# Crossover asymmetries

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**Appendix A: Indirect binding**

The analysis in this paper is based on the view that cases of possessor binding are *direct:* the pronoun is directly bound by the possessor. By contrast, Chierchia (2023) develops an *indirect* binding approach using E-type pronouns.[1] On this approach, the pronoun is not bound by the possessor, but by the DP containing the possessor, as in (1b). The meaning and structure of the pronoun is then enriched to yield the correct interpretation. In particular, Chierchia (2023) assumes that these pronouns involve an NP that is elided under ellipsis (Elbourne 2005) and the denotation of the pronoun is such that, for every individual, it returns the brother of that individual. The meaning of (1b) can thus be paraphrased as "Every boy's sister scolded the brother(s) of that sister."

(1) a. *Direct binding*
[Every boy's$_1$ sister] scolded **him$_1$**.

b. *Indirect binding*
(i) [Every boy's$_1$ sister]$_2$ scolded **[him$_2$ ~~boy~~]**.
(ii) him$_2$ ~~boy~~ $= f_{\text{BOY}}(x_2)$ = the boy(s) that are brothers of $x_2$

One consequence of this analysis is that it does not require a complex trace to handle secondary SCO. To illustrate, the structure of a secondary SCO example on an indirect-binding approach is given in (2). Crucially, because the pronoun is bound by the entire moving element, it is also coindexed with the trace. This produces a Condition C effect without the need for articulated structure inside the trace.

(2) *Structure of secondary SCO on indirect-binding account*
*[har laṛke-kii$_1$ behin-ko]$_2$ **us-ne$_2$** ___$_2$ ḍããṭaa
every boy-GEN sister-ACC he-ERG scolded
'For every boy's sister $x$, $x$ scolded the brother of $x$.'

Given our arguments that possessors do not undergo raising in the relevant Hindi structures, Chierchia (2023) concludes that accounting for the binding requires E-type pronouns and indirect binding. But as Chierchia (2023: 6n4) himself mentions, it is not at all clear that this is the case. There are existing analyses that produce direct binding by a possessor in the

[1] We are indebted to Dylan Bumford, Simon Charlow and a reviewer for very helpful comments on and discussion of these issues.

absence of c-command (e.g., Kobele 2010, Barker & Shan 2014, Bumford & Charlow 2022), and so there does not seem to be a general semantic obstacle to the coindexation regime we adopt.

Chierchia's (2023) indirect binding account is insightful, but we will not adopt it here for the following reasons. First, E-type pronouns appear to conflict with the standard binding theory. In (1b.i), the pronoun *him* in object position is coindexed with the subject. All else equal, this should result in a Condition B violation, contrary to fact. To circumvent this problem, Chierchia (2023: 9n10) assumes that E-type pronouns are not subject to Condition B. This is presumably due to the fact that E-type pronouns do not really exist except in the pronunciation. When a quantificational DP binds an E-type pronoun, it is actually binding into the more complex DP that is pronounced as a pronoun. This additional structure, Chierchia (2023) suggests, creates sufficient distance to the binder for Condition B to be obeyed. But this is not an unproblematic move. For example, in (3), the lower clause contains two E-type pronouns, both of which are bound by the matrix subject. This structure would correspond to a reflexive reading ("every boy admires himself"), which is ungrammatical.

(3) *[Every boy's sister]$_1$ said that [he$_1$ ~~boy~~] admires [him$_1$ ~~boy~~]
= Every boy's sister $x$ said that the brother of $x$ admires the brother of $x$.

The standard explanation for the lack of a reflexive reading is of course Condition B. But this would require that the E-type pronoun in subject position triggers a Condition B effect w.r.t. the E-type pronoun in the object position. But no such Condition B effect should arise on Chierchia's (2023) account precisely because of the added nominal structure used to explain (1b.i). Thus, wholly exempting E-type pronouns from Condition B seems to be too strong. It might well be possible to overcome this challenge, but this would need to be worked out.

Second, a related problem arises with Condition C effects. In order to derive the crucial secondary SCO effects (2), it is important for Chierchia (2023) that the whole E-type pronoun has to have the same index as the trace. Only then do we get Condition C between the E-type pronoun and the trace. But this would contradict the treatment of (1b.i). In (1b.i), the relevant index must be embedded *within* the E-type pronoun to avoid Condition B; but in (2), the index must be on the entire pronoun to trigger Condition C. It is not clear to us how these conflicting requirements can be reconciled with each other. On the direct-binding account proposed here, no such issue arises because it does not involve E-type pronouns.

Third, as we emphasized throughout, the crossover facts in Hindi are an exact analogue of the Condition C facts with R-expressions, and the account we developed here is designed to derive this parallelism. This is because the schematic structure and coindexation pattern is identical in the two cases (see (4)) and so they can be ruled out in a uniform way.

(4) *Structure for secondary SCO and Condition C connectivity on direct-binding approach*
*[$_{DP}$ DP-GEN$_1$ … ]$_2$ … pron-ERG$_1$ … $t_2$ … =(22)

An indirect binding account, on the other hand, fails to derive this link, as far as we can tell. This is because the coindexation patterns in the two configurations are not the same (see (5)).

In the case of crossover/binding, the pronoun is coindexed with the entire moving element. But in the case of coreference and Condition C, the pronoun is (or may be) coindexed with the possessor because these cases do not involve binding. The distinctness of the representations in (5) means that they are not handled in the same way. Chierchia's (2023) account of (5a) is based on the coindexation of the trace and the pronoun, but this is not the case in (5b), so the latter case must be ruled out differently. And if ruling out (5b) requires a complex representation of the trace, then an E-type account of (5a) does not obviate the need for complex traces after all. In sum, then, an indirect binding approach does not derive one of the core generalizations we have argued for.

(5) a. *Structure for secondary SCO on indirect-binding approach*
*$[_{DP}$ DP-GEN$_1$ … $]_2$ … **pron-ERG$_2$** … $t_2$ …

b. *Structure for Condition C connectivity on indirect-binding approach*
*$[_{DP}$ DP-GEN$_1$ … $]_2$ … **pron-ERG$_1$** … $t_2$ …

Fourth, the indirect-binding approach seems to leave unaccounted for the generalization that pronouns bound by possessors are always identical to regular pronouns. Due to the different syntactic structure Chierchia (2023) assumes for E-type pronouns, it is not clear to us how this generalization can be derived in a principled manner.

**Appendix B: Long-distance scrambling**

Long-distance scrambling in Hindi (that is, scrambling out of a finite clause) patterns like English Ā-movement with respect to the crossover diagnostics explored in this paper. It is subject to (secondary) WCO (6) as well as (secondary) SCO (7), and it shows Condition C connectivity with possessors (8).

(6) *Long scrambling: (S)WCO*

a. *Weak crossover*
[**har laṛke-ko**]$_1$ [**us-kii$_{2/*1}$** behin-ne] socaa [$_{CP}$ ki Sangita-ne ___$_1$ ḍããṭaa]
every boy-ACC s/he-GEN sister thought that Sangita-ERG scolded
'Every boy$_1$, his$_{2/1}$ sister thought that Sangita scolded (him).'

b. *Secondary weak crossover*
[**har laṛke-ke$_1$** dost-ko]$_2$ [**us-kii$_{3/*1}$** behin-ne] socaa [$_{CP}$ ki Sangita-ne ___$_2$ ḍããṭaa]
every boy-GEN friend-ACC s/he-GEN sister-ERG thought that Sangita-ERG scolded
'Every boy's$_1$ friend, his$_{3/*1}$ thought that Sangita scolded (him).'

(7) *Long scrambling: (S)SCO*

a. *Strong crossover*

[**har laṛke-ko**]$_1$ **us-ne**$_{2/*1}$ socaa [$_{CP}$ ki Sangita-ne ___$_1$ ḍããṭaa ]
every boy-ACC s/he-ERG thought that Sangita-ERG scolded
'Every boy$_1$, he$_{2/*1}$ thought that Sangita scolded (him).'

b. *Secondary strong crossover*

[**har laṛke-ke**$_1$ dost-ko ]$_2$ **us-ne**$_{3/*1}$ socaa [$_{CP}$ ki Sangita-ne ___$_2$
every boy-GEN friend-ACC s/he-ERG thought that Sangita-ERG
ḍããṭaa ]
scolded
'Every boy's$_1$ friend, he$_{3/*1}$ thought that Sangita scolded.'

(8) *Long scrambling: Condition C connectivity with possessors*

*[**Sita-ke**$_1$ bhaaii-ko ]$_2$ **us-ne**$_1$ socaa [ki Sangita-ne ___$_2$ ḍããṭaa ]
Sita-GEN brother-ACC s/he-ERG thought that Sangita-ERG scolded
*Intended:* 'Sita's$_1$ brother, she$_1$ thought that Sangita scolded (her).'

Given that long-distance scrambling follows case assignment in the same way as local scrambling does, the existence of SCO and Condition C connectivity follows straightforwardly from our analysis. For the absence of WCO, the analytical options mentioned for English Ā-movement in section 3 are available for Hindi as well. However, unlike English Ā-movement and Hindi local scrambling, long-distance scrambling in Hindi exhibits a requirement, or strong preference, for scope reconstruction (Poole & Keine 2024). If binding requires scope, then this fact alone might account for the WCO effects with long-distance scrambling.

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