Non-local Attachment of Clauses: Evidence from ASL*

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Abstract: We argue that some parenthetical-like clauses in ASL can take both intermediate and maximally wide scope outside of *if*-clauses and attitude verbs. Specifically, we investigate embedded coordinations, of the form … *SAY [IF Clause-1 Clause-2 PLUS Clause-3, …]*, and argue that Clause-2 may in some cases be interpreted with wide and intermediate scope (above *SAY*, or between *SAY* and *IF)*. The key to our paradigm is that we mark the scope of *IF* and *SAY* with non-manual markers (Brow Raise and/or Role Shift). By exempting Clause-2 from these non-manuals, we force it to outscope the relevant operator, including when it might be expected to create a syntactic island. Wide scope replicates the behavior of parentheticals and appositives in other languages. Intermediate scope is particularly interesting because it mirrors with full clauses the behavior predicted by some theories for some English appositives (Schlenker 2010, to appear a). The ASL data might thus lend support to the existence of a mechanism of high attachment *in situ* (McCawley 1981, 1998). Alternatives in terms of island-escaping covert movement or in situ indexing face significant challenges.

Keywords: non-manuals, appositives, parentheticals, supplements, scope, bidimensionalism

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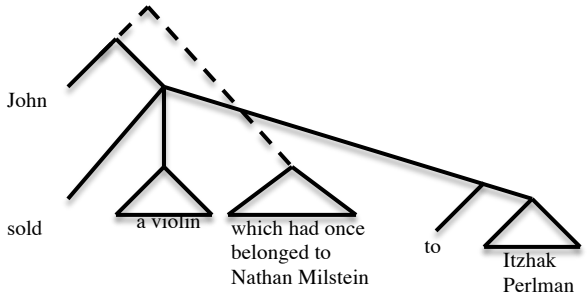
1 Introduction

1.1 High attachment of parentheticals and appositives?

McCawley (1981, 1998) proposed that English appositive relative clauses are attached at the matrix level despite being apparently embedded.[2] His proposal is illustrated in (1), which gives rise to a discontinuous constituent *sold a violin to Itzhak Perlman* (McCawley's analysis countenanced ternary branching for ditransitive verbs; this assumption is immaterial to the issue at hand).

(1)



McCawley motivated his proposal by patterns of ellipsis resolution, as in (2):

(2) John sold a violin, which had once belonged to Nathan Milstein, to Itzhak Perlman, and Mary did too.

As McCawley noted, the second sentence does not imply that the violin that Mary sold to Perlman had once belonged to Nathan Milstein.[3] On the assumption that ellipsis targets a constituent, this suggests that the appositive can be attached outside the constituent which is the antecedent of the elided VP, with the result that the VP can be copied without the appositive. Schlenker 2010, 2013/2020 argued for a liberal version of McCawley's system, one in which appositives can be attached (with different degrees of preference) to any propositional node that dominates their surface position (by contrast, parentheticals were argued to attach only at the matrix level).

An alternative was articulated by Potts 2005 and subsequent work. First, the 'matrix scope' behavior of appositives is not due to an exceptional syntax but to an exceptional semantics: their semantic contribution is made in a separate (non-at-issue) dimension of meaning, which just fails to interact scopally with the 'at-issue' dimension, hence the matrix scope behavior. Second, ellipsis resolution might be a *semantic* operation, one that might ignore elements that are in Potts's non-at-issue dimension. If so, McCawley's facts might not speak against Potts's in situ analysis of appositive clauses, but rather *for* Potts's bidimensional semantics (see Potts et al. 2009 for a related discussion pertaining to expressives that can be disregarded under ellipsis).

A large part of the recent empirical debate has centered on the availability of narrow scope readings of appositives, illustrated in (3)a: a counterfactual past in the appositive forces it to be interpreted in the scope of the *if*-clause. As a result, the truth-conditional effect is essentially that of an embedded conjunction, as in (3)c. This option is unavailable in the parenthetical in (3)b: the past tense cannot be interpreted as modal, and it must be interpreted as temporal, which yields an interpretive

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[2] Schlenker 2010, 2013/2020 proposes a theory in which matrix attachment is just one possibility: attachment to intermediate propositional nodes is possible as well. It seems to us that McCawley 1998 took matrix attachment to be the only possibility, as suggested by his remark that "a nonrestrictive clause accomplishes a separate **speech act** from the sentence in which it appears" (p. 448), and that "this sketch is neutral with regard to whether the two Ss [i.e. the main clause and the appositive -PS] even make up a constituent".

[3] We do not exclude the possibility that it might be *permissible* to copy the appositive in the elided clause; our point is that this is not obligatory. As an Editor notes, (i) probably suggests that Emma read a book by Jane Austen. The reason is not hard to find: the second clause would make a rather trivial point without the appositive. We do not seek to explain what determines the choice between copying the appositive or not in such cases (nor how copying works if it does).

(i) Anna read a book, which had been written by Jane Austen, and Emma did too.

clash with *tomorrow*.[4] These facts argue against a 'matrix scope only' analysis *à la* Potts, and in favor of the liberal version of McCawley's theory.

(3) *Context:* someone made a big mistake at the Department.
a. If tomorrow I called the Chair, who in turn called the Dean, then we would be in deep trouble.
b. *If tomorrow I called the Chair (he in turn called the Dean) then we would be in deep trouble.
c. If tomorrow I called the Chair and he in turn called the Dean, then we would be in deep trouble.
(Schlenker 2013/2020, to appear a[5])

If the liberal version of McCawley's analysis is on right track, appositives can be attached at various propositional levels in the absence of any movement. The key question, however, is whether such liberal attachment possibilities can be independently motivated. We provide a positive answer by considering clauses in ASL which, depending on the non-manual markings that they bear, can be attached with narrow, matrix or intermediate scope.

The rest of this article is organized as follows. After laying out our elicitation methods and transcription conventions (Section 1.2), we introduce the debate on the attachment possibilities of appositive relative clauses (Section 2). We then display the existence of matrix and intermediate readings of some ASL clauses embedded under two types of indirect discourse: Role Shift, which has been variably analyzed in terms of context shift or of quotation (Section 3), and standard indirect discourse (Section 4). Following McCawley's lead, we then investigate the behavior of these clauses under ellipsis (Section 5), and discuss the theoretical consequences of our data for competing theories (Section 6), concluding that a liberal version of McCawley's best accounts for the data. (An Appendix argues that a movement-based account of our data faces significant challenges.)

1.2 Elicitation methods and transcription conventions

ASL data were elicited from a native signer (a Deaf child of Deaf, signing parents) using the 'playback method' (used for instance in Schlenker et al. 2013, Schlenker 2014, 2017a,b, 2018, to appear b), with repeated acceptability judgments and inferential (i.e. semantic) judgments (on separate days) on videos involving minimal pairs.[6] We also used a 7-point scale to assess (i) acceptability (with 7 = best) and also (ii) the strength of the inferences triggered, with 1 = no inference and 7 = strongest inference. When sentences are very degraded (acceptability < 4.5), no translation is provided. Otherwise, translations were chosen to reflect to the extent possible the inferences that were tested.

As stated in Schlenker, to appear b, the playback method involves two steps. First, the consultant signs sentences of interest on a video, as part of a paradigm (e.g. often with 2 to 8 sentences) involving minimal pairs. Second, the consultant watches the video, provides quantitative acceptability ratings and inferential judgments, enters them in a computer, and redundantly signs them on a video. The second step can be repeated on other days. This method has the advantage of allowing for the precise assessment of minimal pairs (signed on the same video), in a quantitative, replicable fashion; its obvious limitation is that it solely assesses one individual's idiolect. Still, the repetition of the task makes it possible to assess the stability of the judgments; and if necessary, this method could be turned into an experimental one in the future, assessing the same videos with other signers.

For readability, in normal cases only average judgments are provided. Average acceptability

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[4] In (3)a,b, a conditional mood can be used instead of the past tense, as is illustrated in (i). This is expected on a matrix attachment reading: the parenthetical and appositive are in this case interpreted outside the scope of the *if*-clause, and give rise to a reading of 'modal subordination' on which *if tomorrow I called the Chair, the latter would call the Dean*. This inference is absent from (3)a,b,

(i) a. If tomorrow I called the Chair, who would in turn call the Dean, then we would be in deep trouble.
=> if I tomorrow called the Chair, he would call the Dean
b. If tomorrow I called the Chair (he would in turn call the Dean) then we would be in deep trouble.
=> if I tomorrow called the Chair, he would call the Dean

[5] See Schlenker 2013/2020 for a more complete paradigm, and quantitative acceptability and inferential judgments obtained from 8 consultants. A related paradigm is discussed in greater detail below (= (9)).

[6] This discussion of elicitation methods and transcription conventions is similar to one that appears in Schlenker 2018.

judgments appear as superscripts before the sentences, and the number of judgments corresponding to each average (typically, 3) appears at the end of every paradigm.[7] Notations such as *ASL, 34, 1550, 3 judgments* indicate that the relevant sentences appeared in ASL video 34, 1550, and that averages are computed on the basis of 3 judgments. Inferential scores of 5 or more are highlighted (to indicate relatively strong inferences). Unless otherwise noted, sentences that appear in the same numbered example were assessed as part of the same video. Raw data (obtained during elicitation sessions) are provided in the Supplementary Materials.

Sign language sentences are glossed in capital letters, as is standard.[8] Expressions of the form *WORD–i*, $WORD_i$ and $[\ldots EXPRESSION\ldots]_i$ indicate that the relevant expression is associated with the locus (= position in signing space) *i*. A suffixed locus, as in *WORD–i,* indicates that the association is effected by modulating the sign in such a way that it points towards locus *i* (this is different from the addition of a pointing sign *IX-i* to a word); a subscripted locus, as in $WORD_i$ or $[\ldots EXPRESSION\ldots]_i$, indicates that the relevant expression is signed in position *i*. Locus names are assigned from right to left from the (right-handed) signer's perspective; thus when loci *a, b, c* are mentioned, *a* appears on the signer's right, *c* on the left, and *b* somewhere in between. *IX* (for 'index') is a pointing sign towards a locus, while *POSS* is possessive; they are glossed as *IX-i* and *POSS-i* if they point towards locus *i*; the numbers *1* and *2* correspond to the position of the signer and addressee respectively (*IX-i* is a standard way of realizing a pronoun corresponding to locus *i*, but it can also serve to *establish* rather than to *retrieve* one). Agreement verbs include loci in their realization – for instance the verb *a-ASK-1* starts out from the locus *a* and targets the first person locus *1;* it means that the third person individual denoted by *a* asks something to the signer. When no locus is assigned to a Noun Phrase, this is because it was signed in neutral space (in front of the signer, sometimes towards the dominant side).

We only seek to encode three non-manuals: Role Shift, Brow Raise, Brow Lowering (also called 'raised eyebrows' and 'furrowed eyebrows' respectively). Role Shift is notated as RS_i if the signer shifts his body to adopt a perspective associated with locus *i*. Brow Raise and Brow Lowering are iconically notated as ^ and ~ respectively, as in Schlenker et al. 2016.[9] They appear above the beginning of the string they co-occur with, with a line marking the span of the non-manual. (We occasionally repeat RS_i, ^ and ~ at the end of the line to forestall ambiguities in case of line breaks.)

2 The debate on the attachment possibilities of appositive relative clauses

2.1 Appositive vs. restrictive relative clauses

Appositive relative clauses and restrictive ones differ along several dimensions, illustrated in (4): besides intonation, they may sometimes be distinguished by the choice of the *wh*-pronoun, as is stated in (4)b. In addition, they display different behaviors in negative environments, as is stated in (4)c, d: in the immediate scope of some negative operators, such as *nobody*, restrictive relative clauses but not appositives are acceptable. In other negative-like environments, such as in the scope of *less than five students*, appositive relative clauses are acceptable but have clearly distinct semantic effects from restrictive relative clauses: the latter weaken the meaning[10] but the former may strengthen it.

(4) **Some differences between appositive and restrictive relative clauses**
a. Intonation may set an appositive relative clause aside from the DP it modifies (Selkirk 2005).
b. In some dialects of English, *that* can only introduce restrictive relative clauses (not appositives), whereas *who* can be used in both cases, as seen in (5). Conversely, in French *lequel* can only introduce appositives (not restrictive relative clauses), whereas *qui* can be used in both cases (e.g. Schlenker, to

[7] We usually provide complete quantitative judgments when there is more than a 2-point difference in the judgments obtained for a given sentence, but this case just didn't arise in the present piece, indicating that acceptability and inferential judgments were rather stable for our consultant.

[8] This paragraph recapitulates transcription conventions that are found elsewhere, and it is thus similar to homologous paragraphs in the literature.

[9] Role Shift and Brow Raise are typically easer to perceive, but Brow Lowering may be much more subtle, and our transcriptions are correspondingly less secure in the latter case.

[10] The behavior of restrictive relative clauses is entirely expected. Take (7)a. *Students that were incompetent* is a stronger (i.e. more restrictive) property than *students*. *Less than five* is downward-monotonic relative to its nominal argument, which means that a logically stronger property gives rise to a logically weaker meaning.

appear a).
c. In some negative environments, as in (6), restrictive relative clauses are acceptable but appositives are not.
d. In some negative-like environments in which appositive relative clauses are acceptable, they may strengthen the meaning whereas restrictive relative clauses weaken it, as illustrated in (7).

(5) a. Max wants to visit Doctor Brown, who his sister works for.
b. *Max wants to visit Doctor Brown, that his sister works for. (Stowell 2005)

(6) a. Nobody that George knows is qualified for this position.
b. *Nobody, who George knows, is qualified for this position. (Stowell 2005)
b'. *Nobody is qualified for the position. They know George.

(7) a. John flunked less than five students that were incomptent.
≠> John flunked less than five students
b. John flunked less than five students, who were incompetent.
=> John flunked less than five students
b'. John flunked less than five students. They were incompetent.
(Schlenker, to appear a)

As a first approximation, the distribution of appositive relative clauses in negative-like environments can be captured by observing that they can behave like independent clauses with an E-type pronoun (e.g. Del Gobbo 2003), hence the similarity between (6)b and (6)b' and between (7)b and (7)b'. This resemblance between appositive relative clauses and independent clauses will be important, as it suggests that they could in principle be attached at various levels (restrictive relative clauses, by contrast, are of predicative type and thus resemble adjectives, which can just attach to the NP's they modify).

2.2 Scopal properties

Appositive relative clauses are typically interpreted with matrix scope even when they are attached in an embedded position, as is shown by the sharp interpretive contrast in (8): the appositive relative clause in (8)a is interpreted outside the scope of the matrix attitude verb, leading to the inference that Trump will in fact retain the support of the Republican party. By contrast, the conjunct displayed in (8)b exhibits the expected narrow scope behavior, and thus fails to trigger the same inference.

(8) John wonders whether / hopes that / fears that Trump
a , who will retain the support of the Republican party,
b. will retain the support of the Republican Party and
will be re-elected in 2020. (Schlenker, to appear a)

While matrix scope is in some sense the default reading of appositive relative clauses, clear cases of narrow scope readings have been described in the literature. An example from English was already discussed in (3)a, where the modally interpreted past tense forces a narrow scope interpretation. A related but more complete paradigm appears in (9) (from Schlenker 2013/2020) with average acceptability and inferential judgments from 8 consultants (related paradigms exist in French).

(9) *Context:* A news channel has information about the identity of an American spy in Pakistan, Smith. The following is uttered by a journalist working for that channel:

If tomorrow we published information about Smith ___ we could kiss our jobs goodbye.

Target inference: if tomorrow we published information about Smith, Smith would get killed as a result.

Construction filling ___ (survey A, with 8 consultants)	**Acceptability** (7 = best)	**Inferential strength** (7 = strongest)
a. , who got killed as a result,	6.3	4.0
b. (he got killed as a result),	2.0	3.3
c. and he got killed as a result,	7.0	2.6
d. , who would get killed as a result,	6.8	6.8
e. (he would get killed as a result),	6.0	7.0

In (9)a-c, the past tense refers to a future event and must thus be interpreted modally; this is possible with the appositive relative clause in (9)a and the narrow scope conjunctive in (9)c, but not with the clausal parenthetical in (9)b (presumably because it must be attached at the matrix level, above the *if*-clause). The controls with *would* in (9)d,e, which presumably involve matrix attachment, are acceptable but give rise to a 'modal subordination' reading on which *if tomorrow we published information about Smith, Smith would get killed as a result*; the narrow scope constructions in (9)a,c do not give rise to this inference.[11]

The possibility of a narrow scope behavior was further highlighted by experimental work on German (Poschmann 2018), even in the absence of morpho-syntactic markers to force narrow scope. In an initial experiment, she shows that in the context in (10), which makes a matrix reading of the proposition *Dr. Meier gives Gerd the right antidote* (as this is stated to be unlikely), the appositive relative clause in (10)a is rated more highly than the parenthetical in (10)c (but less highly than the narrow scope conjunct in (10)b, possibly due to the scopal unclarity of the appositive).

(10) *Context:* Gerd got bitten by a snake. There is only little chance that he will survive. The venom is quite deadly. His only chance is to reach Dr. Meier in time, who lives close by. But it's quite unlikely that Dr. Meier has got the antidote Gerd needs. Only if Dr Meier gives him the antidote in time, can Gerd be saved.

Aus der Zusammenfassung des Schülers
Part of the pupil's summary:

Wenn Gerd rechtzeitig Dr. Meier erreicht
If Gerd reaches Dr. Meier in time

a. , der ihm das passende Gegengift verabreicht,
, who gives him the right antidote,
b. und der ihm das passende Gegengift verabreicht,
and he gives him the right antidote
c. (der verabreicht ihm das passende Gegengift),
(he gives him the right antidote)

kann Gert gerettet werden.
Gert can be saved.

While there are discourse and lexical constraints that we do not discuss here, Poschmann concludes that her work "strongly confirms an assumption made by Schlenker (2013) that NRCs [= non-restrictive relative clauses] can have narrow scope interpretations in which they contribute conjunctively to the content of their host-clause".

2.3 Two theories

In seminal work, Potts 2005 sought to explain the matrix scope behavior illustrated in (8)a, and proposed that appositive relative clauses (and more generally what he called 'supplements') belong to a new dimension of meaning, the conventional implicature (or CI) dimension. For him, appositives have an unexceptional syntax and are attached to the DP's they modify. But their special semantic type guarantees that their contribution is computed independently from that of the operators in whose scope they may be embedded, hence yielding the interpretive effect of matrix scope, as is stated in (11)a,b[12] ((11)c pertains to complicating discourse factors that we revisit in Section 3.3).

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[11] Schlenker 2013/2020 explains the stronger endorsement of the inference in (9)a than in (9)c by a (weak) projection phenomenon reminiscent of presupposition projection.

[12] Two remarks should be added.

(i) The type system posited by Potts 2005 is designed to ensure that meanings in the CI dimension do not affect the at-issue meaning obtained for a given sentence. Basic types (e, s, t) exist both in a standard (at-issue) version and in a CI version. But no complex type allows an expression to take as argument a CI-type and return an at-issue type; as a result, CI types do not affect the computation of at-issue meanings. See Potts 2005 for discussion, and Schlenker, to appear a for a summary.

(11) **Bidimensional Analysis** (Potts 2005, Harris and Potts 2009a,b)
a. An appositive relative clause can only be attached to the DP it modifies.
b. Its type-theoretic semantics (the fact that it has a non-at-issue, CI type) guarantees that it is interpreted independently from any operators in whose scope it appears.
c. Some discourse phenomena can yield the impression of embedding (but these should presumably apply in the same way to clause parentheticals and to appositive relative clauses).

Motivated by the existence of narrow scope readings of some appositives, illustrated in (3) and (10), and in the spirit of McCawley's analysis, Schlenker 2010, 2013/2020, to appear a and Poschmann 2018 argue for the hypotheses in (12). While their proposal adopts McCawley's analysis of wide scope readings (and optional disappearance under ellipsis), it allows for more liberal attachment possibilities for appositive relative clauses: these can attach not just to the matrix node, but also to any propositional node that dominates their surface position. By contrast, parentheticals were argued to only display a matrix attachment behavior.

(12) **Non-local attachment possibilities for clausal parentheticals and appositive relative clauses** (Schlenker 2010, 2013/2020, to appear a, Poschmann 2018)
a. An appositive relative clause can be attached to any propositional node that dominates its surface position (with a preference for highest node attachment).
b. A parenthetical clause can only be attached to the highest node.
c. While narrow scope readings of appositives are usually dispreferred, they can be forced by certain grammatical constraints, such as the licensing of the counterfactual past under *if* (see (3)a, (9)a); doing so with a parenthetical is impossible (see (3)b, (9)b).

Still, two important questions were left open. First, is the liberal syntactic mechanism in (12)a real and independently motivated? Second, and more specifically, are there cases not just of narrow and matrix scope, but also of intermediate scope? The liberal mechanism of attachment leads one to expect that such cases should exist, but there are few attempts at testing this prediction, in large part because the relevant sentences tend to be rather complicated.[13]

We will now investigate sentences in ASL (American Sign Language) that might provide independent evidence for liberal attachment possibilities, pertaining not just to matrix scope but also to intermediate scope. By using non-manual markers to indicate the scope of the target clauses, we construct examples in which a clause is attached with intermediate scope; as we will see, the mechanism

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(ii) Technically, Potts 2005 posits of rule of "parsetree interpretation" that collects all the propositional types that correspond to supplements, irrespective of where in the tree they are found.

[13] Schlenker 2013/2020 discusses several possible cases of intermediate scope in English and French, including (i), with average judgments on a 7-point scale (from a survey with 8 native speakers of American English; the structures in a. and b. should be understood to fill ___):

(i) *Context:* there is discontent with the current Chair, John, but many people didn't say anything to the Dean for fear that she would take excessive action. I justify this course of action:

If each of the faculty had mentioned the fact that they didn't like John ____ we would now feel terrible.
a. [5,4] , who had gotten fired as a result,
b. [2] (he had gotten fired as a result)

The example in (i)a involves a modally interpreted pluperfect licensed within the scope of the *if*-clause, while (i)b serves as a control: the clausal parenthetical should only be able to attach at the matrix level, and for this reason the counterfactually interpreted pluperfect should not be licensed and the sentence should be deviant (as is the case).

The modally interpreted pluperfect (and the intuitive truth conditions) show that the appositive relative clause in (i)a is interpreted within the scope of the *if*-clause. But it also seems to be interpreted above the scope of *each of the faculty:* on the most plausible reading, the condition is that [each of the faculty mentions the fact that he doesn't like the Chair] *and* the latter gets fired as a result of this unanimous opinion; attachment under *each of the faculty* yields an implausible reading "on which for each faculty f, the Chair could be fired on the strength of f's particular opinion" (Schlenker 2013/2020).

in (12)a is a serious contender to explain the data, and alternative mechanisms face non-trivial challenges.

3 High and intermediate attachment of clauses under Attitude Role Shift

3.1 Target structures and non-manuals

In (3)a and (9)a above, narrow scope of the appositive was forced by the counterfactual past, which is only licensed in the scope of an *if*-clause. We use a different mechanism, non-manuals, to force different attachment sites in ASL. Sandler and Lillo-Martin 2006 note that "some parentheticals are found interrupting sentences, including WH-questions", and that "when such an element is used, it is clear that the non-manual markings must change" (p. 469).[14] We investigated related facts with respect to two non-manuals: Brow Raise, which can appear on an *if*-clause (and more generally in topic- and focus-related constructions); and Attitude Role Shift, an operation whereby the signer shifts his or her body to adopt the perspective of a character. These non-manuals have the advantage of spanning an entire string of words; as a result, signing one subgroup *without* the non-manual helps indicate that it should be exempted from the scope of the relevant operator.

Schematically, we will consider the structures in (13), where *&* corresponds to the word *PLUS* (a standard way to mark conjunction in ASL), and where absence of Brow Raise (^) leads to the insertion of Brow Lowering (~).[15] (Our discussions will not determine whether the absence of Role Shift and Brow Raise is sufficient to trigger the relevant readings, or whether Brow Lowering plays a role *per se*; but this won't affect our general point that non-manuals make some wide and intermediate scope readings clearly available.[16])

(13) a. RS_i_____
^_____
… SAY IF Clause-1 **Clause-2** & Clause-3, …

b. RS_i_____
^_____ ~_____ ^_____
… SAY IF Clause-1 **Clause-2** & Clause-3, …

c . RS_i_____ RS_i_____
^_____ ~_____ ^_____
… SAY IF Clause-1 **Clause-2** & Clause-3, …

The clause of interest is Clause-2 (boldfaced): it appears under Role Shift and Brow Raise in (13)a, under Role Shift but without Brow Raise (and with Brow Lowering) in (13)b, and it is exempted from both in (13)c, with Brow Lowering again replacing Brow Raise when the latter is missing.

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[14] As Sandler and Lillo-Martin 2006 note (p. 469), "if the parenthetical indicates the speaker's viewpoint, there will be a body shift as well as a change in facial expression to the signer's opinion, with a return to the original position and WH-question expression following the parenthetical", as shown in their example in (i) (we preserve their transcription, where ^ in *TRUE^BUSINESS* presumably indicates that the ASL word is made of two component parts).

(i) whq shift whq
WHY IX-a STUDENT – STUDENT TRUE^BUSINESS HUH – FAIL CLASS (WHY)
'Why did that student - if he can be called a student - fail the class?'

[15] Depending on the case, Brow Raise in Clause-3 starts on or after *&*; we do not know of any consequences of this variation.

[16] Liddell 1986 argues that the consequent of ASL conditionals is marked by another non-manual, head thrust. Since we do not aim to provide an exhaustive transcription of non-manuals, and this one does not interact with our goals (since the action will be in the antecedent clause), we disregard this point in what follows.

Some authors have argued that ASL Attitude Role Shift involves context shift in attitude reports, with additional iconic conditions that have not been described for context shift in spoken language (Quer 2005, 2013; Schlenker 2017a,b); other authors have taken ASL Attitude Role Shift to be a species of quotation (Davidson 2015).[17] The choice will matter a bit later. As for Brow Raise, it has been variously analyzed in prosodic terms (as a sign language counterpart of a high boundary tone, e.g. Sandler 2011), or in morphosyntactic or semantic terms (Neidle et al. 2002, Wilbur and Patschke 1999, Wilbur 2011); the choice won't matter here, as we solely use Brow Raise to indicate whether a word is or isn't dependent on *IF* (see Quer 2016 for a useful survey of theories of Brow Raise); inferential judgments will show that the attempt is indeed successful. Brow Lowering has been studied in less detail. While Wilbur 2000 takes it to "occur uniquely and exclusively with wh-questions and embedded wh-complements", Liddell 1986 finds (a version of) Brow Lowering in some examples in which a "conditional is followed by another clause that describes what will occur if the condition is met, and in which the eyebrows are lowered". He adds with respect to these data that Brow Lowering "is what signers do when the second clause is to be signed without raised brows", a description that seems consistent with our data (we occasionally find Brow Lowering on wh-words as well). Still, we won't take a stance on the correct analysis of the non-manuals we use, since our goal is not to understand them in detail, but rather to use them in order to bring out readings that might otherwise be unavailable or hard to access.

In ASL, *and* can be expressed with the words *AND* or *PLUS*, but parataxis suffices to express ('asyndetic') conjunction, and thus a narrow scope reading is expected to obtain in (13)a. By exempting Clause-2 from Brow Raise and Role Shift, we can force it to be interpreted outside the scope of the *IF*-clause and of the attitude report. This just replicates the behavior of appositives and parentheticals in English (e.g. McCawley 1981, 1998, Potts 2005, Schlenker, to appear a). More interesting is what happens when Clause-2 is exempted from Brow Raise but not from Role Shift: it then takes scope outside of the *IF*-clause but within the attitude report. This behavior is not expected for English parentheticals, which only take matrix scope, and it is expected in only limited cases for appositive relative clauses, and only on some theories (see (12) above).

3.2 Basic phenomenon

The basic phenomenon is introduced in (14), with Clause-2 corresponding to *PEOPLE LIKE IX-a,* where *IX-a* denotes John. We note that this is a fully normal (but possibly parenthetical) clause, and certainly not a restrictive relative clause, which would not be expected to modify a proper name.[18] We include with the paradigm the strength of crucial inferences, assessed by way of the questions in (15). These were designed to determine whether Clause-2 is interpreted (i) outside the *IF*-clause but within the scope of the attitude verb, or (ii) outside the scope of the attitude verb (and thus also outside the *IF*-clause).

(14) *Context:* There is a research competition by pairs.

ANN$_b$ b-TELL-1
'Ann tells me that

RS$_b$_____
^_____ ^_____ ^_____
a.[7] IF IX-1 WORK WITH JOHN$_a$ PEOPLE LIKE IX-a PLUS GOOD INTERACTION
if she works with John, people like him, and there is a good interaction

RS$_b$_____
^_____ ~_____ ^_____
b.[7] IF IX-1 WORK WITH JOHN$_a$ PEOPLE LIKE IX-a PLUS GOOD INTERACTION
if she works with John (she says that people like him) and there is a good interaction

[17] See Koulidobrova and Davidson 2015, to appear for yet another view, on which Role Shift sometimes affects the embedding predicate itself. Note that in our data the embedding predicate is not affected.

[18] In addition, as summarized in Wilbur 2017, ASL restrictive relative clauses are expected to involve Brow Raise, as well as pronominal *SELF* or a post-clausal *THAT* (Wilbur 2017 and Liddell 2003 also mention tensed lips and back head tilt).

RS$_b$_____ RS$_b$_____
^_____~_____ ^_____
c. [5.7] [IF IX-1 WORK WITH JOHN$_a$][INFORM-2 PEOPLE LIKE IX-a][PLUS GOOD INTERACTION]
if she works with John (I inform you that people like him) and there is a good interaction

_____RS$_b$

IX-1 WILL WIN.
she will win.' (ASL 35, 0462, 3 judgments)

Inferential judgments:	John is in fact popular	Ann thinks that John is popular
a.	1	2.3
b.	1	**6.7**
c.	**6.3**	1.7

(15) Do you derive the inference that (i) John is in fact popular? (ii) Ann thinks that John is popular? (Indicate with which strength you derive the relevant inference: 1 = no inference; 7 = strongest inference)

In (14)a, Clause-2 is signed under Role Shift and with Brow Raise associated with the *IF*-clause. We thus expect that the clause is interpreted as a conjunct in the scope of both operators; this explains why we neither obtain the inference that John is popular nor that Ann believes that he is. In (14)b, Clause-2 is exempted from Brow Raise and hence from the *IF*-clause, but not from Role Shift, and we obtain the inference that Ann thinks that John is smart. In (14)c, Clause-2 is exempted both from Role Shift and from Brow Raise, and we obtain the inference that John is in fact smart.

The sentence in (16)a provides a control that shows that Brow Raise alone isn't enough to suspend the inference that the attitude holder believes Clause-2. Specifically, when Clause-2 appears under Role Shift and Brow Raise, but in a separate clause *outside* the conditional, its content is assigned to the attitude holder, with no trace of a conditional meaning. On the other hand, this separate instance of Role Shift does attribute these further thoughts/claims to the attitude holder (rather than to the signer).

(16) *Context:* There is a research competition by pairs.
ANN$_b$ b-TELL-1
'Ann tells me that
RS$_b$_____
^_____ ^_____
IF IX-1 WORK WITH JOHN$_a$ PLUS [GOOD INTERACTION], IX-1 WILL WIN.
if she works with John and there is a good interaction, she will win.

_____RS$_b$
^_____
a. [7] PEOPLE LIKE IX-a.
She says that people like him.'

_____RS$_b$
~_____
b. [7] PEOPLE LIKE IX-a.
She says that people like him.'

~_____
c. [7] INFORM-2 PEOPLE LIKE IX-a.
I inform you that people like him.'
(ASL 35, 0464, 3 judgments)

Inferential judgments:	John is in fact popular	Ann thinks that John is popular
a.	1	**6**
b.	1	**6.3**
c.	**7**	1.3

3.3 Analytical directions

The examples with intermediate scope interpretation schematically represented in (13)b and illustrated in (14)b could be analyzed along two directions.[19] One is that a *syntactic operation* is responsible for intermediate scope: this could involve the operation posited for appositives in (12)a, whereby a clause can be attached to a higher propositional node; or it could involve an operation of covert movement. Alternatively, a *pragmatic operation* might be responsible for the impression that Clause-2 is interpreted within the scope of the attitude verb.

This second line was explored Potts 2005, who observed that his claim that appositives are never semantically embedded has apparent counterexamples (this is the reason our summary in (11) includes a reference to discourse conditions in (11)c). Thus in the German sentence in (17)a, the appositive is interpreted as if it were in the scope of the attitude verb. In addition, the appositive verb takes the 'Konjunktiv I', a mood that is characteristic of reported speech in German (see Fabricius-Hansen and Sæbø 2004).

(17) a. Juan behauptet, dass Maria, die sehr schwach sei,
Juan *maintains* *that* *Maria* *who* *very* *weak* *be*.konj
krank sei.
sick *be*.konj
'Juan maintains that Maria, who is supposed to be really weak, is sick.' (Potts 2005)

b. Juan behauptet, dass Maria krank sei. Sie sei
Juan *maintains* *that* *Maria* *sick* *be*.konj *She* *be*.konj
sehr schwach.
very *weak*
'Juan maintains that Maria is sick. According to him, she is very weak.' (Potts 2005)

But as Potts points out, this is not a genuine counterexample to his analysis: as (17)b shows, an independent clause in the Konjunktiv I can be understood *as if* it were semantically embedded, possibly by a mechanism akin to 'modal subordination' or 'perspectival shift'. Harris and Potts 2009a,b argue with experimental means that such a mechanism is also available in English. Thus their subjects accepted to attribute to the agent (= Sid, rather than the speaker) the content of the nominal appositive *a complete waste of time* both in (18)a and in (18)b.

(18) My brother Sid hates school.
a. He says that he puts off his homework, a complete waste of time, to the last minute.
b. He puts off his homework, a complete waste of time, to the last minute.

The idea, then, is that these appositives fail to interact scopally with operators, but that an independent, possibly pragmatic operation of perspectival shift blurs the picture. Crucially, this pragmatic operation should apply to root clauses, since its theoretical *raison d'être* is to explain why a theory of appositives that interprets them with matrix scope can nonetheless account for the interpretive possibilities in (18).

3.4 Embedding under **none-***type quantifiers*

One key property of perspectival shift as a pragmatic operation is that it should not take scope under further operators. But non-local attachment of clauses is possible under the scope of operators, as we will now see.

In (19), an *IF*-clause is embedded under Role Shift, which is itself embedded under a *none*-type quantifier, *NO GOOD STUDENT*. The semantic questions in (20) help diagnose the scope of Clause-2, with quantitative results that appear in the table in (20).

(19) *Context:* There is a research competition by pairs.
[NO GOOD STUDENT]$_b$ b-TELL-1
'No good student tells me that

RS$_b$_____
^_____ ^_____ ^_____
a. ^{6}IF IX-1 WORK WITH JOHN$_a$ PEOPLE LIKE IX-a PLUS GOOD INTERACTION,

[19] We follow in part the discussion of Schlenker, to appear a.

if he works with John, and people like him, and there is a good interaction,

RS$_b$_____
^_____ ~_____ ^_____
b. [6.3] IF IX-1 WORK WITH JOHN$_a$ PEOPLE LIKE IX-a PLUS GOOD INTERACTION,
if he works with John (adding that people like him) and there is a good interaction,

RS$_b$_____ _____
^_____ ~_____ ^_____
c. [5.3] IF IX-1 WORK WITH JOHN$_a$ INFORM-2 PEOPLE LIKE IX-a PLUS GOOD INTERACTION,
if he works with John (I inform you that people like him) and there is a good interaction,

_____RS$_b$

IX-1 WILL WIN.
he (= the student) will win.'
(35, 0468, 4 judgments)

Meaning contribution of *PEOPLE LIKE IX-a*:	**Wide scope** John is in fact popular	**Intermediate scope** No good students said that John is popular, and that if they were to work well with him, they would win.	**Narrow scope** No good students said that if John is popular and they were to work well with him, they would win
a.	1	2	**6**
b.	1	**6.8**	1
c.	**6.5**	1.8	1

(20) What is the meaning contribution of *PEOPLE LIKE IX-a*? (i) that John is in fact popular [according to the signer]; (ii) that no good students said that John is popular, and that if they were to work well with him, they would win; (iii) that no good students said that if John is popular and they were to work well with him, they would win; (iv) something else (if so, say what). Indicate with which strength you derive the relevant inference: 1 = no inference; 7 = strongest inference.

As expected, in (19)a Clause-2 (= *PEOPLE LIKE IX-a*) displays an unexceptional, narrow scope behavior. In (19)c, which is a bit less acceptable, it displays a wide scope behavior, as parentheticals do in English. What is of interest is that in (19)b Clause-2 is interpreted within the scope of *NO GOOD STUDENT* and of the attitude verb (because of Role Shift), but outside the *IF*-clause. Since Role Shift is in this case embedded under a negative quantifier, a pragmatic operation of perspectival shift cannot be responsible for the observed reading: a genuine scopal interaction is needed.

In the literature on intermediate scope appositives, it is not entirely clear whether these are interpreted as being at-issue, or give rise to some projection phenomena. Due to the difficulty of forcing a narrow scope reading of appositives in English, structures directly comparable to those in (19) (with an appositive within an *if*-clause embedded under *tell* and a negative quantifier) have not been investigated in the literature. But there are discussions of projection effects reminiscent of presupposition for simpler cases. The target sentence in (22)a has the structure in (21): the past tense of *met* in the appositive is interpreted relative to a future time t introduced by *will*, and this relative reading of the past tense (which we write as met_{t-1}) is only possible if the appositive has scope under *will*. In other words, tense forces a narrow scope reading. The lower clause is embedded under a modal construction (*wonder whether*) in order to test a projection-like phenomenon. The question is whether, relative to controls, we get an inference that DSK will in fact have met with the judge on the relevant day.

(21) I will$_t$ wonder … whether DSK , who met$_{t-1}$ with the judge the day before, …

(22) *Context:* DSK, a French politician, is thought to be in discussions to settle a civil lawsuit against him. The speaker is talking to a journalist who might have information about how the procedure will unfold.

I will be wondering next Wednesday whether DSK ____ agreed to a settlement.

Target inference: DSK will meet with the judge next Tuesday

Construction filling ___ (survey B, with 8 consultants)	**Acceptability**	**Inferential strength**
a. , who met with the judge the day before,	5.4	**5.8**
b. (he met with the judge the day before)	4.0	5.6
c. (he will have met with the judge the day before)	6.8	6.8
d. met with the judge the day before and	7.0	**1.3**

Schlenker, 2013/2020, to appear argues in favor of such projection effects: in a study with 8 consultants, (22)a gave rise to a strong inference that DSK will meet with the judge next Tuesday (= 5.8 on a 7-point scale), whereas no such inference was obtained in the conjunctive control in (22)d (= 1.3). Furthermore, a strong contrast also obtained for a subset of 4 consultants that had a large (≥ 2-point) acceptability contrast between (22)a and (22)b, making it unlikely that a parenthetical-like reading of the appositive was responsible for the inference. In addition, smaller but related effects were found in (9) above: the narrow scope appositive in (9)a gave rise to stronger endorsement of the target inference than the conjunctive control in (9)c. Schlenker, 2013/2020, to appear a further takes these projection phenomena to display characteristic properties of presupposition projection (although he takes supplements to differ sharply from presuppositions in their epistemic conditions: supplements should make a non-trivial contribution, presuppositions should make a trivial contribution).

So is there a trace of similar projection effects (reminiscent of presuppositions) in our ASL data? Let us first see what they would be expected to yield. In the scope of *none*-type quantifiers, presuppositions are usually thought to project universally (Chemla 2009), although some have argued for existential projection instead (Beaver 2001). Schlenker, to appear b discusses directly relevant data from ASL (with judgments from the very same consultant as in the present piece): the presupposition trigger *CONTINUE* gives rise to strong existential projection and moderate universal projection, as shown in (23)-(24), where we have reproduced not just the target sentences but also the inferential questions asked and the scores obtained.

(23) (i) *Context:* our company has four helicopters and one airplane.
[7] WITHIN 1-HOUR OUR COMPANY 4 BIG HELICOPTER BOSTON$_a$ NEW-YORK$_b$ NONE IX-arc[20] CONTINUE GO-helicopter-large_.
'Within the next hour, none of our company's 4 big helicopters will continue to fly from Boston to New York.' (ASL, 34, 3552; 2 judgments; Schlenker, to appear b)

(ii) Does the sentence suggest that any of the following is the case? (1 = no inference; 7 = strongest inference) a. each b. at least one helicopter has been on its way from Boston to NYC
a. 5
b. 6.5

(24) (i) *Context:* our company has four helicopters and one airplane.
[7] WITHIN 5-MINUTES OUR COMPANY 4 HELICOPTER NONE IX-arc CONTINUE GO-helicopter-up_.
'Within the next five minutes, none of our company's 4 helicopters will continue to take off.' (ASL, 34, 3570; 2 judgments; Schlenker, to appear b)

(ii) Does the sentence suggest that any of the following is the case? (1 = no inference; 7 = strongest inference) a. each b. at least one helicopter is currently taking off
a. 4.5
b. 6

The next question is whether there are related projection effects (thus reminiscent of presuppositions) in (19)b. To test this, we added *post-hoc* another judgment task involving the questions

[20] *IX-arc* appears to be signed in a neutral position, so no locus is assigned to it.

in (25). No universal or even existential projection is observed in (19)b, suggesting that the contribution of Clause-2 is at-issue even when it has intermediate scope.[21]

(25) Do we get an inference that (i) every good student (ii) at least one good student says/thinks people like John? (1 = no inference; 7 = strongest inference) (2 judgments)

Projection	**Universal projection** Every good student says/thinks people like John	**Existential projection** At least one good student says/thinks people like John
a.	1	1
b.	1	1.5
c.	2	4

3.5 *Summary and limitations*

In sum, we have seen that Clause-2 in (13) can have a narrow scope, a wide scope or an intermediate scope interpretation. In our initial example in (14)b, the data are structurally similar to those that lead Potts 2005 to posit a pragmatic operation of perspectival shift for German (as in (17)) and other languages. But in our ASL data, intermediate scope behavior continues to arise upon embedding under *none*-type quantifiers as in (19)b, which suggests that genuine scopal interaction is obtained.

Our data have one key limitation, however: some theories, such as Davidson 2015, take Attitude Role Shift to be a species of quotation. Schlenker 2017a,b argued against a purely quotational theory, in part on the basis of *wh*-extraction data (which are complex to interpret), and in part due to the availability of Role Shift outside of attitude reports. But it is fair to say that a quotational analysis is a serious contender. If so, the 'intermediate scope' phenomena we discussed are in fact root phenomena within quoted (role-shifted) clauses. This is an important limitation, because on this view our findings do not support the controversial part of the proposal in (12): wide scope readings of parentheticals in root sentences were already known to be a grammatical possibility in several languages, and it need not be surprising that this behavior can be replicated in quoted sentences.

4 High and intermediate attachment of clauses under normal indirect discourse

To address this problem, we now extend our findings to ASL examples that are clearly in indirect discourse, and yet continue to allow Clause-2 to display an intermediate scope behavior. This will genuinely establish the controversial part of the proposal in (12) (i.e. (12)a).

4.1 The basic phenomenon without Role Shift

The basic phenomenon is illustrated in (26), which has no Role Shift, and an overt complementizer *THAT*; the use of the third person pronoun *IX-b* to refer to Ann further highlights the fact that this construction does not involve direct discourse.[22]

---

[21] The stronger endorsement of the inferences in (19)c seems to be due to the wide scope interpretation of Clause-2 combined with plausibility reasoning. As the consultant wrote in the first of the two additional judgments bearing on these questions, "it is likely that the students would know how the others feel, but not necessarily" ([JL 18.10.19]).

[22] Wilbur 2017 writes that "a sentence with an overt 'that' complementizer is usually branded as 'Englishy' by native signers, reflecting the influence of the dominant spoken language; the literature suggests similar situations across better-studied SLs". There is no trace of this effect in our consultant's judgments: not only are the sentences rated very highly, but the consultant did not make use of the option (which is systematically available in our elicitation forms) of writing 'E' for 'English influence'. An anonymous reviewer informs us that, for her consultant, the sentences become ungrammatical in the absence of Role Shift or *THAT*. We are neutral on this issue, which is immaterial for our purposes: all we need is a construction in which the clauses in (26)a-c are clearly embedded and involve indirect discourse. This is clearly the case here (among others because *Ann* is referred to with *IX-b* rather than with a first person pronoun), and this is enough for our purposes.

(26) *Context:* There is a research competition by pairs.
ANN$_b$ b-TELL-1 THAT
'Ann tells me that

^_____
a. [7] IF IX-b WORK WITH JOHN$_a$ PEOPLE LIKE IX-a PLUS GOOD INTERACTION
if she works with John, people like him, and there is a good interaction,

^_____ ~_____ ^_____
b. [7] IF IX-b WORK WITH JOHN$_a$ PEOPLE LIKE IX-a PLUS GOOD INTERACTION
if she works with John (she says that people like him) and there is a good interaction,

^_____ ~_____ ^_____
c. [6.7] IF IX-b WORK WITH JOHN$_a$ INFORM-2 PEOPLE LIKE IX-a] PLUS GOOD INTERACTION
if she works with John (I inform you that people like him) and there is a good interaction,

IX-b WILL WIN.
she will win.'
(ASL, 35, 0352, 3 judgments)

Inferential judgments:	John is in fact popular	Ann thinks that John is popular
a.	1.7	3
b.	2.3	**6**
c.	**6.3**	2

The narrow scope case in (26)a is as before. In earlier paradigms, the interruption of Role Shift was enough to signal that Clause-2 was endorsed by the signer, but this mechanism is inapplicable in standard indirect discourse. To bring out the wide scope reading, we include the word *INFORM-2* ('I inform you that') right before Clause-2 (as was already the case in (19)): this makes clear that Clause-2 is endorsed by the signer. What is of interest for our purposes is that in (26)b Clause-2 is exempted from Brow Raise and is interpreted outside the *IF*-clause, but still within the scope of the attitude operator: this is the intermediate scope behavior we were looking for.

In the absence of Role Shift, the control paradigm in (27) involves a second sentence that is uniformly interpreted from the signer's perspective. Unsurprisingly, adding Brow Raise on it fails to yield a conditional meaning: if Brow Raise on the second sentence yielded an *if*-clause, it would be one without a consequent.

(27) *Context:* There is a research competition by pairs.

^_____
ANN$_b$ b-TELL-1 THAT IF IX-b WORK WITH JOHN$_a$ PLUS GOOD INTERACTION, IX-b WILL WIN.[23]
'Ann tells me that if she works with John and there is a good interaction, she will win.

^_____
a. [7] PEOPLE LIKE IX-a.
People like him.'

~_____
b. [7] PEOPLE LIKE IX-a.
People like him.'

~_____
c. [7] INFORM-2 PEOPLE LIKE IX-a.
I inform you that people like him.'
(ASL 35, 0354, 3 judgments)

Inferential judgments:	John is in fact popular	Ann thinks that John is popular
a.	**6.3**	2.3
b.	**6.3**	2
c.	**7**	1

[23] We believe there is an easily perceptible pause after *WIN*.

4.2 Embedding under none*-type quantifiers*

The same facts can be replicated under *none*-type quantifiers, as in (28). Here too, the wide scope interpretation of Clause-2 in (28)c is forced by the addition of *INFORM-2* to make it clear that it is endorsed by the signer. Semantic questions were the same as in the quantified examples with Role Shift discussed in (19). Importantly, Clause-2 in (28)b is interpreted outside the scope of the *IF*-clause but within the scope of the attitude report and of *NO GOOD STUDENT*, making it implausible that a pragmatic operation of perspectival shift is responsible for this scopal interaction.

(28) *Context:* There is a research competition by pairs.

NO GOOD STUDENT a-TELL-1 THAT
'No good student tells me that

a. [6.3] IF IX-a WORK WITH JOHN$_b$ PEOPLE LIKE IX-b PLUS THE-TWO$_{a,b}$ GOOD INTERACTION
if he works with John, people like John, and the two of them have a good interaction,

b. [6.3] IF IX-a WORK WITH JOHN$_b$ PEOPLE LIKE IX-b PLUS THE-TWO$_{a,b}$ GOOD INTERACTION
if he works with John (adding that people like John), and the two of them have a good interaction,

c. [6.3] IF IX-a WORK WITH JOHN$_b$ INFORM-2 PEOPLE LIKE IX-b PLUS THE-TWO$_{a,b}$ GOOD INTERACTION
if he works with John (I inform you that people like John), and the two of them have a good interaction,

IX-a WILL WIN.
he (= the student) will win.'
(ASL, 35, 0342, 3+2 judgments[24])

Meaning contribution of *PEOPLE LIKE IX-a*:	**Wide scope** John is in fact popular	**Intermediate scope** No good students said that John is popular, and that if they were to work well with him, they would win.	**Narrow scope** No good students said that if John is popular and they were to work well with him, they would win
a.	1	2.7	**5.7**
b.	1.7	**6.3**	1
c.	**6.7**	2	1

As was the case for (19), we added a judgment task (identical to that in (25)) to determine whether an inference projected to the effect that (i) every good student, or (ii) at least one good student says/thinks people like John. No evidence of projection was found in the crucial, intermediate scope case in (28)b.

(29) Do we get an inference that (i) every good student (ii) at least one good student says/thinks people like John? (1 = no inference; 7 = strongest inference) (2 judgments)

Projection	**Universal projection** Every good student says/thinks people like John	**Existential projection** At least one good student says/thinks people like John
a.	1	1
b.	1	1.5
c.	2	3.5

4.3 Intermediate conclusion

The data discussed in this section show that all the interpretive facts obtained with Role Shift in Section 3 can be replicated with standard indirect discourse, which involves genuinely embedded clauses. In particular, Clause-2 continues to display an intermediate scope behavior when it is exempted from Brow Raise. This suggests that intermediate scope is a genuine possibility.

[24] The last two judgments solely pertained to the projection effects mentioned in (29).

5 Behavior under ellipsis

McCawley's original argument leads us to expect that Clause-2 could be ignored in the course of ellipsis resolution when it is attached above the ellipsis site. This might also be expected if Clause-2 is syntactically moved by covert movement. This prediction appears to be borne out, both in our paradigm involving Role Shift and in the variant involving standard indirect discourse.

Let us first state the prediction in greater detail:

(30) **Predictions about ellipsis**
In the following configuration (with or without Role Shift under *SAY*),

… [SAY IF Clause-1 **Clause-2** & Clause-3], …

if the constituent that includes both *SAY* and the embedded clause is elided, then:
Clause-2 can fail to be copied under ellipsis when it is attached above *SAY*;
Clause-2 must be copied under ellipsis when it is attached under *SAY* (including when it is attached above the *IF*-clause).

There is an important difficulty, however. In McCawley's paradigm in (2), there was little doubt that the word *which* had to be bound locally, since non-relative pronouns never have non-local readings. But our ASL paradigm involves full clauses, not appositive relative clauses. As a result, the pronoun *IX-a* in Clause-2 could have a strict or a bound variable reading. On the bound variable reading, copying Clause-2 (i.e. *PEOPLE LIKE IX-a*) with matrix scope would indeed be expected to have a semantic effect on the elided clause. But on the strict reading, copying Clause-2 would yield an effect that is redundant with the antecedent clause, and hence it would be undetectable by inferential means.

To test the crucial prediction, we need a construction that strongly favors a bound variable reading. We used the term *FIELD* to refer to the salient scientific field under discussion. It can be checked by way of inferential judgments that *FIELD* without an overt possessive pronoun: (31)a gives rise to a strongly bound reading, whereas a strict reading became somewhat more available with the possessive *POSS-a FIELD*, especially when the possessive is emphasized/focused (as in (31)c).[25]

(31) [LINGUISTICS PROFESSOR]$_a$ FINISH STUDY UNIVERSITY POPULAR WITHIN
'The linguistics professor studied at a university that's popular within
a. [6.8] FIELD. [ECONOMICS PROFESSOR]$_b$ SAME.
his field. The economics professor did too.' (= bound variable reading)
b. [7] POSS-a FIELD. [ECONOMICS PROFESSOR]$_b$ SAME.
his field. The economics professor did too.' (= bound variable reading)
^_____
c. [7] POSS-a_emphatic FIELD. [ECONOMICS PROFESSOR]$_b$ SAME.
his field. The economics professor did too.' (= slightly weaker bound variable reading)
(ASL 35, 0550; 4 judgments)

Inferential judgments:	The economics professor studied at a university that's popular **in linguistics**	The economics professor studied at a university that's popular **in economics**
a.	1	**7**
b.	1.5	**6.5**
c.	3	**5**

Since possessive-free *FIELD* strongly prefers a bound variable reading, we can test the crucial prediction in (30). It is borne out: Clause-2 can be disregarded under ellipsis when it is attached above *SAY*, but not when it is attached under *SAY*. Specifically, in the paradigm in (32), when Clause-2 has intermediate scope (in (32)b), it yields a strong inference that the linguistics professor thinks that linguistics is a reasonable field, and also that the economics professor thinks that economics is a reasonable field. This is expected on the assumption that (i) *FIELD* is understood with a bound reading, and (ii) Clause-2 is preserved under ellipsis. By contrast, when Clause-2 is attached above *SAY*, it yields the inference that linguistics is a reasonable field, and no inference that economics is a reasonable field.

[25] The inferential question was: Do you derive the inference that the economics professor studied at a university that's popular (i) in linguistics? (ii) in economics? (Indicate with which strength you derive the relevant inference: 1 = no inference; 7 = strongest inference)

These conclusions are drawn on the basis of the inferential judgments in (33) and of the inferential ratings reported in the tables after (32).

(32) *Context:* There is a science competition by pairs. The linguistics professor and the economics professor don't know each other.

^_____
TODAY [LINGUISTICS PROFESSOR]$_a$ WILL TELL-2
'Today the linguistics professor will tell you that

RS$_a$_____
^_____ ^_____ ^_____
a. [6.3] IF IX-2 WORK WITH IX-1, FIELD REASONABLE, PLUS GOOD INTERACTION, IX-2 WIN.
if you work with him, and the field [= linguistics] is reasonable, and there is a good interaction, you will win.

^_____
TOMORROW [ECONOMICS PROFESSOR]$_b$ WILL SAME.
Tomorrow, the economics professor will, too [= tell you that if you work with him, and the field [= economics] is reasonable, and there is a good interaction, you will win].'

RS$_a$_____
^_____ ~_____ ^_____
b. [6.3] IF IX-2 WORK WITH IX-1, FIELD REASONABLE, PLUS GOOD INTERACTION, IX-2 WIN.
if you work with him (he says the field [= linguistics] is reasonable) and there is a good interaction, you will win.

^_____
TOMORROW [ECONOMICS PROFESSOR]$_b$ WILL SAME.
Tomorrow the economics professor will, too [= tell you that if you work with him (he says the field [= economics] is reasonable) and there is a good interaction, you will win].'

RS$_a$_____ RS$_a$_____
^_____ ~_____ ^_____
c. [5.3] IF IX-2 WORK WITH IX-1, FIELD REASONABLE[26], PLUS GOOD INTERACTION, IX-2 WIN.
if you work with him (the field [= linguistics] is reasonable) and there is a good interaction, you will win.

^_____
TOMORROW [ECONOMICS PROFESSOR]$_b$ WILL SAME.
Tomorrow the economics professor will, too [= tell you that if you work with him and there is a good interaction, you will win].'
(ASL, 35, 0574; 3 judgments)

Inferential judgments 1 (Antecedent clause):	**Wide scope** Linguistics is a reasonable field	**Narrow scope - matched** The linguistics professor thinks/says that linguistics is a reasonable field	**Narrow scope - mismatched** The linguistics professor thinks/says that economics is a reasonable field
a.	1.3	2.7	1
b.	2.3	**6.3**	1
c.	**6**	3	1

Inferential judgments 2 (Elided clause):	**Wide scope** Economics is a reasonable field	**Narrow scope - matched** The economics professor thinks/says that economics is a reasonable field	**Narrow scope - mismatched** The economics professor thinks/says that linguistics is a reasonable field
a.	1	1.3	1
b.	1.7	**6**	1
c.	1.3	1.7	1

(33) Inferential questions for (32)-(34)
Meaning1: Do you derive the inference that (i) linguistics is a reasonable field? (ii) the linguistics professor thinks/says that linguistics is a reasonable field? (iii) the linguistics professor thinks/says that economics is a reasonable field? (Indicate with which strength you derive the relevant inference: 1 = no inference; 7 = strongest inference)
Meaning2: Do you derive the inference that (i) economics is a reasonable field? (ii) the economics professor thinks/says that economics is a reasonable field? (iii) the economics professor thinks/says that linguistics is a reasonable field? (Indicate with which strength you derive the relevant inference: 1 = no inference; 7 = strongest inference)

[26] As our consultant mentioned upon checking the transcriptions, *FIELD REASONABLE* is signed closer to locus *b* than to a neutral locus.

The same contrasts are obtained in (34), which involves an embedded clause in standard indirect discourse rather than under Role Shift.

(34) *Context:* There is a science competition by pairs; each field makes separate decisions. The linguistics professor and the economics professor don't know each other.

^_____
TODAY [LINGUISTICS PROFESSOR]$_a$ WILL TELL-2 THAT
'Today the linguistics professor will tell you that

^_____ ^_____ ^_____
a. [7] IF IX-2 WORK WITH IX-a, FIELD REASONABLE, PLUS GOOD INTERACTION, IX-2 WIN.
if you work with him, and the field [= linguistics] is reasonable, and there is a good interaction, you will win.

^_____ ~___
TOMORROW [ECONOMICS PROFESSOR]$_b$ WILL SAME.
Tomorrow, the economics professor will, too [= tell you that if you work with him, and the field [= economics] is reasonable, and there is a good interaction, you will win.'

^_____ ~_____ ^_____
b. [7] IF IX-2[27] WORK WITH IX-1, FIELD REASONABLE, PLUS GOOD INTERACTION, IX-2 WIN.
if you work with him (he says the field [= linguistics] is reasonable) and there is a good interaction, you will win.

^_____
TOMORROW [ECONOMICS PROFESSOR]$_b$ WILL SAME.
Tomorrow the economics professor will, too [= tell you that if you work with him (he says the field [= economics] is reasonable) and there is a good interaction, you will win.'

^_____ ~_____ ^_____
c. [6] IF IX-2 WORK WITH IX-1, INFORM-2 FIELD REASONABLE, PLUS GOOD INTERACTION, IX-2 WIN.
if you work with him (the field [= linguistics] is reasonable) and there is a good interaction, you will win.

^_____
TOMORROW [ECONOMICS PROFESSOR]$_b$ WILL SAME.
Tomorrow the economics professor will, too [= tell you that if you work with him and there is a good interaction, you will win].'
(ASL, **35, 0558**; 3 judgments)

Inferential judgments 1 (Antecedent clause):	**Wide scope** Linguistics is a reasonable field	**Narrow scope - matched** The linguistics professor thinks/says that linguistics is a reasonable field	**Narrow scope - mismatched** The linguistics professor thinks/says that economics is a reasonable field
a.	1.7	2.7	1
b.	2.7	**6.7**	1
c.	**7**	2.7	1

Inferential judgments 2 (Elided clause):	**Wide scope** Economics is a reasonable field	**Narrow scope - matched** The economics professor thinks/says that economics is a reasonable field	**Narrow scope - mismatched** The economics professor thinks/says that linguistics is a reasonable field
a.	1.3	1.7	1
b.	1.7	**6**	1
c.	1.7	1	1

We conclude that, *modulo* some limitations due to the conceivable (but unlikely) possibility of a strict reading of *FIELD*, the prediction in (30) appears to be borne out.

6 Theoretical possibilities

What do our ASL data show about interpretive possibilities of clauses whose scope is made explicit by way of non-manuals?

6.1 Non-local attachment: in situ vs. with movement

The existence of intermediate scope readings of Clause-2 shows that an analysis based on Potts's bidimensional semantics combined with a pragmatic operation of perspectival shift is insufficient to

[27] There was a performance error, with a superfluous *IX-a* preceding *IX-2*. This was clearly disregarded in the judgments, since the sentence got a maximal score.

account for the data. The reason is straightforward: Potts's analysis ensured that semantic contributions in the non-at-issue dimension fail to interact scopally with any operators. But precisely this kind of scopal interaction was found in all of our data, including in cases in which discourse operations could not explain the data away, as argued in connection with embedding under *NONE*.

This leaves two initial possibilities. One is a liberal version of McCawley's analysis with intermediate scope attachment as in (12). An alternative is that Clause-2 is moved by covert movement. As we argue in the Appendix, an analysis based on covert movement comes at a price: one might have to posit that this movement operation is not sensitive to the Coordinate Structure Constraint, and in addition it might not necessarily predict the right truth conditions. A liberal version of McCawley's analysis is thus a prime contender.

6.2 Local attachment with non-local indexing?

One additional theoretical direction should be mentioned, although on closer inspection it might not be very appealing. It is based on indexing by way of world variables, rather than on movement.

The main idea comes from the analysis of nominal readings in intensional contexts, which argues for the presence of world variables in English and other languages (e.g. Heim 1991, Percus 2000); this contrasts with the intensional treatments we have been assuming so far. Once available, these world variables make it in principle possible to index a Verb Phrase relative to a non-local world variable, as illustrated in (35): *SAY* is evaluated with respect to a world variable *w** and introduces ('binds') a world variable *w*; *IF* introduces a world variable *w'* (and is evaluated with respect to a world variable *w*); and *LIKE* could in principle take one of three world variables as argument: *w'* (local binding, by *IF*), *w* (intermediate binding, by *SAY*), or another world variable, e.g. *w**, which denotes the actual world – which would yield a version of matrix binding.[28]

(35) X SAY $^{w^*}_{w}$ IF$^{w}_{w'}$ Clause-1 **[PEOPLE LIKE$_{w/w^*}$ IX-a]** & Clause-3, …

Schematically, this approach makes it possible to emulate the readings represented by way of movement in (49)c (wide scope) and (58)c (intermediate scope), but with *in situ* indexing, as shown in (36); importantly, Clause-2 is indexed with a variable *w** denoting the actual world in (36)a, while it is indexed with a world variable *w* bound by the attitude operator *SAY* in (36)b.

(36) a. 'Wide scope': Ann SAY$^{w^*}_{w}$ [[IF$^{w}_{w'}$ Clause-1$_{w'}$ **Clause-2$_{w^*}$** & Clause-3$_{w'}$], …]
b. 'Intermediate scope': Ann SAY$^{w^*}_{w}$ [[IF$^{w}_{w'}$ Clause-1$_{w'}$ **Clause-2$_{w}$** & Clause-3$_{w'}$], …]

This analysis is faced with an interpretive problem that also arises for a movement-based analysis (as is discussed in the Appendix): obtaining the right truth conditions is not at all trivial. To see the problem in a slightly simpler setting, let us consider the structure in (37)a, where *Clause-2* is interpreted relative to the world of evaluation w. The problem is that with a standard analysis of the truth conditions of the conditional, as in (37)b, the conditional will be trivially true because it contains a conjunct (namely *Clause-2$_w$*, with index w) which is false throughout the worlds w' that are quantified over.[29]

(37) a. IF$^{w}_{w'}$ Clause-1$_{w'}$ **Clause-2$_{w}$** & Clause-3$_{w'}$, Consequent $_{w'}$
b. Paraphrase of the truth conditions of (a):
In every world w' accessible from w, if w' makes true *Clause-1$_{w'}$* ***Clause-2$_{w}$*** *& Clause-3$_{w'}$*
w' makes true *Consequent $_{w'}$*.
This condition is trivially satisfied if Clause-2 is false at w.

---

[28] For *X SAY$^{w^*}_{w}$ F*, the intended truth conditions are: *all worlds w compatible with what X believes in w* satisfy F*. Similarly, for *IF$^{w}_{w'}$ F, G*, the intended truth conditions are: *every accessible world w' from w which satisfies F satisfies G,* or alternatively: *the closest worlds w' from w which satisfy F also satisfy G* (see for instance Stalnaker 1968 and Schlenker 2004 for the latter, non-monotonic semantics).

[29] As seen in our paraphrase of the truth conditions, this result does not hinge on a 'material implication' analysis of the *IF*-clause: we assume instead that its meaning is that of a strict conditional, which quantifies over all accessible worlds w' from a world of evaluation w. The source of the problem is that when Clause-2 is false in w, no world w' at all can make true the conjunction *Clause-1$_{w'}$* ***Clause-2$_{w}$*** *& Clause-3$_{w'}$*.

As we discuss in the Appendix in relation to a movement-based analysis, one might investigate solutions in which the conditional yields a semantic failure rather than truth when its antecedent is trivially false.

But there is a further difficulty. A key insight of Percus 2000 was that Verb Phrases differ from Noun Phrases in requiring *local* binders for their world variables. For instance, on the non-contradictory reading of the embedded clause in (38)a, we interpret *poor person* as indexed with respect to the actual world (thanks to a distinguished variable *w**), whereas the embedded Verb Phrase is dependent on the world variable *w'* introduced by the *if*-clause; this is illustrated in (38)b. The sentence cannot mean that I would be happy if at least one person who is in fact rich were poor instead – and this restriction appears in other languages than English (e.g. French); but precisely this reading should be available if the embedded Verb Phrase could be bound non-locally, as illustrated in (38)c.

(38) a. I would be happy if at least one poor person were rich instead.
b. Possible reading: I would be happy if $^{w*}_{w'}$ at least one [poor person]$_{w*}$ were$_{w'}$ rich
c. Impossible reading: I would be happy if $^{w*}_{w'}$ at least one [poor person]$_{w'}$ were$_{w*}$ rich

Crucially, it is precisely this non-local reading of the world variable of *LIKE* that would be needed to get intermediate or wide scope readings in (35); we know of no evidence that ASL verbs differ from English verbs with respect to such indexing possibilities, nor do we know of other languages in which verbs display such a behavior.

6.3 Neither non-local attachment nor non-local indexing?

Intermediate scope readings of appositives are typically difficult to obtain in French or in English. The ease with which intermediate scope readings are obtained in our data might give us pause. One possibility, in line with our discussion, is that this is due to the unambiguous marking afforded by non-manuals, combined with the fact that unlike appositives the target clauses seem to be at-issue (as they fail to yield projection phenomena, at least ones we could detect). A radical alternative is that we are in fact dealing with very different structures from the ones we discussed throughout. To be concrete, consider again (26)b, repeated as (39).

(39) *Context:* There is a research competition by pairs.
[7] ANN$_b$ b-TELL-1 THAT
'Ann tells me that

^_____ ~_____ ^_____
IF IX-b WORK WITH JOHN$_a$ PEOPLE LIKE IX-a PLUS GOOD INTERACTION
if she works with John (she says that people like him) and there is a good interaction,

IX-b WILL WIN.
she will win.'
(ASL, 35, 0352b, 3 judgments)

We could try a completely different analysis of the purported *if*-clauses, one that does not require Clause-2 to be extracted at all. To play the devil's advocate, we provide a candidate analysis in (40)a, where we take Brow Raise to just indicate that certain clauses are possible – hence the appearance in our Logical Form of possibility operators.

(40) a. Ann says$^{w*}_{w}$ [possible $^{w}_{w'}$ Clause-1$_{w'}$]$_i$ (and) Clause-2$_w$ (and) [possible $^{w}_{w''}$ Clause-3$_{w''}$]$_k$, (and) Clause-4$_{i+k}$
b. Purported truth conditions of a.:
Every world w compatible with what Ann says in w* is such that some worlds w' accessible from w satisfy Clause-1, and Clause-2 satisfies w, and some worlds w" accessible from w satisfy Clause-3, and Clause-4 satisfies the accessible worlds from w that satisfy Clause-1 and Clause-3.

On this analysis, then, *IF* and Brow Raise just indicate the possibility of Clause-1 and Clause-3, hence the presence of the existence modals *possible* $^{w}_{w'}$ and *possible* $^{w}_{w''}$ in the Logical Form. These modals introduce discourse referents *i* and *k* for *accessible worlds in which Clause-1 holds*, and *accessible worlds in which Clause 3 holds*. The consequent then says that Clause-4 holds in (the sum of) those worlds (i.e. *i+k*), as paraphrased in (40)b. To analyze this reading explicitly, we would need the world index of Clause-4 to be an E-type pronoun that refers to *those accessible worlds that satisfy*

Clause-1 and Clause-3, or we would need a semantics with dynamic existential modals, possibly along the lines of Brasoveanu 2010[30]. This arguably gives the right truth conditions, and no extraction or non-local indexing is needed. But at this point, this analysis is entirely stipulative.[31]

7 Conclusion

While more work will be needed (especially with further consultants), we note that throughout this article the behavior of Clause-2 dovetails with a generalization of the liberalized McCawley account in (12), according to which some clauses can be attached non-locally, and without movement, to propositional nodes that dominate them. While we have considered alternative accounts, with movement (as in the Appendix), or with non-local indexing, or with a completely non-standard analysis of *IF*-clauses, each comes at a significant price, and thus the McCawley-inspired account can be taken as the most serious contender in view of the present data.

Still, our results raise two further questions, which we leave for future research. First, why do ASL full clauses have (for our consultant at least) such possibilities, whereas in English only appositive relative clauses and not parentheticals have been claimed to display this behavior? Second, why do the projection effects illustrated with appositives in (22) fail to materialize in our ASL data, as discussed in Sections 3.4 and 4.2?

[30] One important requirement is that the consequent Clause-4 must be predicted to hold in *all* the accessible worlds from *w* that satisfy Clause-1 and Clause-3.

[31] In addition, we do not know of evidence that Brow Raise marks possibility. For instance, its uses to mark focus (e.g. Schlenker et al. 2016) do not fall under that description.

Appendix.
Problems with a movement-based account

We explore in greater detail the possibility that wide and intermediate scope readings of the ASL clauses studied in this piece arise through covert movement. This analysis faces two challenges: it might require movement out of some syntactic islands; and it might not yield the right meanings.

❑ *Syntactic islands*

A movement account of wide and intermediate scope readings is initially implausible because the movement would need to cross a classic island, namely an *IF*-clause. But as we now show, the situation is more complicated than it seems, because our consultant tends to accept *wh*-extraction out of the relevant *IF*-clauses. On the other hand, extraction out of coordinate structures is sharply degraded. Thus if we take the extraction in (13)b and possibly (13)c (repeated as (41)b,c) to be out of a coordinate structure island *in addition* to an *IF*-clause, a movement analysis will prove implausible.

(41) b. RS_i_____

^_____ ~_____ ^_____

… SAY IF Clause-1 **Clause-2** & Clause-3, …

c . RS_i_____ RS_i_____

^_____ ~_____ ^_____

… SAY IF Clause-1 **Clause-2** & Clause-3, …

In (42)b and (43)b, *wh*-extraction out of an *IF*-clause is only minimally degraded relative to the controls, including ones with a resumptive pronoun, as in (42)d-(43)d. The constructions we picked are *not* agreement verbs (also called 'indicating verbs' or 'directional verbs'), which are independently known to obviate some binding-theoretic effects (Lillo-Martin 1991). But it is worth noting that Koulidobrova 2017 has further examples of apparently licit extraction out of an island in the absence of agreement or resumption.

(42) *Context:* There is a research competition by pairs.

a. [7] IX-1 WONDER WHO IX-1 SHOULD WORK WITH.
'I wonder who I should work with.'

^_____

b. [5.7] IX-1 WONDER WHO IF IX-1 WORK WITH, IX-1 WILL WIN.
'I wonder who is such that, if I work with this person, I will win.'

c. [6] IX-1 WONDER WHO IX-a IX-1 SHOULD WORK WITH IX-a.
'I wonder who I should work with.'

^_____

d. [6.7] IX-1 WONDER WHO IX-a IF IX-1 WORK WITH IX-a, IX-1 WILL WIN.
'I wonder who is such that, if I work with this person, I will win.'
(ASL, 35, 0426, 3 judgments)

(43) *Context:* There is a research competition by pairs. The signer considered several potential partners.
a. [7] IX-1 WONDER WHO IX-1 SHOULD KEEP.
'I wonder who I should keep.'

^_____

b. [6] IX-1 WONDER WHO IF IX-1 KEEP, IX-1 WILL WIN.
'I wonder who is such that, if I keep this person, I will win.'

c. [6] IX-1 WONDER WHO IX-a IX-1 SHOULD KEEP IX-a.
'I wonder who I should keep.'

^_____

d. [7] IX-1 WONDER WHO IX-a IF IX-1 KEEP IX-a, IX-1 WILL WIN.
'I wonder who is such that, if I keep this person, I will win.'
(ASL 35, 0592, 3 judgments)

By contrast, extraction out of a coordinate structure with an overt *AND* is degraded for our consultant, as seen in (44)a,b and (45)a,b. These contrast with the acceptable versions involving resumptive pronouns in (44)c,d-(45)c,d.[32]

(44) *Context:* There is a research competition by triples[33].
a. [4] IX-1 WONDER WHO IX-1 SHOULD WORK WITH JOHN AND.
^_____
b. [2] IX-1 WONDER WHO IF IX-1 WORK WITH JOHN AND, IX-1 WILL WIN.

c. [6] IX-1 WONDER WHO IX-a IX-1 SHOULD WORK WITH JOHN AND IX-a.
'I wonder who is such that I should work with John and this person.'
^_____
d. [6.7] IX-1 WONDER WHO IX-a IF IX-1 WORK WITH JOHN AND IX-a, IX-1 WILL WIN.
'I wonder who is such that if I work with John and this person, I will win.'
(ASL 35, 0430, 3 judgments)

(45) *Context:* There is a research competition by triples. The signer considered several potential partners, including John and Bill.
a. [4.3] IX-1 WONDER WHO IX-1 SHOULD KEEP JOHN AND.
^_____
b. [2.3] IX-1 WONDER WHO IF IX-1 KEEP JOHN AND, IX-1 WILL WIN.

c. [6.3] IX-1 WONDER WHO IX-a IX-1 SHOULD KEEP JOHN AND IX-a.
'I wonder who is such that I should keep John and this person.'
^_____
d. [7] IX-1 WONDER WHO IX-a IF IX-1 KEEP JOHN AND IX-a, IX-1 WILL WIN.
'I wonder who is such that if I keep John and this person, I will win.'
(ASL 35, 0596, 3 judgments)

The same results are obtained with asyndetic coordinate structures as in (46)b,c and (47)b,c (we do not know why (46)b is slightly more acceptable than (47)b).

(46) *Context:* There is a research competition by triples.

a. [7] IX-1 SHOULD WORK WITH JOHN BILL.
'I should work with John and Bill.'

b. [4.3] IX-1 WONDER WHO IX-1 SHOULD WORK WITH JOHN.
^_____
c. [2.3] IX-1 WONDER WHO IF X-1 WORK WITH JOHN, IX-1 WILL WIN.

d. [5.7] IX-1 WONDER WHO IX-a IX-1 SHOULD WORK WITH JOHN IX-a.
'I wonder who is such that I should work with John and this person.'
^_____
e. [6.7] IX-1 WONDER WHO IX-a IF IX-1 WORK WITH JOHN IX-a, IX-1 WILL WIN.
'I wonder who is such that if I work with John and this person, I will win.'
(ASL 35, 0438, 3 judgments)

(47) *Context:* There is a research competition by triples. The signer considered several potential partners, including John and Bill.

a. [7] IX-1 SHOULD KEEP JOHN BILL.
'I should keep John and Bill.'

b. [3] IX-1 WONDER WHO IX-1 SHOULD KEEP JOHN.
^_____
c. [2.3] IX-1 WONDER WHO IF IX-1 KEEP JOHN, IX-1 WILL WIN.

d. [6] IX-1 WONDER WHO IX-a IX-1 SHOULD KEEP JOHN IX-a.
'I wonder who is such that I should keep John and this person.'
^_____
e. [7] IX-1 WONDER WHO IX-a IF IX-1 KEEP JOHN IX-a, IX-1 WILL WIN.
'I wonder who is such that if I keep John and this person, I will win.'
(ASL 35, 0598, 3 judgments)

---

[32] An anonymous reviewer suggests that the degraded nature of the extraction out of coordinate structures might be due to processing rather than to syntax. If so, the question becomes: if our ASL clauses are also extracted out of coordinate structures, shouldn't the same processing difficulty extend to them as well? This seems hard to decide in the absence of a more precise theory of the processing difficulty evoked here.

[33] The expression 'groups of three' would have been more appropriate, but for accuracy we leave the context as it appeared in elicitation sessions.

In sum, no clear island effects are obtained with *wh*-extraction out of *IF*-clauses alone, but clear violations are obtained for *wh*-extraction out of coordinate structures, with or without an overt *AND*. Thus if we take the extraction in (41)b,c, to be out of a coordinate structure island, we would expect it to be degraded, contrary to the judgments our consultant obtained. This is unexpected for an analysis based on covert movement, unless covert movement can somehow escape the coordinate structure island constraint.

❑ *Meaning*

A movement analysis faces another challenge: it is not clear that it yields the right meaning. Consider for instance the wide scope reading obtained in (26)c, repeated as (48):

(48) *Context:* There is a research competition by pairs.
ANN$_b$ b-TELL-1 THAT
'Ann tells me that
^_____ ~_____ ^_____
6.7 IF IX-b WORK WITH JOHN$_a$ INFORM-2 PEOPLE LIKE IX-a] PLUS GOOD INTERACTION
if she works with John (I inform you that people like him) and there is a good interaction,

IX-b WILL WIN.
she will win.'
(ASL, 35, 0352c, 3 judgments)

This sentence is schematically represented in (49)a. Let us take Clause-2 to be (as is natural) of propositional type, i.e. <s, t>, where s is the type of worlds and t is the type of truth values. On the standard assumption that movement leaves behind a trace bound by a λ-abstractor (Heim and Kratzer 1998), the resulting structure could be interpreted as in (49)b, where the trace is of intensional type, i.e. <s, t>, or conceivably as in (49)c, where the trace just denotes a truth value, and is thus of type t (we assume that parataxis is interpreted as conjunction).

(49) Wide scope reading of Clause-2
a. Ann says [[if Clause-1 **Clause-2** & Clause-3], Consequent]
b. **Clause-2** $\lambda p_{<s,t>}$ [Ann says [[if Clause-1 p & Clause-3], Consequent]]
b'. Schematic paraphrase of b. with *say* treated as a universal modal
The proposition p expressed by Clause-2 is such that, for each world compatible with what Ann says in the actual world, w satisfies: if Clause-2 and t and Clause 3, Consequent.
c. **Clause-2** λp_t [Ann says [[if Clause-1 p & Clause-3], Consequent]]
c'. Schematic paraphrase of c. with *say* treated as a universal modal
The truth value t of Clause-2 in the actual world is such that, for each world w compatible with what Ann says in the actual world, w satisfies: if Clause-2 and t and Clause 3, Consequent.
d. **Clause-2** [Ann says [[if Clause-1 & Clause-3, Consequent]

Let us consider each possibility in turn, starting with (49)b. The problem is that in this case the movement won't affect interpretation at all. To make the technical point concrete, let's consider a simpler case, with the semantics of conditionals in (50) within a modal semantics with a world parameter w (and an assignment function s).

(50) $[[\text{if F, Q}]]^{w,s} = 1$ iff for every world w' accessible from w, if $[[F]]^{w',s} = 1$, $[[Q]]^{w',s} = 1$.

In this simple example, the possibility we are considering is that *F* is moved out if the *if*-clause and abstracted over as an object of type <s, t>, as in (51):

(51) F $\lambda p_{<s,t>}$ [if p, Q]

We need a rule to interpret this structure, and the following version of Intensional Function Application (e.g. Heim and Kratzer 1998) will do:

(52) Intensional Function Application (special case)
If $[[F]]^s$ is of type <s, t> and $[[G]]^{w,s}$ is of type <<s, t>, t>, $[[F\ G]]^{w,s} = [[G]]^{w,s}([[F]]^s)$.

The problem is that the fact that *F* appears outside the *if*-clause does not change the truth conditions, because in (52) the value of *F* is not sensitive to the value of the world parameter (as is standard, we write *s[p→π]* for the assignment function which is identical to s except that it assigns π to the variable *p*):

(53) $[[F\ \lambda p_{<s,t>}\ [\text{if } p, Q]]]^{w,s} = [[\lambda p_{<s,t>}\ [\text{if } p, Q]]]^{w,s}([[F]]^{s})$ (by appyling (52))
$= [\lambda \pi_{<s,t>}\ [[\text{if } p, Q]]^{w,s[p\rightarrow\pi]}]([[F]]^{s})$
$= [[\text{if } p, Q]]^{w,s[p\rightarrow\pi]}$ with $\pi = [[F]]^{s}$
$= [[\text{if F}, Q]]^{w,s}$

The same problem arises in (49)b as in (51), with the difference that the sentence is far more complicated, as it involves extraction out of a conjunction which is itself embedded within an *if*-clause under *say*. But the difficulty is the same: it is unclear how the movement of Clause-2 can affect the truth conditions.

The second possibility is to take the abstraction to be over an expression of type t rather than <s, t>, as in (49)c. This means that we must use a version of Extensional Function Application (e.g. Heim and Kratzer 1998), as in (54).

(54) Extensional Function Application (special case)
If $[[F]]^{w,s}$ is of type t and $[[G]]^{w,s}$ is of type <t, t>, $[[F\ G]]^{w,s} = [[G]]^{w,s}([[F]]^{w,s})$.

To see the effect of the rule in a much simpler case, we consider the extraction in (55), where the propositional variable *p* now has type t rather than <s, t> (as in (51).

(55) $F\ \lambda p_{t}\ [\text{if } p, Q]$

Contrary to the case in (53), moving *F* will now have an effect:

(56) $[[F\ \lambda p_{t}\ [\text{if } p, Q]]]^{w,s} = [[\lambda p_{t}\ [\text{if } p, Q]]]^{w,s}([[F]]^{w,s})$ (by (54))
$= [\lambda \pi_{t}\ [[\text{if } p, Q]]^{w,s[p\rightarrow\pi]}]([[F]]^{w,s})$
$= [[\text{if } p, Q]]^{w,s[p\rightarrow\pi]}$ with $\pi = [[F]]^{w,s}$

Now the truth value of *F* at w will be rigidly assigned to the variable *p*. Assuming for the sake of argument that we can proceed with the computation[34], we will assign a specific value to $\pi = [[F]]^{w,s}$. For concreteness, we take it to have the value false, i.e. 0. The computation then proceeds as in (57):

(57) With $\pi = [[F]]^{w,s} = 0$, $[[\text{if } p, Q]]^{w,s[p\rightarrow\pi]} = 1$
iff for every world w' accessible from w, if $[[p]]^{w',s[p\rightarrow\pi]} = 1$, $[[Q]]^{w',s} = 1$,
iff for every world w' accessible from w, if $s[p\rightarrow\pi](p) = 1$, $[[Q]]^{w',s} = 1$,
iff for every world w' accessible from w, if $\pi = 1$, $[[Q]]^{w',s} = 1$,
iff for every world w' accessible from w, if $0 = 1$, $[[Q]]^{w',s} = 1$.

The last line is trivially satisfied, and this is a bad result: the fact that *F* is false in the world of evaluation makes the conditional with the moved antecedent trivially true. This problem arises in a more complex setting in (49)a analyzed as in (49)c. On the intended reading, (49)a ought to entail Clause-2, hence (49)a couldn't be true while Clause-2 is false. But with the analysis we just sketched, this is not the case; the falsity of Clause-2 in the actual world will wrongly lead to the prediction that Ann said something trivially true (informally, the predicted meaning for (49)c is akin to: *Ann says that if Clause-1 and falsity and Clause-3, Consequent*).

To get out of this problem, one would need to posit, with various analyses (e.g. Schlenker 2004, among others), that a conditional whose antecedent is trivially false yields a presupposition failure. The presupposition failure of the conditional could then be expected to percolate to the matrix sentence (Heim 1992). Thus from the assumption that the asserted sentence is true, one would get the inference

[34] This need not be unproblematic because *p* is type t whereas the conditional might require that it should be of type <s, t>.

that Clause-2 is true in its world of evaluation – on a wide scope reading, the actual world. The full repercussions of this analysis would need to be investigated, however.

A third alternative is to posit that Clause-2 moves out *without* leaving behind an interpreted trace, as schematized in (49)d (with the continued assumption that parataxis is interpreted as conjunction). This might conceivably explain why this movement does not display the hallmarks of the coordinate structure constraint, since no trace is left within the syntactic island. But it remains mysterious how this operation fits with standard views on the syntax/semantics interface for movement structures.

Finally, we note that the same problems and solutions are relevant for the intermediate scope reading of Clause-2, as illustrated in (58). On the intended reading, what Ann says entails Clause-2. But on bivalent analyses of conditionals, (58)a may be true on the analysis in (58)c even though in each world compatible with what Ann says, Clause-2 is false, as this makes the embedded conditional trivially true. The presuppositional solution discussed above could presumably be applied to this case as well.[35]

(58) Intermediate scope reading of Clause-2
a. Ann says [[if Clause-1 **Clause-2** & Clause-3], Consequent]
b. Ann says [**Clause-2** $\lambda p_{<s,t>}$ [[if Clause-1 p & Clause-3], Consequent]]
c. Ann says [**Clause-2** λp_{t} [[if Clause-1 p & Clause-3], Consequent]]
d. [Ann says [**Clause-2** [[if Clause-1 & Clause-3, Consequent]]

In sum, a covert movement analysis of intermediate (and wide) scope readings has two problems to address: the movement might have to be out of a coordinate island; and it might or might not yield the right inferences depending on the details of one's analysis.

[35] Standardly, presupposition under attitude verbs such as *say* and *believe* works by requiring that every world compatible with what the agent says/believes satisfies the presuppositions of the embedded clause (Heim 1992). On the presuppositional analysis on which the conditional yields a failure if its antecedent contains a contradiction, the requirement for (58)c will imply that every world compatible with what Ann says makes Clause-2 true.

Supplementary Materials

Raw ASL data can be downloaded at the following URL:

https://drive.google.com/file/d/1K9Cgy8iqANRjv9sLivWcWj2ZDbJv8MaS/view?usp=sharing

Numerical scores and averages for the ASL data can be found in this Excel document:[36]

https://drive.google.com/file/d/1VW2FUmmssjLUTG06vJShM4nkVX6wp1B7/view?usp=sharing

[36] Thanks to Lucie Ravaux for checking all averages and putting this document together.

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