Asymmetric reconstruction for binding but not for scope[*]

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1 Introduction

Debates on the nature of reconstruction

- Fox (1999): Reconstruction should be syntactic (via Higher Copy Neglect)
- Poole and Keine (2024): Not all reconstructions are syntactic (i.e., we need *Semantic Reconstruction*.)

Today:

- **Semantic** Reconstruction is needed.
- We need two kinds – one for scope; the other for binding: **an assignment-function-dependent trace**
  ➜ **Methodologically**, disentangling predictions by different reconstruction strategies
- Fill out the **typology** of movement dependencies by reconstruction possibilities.

Interpreting movement chains

We consider the following four '*interpretations*' of movement chains.[1] They make testable predictions.

(1) Working assumption: Each kind of movement dependency only recruits one reconstruction strategy, regardless of the semantic type of the moved element.

	Strategies	Proponents
❶	No Reconstruction: a type e trace via Trace Conversion	Heim and Kratzer 1998
❷	Syntactic Reconstruction / Higher Copy Neglect	Chomsky 1995
❸	Semantic Reconstruction for scope: a trace of type $\langle et, t\rangle$	Rullman 1995; Cresti 1995
❹	Semantic Reconstruction for binding: a trace of type $\langle s, e\rangle$	Sternefeld 2001

Table 1: Four strategies to interpret movement chains

Predictions on	❶	❷	❸	❹	
(i) $\beta > \alpha$ scope ($\alpha_i ... \beta ... t_i$)	N/A	✓	✓	N/A	(both α & β= quantificational)
(ii) β binds into α ($[_\alpha ... x_j ...]_i ... \beta_j ... t_i$:)	N/A	✓	N/A	✓	(x=anaphors; β=binder)

Table 2: Predictions made by different strategies for interpreting α ... β ... t_i

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1. See section 4 for a discussion on the so-called '*functional*' trace, of type $\langle e, e\rangle$.

2 Asymmetric reconstruction in topicalization

- The schematic structure of reconstruction in topicalization:

(2): When the moved constituent is a quantifier β, it always takes scope over α.

(3): The anaphor inside a moved constituent (β) may be bound by α (i.e., "reconstructed" for binding)

(2) No reconstruction for scope

a. [... α ... [... β ...]] ($\alpha > \beta, \beta > \alpha$)

b. [$_{\text{TopP}}$ β ... [... α ... [... t_β ...]]] (*$\alpha > \beta, \beta > \alpha$)

(3) Reconstruction for binding

a. [... α_i ... [... [$_\beta$ ...x_i...] ...]] (α binding x)

b. [$_{\text{TopP}}$ [$_\beta$ ...x_i...] ... [... α_i ... [... t_β ...]]] (α binding x)

- Topicalization in English **obligatorily shifts scope**[2]
  (earliest reference we can track down: Poole 2017, 2024)[3]
- Even more strikingly, scope reconstruction for **NPI-licensing** is not possible (vs. raising, for example)

(4) No reconstruction for scope in English topicalization (Poole 2024:298)

a. **Every** teacher liked **some** student in the first week.
   (i) For every teacher x, there is some student y such that x liked y. ($\forall > \exists$)
   (ii) There is some student y such that for every teacher x, x liked y. ($\exists > \forall$)

b. [**Some** student]$_1$, **every** teacher liked $\_{}_1$ in the first week.
   (i) *For every teacher x, there is some student y such that x liked y. (*$\forall > \exists$)
   (ii) There is some student y such that for every teacher x, x liked y. ($\exists > \forall$)

(5) No reconstruction for NPI-licensing in English topicalization

a. Sophia did **not** eat **any** pizza.

b. *[**Any** pizza]$_1$, Sophia did **not** eat $\_{}_1$. (Poole 2017:51)

Cf. [A doctor with **any** reputation]$_1$ is likely **not** $\_{}_1$ to be available.
(raising, Sauerland and Elbourne 2002:287)

- Nevertheless, reconstruction for **variable binding** is possible in topicalization.
- This asymmetry is only acknowledged by Poole (2024, 298n15) but not yet explained

(6) Reconstruction for binding in English topicalization

a. **Every boy**$_2$ likes **his**$_2$ mom.

b. [**His**$_2$ mom]$_1$, **every boy**$_2$ likes $\_{}_1$. (Charlow 2018, ex.9)

c. ...But [the paper that **he**$_1$ gave to Mrs. Brown]$_2$, I don't think [**any man**]$_1$ would want her to read $\_{}_2$.
(Moulton 2013:254)

2. Topicalization is string-identical to but scopally different from focus movement, see discussion by Poole (2017, 15–31).

3. Poole (2017, 48n36) was also not able to track down earlier references. Nevertheless, **LasnikUriagereka:1988<empty citation>** reported that topicalization bleeds further QR (as also discussed by Bošković 2008):

(i) Topicalization bleeds further QR (Bošković 2008:251, citing judgment from **LasnikUriagereka:1988**)
   a. Someone thinks that Mary solved every problem. (%$\forall > \exists; \exists > \forall$)
   b. Someone thinks that every problem, Mary solved. (*$\forall > \exists; \exists > \forall$)

- Not a quirk in English: **Mandarin** behaves the same (as confirmed by 9 Mandarin native speakers):

(7) No reconstruction for scope in Mandarin topicalization[4]

a. **Meige laoshi** dou xihuan Zhangsan-de **yixie** xuesheng. ($\forall > \exists$: preferred, $\exists > \forall$: stress *yixie*)
every teacher DOU like Zhangsan-POSS some student
'Every teacher likes some of Zhangsan's students.'

b. [Zhangsan-de **yixie** xuesheng]$_1$ (ne), **meige laoshi** dou xihuan _$_1$. ($*\forall > \exists$, $\exists > \forall$)
Zhangsan-POSS some student TOP every teacher DOU like
'There are some of Zhangsan's students that every teacher likes.'

(8) No reconstruction for NPI-licensing in Mandarin topicalization[5]

a. Lisi **bu** xihuan banshang-de **renhe** yi-ge xuesheng.
Lisi not like class-MOD any one student
'Lisi does not like any student in the class.'

b. *[Banshang-de **renhe** yi-ge xuesheng]$_1$ (ne), Lisi **bu** xihuan _$_1$.
class-MOD any one student TOP Lisi not like
Lit.: 'Any student in the class, Lisi does not like.'

c. Wo **bu** juede [banshang-de **renhe** yi-ge xuesheng]$_1$ (ne), Lisi hui xihuan _$_1$.
1SG not think class-MOD any one student TOP Lisi will like
Lit.: 'I don't think any student in the class, Lisi will like.'
(i.e., I don't think Lisi will like any student in the class)

(9) Reconstruction for binding in Mandarin topicalization

a. **Meige laoshi**$_2$ dou xihuan [**ziji/taziji**$_2$-de xuesheng].
every teacher DOU like self/3SG.self-POSS student
'Every teacher likes his/her own students.'

b. [**Ziji/taziji**$_2$-de xuesheng]$_1$, **meige laoshi**$_2$ dou xihuan _$_1$.
self/3SG.self-POSS student every teacher DOU like
'His/her own students, every teacher likes '

- **Not a *dou* problem**: without it, scope reconstruction is still unavailable
(See Li 2014 for environments where *mei* 'every' does not need *dou*)

(10) a. **Meiyou** xuesheng xihuan xuexiaoli-de **mei** yige laoshi. ($\neg\exists > \forall$, $*\forall > \neg\exists$)
no student like school-POSS every one teacher
'No student likes every teacher in the school.'

b. [Xuexiaoli-de **mei** yige laoshi]$_1$ ne, **meiyou** xuesheng xihuan _$_1$. ($*\neg\exists > \forall$, $\forall > \neg\exists$)
school-POSS every one teacher TOP no student like
'Every teacher x in the school is such that no student likes x.'

4. Indefinite/numerals are often degraded as topics and require *you* 'have', which might be confounded by a possible parse of existential constructions. We place the possessor *Zhangsan* before *yixie* 'some' to block the occurrence of *you* (*cf.* **Zhangsan-de **you** yixie xuesheng*).
5. The distributor *dou* must *not* be added in (8b), which can license polarity items leftward.

(11) a. Laoshi rang **meige xuesheng** qu du yixia Zhangsan-de **yixie** wenzhang.
teacher let every student go read a.bit Zhangsan-POSS some paper
'The teacher let every student read some of Zhangsan's papers briefly.'[6] ($\forall > \exists, \exists > \forall$)

b. [Zhangsan-de **yixie** wenzhang]$_1$ ne, laoshi rang **meige xuesheng** qu du yixia $\_{1}$.
Zhangsan-POSS some paper TOP teacher let every student go read a.bit
'There are some of ZS's papers that the teacher let every student read briefly.' ($*\forall > \exists, \exists > \forall$)

- Not determined by relative logical strength between the surface and reconstructed scope readings

(12): Neither wide nor narrow scope of 'exactly' over universal quantifiers entails the other, but topicalization of 'exactly' in (12) still renders only a wide scope reading $3! > \forall$.

(12) a. **Meige xuesheng** dou kan-guo **zhenghao san-bu dianying**.
every student DOU watched exactly three movie
'Every student watched exactly three movies.' $\not\Rightarrow$ (b) (Baseline, no QR: $\forall > 3!$, $*3! > \forall$)

b. [**Zhenghao** (you) **san-bu dianying**]$_1$ ne, **meige xuesheng** dou kan-guo $\_{1}$.
exactly have three movie TOP every student DOU watched
'There are exactly three movies that every student watched.' $\not\Rightarrow$ (a)
(topicalization, with or without *you*: $*\forall > 3!$, $3! > \forall$)

➜ **Asymmetry**: reconstruction only for binding but not for scope in topicalization

- Mixed behavior: when a **quantifier** containing an **anaphor** moved, judgment varies

(13) %**Ziji/taziji**$_k$-de **yixie** pengyou, **meige ren**$_k$ dou bu-xihuan _. ($\%\forall > \exists$, $*\exists > \forall$)
self/3SG.self-POSS some friend every person DOU not-like
'For everyone$_k$, there are some of his$_k$ friends that he$_k$ doesn't like.' [MC:n=3 OK; n=5 *]

6. The $\forall > \exists$ reading in (11a) is slightly marked, but still available under the following context.

(i) *The teacher is posting reading assignments. To prevent students from copying each other's reading reports, each student must read a different article. The teacher really likes Zhangsan's work, so ...*

3 (Semi-)Formal analysis

Consider a movement represented as (14).

(14) $[_{\alpha}$ { `his friend` / `some friend`}] $[_{\beta}$ `every man`] `loves` t_{α}

The strategies and the predictions:

❶ **Trace Conversion** (type e trace): No reconstruction at all
➜ `some` $>$ `every`; `his` remains free.

❷ **Syntactic Reconstruction**: No asymmetry in reconstruction
➜ `every`$>$`some`; `his` can be bound – the movement undone (total reconstruction). [7]

❸ **Semantic Reconstruction for scope** (GQ-type trace): asymmetric reconstruction
➜ `every`$>$`some`; but `his` remains free

❹ **Semantic Reconstruction for binding** (assignment-dependent trace): asymmetric reconstruction
➜ `some`$>$`every`; but `his` can be bound

Predictions on		❶	❷	❸	❹
(i) $\beta > \alpha$ scope	$(\alpha_i ... \beta ... t_i)$	N/A	✓	✓	N/A
(ii) β binds into α	$([_{\alpha} ... x_j ...]_i ... \beta_j ... t_i:)$	N/A	✓	N/A	✓

Table 2 (Repeated): Predictions made by different strategies for interpreting α ... β ... t_i

Strategy ❸, Semantic Reconstruction for scope

- Trace $t \rightsquigarrow$ Variable $Q_{\langle et,t \rangle}$.
- Figure 1: Quantifier scope is reconstructed (with suitable type adjustments within VP)

`every man love` t

$$\forall x : \texttt{man}(x) \rightarrow Q(\lambda y.\texttt{love}(x, y))$$

abst.

`some linguist`

$$\lambda P_{et}.\, \exists z : \texttt{linguist}(z) \wedge P(z) \qquad \lambda Q_{et,t}\, \forall x : \texttt{man}(x) \rightarrow Q(\lambda y.\texttt{love}(x, y))$$

appl.

$$\forall x : \texttt{man}(x) \rightarrow \exists z : \texttt{linguist} \wedge \texttt{love}(x, z)$$

Figure 1: `some linguist` [`every man loves` t] via strategy ❸

7. Condition C effects are regarded as evidence for syntactic reconstruction, but they can be absent in topicalization (cf. Appendix).

- Figure 2: $\texttt{his}_z$ remains free ($\texttt{FriendOF}$ being of type $\langle e, e\rangle$)[8]

$$\dfrac{\underset{\lambda P_{et}.\, P(\texttt{FriendOf}_{ee}(z))}{\texttt{his friend}} \qquad \dfrac{\underset{\forall x : \texttt{man}(x) \to Q(\lambda y.\texttt{love}(x, y))}{\texttt{every man love}\ t}}{\lambda Q_{et,t}\ \forall x : \texttt{man}(x) \to Q(\lambda y.\texttt{love}(x, y))}\ \text{abst.}}{\forall x : \texttt{man}(x) \to \texttt{love}(x, \texttt{FriendOf}(z))}\ \text{appl.}$$

Figure 2: $\texttt{His friend}$ [$\texttt{every man loves}$ t] via strategy ❸

Strategy ❹, Semantic Reconstruction for binding

- The basics: an assignment-dependent trace (Sternefeld 2001; Charlow 2018)
- Suppose:
  - assignment functions $f, g, \ldots$ of type $\langle n, e\rangle$ ($\mathbb{N} \to D_e$)
  - T: a variable of type $\langle ne, e\rangle$

Baseline: $[\texttt{Himself}_1]_j$ $\texttt{every man}_1$ $\texttt{loves}$ T_j

$$\dfrac{\dfrac{\underset{\lambda f_{ne}.\, f(1)}{\texttt{himself}_1} \qquad \dfrac{\underset{\lambda g.\, \forall x : \texttt{man}(x) \to \texttt{love}(x, T(g[1 \to x]))}{\texttt{every man loves}\ t}}{\lambda T_{ne,e}.\, \lambda g.\, \forall x : \texttt{man}(x) \to \texttt{love}\big(x, T(g[1 \to x])\ \ T(g[1 \to x])\big)\big)}\ \text{abst.}}{\lambda g.\, \forall x : \texttt{man}(x) \to \texttt{love}(x, g[1 \to x]\ (1))}}{\lambda g.\, \forall x : \texttt{man}(x) \to \texttt{love}(x, x)}\ \text{equiv.}$$

With a possessive: $[\texttt{his}_1\ \texttt{friend}]_j$ $\texttt{every man}_1$ $\texttt{loves}$ T_j

$$\dfrac{\dfrac{\underset{\lambda f_{ne}.\, \texttt{FriendOF}\big(f(1)\big)}{\texttt{his}_1\ \texttt{friend}} \qquad \dfrac{\underset{\lambda g.\, \forall x : \texttt{man}(x) \to \texttt{love}(x, T(g[1 \to x]))}{\texttt{every man loves}\ t}}{\lambda T_{ne,e}.\lambda g.\, \forall x : \texttt{man}(x) \to \texttt{love}\big(x, T(g[1 \to x])\big)}\ \text{abst.}}{\lambda g.\, \forall x : \texttt{man}(x) \to \texttt{love}\big(x, \texttt{FriendOF}(g[1 \to x](1))\big)}}{\lambda g.\, \forall x : \texttt{man}(x) \to \texttt{love}\big(x, \texttt{FriendOF}(x)\big)}\ \text{equiv.}$$

8. Note that even if we give more power to this strategy with a $\langle s, \langle et, t\rangle\rangle$ trace to achieve binding somehow (i.e., by augmenting ❸ with ❹), scope reconstruction is still possible, and thus the asymmetry still cannot be captured.

Quantifier: A straightforward type adjustment does not allow scope reconstruction (**Hence asymmetry!**)[9]

$$\dfrac{\dfrac{\dfrac{\texttt{some linguist}}{\lambda P.\lambda g_{ne}.\,\exists y:\texttt{linguist}(y)\wedge P(\lambda f.f(2))(g[2\to y])} \quad \dfrac{\dfrac{\texttt{every man loves } t}{\lambda g.\,\forall x:\texttt{man}(x)\to\texttt{love}(x,T(g[1\to x]))}}{\lambda T_{ne,e}.\lambda g.\,\forall x:\texttt{man}(x)\to\texttt{love}\big(x,T(g[1\to x])\big)}\ \text{abst.}}{\lambda g.\,\exists y:\texttt{linguist}(y)\wedge\forall x:\texttt{man}(x)\to\texttt{love}\big(x,g[1\to x,2\to y](2)\big)}}{\lambda g.\,\exists y:\texttt{linguist}(y)\wedge\forall x:\texttt{man}(x)\to\texttt{love}(x,y)}\ \text{equiv.}$$

Quantifier + Anaphor: Option 1: $[\texttt{some}_2\ \texttt{of his}_1\ \texttt{friend}]_j$ $\texttt{every man}_1\ \texttt{loves}$ T_j

- $\texttt{some}_2\ \texttt{of his}_1\ \texttt{friend} \rightsquigarrow \lambda P.\lambda g.\,\exists y: \wedge\texttt{IsFriendOF}(y,g(1))\wedge P(\lambda f.f(2))(g[2\to y])$
- The scope does not reconstruct; $\texttt{his}$ remains unbound.

Quantifier + Anaphor: Option 2: $[\texttt{some}_2\ \texttt{of his}_1\ \texttt{friend}]_j$ $\texttt{every man}_1\ \texttt{loves}$ T_j

- $\texttt{some}_2\ \texttt{of his}_1\ \texttt{friend} \rightsquigarrow \rightsquigarrow \lambda P.\lambda g.\,\exists y: P(\lambda f.\texttt{FriendOf}(f(1)))(g[2\to y])$

$$\dfrac{\dfrac{\dfrac{\texttt{some}_2\texttt{of his}_1\texttt{friend}}{\lambda P.\lambda g.\,\exists y:P(\lambda f.\texttt{FriendOf}(f(1)))(g[2\to y])} \quad \dfrac{\dfrac{\texttt{every man loves } t}{\lambda g.\,\forall x:\texttt{man}(x)\to\texttt{love}(x,T(g[1\to x]))}}{\lambda T_{ne,e}.\lambda g.\,\forall x:\texttt{man}(x)\to\texttt{love}\big(x,T(g[1\to x])\big)}\ \text{abst.}}{\lambda g.\,\exists y:\forall x:\texttt{man}(x)\to\texttt{love}\big(x,\texttt{FriendOf}(g[1\to x,2\to y](1))\big)}}{\lambda g.\,\exists y:\forall x:\texttt{man}(x)\to\texttt{love}\big(x,\texttt{FriendOf}(x)\big)}\ \text{equiv.}$$

- It *does* create a reading in which lov*ee* differs depending on men.
- But $\exists y$ is (almost) vacuous.
- $\texttt{FriendOf}(x)$ returns the friend of x, if each man only has one friend, or some salient friend that meets certain property (e.g., the annoying friend of x).
- The source of the speaker variation on (13)?

9. It is worth noting that Sternefeld 2000 did not argue for the significance of this asymmetry. Rather, Sternefled sets up the technical details so that quantifier scope is also reconstructed. This move requires redefining assignment functions so that they can return a formulae like $\lambda P\ldots$ given a number. We do not endorse this option and argue that the asymmetry should be there.

4 Against other alternatives

4.1 Against functional traces in topicalization

- Functional $\langle e, e\rangle$ type trace (e.g., Engdahl 1980, 1986; Groenendijk and Stokhof 1984; Chierchia 1993; Dayal 2016): for DPs with possessives
- Definite e type trace: for quantifiers

➜ Flexible types, unlike what we assumed in (1)

(15) a. [His mom]$_{\langle e,e\rangle}$ [$\lambda f_{\langle e,e\rangle}$ [every boy loves $t_{\langle e,e\rangle}$]] (Functional traces)
$\rightsquigarrow \forall x.boy(x) \rightarrow love(x, momOf(x))$

b. [Some student]$_{\langle et,t\rangle}$ [λx_e [every teacher likes t_e]] (i.e., Trace Conversion)
$\rightsquigarrow \exists y.student(y) \wedge \forall x.teacher(x) \rightarrow like(x, y)$

☞ Important: We only argue against such a treatment to topicalization, not against the existence of functional traces in other movement dependencies

- Problem #1: Why must Trace Conversion occur?
If a trace's type is determined by the type of moved elements, a GQ-type trace should be possible
➜ Requires stipulation to rule out reconstruction for scope
- Problem #2: Why can't the moved element quantify over functions?
Independently available: (i) *wh*-questions with functional answers in (16), and (ii) inverse linking in (17)
cf. unacceptable quantifier+anaphor cases (* for most speakers, (13))
➜ Doing so would wrongly predict reconstruction for scope
➜ Again requires stipulation to rule out a higher-order type of the moved element

(16) Quantifying over Skolem functions in *wh*-questions with functional answers (Dayal 2016:102-104)

a. **Which woman** does **every** man like? (A: his/their mom.)

b. LF: $[_{CP}\ \lambda p\ [[_{DP}$ which woman$]_{\langle\langle e,e\rangle,t\rangle}\ [_{C'}\ \lambda f_{\langle e,e\rangle}\ [_{IP}$ every man likes $t_{\langle e,e\rangle}$]]]]

c. $[\![\text{DP}]\!] = \lambda\mathcal{F}.\exists f[\forall y.woman(f(y)) \wedge \mathcal{F}(f)]$ (Quantifying over functions)

d. $[\![\text{C'}]\!] = \lambda f.p =^{\wedge} \forall x.man(x) \rightarrow like(x, f(x))$

e. $[\![\text{CP}]\!] = \lambda p.\exists f[\forall y.woman(f(y)) \wedge p =^{\wedge} \forall x.man(x) \rightarrow like(x, f(x))]$

(17) Quantifying over Skolem functions in inverse linking constructions (Zimmermann 2021:21)

a. [**An** apple [in **every** basket]] is rotten.
(i) Every basket contains (at least) one apple that is rotten. ($\forall > \exists$)
(ii) #There is (at least) one apple in s that is located in every basket and rotten. ($\exists > \forall$)

b. LF: $[_{DP}\ \varnothing_{\langle\langle e,e\rangle,t\rangle}\ [_{PrP}\ [_{NP}$ an apple$]_{\langle e,t\rangle}$ [Pr+in$_{\langle\langle et,t\rangle,\langle et,\langle e,e\rangle\rangle\rangle}$ $[_{QP}$ every basket$]_{\langle et,t\rangle}$]]]

c. $[\![\text{Pr+in}]\!] = \lambda Q_{\langle et,t\rangle}\lambda P_{\langle e,t\rangle}\lambda f_{\langle e,e\rangle}.Q(\lambda x.P(f(x)) \wedge in(f(x), x))$

d. $[\![\varnothing]\!] = \lambda\mathcal{F}_{\langle\langle e,e\rangle,t\rangle}.\exists f.[\mathcal{F}(f)]$

e. $[\![\text{DP}]\!] = \exists f[\forall z.basket(z) : an\_apple((f(z)) \wedge in(f(z), z)]$
= 1 iff there is a Skolem function that maps every basket to an apple in it.

(18) Quantifying over Skolem functions wrongly predicts reconstruction for scope in topicalization

a. **Some** student, **every** teacher likes.

b. LF: [$_{\text{TopP}}$ [$_{\text{DP}}$ Some student]$_{\langle\langle\langle e,e\rangle,t\rangle,t\rangle}$ [$_{\text{TP}}$ $\lambda f_{\langle e,e\rangle}$ [every teacher likes $t_{\langle e,e\rangle}$]]

c. ⟦DP⟧=$\lambda\mathcal{F}.\exists f[\forall y.student(f(y)) \wedge \mathcal{F}(f)]$ (Quantifying over functions)

d. ⟦TP⟧=$\lambda f.\forall x[teacher(x) \rightarrow like(x, f(x))]$

e. ⟦CP⟧=$\exists f[\forall y.student(f(y)) \wedge \forall x.teacher(x) \rightarrow like(x, f(x))]$

$\rightsquigarrow$ For every teacher x, x likes a student of x. (Covarying, roughly $\forall > \exists$)

- **Recall:** The strategy ❹ did not confront with this risk.[10]

4.2 Against partial reconstruction in topicalization

- Reconstruction of the restrictor of a quantifying determiner (Chomsky 1993; Fox 1999; Sauerland 1998, 2004; Abels and Martí 2010; Branan and Erlewine 2021)
  - Det is analyzed as a quantifier $\mathcal{D}$ over choice functions, while the NP is interpreted at base position
  - ➜ Scope remains high, restrictor reconstructed for binding ➜ Asymmetry

(19) a. [Which **relatives of hers**$_2$]$_1$ did [every student]$_2$ invite _$_1$?
partial reconstruction

b. (Pseudo-)LF: [$_{\text{CP}}$ $\mathcal{D}_{\langle\langle\langle et,e\rangle,t\rangle,t\rangle}$ [$\lambda f_{\langle et,e\rangle}$ did [every student]$_2$ invite [f(relatives of hers$_2$)]]]

c. ⟦$\mathcal{D}$⟧=$\lambda R_{\langle\langle et,e\rangle,t\rangle}\exists f \in CF : R(f) = 1$ (After Abels and Martí 2010)

d. ⟦CP⟧=$\lambda p \exists f \in CF : p \rightarrow [\lambda w : \forall y.student(y) \rightarrow invited_w(y, f(\textit{relative of } y))]$
where $CF = \{f \in D_{\langle\langle e,t\rangle,e\rangle} | \forall P : P(f(P)) = 1\}$ (After Sauerland 2004:121)

- Problem: when the moved element contains more than one quantifier, both still take wide scope over a lower element. ➜ Empirically, the restrictor takes surface scope and does not reconstruct

(20) a. [[banshang **yixie** xuesheng-de] **mei** yige youdian]$_1$, **meige** laoshi dou xihuan _$_1$.
class some student-POSS every one strength every teacher DOU like
'For some students x in the class s.t. for every strength y of x, every teacher z likes y.'
NOT: 'For every strength y s.t. for every teacher z there is a student x s.t. z likes x's y.'
NOT: 'For every teacher z, there is a student x such that for every strength y of x, z likes x's y.'
($\exists > \forall_y > \forall_z$, *$\forall_y > \forall_z > \exists$, *$\forall_z > \exists > \forall_y$)

b. *Attested reading with surface scope*
LF: [$_{\text{TopP}}$ some student x [every x's strength y [every teacher z [like(z, y)]]]]
$\exists x.student.in.class(x) \wedge \forall y.strength.of.x(y) \rightarrow (\forall z.teacher(z) \rightarrow like(z, y))$ =(a)

c. *Unattested "split scope" reading by partial reconstruction*
LF1: [$_{\text{TopP}}$ $\mathcal{D}$-every [λf every teacher z [z like f(strength of some student x)]] $\rightsquigarrow$???
LF2: [$_{\text{TopP}}$ $\mathcal{D}$-every [λf every teacher z [some students x [z like f(strength of x)]]
$\rightsquigarrow \forall f.CF(f) \rightarrow (\forall z.teacher(z) \rightarrow \exists x.student(x) \wedge like(z, f(strength.of.x))) \neq$ (a)

10. It is possible to obtain wide scope existential using functional traces as long as we build double quantification on individuals and functions for *some students* as: $\lambda\mathcal{F}\exists z\exists f.(\forall y.student(f(y)) \rightarrow f(y) = z) \wedge \mathcal{F}(f)$. Yet, it predicts scopal ambiguity with (18).

5 A typology of movement types by reconstruction

	Reconstruction strategies	scope	binding	Movement dependencies
❶	None, Trace Conversion: e trace	✘	✘	Quantifier Raising, Mandarin *bei*-passive
❷	Syntactic: total reconstruction	✔	✔	German V2, English raising, Japanese long scrambling
❸	Semantic: $\langle et, t\rangle$ trace	✔	✘	Japanese VP-internal scrambling, German & Hindi scrambling
❹	Semantic: $\langle s, e\rangle$ trace	✘	✔	English and Mandarin topicalization

Table 4: A typology of movement dependency by reconstruction

❶ Reconstruction for neither scope and binding

- **Quantifier Raising**
- **Mandarin *bei*-passive** does not allow reconstruction for binding (Chen 2023, 2025), nor scope

(21) a. *[**Ta-ziji/ziji**$_2$-de pengyou]$_1$ bei Lisi$_2$ ma-guo _$_1$.
3sg-self/self-poss friend pass Lisi scold-exp
Int.: 'His$_2$ friend was once scolded by Lisi$_2$.' (Chen 2025, fn.22)

b. [Zhangsan-de **yige** xuesheng]$_1$ bei **meige** laoshi dou ma-guo _$_1$.
Zhangsan-poss one student pass every teacher dou scold-exp
'There is one of Zhangsan's students who got scoled by every teacher.' (*$\forall > \exists$, $\exists > \forall$)

❷ Reconstruction for both scope and binding

- **Japanese long scrambling** (LS; scrambling beyond the local clause) *must* be reconstructed. (Yagi 2024)
- The given scenario would make the sentence true only in the $\forall > \exists$ reading, in which the scrambled universal quantifier would take scope over the existential quantifier in the matrix subject position.
- The sentence is judged to be false, indicating that the $\forall > \exists$ reading is absent from the sentence.
- (22b) shows that the scrambled element can be reconstructed for binding by a matrix subject.

(22) a. **LS does not let the scrambled element take scope over a matrix element**
(Scenario: Among the three persons A, B, and C, A said John met Alex, B said John met Beth, and C said John met Cathy.)
Daremo$_\forall$**-ni** [**dareka**$_\exists$-ga [John-ga e atta to] itta] .
everyone-dat someone-nom John-nom met c said
'Someone said John met everyone.' ($\exists > \forall$, *$\forall > \exists$)

b. **LS reconstruct for binding by a matrix element**
[**soko**$_i$-ni funinsuru sensee]-o **dono**$_i$-gakoo-mo [soori-ga e mendansuru to]
there-DAT assign teacher -ACC every-school-all premi.minisiter-NOM interview C
koohyoosita.
announced
'Every school announced that the prime minister will interview the teacher who is assigned to that school.'

❸ Reconstruction for scope but not for binding

- **Japanese VP-internal scrambling** reconstruncts for scope, but not for binding. (Yagi 2024)
- Also for German Lechner 1998 and Hindi Poole and Keine 2024

(23) **VPS reconstructs for quantifier scope**
John introduced Student A to Professor A, Student B to Professor B, and Student C to Professor C.
John-wa **dareka**$_\exists$**-o** **dono-sensee-ni-mo**$_\forall$ e syookaisita.
John-TOP someone-ACC every-professor-DAT-all e introduced
'Taro introduced someone to every teacher.' ($^{ok}\forall > \exists$)

(24) **VPS does not reconstruct for binding**
a. John-wa [$_{IO}$ **dono-gakkoo–ni-mo**$_i$][$_{DO}$ **soko**$_i$-ni funinsuru sensee]-o syookaisita
John-TOP each-school-DAT-all there-DAT assign teacher -ACC introduced.
'John introduced to every school a teacher who is assigned to that school.'

b. #John-wa [$_{DO}$ **soko**$_i$-ni funinsuru sensee]-o [$_{IO}$ **dono-gakkoo–ni-mo**$_i$] e syookaisita
John-TOP there-DAT assign teacher -ACC each-school-DAT-all introduced.
Int. 'John introduced to every school a teacher who is assigned to that school.'

6 Conclusion

The typology of reconstruction is extended with Strategy ❹.

	Strategies	Proponents
❶	No Reconstruction: a type e trace via Trace Conversion	Heim and Kratzer 1998
❷	Syntactic Reconstruction / Higher Copy Neglect	Chomsky 1995
❸	Semantic Reconstruction for scope: a trace of type $\langle et, t\rangle$	Rullman 1995; Cresti 1995
❹	Semantic Reconstruction for binding: a trace of type $\langle s, e\rangle$	Sternefeld 2001

Table 1: Four strategies to interpret movement chains

The predictions are sorted out.

Predictions on		❶	❷	❸	❹
(i) $\beta > \alpha$ scope	$(\alpha_i ... \beta ... t_i)$	N/A	✓	✓	N/A
(ii) β binds into α	$([_\alpha ... x_j ...]_i ... \beta_j ... t_i :)$	N/A	✓	N/A	✓

Table 2: Predictions made by different strategies for interpreting α ... β ... t_i

Now What Next?

- Which movement appeals to which strategy? More surveys needed!
- What governs the choice? Any relevance of A/A'-properties in syntax?
- Do we still need syntactic reconstruction?
  - Combining the strategies ❸ and ❹ result in the same effect?
  - Distinguishing observation: A movement that allows reconstruction of scope *and* binding, but still does not induce a Condition C violation.

7 Appendices

7.1 (Lack of) Condition C effects in topicalization

Huang (1993) argues that reconstruction for Condition C is absent in Mandarin topicalization. Strong crossover effects are weakened, if not gone, with topicalization of nominals (vs. VP fronting).

(25) a. ?[**Zhangsan**$_2$-de pengyou]$_1$, wo zhidao **ta**$_2$ changchang piping _$_1$.
Zhangsan-POSS friend 1SG know 3SG often criticize
'Zhangsan$_2$'s friend, I know that he$_2$ often criticizes.' (Huang 1993:119)

b. *[Piping **Zhangsan**$_2$-de pengyou]$_1$, wo zhidao **ta**$_2$ juedui bu hui _$_1$.
criticize Zhangsan-POSS friend 1SG know 3SG definitely will not
Int.: 'Criticize Zhangsan$_2$'s friend, I know he definitely will not.' (Huang 1993:119)

Topicalization in English is also known to obviate weak crossover effects, as long noticed by Lasnik and Stowell (1991), P. M. Postal (1994), and P. Postal (1998).

(26) **This book**$_2$ [I would expect [**its**$_2$ author] to disavow _$_2$] but that book$_1$ [I wouldn't _$_1$].
(Lasnik and Stowell 1991 via Chierchia 2020:28)

Topicalization can even obviate strong crossover effects, as documented by Safir (1999). See Krifka (2018) for a semantic account of how topicality leads to these exceptions.

(27) [Most articles about **Mary**$_2$]$_1$, I am sure **she**$_2$ hates _$_1$. (Safir 1999:609)

7.2 Compositional Details: `His friend [ every man loves` t`]`

- F: Assignment-friendly composition: $\alpha_{ne,a}\ \beta_{ne,ab} \rightsquigarrow \lambda g_{ne}.\beta(g)(\alpha(g))$

$$\frac{\underset{\lambda x\,y.\,\texttt{love}(y,x)}{\texttt{love}} \qquad \underset{\lambda g.\,T(g)}{t}}{\lambda g.\,\lambda y.\,L(y,\,T(g))}\ \text{F}$$

$$\frac{\underset{\lambda g.\,g(1)}{t} \qquad \lambda g.\,\lambda y.\,L(y,\,T(g))}{\lambda g.\,\texttt{love}(g(1), T(g))}\ F$$

$$\frac{\underset{\lambda F.\lambda g.\lambda x.\,F(g[1\to x])}{\Lambda_1} \qquad \lambda g.\,\texttt{love}(g(1), T(g))}{\lambda g.\lambda x.\texttt{love}\big(g[1\to x](x), T(g[1\to x])\big)}\ \text{appl.}$$

$$\frac{\lambda g.\lambda x.\texttt{love}\big(g[1\to x](x), T(g[1\to x])\big)}{\lambda g.\lambda x.\texttt{love}\big(x, T(g[1\to x])\big)}\ \text{equiv.}$$

$$\frac{\underset{\lambda g.\lambda P.\,\forall x:\texttt{man}(x)\to P(x)}{\texttt{every man}} \qquad \lambda g.\lambda x.\texttt{love}\big(x, T(g[1\to x])\big)}{\lambda g.\,\forall x:\texttt{man}(x)\to\texttt{love}\big(x, T(g[1\to x])\big)}\ \text{F}$$

$$\frac{\lambda g.\,\forall x:\texttt{man}(x)\to\texttt{love}\big(x, T(g[1\to x])\big)}{\lambda T.\lambda g.\,\forall x:\texttt{man}(x)\to\texttt{love}\big(x, T(g[1\to x])\big)}\ \text{abst.}$$

$$\frac{\underset{\lambda g.\,\texttt{FriendOf}(g(1))}{\texttt{his friend}} \qquad \lambda T.\lambda g.\,\forall x:\texttt{man}(x)\to\texttt{love}\big(x, T(g[1\to x])\big)}{\lambda g.\,\forall x:\texttt{man}(x)\to\texttt{love}\big(x, \texttt{FriendOf}(g[1\to x](1))\big)}\ \text{appl.}$$

$$\frac{\lambda g.\,\forall x:\texttt{man}(x)\to\texttt{love}\big(x, \texttt{FriendOf}(g[1\to x](1))\big)}{\lambda g.\,\forall x:\texttt{man}(x)\to\texttt{love}\big(x, \texttt{FriendOf}(x)\big)}\ \text{equiv.}$$

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