Interpreting scrambling: Reconstruction in Hindi

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1 A- and $\overline{\text{A}}$-scrambling in Hindi

- It is well-known that scrambling in Hindi exhibits different properties depending on the configuration it takes place in (Gurtu 1985, 1992, Déprez 1989, Mahajan 1990, 1994, Dayal 1994, Kidwai 2000, Bhatt & Dayal 2007, Bhatt 2016).

- **A-scrambling**:
  Clause-internal scrambling in Hindi exhibits A-properties: it is not subject to weak crossover and it may result in reciprocal binding.

(1) *Weak crossover obviation*

a. [*us-kii*$_{i/*j}$ mãã-ne] har bacce-ko$_j$ dekhaa
s/he-GEN mother-ERG every child-ACC saw
'His/her$_{i/*j}$ mother saw every child$_j$.' (*bound reading impossible*)

b. har bacce-ko$_i$ [*us-kii*$_i$ mãã-ne] t_i dekhaa
every child-ACC s/he-GEN mother-ERG saw
'For every child x, x's mother saw x.'

(2) *Reciprocal binding*

a. *[*ek-duusre-kii*$_i$ bahinõ-ne] [raam aur prataap]-ko$_i$ maaraa
each other's sisters-ERG Ram and Pratap -ACC hit
'*Each other's$_i$ sisters hit [Ram and Pratap]$_i$.'

b. [raam aur prataap]-ko$_i$ [*ek-duusre-kii*$_i$ bahinõ-ne] t_i maaraa
Ram and Pratap -ACC each other's sisters-ERG hit
'Ram and Pratap were hit by each other's sisters.'

- **$\overline{\text{A}}$-scrambling**:
  By contrast, if scrambling leaves a finite clause, it is subject to weak crossover and it may not feed reciprocal binding.

(3) *Weak crossover*

har bacce-ko$_i$ [*us-kii*$_{j/*k}$ mãã-ne] socaa [$_{CP}$ ki raam-ne t_i
every child-ACC s/he-GEN mother-ERG thought that Ram-ERG
dekhaa]
saw
'His/her$_j$ mother thought that Ram had seen every child$_i$.'
(*bound reading impossible*)

(4) *No reciprocal binding*

*[raam aur prataap]-ko$_i$ [*ek-duusre-kii*$_i$ bahinõ-ne] socaa [$_{CP}$ ki
Ram and Pratap -ACC each other's sisters-ERG thought that
sangiitaa-ne t_i maaraa]
Sangita-ERG hit
'*Each other's$_i$ sisters thought that Sangita had hit [Ram and Pratap]$_i$.'

- One way of characterizing this difference is in terms of *reconstruction:* $\overline{\text{A}}$-movement obligatorily reconstructs for the purposes of binding.

- **Goal for today**:
  Investigate the reconstruction properties of A- and (especially) $\overline{\text{A}}$-scrambling with respect to other semantic aspects. I will focus on reconstruction for scope, reconstruction for opacity, Condition C and their interactions.

- This will also teach us something about reconstruction more generally. Hindi indicates that natural language makes available two reconstruction strategies:

- ▹ syntactic reconstruction (SynR) → interpretation of a lower copy
- ▹ semantic reconstruction (SemR) → higher-typed semantic variable

- The two strategies have often been treated as rivals (Romero 1998, Fox 1999, Ruys 2015). Following Lechner (1998, to appear), we will argue for the view that they coexist.

- **Roadmap**:
  - ❶ Background on SynR and SemR
  - ❷ Arguments for SynR: Interactions between Condition C and scope in English
  - ❸ Evidence for SemR+SynR: Condition C, scope, and opacity in Hindi
  - ❹ Landing site differences between A- and $\overline{\text{A}}$-scrambling
  - ❺ Account: two paths to reconstruction
  - ❻ Extension to weak crossover
  - ❼ Reconciling English and Hindi

2 Scope reconstruction

- It is well-known that many intances of movement give rise to ambiguity if the moved element is quantificational. Frequently, the quantificational force may be interpreted in the launching or the landing site of movement:

(5) Someone from NY is likely to win the lottery. ($\exists >$ *likely*; *likely* $> \exists$)

2.1 Two accounts of reconstruction

- **Syntactic reconstruction (SynR)**:
  Broadly speaking, there are two types of accounts for scope reconstruction. One is that the movement is syntactically undone. The moved element is placed back into its starting position so to speak, either via lowering (Cinque 1990) or via interpreting a lower copy (Chomsky 1995). It then follows that its quantificational force is interpreted there:

(6) *Wide scope*
  a. [someone from NY]$_i$ is likely [t_i to win the lottery]
  b. [someone from NY] [λ_1 [likely t_1 to win the lottery]]
     $\equiv \exists x\,[\text{from-NY}(x) \wedge \forall w' \in \text{likely}_w\,[x \text{ wins the lottery in } w']]$

(7) *Narrow scope*
  a. ___ is likely [[someone from NY] to win the lottery]
  b. $\forall w' \in \text{likely}_w\,.\,\exists x\,[\text{from-NY}(x) \wedge x \text{ wins the lottery in } w']$

- **Semantic reconstruction (SemR)**:
  The second line of account is to vary the semantic type of the trace that is left behind (Cresti 1995, Rullmann 1995, Ruys 2015). If the trace is of the type of individuals (i.e., e), a wide-scope interpretation results. If the trace is of the type of a generalized quantifier (i.e., $\langle et,t\rangle$), then narrow scope results.

- Rullmann (1995) marks a trace that is mapped onto a GQ-variable as 'T', a convention that I will adopt here.

(8) *Wide scope* (same as (6))
  a. [someone from NY]$_i$ is likely [t_i to win the lottery]
  b. $\exists x\,[\text{from-NY}(x) \wedge \forall w' \in \text{likely}_w\,[x \text{ wins the lottery in } w']]$

(9) *Narrow scope*
  a. [someone from NY] [λ_1 [likely [T_1 to win the lottery]]]
  b. $\big[\lambda \text{X}_{\langle et,t\rangle}\,.\,\forall w' \in \text{likely}_w\,[\text{X to win the lottery in } w']\big]$
     $\Big(\lambda \text{P}_{\langle et\rangle}\,.\,\exists x\,[\text{from-NY}(x) \wedge \text{P}(x)]\Big)$
     $\equiv \forall w' \in \text{likely}_w\,.\,\exists x\,[\text{from-NY}(x) \wedge x \text{ wins the lottery in } w']$

- **Question**:
  Both accounts get the ambiguity right. Is there a way to distinguish between them empirically?

- **Preview**:
  Romero (1998) and Fox (1999) argue that interactions between Condition C and scope provide evidence for the SynR account (see also Heycock 1995 and Sportiche 2006).

2.2 Scope reconstruction and Condition C connectivity

- Romero (1998) and Fox (1999) note that SynR and SemR differ w.r.t. the relation they predict between scope reconstruction and Condition C reconstruction.

- **Condition C obviation**:
  It is well-known that movement obviates Condition C effects in RCs (van Riemsdijk

& Williams 1981, Lebeaux 1988, 2000). This is often attributed to late Merge of the RC (following the analysis in Lebeaux 1988).

(10) a. *He$_i$ liked [the paper that John$_i$ read].

b. [Which paper that John$_i$ read] did he$_i$ like?

- **A prediction by SynR: Scope freezing**:
If scope reconstruction amounts to syntactically undoing the movement, then it should induce Condition C effects as well. In other words, if Condition C makes reconstruction impossible, then scope should be frozen upstairs.

- **SemR**:
SemR does not make this prediction because scope reconstruction is purely semantic. Syntactic effects like Condition C should be unaffected by the type of the variable that is inserted.

- **Preview**:
Romero (1998) and Fox (1999) argue that the prediction of SynR is correct.

(11) *Scope reconstruction feeds Condition C*
Scope reconstruction is impossible in the structural configuration (12).
(Romero 1998, Fox 1999, Sportiche 2006, Ruys 2015)

(12) [… R-expression$_i$ …]$_j$ … pronoun$_i$ … t_j …

- **The argument**:
If (11) turns out to be true, a SemR would require additional stipulations to capture it (see Ruys 2015 for one proposal), but the SynR gets it for free.

2.2.1 A-movement

- A-movement provides a good illustration of the basic empirical logic, but the data are not crystal clear (Fox 1999).

(13) a. [A student of David's$_i$] seem to him$_i$ t to be at the party.
($\exists$ > *seem*; **seem* > $\exists$)

b. [A student of his$_i$] seem to David$_i$ t to be at the party.
($\exists$ > *seem*; *seem* > $\exists$)

2.2.2 *How many*-questions

- A large portion of the evidence comes from *how many*-questions.

- There is good reason to believe that *how many* contains two quantificational expressions: (i) one that asks for a number (i.e., quantifies over degrees), and (ii) an existential quantification over individuals (e.g., Cresti 1995).

(14) [How many people$_i$ did you meet t_i today?

(15) what is the number n, s.t.
$\exists x\,[|x| = n \wedge$ you met x today$]$?

- **Evidence**:
The evidence comes from questions in which *how many* is moved over a scope-bearing element. Here the question is ambiguous. What is at stake is the scope position of the $\exists x$ part (either above or below the other quantificational element).

(16) How many people did Mary decide to hire?

a. *many* > *decide*
what is the number n, s.t.
$\exists x\,[|x| = n \wedge$ Mary decided to hire $x$$]$?

b. *decide* > *many*
what is the number n, s.t.
Mary decided that $\exists x\,[|x| = n \wedge$ Mary hires $x$$]$?

- (17) gives the denotation of the two quantificational parts. We abstract away from the details of the question semantics and will use the abbreviation '?n' to refer to questions over cardinalities.

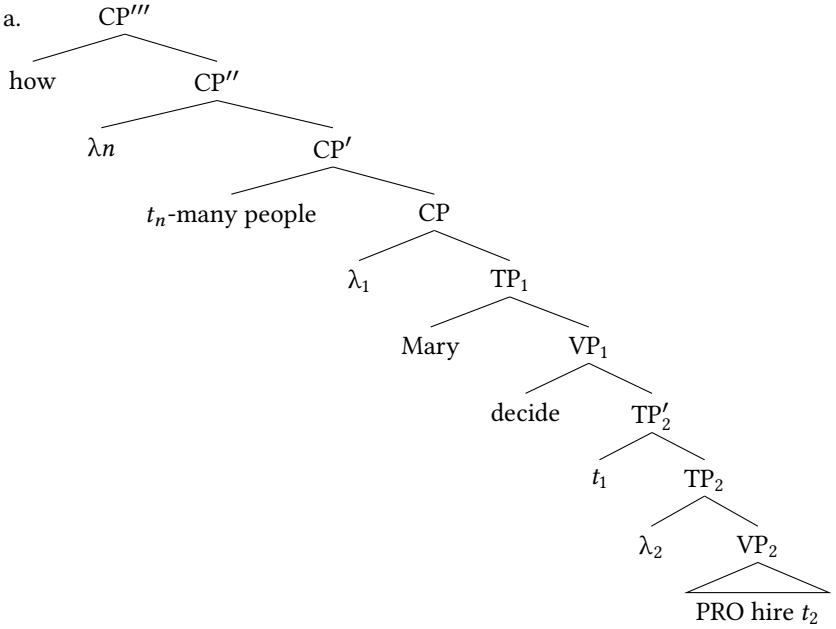
(17) a. $[\![\text{how}]\!] = \lambda \mathrm{P}_{et}\,.\,?n\,[\mathrm{P}(n)]$

b. $[\![\text{many}]\!] = \lambda \mathrm{P}_{et}\,\lambda n\,\lambda \mathrm{Q}_{et}\,.\,\exists x\,[\mathrm{P}(x) \wedge |\mathrm{P}| = n \wedge \mathrm{Q}(x)]$

- **Wide scope**:
The wide scope is derives as in (18), where we abstract away from the quantifications over possible worlds.

(18) *Wide-scope interpretation*

a.



b. $[\![\mathrm{TP}_1]\!] = \mathrm{decide}\,(\mathrm{hire}(g(1))(\mathrm{Mary}))\,(\mathrm{Mary})$

c. $[\![t_n\text{-many people}]\!] = \lambda \mathrm{Q}\,.\,\exists x\,[\mathrm{people}(x) \wedge |x| = n \wedge \mathrm{Q}(x)]$

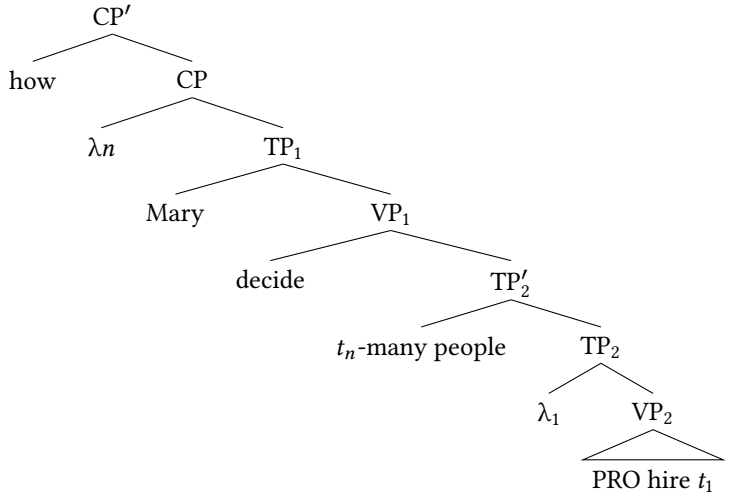
d. $[\![\mathrm{CP}']\!] = \exists x\,[\mathrm{people}(x) \wedge |x| = n \wedge \mathrm{decide}\,(\mathrm{hire}(x)(\mathrm{Mary}))\,(\mathrm{Mary})]$

e. $[\![\mathrm{CP}‴]\!] = ?n\,\exists x\,[\mathrm{people}(x) \wedge |x| = n \wedge \mathrm{decide}\,(\mathrm{hire}(x)(\mathrm{Mary}))\,(\mathrm{Mary})]$

- **Narrow scope**:
  The narrow scope reading can be produced in two ways. Either the part that quantifies over individuals is syntactically put back (SynR), as in (19). Or the movement is mapped onto binding of a higher-typed trace (SemR), as in (20).

(19) *Narrow-scope interpretation via SynR*

a.



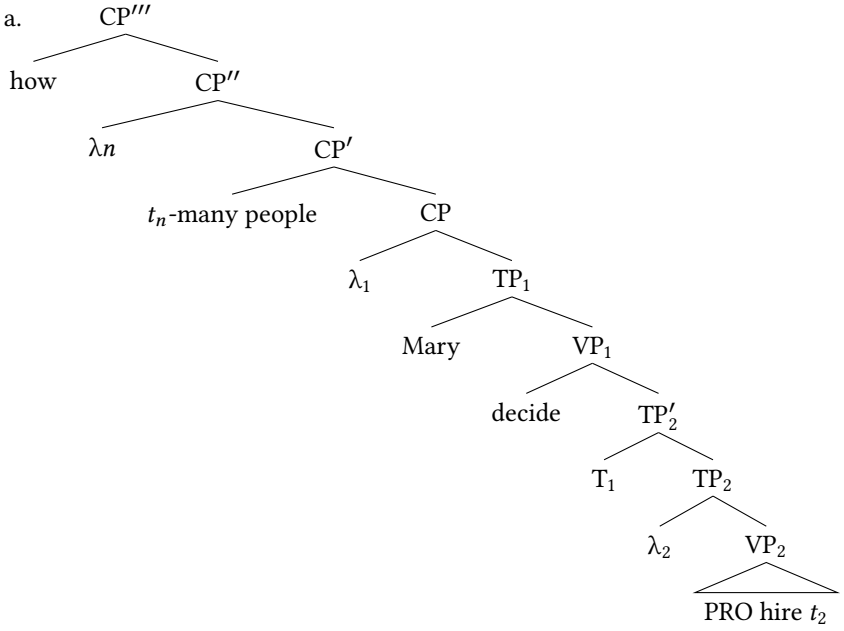
b. $[\![\mathrm{TP}'_2]\!] = \exists x\,[\mathrm{people}(x) \wedge |x| = n \wedge \mathrm{hire}(x)(\mathrm{Mary})]$

c. $[\![\mathrm{TP}_1]\!] = \mathrm{decide}\,(\exists x\,[\mathrm{people}(x) \wedge |x| = n \wedge \mathrm{hire}(x)(\mathrm{Mary})])\,(\mathrm{Mary})$

d. $[\![\mathrm{CP}']\!] = ?n\,[\mathrm{decide}\,(\exists x\,[\mathrm{people}(x) \wedge |x| = n \wedge \mathrm{hire}(x)(\mathrm{Mary})])\,(\mathrm{Mary})]$

(20) *Narrow-scope interpretation via SemR*

a.



b. $[\![\mathrm{TP}'_2]\!] = \mathrm{T}_{\langle et,t\rangle}\,(\lambda y\,[\mathrm{hire}(y)(\mathrm{Mary})])$

c. $[\![\mathrm{CP}]\!] = \lambda \mathrm{T}\,[\mathrm{decide}\,(\mathrm{X}\,(\lambda y\,[\mathrm{hire}(y)(\mathrm{Mary})]))\,(\mathrm{Mary})]$

d. $[\![\mathrm{CP}']\!] = [\lambda \mathrm{T}\,[\mathrm{decide}\,(\mathrm{X}\,(\lambda y\,[\mathrm{hire}(y)(\mathrm{Mary})]))\,(\mathrm{Mary})]]\left(\lambda \mathrm{Q}_{\langle e,t\rangle}\,.\,\exists x\,[\mathrm{people}(x) \wedge |x| = n \wedge \mathrm{Q}(x)]\right)$

$\equiv \mathrm{decide}\,(\exists x\,[\mathrm{people}(x) \wedge |x| = n \wedge \mathrm{hire}(x)(\mathrm{Mary})])\,(\mathrm{Mary})$

e. $[\![\mathrm{CP}‴]\!] = ?n\,[\mathrm{decide}\,(\exists x\,[\mathrm{people}(x) \wedge |x| = n \wedge \mathrm{hire}(x)(\mathrm{Mary})])\,(\mathrm{Mary})]$

- ***How many*-questions and Condition C:**
  In-situ and reconstructed readings of *how many*-questions may be distinguished in scenarios where they produce different answers. Romero (1998) and Fox (1999) observe that in such cases, the answer corresponding to the reconstructed reading is unavailable if reconstruction would result in a Condition C violation. The following example is again from Fox (1999).

(21) a. *Context:*
Jonathan wants to show slides from his trip to Kamchatka at a party. He tries to figure out how many slides he can show within an hour. After consulting with his roommate, Uli, he decides to show 100 slides (out of the 1,000 he has). Now it's time to choose the actual slides. After an hour of internal debate, he decides on 52 slides that he really likes and prepares them for display. The remaining 48 slides will be chosen at random at the time of the party.

b. [How many slides of his$_i$ trip to Kamchatka] did Jonathan$_i$ decide to show *t* at the party?
✓ *many > decide:* 52
✓ *decide > many:* 100

c. [How many slides of Jonathan$_i$'s trip to Kamchatka] did he$_i$ decide to show *t* at the party?
✓ *many > decide:* 52
* *decide > many:* 100

- **Rate readings and Condition C:**
  Reconstructed readings of *how many* questions become salient if a 'rate' adverbial makes the high-scope reading impossible. Romero (1998) shows that if Condition C interferes, a rate reading becomes unavailable.

(22) a. ?How many pictures of John$_i$ do you think that he$_i$ will like?

b. *How many pictures of Neil Young$_i$ do you think that he$_i$ should publish per month?

c. How many pictures of himself$_i$ do you think that Neil Young$_i$ should publish per month?

2.3 Consequences: SynR vs. SemR

- Romero (1998) and Fox (1999) argue that these interactions between reconstruction for scope and Condition C are immediately accounted for on a SynR account.

- A SemR account is possible, but requires a stipulation. Ruys (2015), for example, imposes a condition that bars a GQ-trace when late Merge has taken place.

(23) [… R-expression$_i$ …]$_j$ … pronoun$_i$ … t_j …

(24) *Scope reconstruction feeds Condition C*
Scope reconstruction is impossible in the structural configuration (23).
(Romero 1998, Fox 1999, Sportiche 2006, Ruys 2015)

- **Additional evidence**:
Poole (2017, and forthcoming dissertation) provides additional arguments against higher-typed traces, which interestingly partially conflict with the conclusions reached here.

3 Scope or opacity?

- **A complication**:
There is some indication that the generalization we have arrived at now is not quite correct. Sharvit (1998) notes that it does not appear to be scope that correlates with Condition C, but the availability of *de dicto* interpretations.

- In (25), scope reconstruction below *hope* is possible, but the NP *student who hate Anton* cannot be interpreted *de dicto*. In other words, a reading where Anton believes that the individuals are students who hate him, but in reality they are not, is reported to be absent.

(25) [How many students who hate Anton$_i$]$_j$ did he$_i$ hope [t_j will buy him$_i$ a beer]?

a. ✓ *Narrow scope, de re*
For what number n: In all of Anton's bouletic alternatives w' in w_0, there are n-many x that are students who hate Anton in w_0 and that will buy him a beer in w'.

b. * *Narrow scope, de dicto*
For what number n: In all of Anton's bouletic alternatives w' in w_0, there are n-many x that are students who hate Anton in w' and that will buy him a beer in w'.

c. ✓ *Wide scope, de re*
For what number n: There are n-many x that are students who hate Anton in w_0 and in all of Anton's bouletic alternatives w' in w_0, x will buy him a beer in w'.

- **Generalization**:
Parallel observations are made by Romero (1998) and Lechner (to appear). Facts like these suggest the generalization in (27).

(26) [… R-expression$_i$ …]$_j$ … pronoun$_i$ … t_j …

(27) *World-variable binding feeds Condition C*
Reconstruction for world-variable binding is impossible in the structural configuration (26). (Sharvit 1998, Romero 1998, Lechner to appear)

- **The predicament**:
We have now arrived at two seemingly incompatible generalizations.

(28) a. *Scope–Condition C connectivity*
Condition C effects prohibit reconstruction for scope.

b. *Opacity–Condition C connectivity*
Condition C effects prohibit *de dicto* readings, but do not affect scope.

- The only attempt that we are aware of of directly contrasting these two generalizations is Ruys (2015: 479n27), who notes that they are mutually exclusive and attributes them to differences in judgments. Yet it seems that single speakers can have all the judgments reported so far.

(29) scope ⟷ (??) Condition C ⟷ (??) opacity

- **Questions**:
  1. What is the correct generalization?
  2. How do we reconcile the empirical evidence with each other?
  3. What does it tell us about reconstruction?

- **Preview**:
  1. We will take a look at reconstruction in Hindi, in particular the reconstruction properties of $\overline{\text{A}}$-scrambling.
  2. This evidence indicates rather clearly that Condition C is not connected with scope, but with opacity, supporting (28b).
  3. We will then develop an account of the Hindi facts that invokes both SynR and SemR.
  4. We then speculate a bit about English.

4 Reconstructing scrambling: Evidence from Hindi

4.1 A-movement

- **Scope**:
  Like many free word order languages, Hindi displays scope rigidity in the base order. Clause-internal scrambling extends scope.

(30) a. *Scope rigidity without movement*
kisii laṛkii-ne har laṛke-ko ḍããṭaa
some girl-ERG every boy-ACC scolded
'Some girl scolded every boy.' (∃ > ∀; *∀ > ∃)

b. *A-movement widens scope*
har laṛke-ko kisii laṛkii-ne *t* ḍããṭaa
every boy-ACC some girl-ERG scolded
'Some girl scolded every boy.' (∀ > ∃)

- **Condition C obviation**:
  A-scrambling also it amnesties Condition C effects with RCs.

(31) *Late-Merge effect with RC*

a. *us-ne$_i$ kal [vo kitaab jo raam-ko$_i$ pasand thii] bec
3SG-ERG yesterday that book REL Ram-DAT like AUX sell
dii
give
'*He$_i$ sold yesterday the book that Ram$_i$ liked.'

b. [vo kitaab jo raam-ko$_i$ pasand thii]$_j$ us-ne$_i$ kal t_j
that book REL Ram-DAT like AUX 3SG-ERG yesterday
bec dii
sell give
'The book that Ram$_i$ liked, he$_i$ sold yesterday.'

4.2 $\overline{\text{A}}$-movement

- **Scope**:
  Crossclausal (i.e., $\overline{\text{A}}$-)scrambling with A-scrambling in that it does not extend scope. In other words, it obligatorily reconstructs for scope.

(32) *Scope reconstruction*

a. **har kek-ko$_i$** kisii laṛke-ne socaa [ki prataap-ne t_i khaa
every cake-ACC some boy-ERG thought that Pratap-ERG eat
liyaa hai]
take AUX
'Every cake, some boy thought that Pratap has eaten (it).'
(*only* > ∀; *∀ > *only*)

b. **har smasyaa$_i$** kisii vipakshii netaa-ne socaa hai [ki
every problem some opposition politician-ERG thought AUX that
pradhaan mantrii-ne t_i khadii kii hai]
Prime Minister-ERG cause did AUX
'Every problem, some opposition politician thought that the Prime Minister had caused.' (∃ > ∀; *∀ > ∃)

- **Condition C obviation**:
  Like A-scrambling, $\overline{\text{A}}$-scrambling is able to obviate Condition C effects with RCs.

(33) *Late-Merge effect with RCs*

a. *us-ne$_i$ socaa [ki siitaa-ne kal [vo kitaab jo raam-ko$_i$
3SG-ERG said that Sita-ERG yesterday that book REL Ram-DAT
pasand thii] bec dii thii]
like AUX sell give AUX
'*He$_i$ said that Sita had sold the book that Ram$_i$ liked yesterday.'

b. raam-ne$_i$ socaa [ki siitaa-ne kal [vo kitaab jo us-ko$_i$
Ram-ERG said that Sita-ERG yesterday that book REL he-DAT
pasand thii] bec dii thii]
like AUX sell give AUX
'Ram$_i$ said that Sita had sold the book that he$_i$ liked yesterday.'

c. [vo kitaab jo raam-ko$_i$ pasand thii] us-ne$_i$ socaa [ki
that book REL Ram-DAT like AUX 3SG-ERG said that
siitaa-ne kal *t* bec dii thii]
Sita-ERG yesterday sell give AUX
'The book that Ram$_i$ liked, he$_i$ said that Sita had sold yesterday.'

4.3 Condition C and scope

- The data we have seen so far already point to a dissociation between scope and Condition C: $\overline{\text{A}}$-scrambling obligatorily reconstructs for scope, but not for Condition C.

- This pattern even obtains if we combine both in the same sentence. In (34), the $\overline{\text{A}}$-moved DP has to reconstruct into the embedded clause for scope. Significantly, coreference between the R-expression and the pronoun is still possible.

(34) [har kitaab jo raam-ko$_i$ pasand hai] us-ne$_i$ kisii laṛkii-se
every book REL Ram-DAT like is 3SG-ERG some girl-INSTR
kahaa [ki miinaa-ne kal *t* bec dii]
said that Mina-ERG yesterday sell give
'Every book that Ram$_i$ likes, he$_i$ told some girl that Mina sold yesterday.'
($\exists > \forall$; $^*\forall > \exists$)

- **Consequence: Scope and Condition C are dissociated:**
(34) indicates that Hindi allows scope and Condition C to be evaluated with respect to different copies and hence that the two are unconnected. This is at variance with the characterization of English in Romero (1998), Fox (1999), and Ruys (2015).

- ***How many*-questions:**
The same can be shown with *how many*-questions. (35) shows that $\overline{\text{A}}$-moved *how many* phrases have to reconstruct in Hindi.

(35) a. *Context:*
Sita wants to show slides from her recent trip to Kolkata at a party. She is an avid picture-taker and took about 500 of them. Sangita is preparing the slide show and needs to know how many slides Sita plans to show and which ones. Sita and Sangita meet one afternoon to discuss it. Sita tells Sangita that she will show a total of 100 slides. Sita then lists 52 specific slides she wants to show, but they get interrupted and Sita needs to leave. She intends to tell Sangita about the remaining 48 slides some other day.

b. kitnii slides siitaa-ne$_i$ sangiitaa-se kahaa ki vo$_i$ dikhaaanaa
how many slides Sita-ERG Sangita-INSTR told that she show.INF
caahtii hai?
wants AUX
'How many slides did Sita$_i$ tell Sangita that she$_i$ wants to show?'
✓ *tell > many:* 100
?* *many > tell:* 52

- Against this background, (36) shows that Condition C does not block reconstruction of *many* under the attitude verb.

(36) *Scope reconstruction + Condition C*

a. *Context:*
Sita wants to show slides from her recent trip to Kolkata at a party. She is an avid picture-taker and took about 500 of them. Sita has peculiar tastes in pictures and pictures that she likes usually do not please other people (a fact she is well aware of). Sita tells her friend Sangita that she is going to show 100 slides in total at the party. 50 of these slides will be chosen by Sita, the other 50 by her friends who have more mainstream tastes. Sita has already picked 10 of her 50 slides. That is, she has 10 specific slides in mind that she will show and 40 more slots to fill, which she will pick later. She tells Sangita about the 10 slides she has decided to show.

b. kitnii slides jo siitaa-ko$_i$ pasand hãĩ us-ne$_i$ sangiitaa-se
how many slides that Sita-DAT likes AUX she-ERG Sangita-INSTR
kahaa ki vo dikhaanaa caahtii hai?
said that she show.INF wants AUX
'How many slides that Sita$_i$ likes did she$_i$ tell Sangita that she$_i$ wants to show?'
✓ *tell > many:* 50
?* *many > tell:* 10

- **The role of $\overline{\text{A}}$-movement:**
One might hypothesize that this reconstruction requirement is due to some special property of *how many* in Hindi. Interestingly, if the *how many* phrase does not cross a finite clause boundary (hence, if the movement does not need to be $\overline{\text{A}}$-movement), a wide scope reading is easily available, even preferred.

(37) a. siitaa kitnii slides dikhaanaa caahtii hai?
Sita how many slides show.INF want AUX
'How many slides does Sita want to show?'
(*want > many*; *many > want*)

b. kitnii slides$_i$ siitaa t_i dikhaanaa caahtii hai?
how many slides Sita show.INF want AUX
'How many slides does Sita want to show?'
(*many > want*; ?*want > many*)

- We can replicate this pattern with other embedding verbs as well:

(38) a. *Context:*
Sita took 500 pictures, decides she wants to show 100 of them at the party, picked out 52 specific ones, remaining 48 to be selected at the party.

b. kitne pictures jo siitaa-ne$_i$ liye us-ne$_i$ tay kiyaa ki
how many pictures that Sita-ERG took she-ERG decide did that
vo$_i$ dikhaaegii?
she will show
'How many pictures that Sita$_i$ took did she$_i$ decide that she$_i$ will show?'
✓ *decide* > *many:* 100
?* *many* > *decide:* 52

- As expected by now, if the moved element is an indefinite DP, it can reconstruct for scope even in late-merge configurations.

(39) koii picture jo siitaa-ne$_i$ liye us-ne$_i$ tay kiyaa ki vo$_i$
some picture that Sita-ERG took she-ERG decide did that she
dikhaaegii
will show
'Some picture that Sita$_i$ took, she$_i$ decided that she$_i$ will show.' (*decide* > ∃)

- As a sanity check, in the absence of movement, Condition C effects re-emerge:

(40) a. *us-ne$_i$ tay kiyaa ki vo$_i$ vo pictures jo siitaa-ne$_i$ liye
she-ERG decide did that she the pictures that Sita-ERG took
dikaaegii
will show

b. *us-ne$_i$ tay kiyaa ki vo pictures jo siitaa-ne$_i$ liye vo$_i$
she-ERG decide did that the pictures that Sita-ERG took she
dikaaegii
will show

- **Rate readings**:
Rate readings point to the same conclusions. In (41), a rate reading is available even if syntactic reconstruction would give rise to a Condition C effect.

(41) a. kitnii tasviirẽ jo siitaa-ne$_i$ li vo$_i$ har hafte caapnaa
how many pictures that Sita-ERG took she every week publish
caahtii hai?
want AUX
'How many pictures that Sita$_i$ took does she$_i$ want to publish per week?'
(*rate reading*)

b. kitnii tasviirẽ jo us-ne$_i$ li siitaa$_i$ har hafte caapnaa
how many pictures that she-ERG took Sita every week publish
caahtii hai?
want AUX
'How many pictures that she$_i$ took does Sita$_i$ want to publish per week?'
(*rate reading*)

- **Conclusion**:
English and Hindi appear to differ in whether Condition C and scope reconstruction interact:

(42) *Scope reconstruction in (43)*

	English	Hindi
quantificational DP	✗	✓
how many questions	✗	✓
rate readings	✗	✓

(43) [… R-expression$_i$ …]$_j$ … pronoun$_i$ … t_j …

- **The relation between scope and Condition C**:
Hindi thus provides evidence against (44) as a universal property of reconstruction.

(44) *Scope–Condition C connectivity*
Condition C effects prohibit reconstruction for scope.

- **An argument for SemR**:
To the extent that SynR has (44) as an automatic consequence (i.e., Fox's 1999 argument), the Hindi evidence provides evidence SynR as the only mode of reconstruction.

4.4 Condition C and opacity

- Now that we have seen that scope and Condition C do not appear to be tied together in Hindi, we turn to opacity. (45) shows that in the absence of Condition C, $\overline{\text{A}}$-scrambling may reconstruct for a *de dicto* reading. Neither (45a) nor (45b) entail the actual existence of nagins.

(45) *Context:*
Pratap has the irrational and incorrect belief that shapeshifter nagins really exist and that there is one living in his backyard. When his roommate Sangita told him that she saw some creature out of the corner of her eyes in the backyard today, he is immediately convinced that it was the nagin (when in reality it was just a racoon).

a. prataap soctaa hai ki sangiitaa-ne ek icchadhaarii naagin
Pratap thinks AUX that Sangita-ERG a shapeshifting nagin
dekhii
saw
'Pratap thinks that Sangita saw a shapeshifter nagin.' (*de dicto*)

b. ek icchadhaarii naagin prataap soctaa hai ki sangiitaa-ne
a shapeshifting nagin Pratap thinks AUX that Sangita-ERG
dekhii
saw
'A shapeshifter nagin, Pratap thinks that Sangita saw.' (*de dicto*)

- When we add in Condition C as a factor, however, *de dicto* reconstruction is blocked. Only a *de re* reading is possible.

(46) *Context:*
Pratap, as before, believes in the existence of nagins, that he also believes that there is a nagin in his backyard and that he furthermore believes that this nagin is in love with him. Again, Sangita sees movement out of the corner of her eyes and Pratap is convinced that she saw this nagi.

a. prataap$_i$ soctaa hai ki sangiitaa-ne ek icchadhaarii naagin
Pratap thinks AUX that Sangita-ERG a shapeshifting nagin
[jo us-se$_i$ pyaar kartii hai] dekhii
that him-INSTR love do AUX saw
'Pratap$_i$ thinks that Sangita saw a shapeshifter nagin that loves him$_i$.' (*de dicto*)

b. #ek icchadhaarii naagin [jo prataap-se$_i$ pyaar kartii hai] vo$_i$
a shapeshifting nagin that Pratap-INSTR love do AUX he
soctaa hai ki sangiitaa-ne dekhii
thinks AUX that Sangita-ERG saw
'A shapeshifter nagin that loves Pratap$_i$, he$_i$ thinks that Sangita saw.' (**de dicto/de re*)

c. ek icchadhaarii naagin [jo us-se$_i$ pyaar kartii hai]
a shapeshifting nagin that him-INSTR love do AUX
prataap$_i$ soctaa hai ki sangiitaa-ne dekhii
Pratap thinks AUX that Sangita-ERG saw
'A shapeshifter nagin that loves him$_i$, Pratap$_i$ thinks that Sangita saw.' (*de dicto*)

- **Conclusion**
It is not simply the case that reconstruction and Condition C are unrelated in Hindi, as Condition C determines whether a *de dicto* reading is possible, but it does not affect scope reconstruction. This supports (47).

(47) *Opacity–Condition C connectivity*
Condition C effects prohibit *de dicto* readings, but do not affect scope.

- Remarkably, the Hindi generalization is thus consistent with Sharvit's (1998) and Lechner's (to appear) characterization of English. It thus provides crosslinguistic support for this characterization.

5 Accounting for Hindi

5.1 SynR and SemR

- **The challenge**:
SynR is too restrictive because it does not allow reconstruction for Condition C and for scope to mismatch. But all else equal, SemR would not impose a connection between *de dicto* reconstruction and Condition C.

- **Proposal**:
We adopt here a proposal by Lechner (to appear), who, following Lechner (1998), proposes that scope reconstruction can be achieved through either SynR or SemR and that SemR is constrained by the requirement that the trace must be extensional:

(48) *Trace extensionality* (Lechner to appear)
Traces are extensional.

- Following Percus (2000), DPs contain world/situation variables, which are bound from higher up. The type of a DP is hence extensional, and so is the type of the trace.

(49) *Some (im)possible DP/trace types*
a. $\langle e \rangle$
b. $\langle et,t \rangle$
c. $^{*}\langle \langle e,st \rangle,st \rangle$
d. $^{*}\langle s,\langle et,t \rangle \rangle$

- **Result**:
Because an operator can only bind variables in its scope, SemR cannot give rise to reconstructed world-variable binding and hence *de dicto* readings. It can only reconstruct for scope.

- **Application 1: Scope and Condition C**:
We saw that scope reconstruction is not affected by Condition C connectivity. Condition C blocks SynR but not SemR, which yields scope reconstruction.

(50) koii picture jo siitaa-ne$_i$ liye us-ne$_i$ tay kiyaa ki vo$_i$
some picture that Sita-ERG took she-ERG decide did that she
dikhaaegii
will show
'Some picture that Sita$_i$ took, she$_i$ decided that she$_i$ will show.' (*decide* > ∃)

(51) [$\underline{\lambda_0}$ [$_{DP}$ some picture in $\underline{w_{0/*2}}$ that Sita$_i$ took] [$\underline{\underline{\lambda_1}}$ [she$_i$ decided in w_0
[$\underline{\lambda_2}$ [that $\underline{\underline{T_1}}$ [λ_3 [she$_i$ will show t_3 in w_2]]]]]]]

- **Application 2: Opacity and Condition C**:
Because GQ-traces are extensional, the world-variable in the $\overline{\text{A}}$-moved DP must still be bound in the landing site. This rules out a *de dicto* interpretation under SemR:

(52) #ek icchadhaarii naagin [jo prataap-se$_i$ pyaar kartii hai] vo$_i$
a shapeshifting nagin that Pratap-INSTR love do AUX he
soctaa hai ki sangiitaa-ne dekhii
thinks AUX that Sangita-ERG saw
'A shapeshifter nagin that loves Pratap$_i$, he$_i$ thinks that Sangita saw.'
(**de dicto/de re*)

(53) [$\underline{\underline{\lambda_0}}$ [$_{DP}$ a nagin in $\underline{\underline{w_{0/*2}}}$ that Pratap$_i$ loves] [$\underline{\lambda_1}$ he$_i$ thinks in w_0
[$\underline{\underline{\lambda_2}}$ [that $\underline{T_1}$ [λ_3 [Sangita saw t_3 in w_2]]]]]]

- **Application 3: *De dicto* interpretations without Condition C**:
We saw that once Condition C is removed as a factor, opaque readings of $\overline{\text{A}}$-moved DPs are possible. This follows because in these configurations SynR is an option. Because SynR leads to reconstruction of the entire moved DP (including its world variable), an opaque reading is possible.

(54) ek icchadhaarii naagin [jo us-se$_i$ pyaar kartii hai] prataap$_i$
a shapeshifting nagin that him-INSTR love do AUX Pratap
soctaa hai ki sangiitaa-ne dekhii
thinks AUX that Sangita-ERG saw
'A shapeshifter nagin that loves him$_i$, Pratap$_i$ thinks that Sangita saw.'
(*de dicto*)

(55) [$\underline{\underline{\lambda_0}}$ [___ Pratap$_i$ thinks in w_0 [$\underline{\underline{\lambda_2}}$ [that
[$_{DP}$ a nagin in $\underline{\underline{w_{0/2}}}$ that loves him$_i$] [λ_3 [Sangita saw t_3 in w_2]]]]]]

- **Constraining SynR**:
SynR is subject to Condition C. It is hence unavailable in late-merge configurations. This correctly rules out *de dicto* readings in such configurations (see (46b)).

(56) *[$\underline{\underline{\lambda_0}}$ [___ **he$_i$** thinks in w_0 [$\underline{\underline{\lambda_2}}$ [that
[$_{DP}$ a nagin in $\underline{\underline{w_{0/2}}}$ that loves **Pratap$_i$**] [λ_3 [Sangita saw t_3 in w_2]]]]]]

- **Putting the pieces together**:
We can now characterize the interpretation of A- and $\overline{\text{A}}$-scrambling in Hindi using this machinery.

(57) *$\overline{A}$-scrambling*

a. SynR (subject to Condition C)

b. SemR (does not feed world variable binding)

c. trace *must* be translated into $\langle et,t\rangle$-variable

(58) *A-scrambling*

a. no obligatory reconstruction for scope

b. trace can be translated into *e*-variable

5.2 Distinguishing A- and $\overline{A}$-scrambling

- **Question**:
  We saw that the two types of scrambling differ in their interpretation, specifically the type of variable that the trace may be mapped onto. How can we characterize this distinction? That is, what independently motivated property of A- and $\overline{A}$-scrambling can we tie it to?

- **Answer**:
  We will argue that A- and $\overline{A}$-scrambling differ in their landing site: A-scrambling lands in a TP-internal position; $\overline{A}$-scrambling lands in Spec,CP. The type of trace variable that is available is therefore plausibly a function of what head the movement-inducing feature is located on.

- **The size of clauses in Hindi**:
  There is good evidence that finite and nonfinite clauses differ in their sizes in Hindi:

(59) a. *Finite clauses*
can bear the complementizer *ki* 'that' and carry interrogative force
⇒ *are CPs*

b. *Nonfinite clauses*
can never contain a complementizer and obligatorily lack interrogative force (Dayal 1996)
⇒ *are TPs*

- **The height of the landing sites**:
  Due to Hindi's very flexible word order, surface inspection does not reveal where A- and $\overline{A}$-movement land.

- **Where does A-movement land?**
  A-movement in Hindi can land inside nonfinite clauses. This is demonstrated in (60), where the embedded clause is extraposed to demarcate its left edge.

(60) *A-movement within infinitival clause*

a. raam-ne caahaa [$_{TP}$ *har kuttaa$_i$* [*uske$_i$* baccõ-ko] *t_1*
Ram-ERG wanted every dog 3SG.GEN children-DAT
dikhaanaa]
show.INF
'Ram wanted to show every dog *x* to *x*'s children.'

b. siitaa-ne caahaa [$_{TP}$ *har laṛkii-ko$_i$* [*uskii$_i$* shaadii ke dauraan]
Sita-ERG wanted every girl-ACC 3SG.GEN wedding during
t_i dekhnaa]
seeINF
'Sita wanted to see every girl *x* at *x*'s wedding.'

(61) *Conclusion*
Local movement can land in a TP-internal position.

- *Where does $\overline{A}$-movement land?*
  Indirect evidence comes from the paradigm in (62).
  - ▹ In (62), a finite clause is embedded within a nonfinite clause, which is itself embedded in the matrix clause.
  - ☞ Because the lowermost clause is finite, any extraction out of it must be $\overline{A}$-movement.
  - ▹ The infinitival clause is extraposed to diagnose movement into it (Bhatt & Dayal 2007).
  - ▹ In (62b), movement into the nonfinite clause is impossible → **$\overline{A}$-movement cannot land inside a nonfinite clause**
  - ▹ In (62c), the DP is moved all the way into the (finite) matrix clause and the result is grammatical.

(62) *$\overline{A}$-movement cannot land in nonfinite clauses*

a. *Base configuration:*
mãĩ caahtaa hũũ [kah-naa [ki mãĩ-ne *kitaab* paṛh lii hai]]
I want be say-INF [that I-ERG book read take be
'I want to say that I read the book.'

✓ [$_{\text{matrix clause}}$ [$_{\text{non-finite clause}}$ [$_{\text{finite clause}}$ DP]]]

b. *No $\overline{A}$-mvt into non-finite clauses:*

*mãĩ caahtaa hũũ [*kitaab₁* kah-naa [ki mãĩ-ne *t₁* paṛh lii
I want be book say-INF that I-ERG read take
hai]]
be

*[matrix clause [non-finite clause DP [finite clause *t*]]]

c. *$\overline{A}$-mvt into finite clauses:*

kitaab₁ mãĩ caahtaa hũũ [kah-naa [ki mãĩ-ne *t₁* paṛh lii
book I want be say-INF that I-ERG read take
hai]]
be

✓[matrix clause DP [non-finite clause [finite clause *t*]]]

(63) *Conclusion*
Crossclausal movement lands in Spec,CP

- **Determining the variables:**
We now have a straightforward way of characterizing which variables are available when.

(64) *Interpretation of Hindi scrambling*
a. *Movement feature on T:*
translated into λ-abstraction over *e*-type variable
b. *Movement feature on C:*
translated into λ-abstraction over ⟨*et*,*t*⟩-type variable

5.3 Consequences for theories of reconstruction

- Scope and Condition C do not necessarily travel together. Therefore, any theory of scope reconstruction must allow for mismatches. This arguably supports the necessity of SemR.
- Consequently, not all cases of reconstruction involve the interpretation of a lower copy.
- SemR must be blocked from producing *de dicto* reconstruction. Following Lechner (to appear), this can be attributed to an extensionality requirement.
- *De dicto* reconstruction is possible if Condition C is not at issue but cannot be the result of SemR. This indicates the necessity of SynR alongside SemR.
- Some movements obligatorily reconstruct. This indicates that an *e*-type trace is not always available (contra Ruys 2015)

(65) Condition C ←*SynR*→ opacity scope

6 Weak crossover

- One added benefit of this account is that it also explains the weak crossover facts without further ado. Recall that A-scrambling is not subject to weak crossover, whereas $\overline{A}$-scrambling is.
- We can attribute weak crossover to the fact that $\overline{A}$-scrambling has to reconstruct for scope (Ruys 2000). Assuming that pronouns are of type *e*, abstraction over a GQ-variable cannot lead to pronominal binding.

(66) **har** **bacce-ko$_i$** [*us-kii$_{j/*i}$* mãã-ne] socaa [$_{CP}$ ki raam-ne t_i
every child-ACC s/he-GEN mother-ERG thought that Ram-ERG
dekhaa]
saw
'His/her$_j$ mother thought that Ram had seen every child$_i$.'
(*bound reading impossible*)

(67) [every child [$\underline{\lambda_1}$ [$\underline{\text{his}^e}$ mother thought that $\underline{\text{T}_1^{\langle et,t\rangle}}$ [λ_2 [Ram saw t_2]]]]]

- By contrast, because A-scrambling involves abstraction over an *e*-type trace, it is consequently able to bind a pronoun.

(68) har bacce-ko$_i$ [*us-kii$_i$* mãã-ne] t_i dekhaa
every child-ACC s/he-GEN mother-ERG saw
'For every child x, x's mother saw x.'

(69) [every child [$\underline{\lambda_1}$ [$\underline{\text{his}_1^e}$ mother saw $\underline{t_1^e}$]]]

7 What about English?

- **A remaining question**:
  So far, so good. But the judgments in Romero (1998), Fox (1999), and Ruys (2015) suggest that Condition C and scope *do* track each other in English. On the other hand, the evidence provided by Sharvit (1998) suggests that English exhibits the same pattern as Hindi. There is hence an unresolved data conflict here. We offer some speculation on how it might arise.

- We note first that all the data the suggest a scope–Condition C connection in English are ones where opacity is not controlled for.

- **Two contrasts**:
  Furthermore, there is a second contrast between English and Hindi: not only is the reconstructed-scope reading clearly possible in Hindi, it is furthermore the case that in-situ scope is ruled out or at least severely degraded. We explore the view that these two properties are related.

- **Proposal**:
  We propose the economy principle in (70). It states that when a movement dependency is parsed, it is preferentially interpreted by abstracting over the lowest type that is possible.

  (70) *Variable economy*
  Prefer to translate a trace into a variable of the lowest possible type.

- (70) has the effect that abstraction over a $\langle et,t\rangle$-variable is dispreferred if abstraction over an e-trace is also an option.

- **Consequence**:
  In Hindi, $\overline{\text{A}}$-scrambling does not have access to an e-trace. A GQ-trace is therefore the only option (apart from SynR). By contrast, in English an e-trace is possible for $\overline{\text{A}}$-movement and a GQ-trace is hence dispreferred as a result.

  (71) *Hindi $\overline{A}$-scrambling*
  ① $^{*}e$-type trace → unavailable
  ② $^{\checkmark}\langle et,t\rangle$-trace → reconstruction for scope only
  ③ $^{\checkmark}$SynR → reconstruction for scope + opacity; Condition C effects

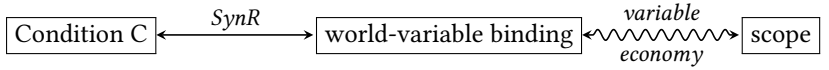
  (72) *English $\overline{A}$-movement*
  ① $^{\checkmark}e$-type trace → no reconstruction
  ② $^{\downarrow}\langle et,t\rangle$-trace → reconstruction for scope only $\rightsquigarrow$ *dispreferred*
  ③ $^{\checkmark}$SynR → reconstruction for scope + opacity; Condition C effects

- Scope reconstruction in Condition C configurations requires a GQ-trace. The use of a GQ-trace is dispreferred in English due to (70). This might give rise to the impression of scope freezing unless scope and opacity are directly disentangled.

- In Hindi, a GQ-trace is the only option and scope reconstruction is hence unproblematic.

- **Upshot**:
  The apparent difference between English and Hindi with respect to scope freezing is reduced to the independently observable difference in whether a high-scope reading is possible or not.

- Condition C is linked to opacity, which is linked to scope indirectly via (70). These two links result in configurations in which it appears as if Condition C and scope are correlated.

(73) 

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Acknowledgments: We are indebted for Sakshi Bhatia, Rajesh Bhatt, and Bhamati Dash for sharing their Hindi judgments with us and the Rajesh Bhatt and Roumi Pancheva for helpful discussion and suggestions.

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