppet to do some push-ups in order to remind the puppet to pay attention to the stories. When the child thought the puppet was wrong, he/she was further asked to explain why it was wrong.
3. Adult group: tested as a group
   - After each story, the adults had to write down on the answer sheet whether he/she thought the puppet was right or wrong, and also the reason why the puppet was wrong.

3 Methodological Preliminaries: Truth-Value Judgment task

- **Sentence-Picture matching**

1. sentence is judged as true or false of a given picture (Bruening's scope field project.) (http://udel.edu/ bruening/scopeproject/scopeproject.html)
2. sentence is judged as whether can be used to describe the picture using a 7-point Likert scale (Scontras et al. 2017)



3 Methodological Preliminaries: Truth-Value Judgment task

- **Written Descriptive contexts (Wu and Ionin 2019**

  - Participants rated each sentence on a scale from 1 (unacceptable) to 4 (acceptable)

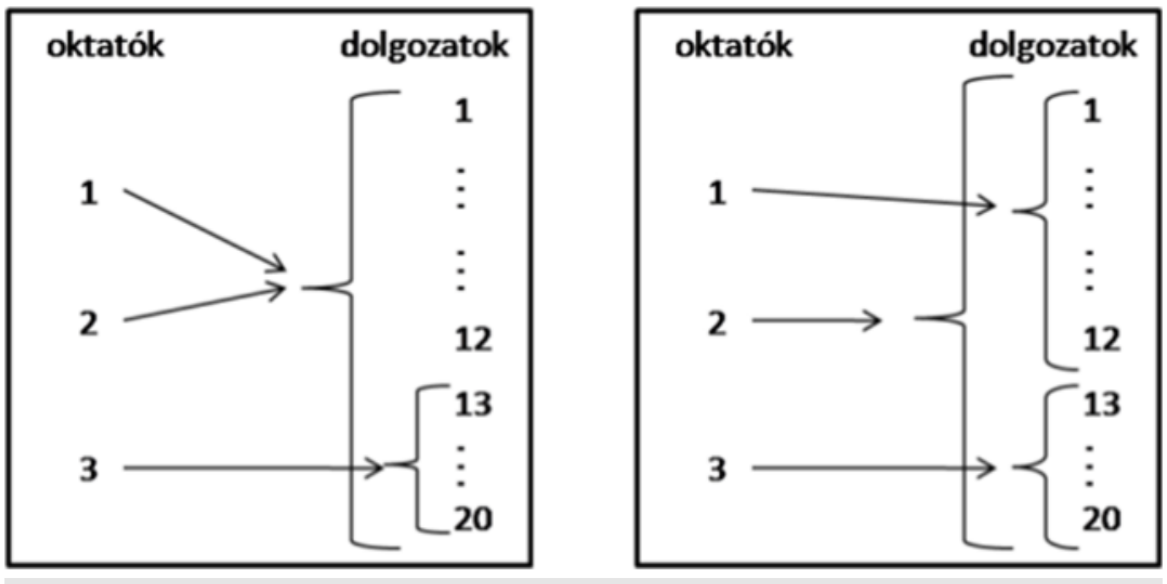
  - Two types of contexts: the "Single Agent" context and the "Pair-list" context

"Single Agent" Context: There were three stray dogs under a tree. One day, one of the dogs chased the three men who walked by the tree, and the three men ran away terrified. The other two dogs simply stayed under the tree sharing a bone. 	**"Pair-list" Context**: There were three vicious dogs in this neighborhood: Rocky, Milo and Gus. This morning, Rocky scared a businessman; Milo scared a man with glasses; and Gus scared a delivery man. All three men were terrified. 

3 Methodological Preliminaries: Truth-Value Judgment task

- **line-drawings (Gyuris B. Jackson S., (2018)**

(19) Két oktató olvasott el sok / SOK dolgozatot.
two professor read.3SG VM many many aper.ACC
'It was two professors who read many papers.' – *LS*
'Many papers are such that it was two professors who read them.' – *IS*



Thank you!

As a researcher, I am

- a firm supporter of integrating theoretical research with experimental research
- a strong believer of collaboration driving innovation

I looking forward to having a chance to work with you or meet you at conferences or NYI Summer School in the future. Wish you all the best!

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