

Locative Shift*

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(ASL transcriptions and translations have yet to be re-checked)

Abstract. In American and French Sign Language (ASL and LSF), one may sometimes re-use a locus introduced to refer to a spatial location to denote an individual found at that location ('Locative Shift'). We investigate this phenomenon in ASL and establish some basic properties: the phenomenon extends to temporal and modal shift; indexical loci are not usually locative-shifted; Locative Shift may have interpretive consequences, which suggests that the co-opted spatial/temporal/modal locus can refer to an individual-in-a-situation, and this contribution sometimes appears to be at-issue; and Locative Shift can occur in highly iconic cases, possibly even without prior establishment of a situation-denoting locus. We further investigate the behavior of the co-opted loci under ellipsis. In some cases, their locative specifications are disregarded in the elided clause, yielding different readings from unelided controls; this happens when locative specifications can be taken to be inherited by agreement, but possibly also in a rather unconstrained fashion. In other cases locative specifications appear *not* be disregarded under ellipsis, possibly even with elided indexical pronouns, despite the fact that these resist overt Locative Shift. We show that our basic findings can be replicated in LSF, although our data leave many questions open. Finally, we argue that some pointing gestures in English can undergo something like Locative Shift.

Keywords: sign language semantics, anaphora, loci, locative shift, agreement, ellipsis

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1 Introduction

1.1 Goals

Sign languages often realize pronominal reference by establishing loci (= positions in signing space) which stand for discourse references, and by pointing towards them to express anaphora (e.g. Lillo-Martin and Klima 1990, Schlenker 2011b). Loci may denote individuals, but also spatial locations; in ASL at least, they may also denote temporal and modal situations (Schlenker 2013a). But a curious phenomenon arises when a locus is available for a spatial location, and one has talked about an individual that is found at that location: in some cases, *one may then point towards the spatial locus to refer to the individual*.

Let us illustrate. (1)a displays the expected pattern, without Locative Shift: in the first sentence, *JOHN* is associated with a pointing sign *IX-b* which establishes a locus *b*. Working in a French city is associated with locus *a*, working in an American city is associated with locus *c*; in the second sentence, the object pronoun refers to John and is realized by pointing (by way of *IX-b*) to the locus *b* associated with John (the rating is of 5.5 on a 7-point scale, thus slightly degraded). The surprising fact is that an analogous reading can be obtained – in a more felicitous fashion – in (1)b by pointing towards the locus *a* to refer to John-in-the-French-city, to the locus *c* to refer to John-in-the-American-city (see Section 1.2.2 for transcription conventions).¹

(1) a. **Plain verb ‘help’, no Locative Shift**

^{5,5} JOHN IX-b_a[WORK FRENCH CITY] SAME_c[WORK AMERICA CITY].

$\overset{\wedge}{IX-a}$ IX-1a HELP IX-b, $\overset{\wedge}{IX-c}$ IX-1c NOT HELP IX-b

b. **Plain verb ‘help’, Locative Shift**

⁷ JOHN_a[WORK IX-a FRENCH CITY] SAME_c[WORK IX-c AMERICA CITY].

$\overset{\wedge}{IX-a}$ IX-1a HELP IX-a+, $\overset{\wedge}{IX-c}$ IX-1c NOT HELP IX-c+ (ASL, Schlenker 2013a, 2 cardinal judgments (see (5) for the full paradigm)

This article offers a detailed study of Locative Shift in one consultant's ASL (American Sign Language), a partial replication of some findings in one consultant's LSF (French Sign Language), and a tentative extension in an understudied (and uncommon) type of gestures in spoken language, called 'pro-speech gestures' (= gestures that replace than accompany words).

1.2 Elicitation methods and transcription conventions²

1.2.1 Elicitation methods

The ASL consultant and the LSF consultant are both Deaf, native signers of Deaf, signing parents. Data were elicited using the 'playback method', with repeated quantitative acceptability judgments (1-7, with 7 = best) and repeated inferential judgments (on separate days) on videos involving minimal pairs (see e.g. Schlenker et al. 2013, Schlenker 2014 for a description of the method). In a nutshell, the playback method involves two steps. First, the sign language consultant signs sentences of interest on a video, as part of a paradigm (e.g. often with 2 to 6 sentences) signed as minimal pairs. Second, the consultant watches the video, provides quantitative acceptability ratings, and (when relevant)

¹ Following a suggestion by Jon Lamberton (p.c., reported in Schlenker 2013a), we write *a+* and *c+* to indicate that pointing is towards a position slightly higher than loci *a* and *c*, which might serve to distinguish between the person who is at the location – namely John – and the location itself. Still, cases of clear ambiguity are described in the literature, as we describe below in connection with (4). A phonetic study would be needed to establish whether there are (possibly optional) distinctions between pronouns that do and pronouns that don't involve Locative Shift.

² This section borrows from Schlenker, to appear a.

inferential judgments, enters them in a computer, and redundantly signs them on a video. The second step can be repeated on other days, sometimes with a considerable time delay. This method has the advantage of allowing for the precise assessment of minimal pairs (signed on the same video), in a quantitative, replicable way. Even when the judgments are obtained from just one consultant, 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 by assessing the same videos with other signers.

For readability, only average judgments are given, as well as a summary of the relevant aspects of the inferential judgments (complete quantitative judgments are given when there is more than a 2-point difference in the judgments obtained for a given sentence). Raw data obtained during elicitation sessions are provided in the Supplementary Materials, and specialists are invited to consult them when relevant (inferential judgments need not be straightforward to summarize, in which case the raw data may be particularly informative). Notations such as ASL, 34, 1550 *a,e*, 5 *judgments* indicate that the relevant sentences appeared in the ASL video numbered 34, 1550, that only sentences *a* and *e* (i.e. the first and the fifth) from that paradigm are transcribed, and that averages are computed on the basis of 5 judgments (if no letters followed 34, 1550, this would indicate that the entire paradigm was transcribed). When different inferential judgments were obtained on the same sentence, this is sometimes written with ratios, e.g. '3/5 judgments' referring to '3 judgments out of 5'.

1.2.2 Transcription and translation conventions

In the following, sign language sentences are glossed in capital letters, as is standard. Expressions of the form *WORD*_{-*i*} and *WORD*_{*i*} and [*..EXPRESSION..*]_{*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 pointing; a subscripted locus, as in *WORD*_{*i*} or [*..EXPRESSION..*]_{*i*}, indicates that the relevant expression is signed in position *i*. Locus names are assigned from right to left from the signer's perspective: when loci *a*, *b*, *c* are mentioned, *a* appears on the signer's right, *c* on the left, and *b* somewhere in between (special conventions will be introduced for high and low loci when relevant). *IX* (for 'index') is a pointing sign towards a locus, while *POSS* is a possessive; they are glossed as *IX*-*i* and *POSS*-*i* if they point towards (or 'index') 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 sometimes *IX*-*i* can also serve to *establish* rather than to *retrieve* a locus *i*. 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 an expression indexes a default locus, it is usually written without a letter index (e.g. *IX* rather than *IX-a*). *IX-arc-i* refers to a plural pronoun indexing locus *i*, as it involves an arc motion towards *i* rather than a simple pointing sign. In most cases we omit non-manual expressions and manual modulations. When non-manual modulations are encoded (especially when citing earlier literature), they appear on a line above the signs they modify, and ^ encodes raised eyebrows.

Finally, note that ASL pronouns are gender-neutral. We usually tried to pick translations that reflected our consultant's choices in written judgments entered in a computer, but nothing hinges on these decisions.

1.3 Structure

The rest of this article is organized as follows. We provide relevant background on Locative Shift and iconic loci in Section 2. We study the main properties of ASL Locative Shift in Section 3, and discuss its interaction with ellipsis in Section 4. We then replicate a few key properties with LSF in Section 5. In Section 6, we suggest that some pointing gestures in English can undergo something like Locative Shift. Conclusions and questions for future research are stated in Section 7.

2 Locative Shift: background

2.1 Basic cases of Locative Shift

Locative Shift has been studied before. In (2), from Padden 1988, locus *c* is introduced in the first sentence to refer to a spatial location, one to which the agent has walked; but in the second sentence, this same locus is used to refer to the agent herself. (Here and throughout, we keep the original transcription conventions when citing earlier literature. Most are transparent, but pointing signs, which we gloss as *IX*, appear as *INDEX* in Padden 1988 and as *PRO* in Emmorey 2002.)

- (2) ^aINDEX ^bPERSON-WALK-TO_c, STOP, THINK-ABOUT. ^cINDEX DECIDE WAIT.
 ‘She_c walked over there, stopped and thought a bit, then she_c decided to wait there.’ (Padden 1988)

Van Hoek 1992 studies the phenomenon within the framework of cognitive semantics, arguing that Locative Shift shows that pronouns "carry a great deal of additional information pertaining to the conceptual location of referents in the discourse space". One of her examples is cited by Emmorey 2002, who adapts the transcription to her own conventions, with *PRO* standing for a pointing sign (i.e. *INDEX* or *IX* in other transcriptions):

- (3) NIGHT, WE-TWO^aTALK THERE^aHIS^aROOM. ^aPRO^aBAWL-OUT^{1st}. I^{1st}TELL^aI SORRY. ^aPRO^aFORGIVE ME. MORNING, I GO^bOUT^bY-A-RD^b ^{1st}SEE^b^aPRO^b AGAIN. ^bBAWL-OUT^{1st} AGAIN. STRANGE. BEFORE, ^aPRO^aTELL^{1st} ^aPRO^aFORGIVE ME. MORNING ^bPRO^bANGRY AGAIN.

‘In the evening, we talked, in his room. He bawled me out. I told him I was sorry, and he forgave me. In the morning, I went out to the yard and saw him again. He bawled me out again. It was strange. Before, **he** told me **he** forgave me, but in the morning **he** was angry again. (van Hoek 1992, cited in Emmorey 2002)

Emmorey 2002 mentions a particularly interesting example in which the same index can have a location-denoting or an individual-denoting interpreting depending on the rest of the sentence it appears in, as shown in (4).

- (4) 1960, DAD^a VISIT^a AUSTRALIA^a. DRIVE-AROUND^a. FINISH, ^aFLY^b INDIA. REFUSE DRIVE-AROUND^b. WHY?
 A) ^aPRO^aLOST_[continually]. SICK-OF-IT.
 B) ^aPRO^aHAVE STRICT LAWS. THINK MAYBE SAME INDIA.

‘In 1960, my dad visited Australia. He drove all around, and then he flew to India. He refused to drive there because

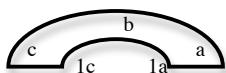
- A) he (in Australia) was continually getting lost. He was sick of it.
 B) it (Australia) had strict (traffic) laws, and he thought it would be the same in India.’

Still, some individual-denoting pronouns could in principle be null, and thus it is not always easy to ascertain that, say, the pronoun in (4)a is individual-denoting: it could in principle be location-denoting ('there'), with a null subject pronoun referring to the relevant individual. But this problem does not arise in the paradigm in (5), from Schlenker 2013a (from which (1) was extracted). 4 judgments were obtained, two of them ordinal (= ranking of sentences by acceptability, with 1st = best), and two of them cardinal (= acceptability on a 7-point scale, with 7 = best). Averages only pertain to the cardinal judgments. Note that we write *a+* and *c+* to indicate that pointing is towards a position slightly higher than loci *a* and *c*, which might serve to distinguish between the location (without +) and the person who is at that location (with +; see also fn. 1). We make no claims about the details of the phonetic realization, and note that the ambiguity found in (4) suggests that this potential fine-grained difference is at best optional (should it be real, it would be easy to accommodate in the account we develop below, since our semantics treats locative-shifted loci differently from location-denoting loci).

(5) **Locative Shift: full paradigm**

Note: *1a* and *1c* are positions close to the signer, but to his right and to his left respectively.

Approximate areas associated with the loci
(from the signer's perspective)

a1. **Plain verb 'help', no Locative Shift**

^{5.5} JOHN IX-b_a[WORK FRENCH CITY] SAME_c[WORK AMERICA CITY].

$\frac{\wedge}{\text{IX-a}}$ IX-1a HELP IX-b, $\frac{\wedge}{\text{IX-c}}$ IX-1c NOT HELP IX-b

Ordinal judgments (1st = best): 5th 5th Cardinal judgments (7 = best): 5 6

a2. **Plain verb 'help', Locative Shift**

⁷ JOHN_a[WORK IX-a FRENCH CITY] SAME_c[WORK IX-c AMERICA CITY].

$\frac{\wedge}{\text{IX-a}}$ IX-1a HELP IX-a+, $\frac{\wedge}{\text{IX-c}}$ IX-1c NOT HELP IX-c+

Ordinal judgments (1st = best) : 2nd, 2nd Cardinal judgments (7 = best): 7, 7

b1. **Agreement verb 'help', no Locative Shift – no full pronoun**

⁴ JOHN IX-b_a[WORK FRENCH CITY] SAME_c[WORK IX-c AMERICA CITY].

< $\frac{\wedge}{\text{IX-a}}$ > IX-1a 1a-HELP-b, $\frac{\wedge}{\text{IX-c}}$ IX-1c NOT 1c-HELP-b

Ordinal judgments (1st = best) : 6th, 6th Cardinal judgments (7 = best): 4, 4

b2. **Agreement verb 'help', no Locative Shift – full pronoun**

⁵ JOHN_a[WORK IX-a FRENCH CITY] SAME_c[WORK IX-c AMERICA CITY].

$\frac{\wedge}{\text{IX-a}}$ IX-1a 1a-HELP-b IX-b, $\frac{\wedge}{\text{IX-c}}$ IX-1c NOT 1c-HELP-b IX-b

Ordinal judgments (1st = best) : 3rd/4th³, 4th Cardinal judgments (7 = best): 5, 5

b3. **Agreement verb 'help', Locative Shift – no full pronoun**

^{6.5} JOHN IX-b WORK_a[IX-a FRENCH CITY] SAME_c[WORK IX-c AMERICA CITY].

$\frac{\wedge}{\text{IX-a}}$ IX-1a 1a-HELP-a, $\frac{\wedge}{\text{IX-c}}$ IX-1c NOT 1c-HELP-c

Ordinal judgments (1st = best) : 3rd/4th, 3rd Cardinal judgments (7 = best): 7, 6

b4. **Agreement verb 'help', Locative Shift – full pronoun**

^{6.5} JOHN IX-b_a[WORK FRENCH CITY] SAME_c[WORK AMERICA CITY].

$\frac{\wedge}{\text{IX-a}}$ IX-1a 1a-HELP-a IX-a, < $\frac{\wedge}{\text{IX-c}}$ > IX-1c NOT 1c-HELP-c IX-c

Ordinal judgments (1st = best) : 1st, 1st Cardinal judgments (7 = best): 6, 7

'John does business in a French city and he does business in an American city
There [= in the French city] I help him. There [= in the American city] I don't help him.'

(ASL, 4, 66; Schlenker 2013a; 2 cardinal and 2 ordinal judgments in a total of 4 separate sessions)

The advantage of this rather complete paradigm is that it involves two versions of the verb *HELP*: a plain form, whose object is expressed as a separate pronoun, and an agreeing form, which targets the locus corresponding to its object; in this case, a separate object pronoun may but need not be separately expressed. The agreeing form is of interest because there is no doubt that the locus it targets corresponds to its object, i.e. the helpee – whereas in the case of the plain verb one might ask whether the post-verbal pronoun could be a locative argument (with a null pronoun, or even an

³ 3rd/4th indicates a tie for 3rd / 4th position.

intransitive use of *HELP* akin to 'I do some helping'). Since there is no sense in which the signer claims to be helping cities, the examples in (3)a2, b3, b4 present very clear cases in which a locus that initially denoted a spatial location does double duty in denoting an individual as well. While we will not be concerned with the ordinal judgments (used by Schlenker 2013a to argue for a similarity between locative, temporal and modal versions of Locative Shift), we can note that in this case there was a weak preference for applying Locative Shift. But when both options yield the same meaning in the data discussed below, we will see that both often seem acceptable (and in our limited LSF data Locative Shift is often dispreferred, although many of the LSF judgments we report are unstable).

2.2 Other cases of locus displacement: high loci⁴

Locative Shift should be investigated within the broader context of iconic uses of loci, as discussed for instance by Liddell 2003, Kegl 2004, Schlenker et al. 2013, Schlenker 2014. As Liddell 2003 emphasized, multiple examples suggest that loci need not be points in space, but may sometimes be entire areas that serve as simplified pictorial representations of their denotations. Schlenker et al. 2013 emphasize that this 'iconic life' is perfectly compatible with a simultaneous 'logical life' of the same loci, functioning as variables. Here we retrace basic facts about high and low loci, used in particular to refer to tall and short individuals. Their connection with our topic is the following: with Locative Shift, we will see that one can co-opt part of a location-denoting iconic representation (e.g. the top of a tower) to refer to an individual located in the relevant place. But this suggests that high and low loci might be a special case of the same phenomenon: when loci are structured areas, one typically points towards a subpart that corresponds roughly to the head, and as a result one may point high or low in signing space simply because the person's head is understood to be high or low in real space. Thus one should probably start from a null hypothesis on which high and low loci are a special case of Locative Shift.

2.2.1 Basic facts about high and low loci

Loci are usually established on a single horizontal plane, but peculiar inferences are obtained when they are established high or low instead. An ASL example without quantifiers, from Schlenker et al. 2013, is given in (6). In brief, high loci are used to refer to a tall, important or powerful individuals, whereas low loci are used to refer to short individuals (similar data were described for LSF in Schlenker et al. 2013). Loci of normal height are often unmarked and thus do not trigger any relevant inference.

- (6) YESTERDAY IX-1 SEE R [= body-anchored proper name]. IX-1 NOT UNDERSTAND IX-a^{high / normal / low} (ASL)
- a. ⁷ High locus. Inference: R is tall, or powerful/important
 - b. ⁷ Normal locus. Inference: nothing special
 - c. ⁷ Low locus. Inference: R is short
- 'Yesterday I saw R [= body-anchored proper name]. I didn't understand him.' (ASL, 11, 24; Schenker et al. 2013)

As can be seen, the relevant inferences are preserved under negation, which provides initial motivation for treating them as presuppositional in nature, a proposal that has been made about the semantic specifications of pronouns, such as gender, in spoken language (Cooper 1983).

Importantly, high and low loci can appear under binding, with results that are expected from the standpoint of a presuppositional analysis. From this perspective, (7)a is acceptable because the bound variable her_i ranges over female individuals; and (7)b is acceptable to the extent that one assumes that the relevant set of directors only comprises females.

- (7) a. [None of these women]_i thinks that I like her_i .
 b. [None of these directors]_i thinks that I like her_i .

⁴ This section borrows from Schlenker et al. 2013 and Schlenker 2014.

Related conditions on bound high and low loci arguably apply in (8)-(9) (here too, similar examples were described for LSF, but we note that systematic 'projection tests' have yet to be applied to these cases):

- (8) NO TALL MAN THINK IX-1 LIKE IX-a
 a. ⁷High locus
 b. ⁶Normal locus
 c. ³Low locus
 'No tall man thinks that I like him.' (ASL, 11, 27; Schlenker et al. 2013)
- (9) NO SHORT-PERSON THINK IX-1 LIKE IX-a
 a. ²High locus
 b. ⁶Normal locus
 c. ⁷Low locus
 'No short person thinks that I like him.' (ASL, 11, 28 ; Schlenker et al. 2013)

In Schlenker et al. (2013), height specifications were taken to have the same kind of presuppositional semantics as gender features (Cooper 1983), but with an iconic component, as seen in (10), which only covers the 'tall' versus 'short' implications of high or low loci (the crucial presupposition is in bold).

- (10) Presuppositions introduced by high and low loci
 Let c be a context of speech, s an assignment function and w a world (with $c_w =$ the world of c).

If i is a locus, n is a locus with neutral height, h is a measure of the heights of loci in signing space, h_c is a measure (given by the context c) of heights of objects in c_w , and $\alpha_c > 0$ is a parameter given by the context c , then

$$\begin{aligned} \llbracket IX-i \rrbracket^{c,s,w} = \# \text{ iff } s(i) = \# \text{ or } [(h_c(i) \neq h_c(n) \text{ and } \mathbf{h_c(s(i)) - h_c(s(n))} \neq \alpha_c(\mathbf{h(i) - h(n)})]. \text{ If } \llbracket IX-i \rrbracket^{c,s,w} \neq \#, \\ \llbracket IX-i \rrbracket^{c,s,w} = s(i). \end{aligned}$$

In words: this rule considers a pronoun $IX-i$ indexing a locus i , and compares its height to that of a neutral locus n . It requires (by way of a presupposition) that the height difference between the denotations $s(i)$ and $s(n)$ should be proportional to the height difference between the loci i and n , with a multiplicative parameter $\alpha_c > 0$; in particular, this condition imposes that orderings be preserved. Here it is the *same* notion of height which is applied to loci and to their denotations: while loci have the semantics of variables, their interpretation is affected by their *real world properties qua geometric objects in signing space*.⁵

2.2.2 Iconicity and behavior under ellipsis

With the goal of assessing more precisely the iconic and grammatical nature of high loci, Schlenker 2014 investigates ASL and LSF paradigms such as (11). In this ASL example, CL_a is a finger (person-denoting) classifier on the right, representing a tall astronaut; CL_b is a finger (person-denoting) person classifier on the left representing a short astronaut.

- (11) HAVE TWO ROCKET PERSON [ONE HEIGHT]_a [ONE SHORT]_b. THE-TWO-a,b PRACTICE DIFFERENT VARIOUS-POSITIONS [positions shown].

IX-a HEIGHT IX-b SHORT, **CL_a-[position]-CL_b-[position]**.

'There were two astronauts, one_a tall, one_b short. They trained in various positions [positions shown]. They were in [___] position.

a. IX-a_upper_part LIKE SELF-a_upper_part IX-b_lower_part NOT.

The tall one liked himself. The short one didn't.

b. *IX-a_upper_part LIKE SELF-a_upper_part. IX-b_lower_part NOT LIKE SELF-b_upper_part.

⁵ Importantly, the height of denotations is assessed relative to the world c_w of the context: the presupposition is in that sense indexical. This point is discussed in detail in Schlenker et al. 2013.

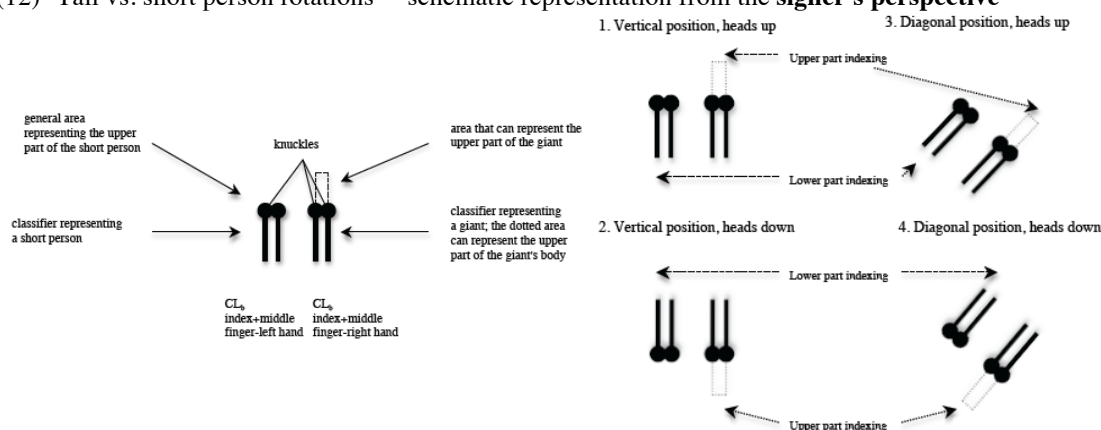
[intended:] The tall one liked himself. The short one didn't like himself.
(ASL, 17, 178)

This paradigm had several goals.

(i) First, it showed that in 'standing' position, 'tall person' indexing could be higher than 'short person' indexing – as is expected given (10). This is the reason this paradigm makes reference to a tall and to a short individual.

(ii) Second, the indexed position could rotate in accordance with the position of the denoted person on the assumption that there was a geometric projection between the structured locus and the denoted situation. Thus the individuals mentioned in (11) are rotated as shown in (12), which depicts the approximate target of upper part vs. lower part indexing in the various situations mentioned in different versions of the paradigm, with the finger classifiers rotated to represent the different positions of their denotations.

(12) Tall vs. short person rotations – schematic representation from the **signer's perspective**



Let us pause to consider the boxed part of (11)a. Each of the two finger classifiers represented an individual, one taller than the other, with the knuckles representing the upper part of the body; in the case of the tall individual, the locus extended above the knuckles, with the result that the reflexive *SELF-a_upper_part* targeted a position *above* the knuckles in the 'vertical position, heads up' case; this is represented in the left-hand figure in (12). But as different cases of rotation were considered, the finger classifiers rotated accordingly, and the 'upper part' of the locus indexed by *SELF-a_upper_part* did as well, as represented in the right-hand figure in (12).⁶

(iii) Third, the paradigm in (11) was also intended to assess whether height specifications resemble gender features in being sometimes disregarded under ellipsis. An example is given in (13)a, where the elided VP has a bound reading, unlike its overt counterpart in (13)b. On the (standard) assumption that VP ellipsis is effected by copying part the antecedent VP, this suggests that the feminine features of that antecedent can be ignored by ellipsis resolution, as represented with a barred pronoun in (13)b.

(13) In my study group,

a. Mary did her homework, and John did too.

=> available bound variable reading in the second clause

b. Mary $\lambda i t_i$ did her_i homework, and John $\lambda i t_i$ did [~~do her_i homework~~] too

c. Mary did her homework, and John did her homework too.

=> no bound variable reading in the second clause

The unboxed part of (11)a was designed to test whether ASL ellipsis makes it possible to disregard height specifications as well. Here the antecedent VP includes a reflexive which indexes the upper part of a locus, which is adequate to refer to a giant but not to a short person. Despite this apparent

⁶ See Liddell 2003 and Schlenker et al. 2013 for further arguments, based on agreement verbs, to the effect that loci are structured representations of their denotations.

mismatch, the elided sentence is acceptable – unlike the overt counterpart in (11)b, which includes a reflexive *SELF* referring to a short person but with high specifications. Thus in ASL height specifications can be ignored by the mechanism that computes ellipsis resolution, just as is the case for phi-features in English.

The interpretation of these results requires caution, however. The main question is whether the ability of an element to be disregarded under ellipsis is *only* true of featural elements, or targets a broader class. Schlenker 2014 didn't give a final answer, and Schlenker 2014, to appear d shows that co-speech gestures in spoken language, which certainly don't count as 'features', can almost certainly be disregarded in this way as well. We will revisit this issue when we discuss the interaction of Locative Shift with ellipsis in Section 4.

2.2.3 *Gradience*

The foregoing results leave open an important question: Do high loci display a (quasi-) gradient behavior? If so, one would expect that when two loci are interpreted iconically, a third one can be 'sandwiched' between them, with the expected interpretation.⁷

This question is addressed by example (14), from Schlenker 2015a. The pronouns index 4 different heights that reflect the height of the heads of their denotations, which is a step towards 'quasi-gradience'. (14)c shows that these height specifications are disregarded in the course of ellipsis resolution, for otherwise the elided occurrences of *SELF* taking *IX-b* and *IX-d* as antecedents would have the 'wrong' feature specifications – which in turn should yield deviance, as in the control sentence in (14)b, which contrast with (14)a.

(14) SHOW HAVE 4 GYMNAST STAND-CL BAR ORDER HEIGHT.

a. *SELF* signed at various, appropriate heights

^{6.5} IX-a PRESENT SELF-a WELL, IX-b MAYBE NOT PRESENT SELF-b WELL, IX-c NOT CLEAR, IX-d DEFINITELY NOT PRESENT SELF-d WELL.

b. *SELF* signed at a constant, low height

^{3.2} IX-a PRESENT SELF-a WELL, IX-b MAYBE NOT PRESENT SELF-b⁰ WELL, IX-c NOT CLEAR, IX-d DEFINITELY NOT PRESENT SELF-d⁰ WELL.

c. *SELF* signed low, only once (with ellipsis of the the second and fourth VPs)

⁷ IX-a PRESENT SELF-a WELL, IX-b MAYBE NOT, IX-c NOT CLEAR, IX-d DEFINITELY NOT.

=> bound variable reading

'During a show, four gymnasts were standing on a bar, ranked by height. One [a short one] presented himself well; the second [taller] one possibly didn't present himself well; for the third [still taller] one, it was unclear; and the fourth [still taller] one definitely didn't present himself well.'

Schematic representation of the loci from the signer's perspective



The fact that such examples involve a genuine pictorial representation was further established in 0. The first sentence of 0 is analogous to (14)a. The third sentence establishes that the gymnasts operated a vertical rotation, hence *additional* heights, but now below the position of the bar.

⁷ We write 'quasi-gradient' rather than 'gradient' behavior because fully gradient behavior would be impossible to test, as it would require infinitely many examples; in addition, obvious limitations of perception would force the system to break down when distinctions become too fine-grained.

SHOW HAVE 4 GYMNAST STAND-CL BAR ORDER HEIGHT.

IX-a PRESENT SELF-a BAD, IX-b MAYBE NOT, IX-c NOT CLEAR, IX-d DEFINITELY NOT.

SUDDENLY STAND-CL HANG-CL. WEIRD - NOW

a. *SELF* signed at various, appropriate heights

^{6.3} IX-a' PRESENT SELF-a' WELL, IX-b' MAYBE NOT PRESENT SELF-b' WELL, IX-c' NOT CLEAR, IX-d' DEFINITELY NOT PRESENT SELF-d' WELL.

b. *SELF* signed at a constant, intermediate height

^{3.7} IX-a' PRESENT SELF-a' WELL, IX-b' MAYBE NOT PRESENT SELF-b⁰ WELL, IX-c' NOT CLEAR, IX-d' DEFINITELY NOT PRESENT SELF-d⁰ WELL.

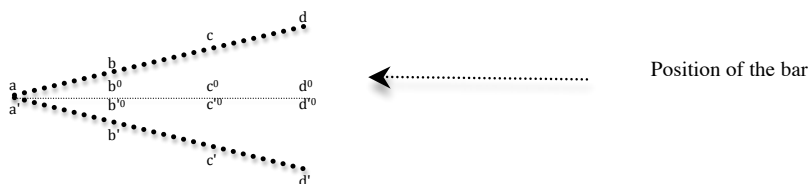
c. *SELF* signed low, only once (with ellipsis of the the second and fourth VPs)

^{6.3} IX-a' PRESENT SELF-a' WELL, IX-b' MAYBE NOT, IX-c' NOT CLEAR, IX-d' DEFINITELY NOT.

=> bound variable reading

'During a show, four gymnasts were standing on a bar, ranked by height. One [a short one] presented himself badly; the second [taller one] didn't present himself badly; for the third [still taller] one, it was unclear; and the fourth [still taller] one definitely didn't present himself badly. Suddenly, they effected a vertical rotation. Oddly, now the short one presented himself well; the second one possibly didn't present himself well; for the third one, it was unclear; and the fourth one definitely didn't present himself well.'

(15)



Unlike the examples in (11), the paradigms in (14) and 0 do not include classifiers, which means that the iconicity of these examples cannot be reduced to the iconicity of classifiers (a fact which is independently known in the literature, and is discussed from this perspective in Schlenker, to appear c).

2.2.4 High/low loci vs. Locative Shift

In Locative Shift, a situation-denoting locus is co-opted to refer to an individual. By contrast, most the examples involving high and low loci above involved a single locus, assigned to an individual (although this came with locative implications). But the example in 0 suggests that the two phenomena should be connected: although the horizontal position of loci remains fixed, their vertical position changes during the discourse depending on what was asserted right before. While one could posit different rules for the vertical and for the horizontal displacement of loci, we will discuss numerous examples involving *diagonal* displacement, suggesting (together with the rotation-based example in (11)-(12)) that broader iconic principles are needed. We will show that some of the same properties observed with high loci – iconicity and behavior under ellipsis – can be replicated with respect to Locative Shift, which will pave the way for a unified theory.

3 Locative Shift in ASL: detailed properties

3.1 Temporal and Modal Shift

Schlenker 2013a argues that Locative Shift has a temporal and a modal analogue. Thus in (16), the loci *a* and *b* are respectively associated with times at which John was a college student and a college professor. In the second sentence, however, the pronouns in bold index the same loci but refer to John rather than to time periods.

(16) **Temporal Shift**

Context: John is retired.

JOHN IX-b_a[FORMER COLLEGE STUDENT]]_c[FORMER COLLEGE PROFESSOR PERSON].

re__ re__
IX-a IX-1a HELP **IX-a+**, IX-c IX-1c NOT HELP **IX-c+**

‘At some point John was a college student and at some point he was a university professor.

Then [=when he was a student] I helped him. Then [= when he was a professor] I didn’t help him.’

(ASL, 4, 68b; Schlenker 2013a)

Turning to the modal case, in (17) the loci *a* and *c* are initially associated with possible situations in which John is a college student and a college professor respectively, but are used in the second sentence to refer to John himself.

(17) **Modal Shift**

Context: I don’t know who John is.

JOHN IX-b_a[POSSIBLE COLLEGE STUDENT]]_c[POSSIBLE COLLEGE PROFESSOR PERSON].

re__ re__
IX-a IX-1a HELP **IX-a+**, IX-c IX-1c NOT HELP **IX-c+**

‘It’s possible that John is a college student and it’s possible that he is a university professor.

Then [= if he is a student] I will help him. Then [= if he is a professor] I won’t help him.’

(ASL, 4, 72b; Schlenker 2013a)

Schlenker 2013a shows that temporal and modal counterparts can be constructed for the full paradigm in (5), and that for his consultant patterns of preference among the various constructions are closely matched across domains, which suggests that a same phenomenon is at work.

3.2 No Locative Shift with indexical pronouns

Schlenker 2011a notes that Locative Shift fails to apply to indexical pronouns, while results with deictic third person pronouns were not entirely clear. This can be seen in the contrasts obtained with the agreement form of *HELP* in (18) (where we average over more judgments than were reported in Schlenker 2011a, with the same results).

(18) –JOHN IX-b WORK_a[IX-a FRENCH CITY] SAME WORK_c[IX-c AMERICA CITY].

‘John does business in a French city and he does business in an American city.

a. No Locative Shift

^{4,2} IX-a IX-1 1-HELP-b. IX-c IX-1 NOT 1-HELP-b.

b. Locative Shift

⁶ JOHN IX-b WORK_a[IX-a FRENCH CITY] SAME WORK_c[IX-c AMERICA CITY].

IX-a IX-1 1-HELP-a. IX-c IX-1 NOT 1-HELP-c.

There [= in the French city] I help him. There [= in the American city] I don’t help him.’

–IX-2 WORK_a[IX-a FRENCH CITY] SAME IX-2 WORK_c[IX-c AMERICA CITY].

‘You do business in a French city and you do business in an American city.

a’. No Locative Shift

^{6,3} IX-a IX-1 1-HELP-2. IX-c IX-1 NOT 1-HELP-2.

There [= in the French city] I help you. There [= in the American city] I don’t help you.’

b’. Locative Shift

^{2,3} IX-a IX-1 1-HELP-a. IX-c IX-1 NOT 1-HELP-c.

(ASL, 8, 1; 3 judgments)

(19) IX-1 WORK_a[IX-a FRENCH CITY] SAME IX-1 WORK_c[IX-c AMERICA CITY].

‘I do business in a French city and I do business in an American city.

a. No Locative Shift

⁷ IX-a IX-2 2-HELP-1. IX-c IX-2 NOT 2-HELP-1.

There [= in the French city] you help me. There [= in the American city] you don't help me.'

b. Locative Shift

^{2,5} IX-a IX-2 2-HELP-a. IX-c IX-2 NOT 2-HELP-c.

(ASL, 8, 3, b1-b2; 4 judgments)⁸

For Schlenker 2011a, Schlenker et al. 2013, this followed from a rule according to which when someone is present in the context of speech, the associated locus normally corresponds to this person's actual location. Schlenker et al. 2013 formalize this constraint with the presuppositional rule in (20):

- (20) If *IX-i* is a pronoun indexing locus *i*, and if *s(i)* is present in the discourse situation around *c*,
 $[[IX-i]]^{c,s,w} = \#$ iff $s(i) = \#$ or ***s(i)* is present in the extra-linguistic situation and 1, *i* and *s(i)* are not roughly aligned.** If $[[IX-i]]^{c,s,w} \neq \#$, $[[IX-i]]^{c,s,w} = s(i)$.

This rule immediately predicted that Locative Shift cannot change the locus assigned to individuals present in the extra-linguistic situations. We will see several cases below in which this seems to be clearly true for second person pronouns.

As alluded to in Schlenker 2011a, this analysis predicts that deictic pronouns referring to a third person who is present in the extra-linguistic situation should also fail to undergo Locative Shift, but judgments are somewhat less consistent. (21) displays a flip in preference between the non-deictic case with *JOHN* (= Locative Shift preferred) and the deictic case (= Locative Shift dispreferred, but the effect is still less than striking:⁹

⁸ Third person controls (with *JOHN* replacing *IX-1*) displayed the opposite pattern of preference: 5.9 with Locative Shift, 3.7 without (we do not know why the version without Locative Shift was so degraded).

⁹ The earlier case in (i) below was afflicted by a production error in (ib), noted by our consultant (locative *IX-a?b?* was not signed with pointing towards the right, but somewhat towards the center). Still, the target sentences displayed the expected pattern in the averages, but with considerable variability across the three judgment tasks.

(i) _____ WORK IX-a FRENCH CITY SAME WORK IX-c AMERICAN CITY.

Non-deictic pronoun

a. ^{4,7} _____ = JOHN IX-b

..... = IX-a 1-HELP-b, IX-c NOT 1-HELP-b. (Judgments: 3, 5, 6)

b. ⁵ _____ = JOHN IX-b

..... = IX-a?b? 1-HELP-a, IX-c NOT 1-HELP-c. (Judgments: 5, 5, 5)

Deictic pronoun [IX-b is realized with a strong pointing towards a position in the extra-linguistic situation]

c. ⁷ _____ = IX-b_{deictic}

..... = IX-a 1-HELP-b, IX-c NOT 1-HELP-b. (Judgments: 7, 7, 7)

d. ^{3,7} _____ = IX-b_{deictic}

..... = IX-a 1-HELP-a, IX-c NOT 1-HELP-c. (Judgments: 3, 2, 6)

'John/He [deictic] works in a French city and he works in an American city. There [= in the French city], I help him. There [= in the American city], I don't help him.' (ASL, 8, 9; 3 judgments)

Let us add that in a modification of (21) in which the deictic pronoun *IX-b_{deictic}* was replaced with *THAT-b GUY* (ASL 34, 2674), the locative-shifted version in d. received a slightly lower rating than the control sentences (6 vs. 7), and that our consultant explicitly noted: "This is a slightly lower judgment because it would be preferable to match *HELP* to that guy's location if he's actually present, or to add meaning that the guy was in that location at the time signer helped him."

(21) ____ WORK IN IX-a IN FRENCH CITY SAME WORK IX-c AMERICAN CITY.

Non-deictic pronoun

- a. ⁵ ____ = JOHN IX-b
 = IX-a 1-HELP-b, IX-c NOT 1-HELP-b. (Judgments: 3, 4, 6, 7)
 b. ^{6,7} ____ = JOHN IX-b
 = IX-a 1-HELP-a, IX-c NOT 1-HELP-c. (Judgments: 6, 7, 7, 7)

Deictic pronoun [IX-b is realized with a strong pointing towards a position in the extra-linguistic situation]

- c. ⁷ ____ = IX-b_{deictic}
 = IX-a 1-HELP-b, IX-c NOT 1-HELP-b. (Judgments 7, 7, 7, 7)
 d. ⁵ ____ = IX-b_{deictic}
 = IX-a 1-HELP-a, IX-c NOT 1-HELP-c. (Judgments: 3, 5, 6, 6)

'John/He [deictic] works in a French city and he works in an American city. There [= in the French city], I help him. There [= in the American city], I don't help him.' (ASL, [10, 133](#); 3 judgments)

3.3 Interpretive effects

In the examples discussed thus far, application of Locative Shift did not affect interpretation in any obvious way because the location of the relevant individuals is made clear by the preceding discourse. But there are cases in which Locative Shift does affect interpretation, as is illustrated in (22). Here different readings are obtained depending on whether the possessive pronoun indexes the locus *b* introduced by *JOHN* or the locus *c* introduced by *AMERICAN CITY*: in the first case, no specification is obtained about the apartment's location, and a plural reading could be obtained referring to both apartments (a bit degraded due to lack of pluralization); in the latter case, the apartment in question is the one John owns in an American city.

(22) Locative Shift with possessives, and an interpretive effect

IX-b JOHN OWN APARTMENT [FRENCH CITY]_a SAME OWN APARTMENT [AMERICAN CITY]_c.

'John owns an apartment in a French city, and he also owns an apartment in an American city.'

- a. ^{6,7} POSS-b APARTMENT NICE
 => no inference about the apartment's location
 'John's apartment is nice.'
- b. ⁶ POSS-c APARTMENT NICE¹⁰
 => John's American apartment is nice
 'His American apartment is nice.'
 (ASL, 34, 2680a,b¹¹ (see also 27, 62); 3 judgments)

One might think that in (22)b we obtain a reading akin to 'the apartment in the American city', with a kind of all-purpose genitive (= 'the American city's apartment') not involving genuine possession. This is not plausible, as in (23) a locative-shifted version of the second person possessive pronoun is highly degraded. This is expected if Locative Shift is genuinely involved, but not if the reading obtained in (22)b is due to an all-purpose genitive, which should be just as available in the second as in the third person case.

¹⁰ As seen in the Supplementary Materials, the consultant commented once [JL 17.05.17] (i) that from *IX-b* 'it looks like John could be present in the context', and that (ii) the judgment in b. 'assumes John is not present'. This is unsurprising if Locative Shift is degraded with deictic elements, as argued in Section 3.2. A version of the paradigm without *IX-b* (ASL 27, 62) does not raise these issues but is harder to analyze: *JOHN* could be taken to be signed in neutral position and to 'acquire' the locus *c* in sentence b., which would not be a strong case of Locative Shift.

¹¹ Examples c. and d. in ASL 34, 2680 were like a. and b. respectively, but with *THERE-c* added. Similar remarks apply to ASL 34, 2682 in (23).

- (23) IX-2 OWN APARTMENT [FRENCH CITY]_a SAME OWN APARTMENT [AMERICAN CITY]_c.
'John owns an apartment in a French city, and he also owns an apartment in an American city.'

a. ^{6,7} POSS-2 APARTMENT NICE
=> no inference about the apartment's location
'Your apartment is nice'

b. ² POSS-c APARTMENT NICE
(ASL, 34, 2682; 4 judgments)

3.4 Iconic cases¹²

In the cases considered so far, Locative Shift involved antecedents that played a standard grammatical role (as a first approximation, loci just corresponded to discourse referents). But as noted in Section 2.2, high loci can play a highly iconic role. Do such cases also arise with loci undergoing Locative Shift? This appears to be the case.

3.4.1 Initial iconic cases

In (24)a, two loci *a* and *b* are introduced for *JOHN* and *PETER* respectively, but in addition *BUILDING LEANING* introduces an area of signing space representing the tower of Pisa, leaning rightwards from the signer's perspective as is represented in (25) and encoded in (24) with the symbol //.

- (24) PETER_b IX-1 THE-THREE-a,b,1 VISIT PISA FAMOUS BUILDING LEANING-//.

'John, Peter and I visited the famous Leaning Tower of Pisa.

THE-TWO-a,b WALK LONG TOP. IX-1 FILM-rep_[wavy line along //].

John and Peter walked towards the top. I filmed their ascent.

a. ⁶ JOHN IX-top SHOW POSS-top HAND. PETER IX-middle NOT.

Towards the top, John showed his hand. Peter didn't.'

=> John showed his hand in the upper part; Peter didn't show his hand (in the middle/lower part)

b. ^{4,7} JOHN IX-top SHOW POSS-top HAND. PETER IX-middle NOT SHOW POSS-top HAND.

(ASL, 28, 26; 3 judgments; Schlenker, to appear, c)

- (25) a. Intuitive representation of the tower in signing space (signer's perspective)



- b. Actual sign establishing the position of the tower (addressee's perspective)



While we will revisit this and related sentences from the perspective of the interaction of ellipsis with Locative Shift, we can restrict attention to the first sentence of the discourse. In both (24)a and (24)b, *JOHN* comes with a pointing sign *IX-top* towards a location near the top of the power. This could be a locative-shifted-version of locus *a*, or a spatial locus meaning *there*. But what is striking is that the possessive pronoun indexes the same locus. One of two things may be going on.

- If *IX-top* is a pronoun referring to John, this is a case in which Locative Shift targets the subject pronoun, has interpretive consequences, and is highly iconic, in the sense that the point of signing space that is used has not already been assigned a discourse referent.

¹² This part borrows material from Schlenker, to appear c.

• If *IX-top* has a locative meaning, akin to *there*, then the possessive must have undergone Locative Shift: an all-purpose genitive meaning such as the 'the top's hand' is not plausible in this case, as the infelicity of the English paraphrase shows (this infelicity is presumably due to the fact that a hand is more directly related to its owner than to any spatial position it finds itself in).

Thus either the index *IX-top* or the possessive *POSS-top* has undergone Locative Shift. In addition, it can be ascertained that the possessive is used as a bound variable: the elided VP following *NOT* is naturally understood with a bound reading.¹³ We will see below ASL examples that also involve Locative Shift of bound variables, and where a part of an iconic representation is co-opted by an individual-denoting locus without first being introduced as a spatial locus.

3.4.2 Iconic choices that influence interpretation

Our ASL consultant also accepts examples in which a reflexive pronoun and its antecedent do not share the same locative specifications. This is the case in (26). Here the reflexive *SELF* is indexed with the loci that appear in (25)a: locus *a* is the locus associated with *JOHN*, while *top* is a location at corresponding to the top of the sign for *LEANING-//*, representing a building in leaning position.

(26) JOHN_a PETER_b IX-1 THE-THREE-1,a,b VISIT PISA FAMOUS BUILDING LEANING-// .

'John, Peter and I visited the famous Leaning Tower of Pisa.

THE-THREE-a,b,1 WALK LONG TOP . IX-1 PHOTO-rep_[wavy line along //], FINISH

The three of us walked towards the top. I took pictures during our ascent, and then

a. ^{6.4} IX-a SEE SELF-top, IX-b NOT.

John saw himself at the top, Peter didn't.'

b. ^{5.6} IX-a SEE SELF-top, IX-b NOT SEE SELF-top. (Judgments: 5, 6, 7, 4, 6)

John saw himself at the top, Peter didn't see himself at the top.'

a, b => only John saw himself being high up

c. ⁷ IX-a SEE SELF-a, IX-b NOT.

John saw himself, Peter didn't.

d. ^{6.6} IX-a SEE SELF-a, IX-b NOT SEE SELF-b

John saw himself, Peter didn't see himself.'

c, d => only John saw himself ([ASL, 20, 82](#); 5 judgments)

The striking observation is that *IX-a* SEE SELF-top is understood to mean that John (originally associated with locus *a*) saw himself being *at the top of the tower*; this shows that the reflexive pronoun makes an iconic contribution. It can be further ascertained with a sentence with ellipsis *IX-b NOT* referring to Peter that the boxed VP is indeed interpreted on a bound variable reading. In other words, *SELF-top* simultaneously displays the behavior of a bound variable and of an iconic element

Each locative-shifted reflexive seems to be relatively acceptable even though it does not have an overt location-denoting locus to agree with. It must be said, however, that the reflexives that display this behavior are a bit less acceptable than those that do not, and thus it is difficult to draw firm conclusions on this basis alone. Be that as it may, the inferential judgments suggest that the locative-shifted reflexives affect the nature of the at-issue component of the sentence. There is nothing in the context that presupposes that the relevant individuals were *at the top of the tower*, as can be seen by the more general inferences that are obtained in the absence of Locative Shift in (26)c,d.

The example in (27) strengthens and extends the conclusions reached up to this point; the position of the loci is schematically represented in (28). Because the bar which is represented is tilted, it is clear that not just horizontal and vertical displacements are involved: full-fledged iconicity is needed.

Notation: here / represents the position of the tilted bar.

¹³ Ellipsis resolution can disregard specifications of the antecedent, since the second sentence of (24) is understood to involve Peter showing his hand in the middle/lower part of the building, rather than towards the top; we come back to this point in Section 4.

- (27) TOMORROW GYMNAST COMPETITION. BAR SELF CL-TILT_/. TWO GYMNAST MUST
'Tomorrow there is a gymnastics competition. The bar is tilted. Two gymnasts must

STAND MOVE JUMP-CL-rep HANG-CL. SO BAR-TILT-CL_/.
stand on the bar, move on it and perform rotations. So the bar is tilted.

ONE GYMNAST IX-a IF IX-1 LOOK-[] LOOK-[] FINISH PHOTO-neut POSS-[] HAND, IX-a HAPPY.
One gymnast will be happy if _____

OTHER GYMNAST IX-c NOT.

The other gymnast won't be [= won't be happy if I watch the first gymnast in this way (2/3 judgments) / if I watch the second gymnast in this way (3/3 judgments)]'.

LOOK-[] LOOK-[] POSS-[]

a. ^{5,7} L1-high L2-high L3-high

I watch her moves on the bar [on the left] before taking a picture of her hand while she is on the bar on the left.

b. ⁶ L1-high L2-high R-high

I watch her moves on the bar [on the left] before taking a picture of her hand while she is on the bar on the right.

c. ^{5,7} L1-high L2-high L3-low

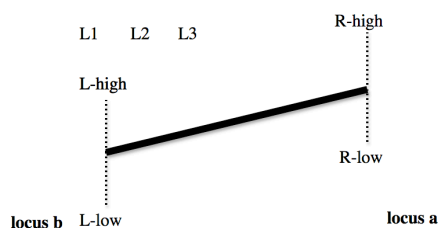
I watch her moves on the bar [on the left] before taking a picture of her hand while she is under the bar on the left.

d. ⁶ L1-high L2-high R-low

I watch her moves on the bar [on the left] before taking a picture of her hand while she is under the bar on the right.

(ASL, [29, 92](#); 3 judgments. See the Supplementary Materials for details.)

(28)



Let us initially disregard the last sentence of each discourse, which involves ellipsis. Our target is the penultimate sentence, which describes the first gymnast. The data can be described as follows: the indefinite *ONE GYMNAST* introduces the locus *a*, which binds three locative-shifted versions of the same locus, corresponding to three different spatial locations, which are varied in the four conditions of the example. Each of these locative-shifted versions of the locus comes with a specification of the position of the first gymnast on the bar. Furthermore, each locative-shifted locus is used in the absence of a spatial locus to agree with. Finally, the fine-grained semantic contribution of each locus appears to be at-issue, as it affects the truth conditions in the scope of a conditional.

Let us argue for these conclusions in turn.

(i) The three loci involved are the object agreement markers of the two occurrences of *LOOK*, and the possessive *POSS*. The inferences triggered suggest that *LOOK* agrees with an individual-denoting locus ('watch the gymnast on the left side of the bar') rather than space-denoting ('look towards the left'), as the latter interpretation wouldn't imply that the signer had looked *at the gymnast* (rather than just in a particular location). It cannot be entirely excluded, however, that this is the result of

pragmatic strengthening - but this would require quite a bit of contextual enrichment, since the target clauses appears in a downward-monotonic environment (under *IF*).

(ii) This issue does not arise with the possessive *POSS*, since it would make no sense to understand the hand to be the hand *of* a location. So *POSS* indexes a locative-shifted version of the initial locus *a*.

(iii) Remarkably, we see that the locative-shifted loci can give rise to a bound variable reading, as attested by the fact that the last sentence of the discourse can be understood on a bound reading, pertaining to the positions of the *second* gymnast.

The same results can be replicated with related sentences with ellipsis,¹⁴ but also with sentences involving *only*, as can be seen in (29). The reading obtained is one on which the first gymnast wants me to look at him and take a picture of his hand while the gymnast is in certain designated positions represented by way of Locative Shift; and the other gymnasts do not want me to do the same with *them*, which indicates that the locative-shifted loci are also read as bound variables.

(29) REMEMBER? TWO-YEAR AGO GYMNAST COMPETITION. BAR SELF BAR-TILT-CL_/.
Remember? Two years ago there was a gymnastics competition. The bar was titled.

REMEMBER TWO GYMNAST MUST STAND MOVE JUMP-CL-rep HANG-CL. SO BAR-TILT-CL_/.
Remember that two gymnasts had to stand on the bar, move on it and perform rotations. So the bar was tilted.

ONLY FIRST GYMNAST IX-a WANT IX-1 LOOK-□LOOK-□ FINISH PHOTO-neut POSS-□ HAND.
Only the first gymnast wanted me to _____
[= bound reading 2/3 judgments; ambiguous answer 1/3 judgment]

a. ^{6.7} L1-high L2-high L3-high
watch her moves on the bar [on the left] before taking a picture of her hand while she is on the bar on the left.'

b. ^{6.7} L1-high L2-high R-high
watch her moves on the bar [on the left] before taking a picture of her hand while she is on the bar on the right.'

c. ^{6.7} L1-high L2-high L3-low
watch her moves on the bar [on the left] before taking a picture of her hand while she is under the bar on the left.'

d. ^{6.3} L1-high L2-high R-low
watch her moves on the bar [on the left] before taking a picture of her hand while she is under the bar on the right.'

([ASL, 29, 89](#); 3 judgments. See the Supplementary Materials for details.)

3.5 Basic semantic proposal

At this point, a tentative way to capture the data is to posit a semantics that is more fine-grained than is usually thought: a locus may refer to an individual, to a situation, or to a 'situation slice' of an individual, which can be thought of as an individual-at-a-situation (in turn, the situations may be spatial, temporal or modal).¹⁵ We can thus state a preliminary hypothesis in (30) (foreshadowed in Schlenker, to appear c).

¹⁴ The example in (i) is slightly simpler than the example in (27) because it does not involve a conditional clause, but it is otherwise similar and makes the same points.

¹⁵ From a metaphysical perspective, Lewis 1986 famously argued for an ontology that countenances time- and world-slides of individuals.

(30) **Hypothesis**

Relative to an assignment function s :

- a. If a locus a denotes an individual $s(a)$ and a locus b denotes a spatial, temporal or modal situation $s(b)$, then under some pragmatic conditions the locus b can stand for the situation slice of individual $s(a)$ found in situation $s(b)$. We will write it as $s(a)_{at_s(b)}$.
- b. In ASL, the locative locus b may but need not have been established in advance of Locative Shift. In highly iconic cases, a point of a pictorial representation may be used to trigger Locative Shift.
- c. Locative Shift may have semantic consequences when different truth conditions are obtained by referring to individual $s(a)$, $s(a)_{at_s(b)}$, or $s(a)_{at_s(c)}$.

The important point is that a locus referring to a situation s can be co-opted as a locus referring to an individual-at-situation- s . But co-opting this locus will yield potentially different readings than referring to the original individual-denoting locus.

The rest of the semantics must be refined so as to allow predicates to take as arguments not just individuals and situations, but also situation slices of individuals. The simplest solution is to make the basic ontology inclusive enough to allow for 'normal' individuals as well as situated individuals. This is arguably needed on independent grounds. To take a type of example discussed in a different context by Matushansky 2008, modified proper names can sometimes be used to refer to time slices of individuals, but when this happens they allow for a non-standard syntax, with definite determiners and modifiers, as in (31)b-c.

- (31) a. Do you remember Paris?
b. Do you remember the Paris of the 1980's?
c. Do you remember the Paris of the 1960's?

- (32) The Paris of 2017 is cleaner than the New York of the 1980's.

The important observation is that a positive answer carries different entailments depending on the question asked, despite the fact that each is in the present tense. While (31)a just asks whether a relation of remembrance holds between the addressee and Paris, (31)b,c ask whether this relation holds with designated temporal stages of the city. Similarly, (32) establishes a comparison between two time slices of two cities – and the semantics of *clean* and of the comparative construction seems to have no difficulties with these arguments, which suggests that they just denote individuals that are part of the standard linguistic ontology.

One issue we leave for future research pertains to the presuppositions (if any) triggered by Locative Shift. Two salient hypotheses are stated in (33). To make them somewhat precise, we adopt a semantics in which expressions are evaluated with respect to a context c , an assignment function s , which assigns value to variables (including loci), and a situation parameter w (which can correspond to temporal, modal or locative situations).

(33) Semantics of Locative Shift

Let c be a context, w a situation of evaluation, and s an assignment function. We write as b^a the locative-shifted version of locus a at locus b .

a. Strong presuppositional semantics

$\llbracket b^a \rrbracket^{c,s,w} = \#$ unless $s(b)$ is a situation and $s(a)$ is an individual and **$s(a)$ is located at $s(b)$ in w** . If $\neq \#$, $\llbracket b^a \rrbracket^{c,s,w} = s(a)_{at_s(b)}$, i.e. the situation stage of $s(a)$ at $s(b)$.

b. Weak presuppositional semantics

$\llbracket b^a \rrbracket^{c,s,w} = \#$ unless $s(b)$ is a situation and $s(a)$ is an individual and **for some situation w' salient in c , $s(a)$ is located at $s(b)$ in w'** . If $\neq \#$, $\llbracket b^a \rrbracket^{c,s,w} = s(a)_{at_s(b)}$, i.e. the situation stage of $s(a)$ at $s(b)$.

According to the Strong presuppositional semantics in (33)a, an individual locus a may undergo Locative Shift to a locus b only if it is presupposed that, in the situation of evaluation, the individual denoted at a is located at the situation denoted by b . Multiple examples discussed above suggest that this condition is too strong. (22)c above didn't say anything about John's location in the context of utterance (and thus in the situation of evaluation, since this was a present tense sentence). Still, the possessive could undergo Locative Shift. Similarly, in the highly iconic example in (27), it certainly

cannot be presupposed that the relevant gymnast is at several locations at the same time, corresponding to the various instances of Locative Shift. Thus the Weak presuppositional semantics in (33)b is more appropriate: it only requires that there be a salient situation of evaluation at which the individual $s(a)$ denoted by locus a is located at the situation $s(b)$ denoted by locus b . When this condition is satisfied, the locative-shifted version of locus a at locus b (written as b^a) denotes the situation stage of $s(a)$ at $s(b)$. This makes it possible for the possessive *POSS-c APARTMENT* in (22)c for the apartment owned by the American-city-stage of John, which comes close to the intended meaning.

4 Locative Shift in ASL: interaction with ellipsis

We turn to the behavior of locative-shifted loci under ellipsis. As discussed in Section 2.2.2, it was argued in Schlenker 2014 that high loci on bound variables can be disregarded in ellipsis resolution (and in the 'focus dimension' under *only*), just as is the case of *phi*-features in English. Schlenker 2014 concluded that (strongly iconic) height specifications of bound loci share the behavior of *phi*-features in being selectively ignored in the course of ellipsis resolution and under *only*. Still, this need not show that height specifications are features: as Schlenker 2014 noted, it might be that a broader class of elements displays this behavior, rather than just featural elements. In addition, in case only featural elements can be ignored under ellipsis and *only*, this may be syntactically constrained, or unconstrained; one prominent view is that only features that can be taken to be inherited under binding by antecedent with the same features can be disregarded under ellipsis.

The debate is summarized in (34).

- (34) Syntactically Constrained vs. Syntactically Unconstrained views.
- (i) Syntactically Constrained: it is only features that can be taken to be inherited under binding by antecedent with the same features can be disregarded under ellipsis and *only*.
 - (ii) Syntactically Unconstrained: some elements can be disregarded under ellipsis and *only* regardless of whether they can be taken to be inherited under binding by an antecedent with the same features.
 - a. *Strong View*: Only features can be disregarded.
 - b. *Weak View*: Featural and non-featural elements can be disregarded.

An example of a Syntactically Constrained view is sketched in (35) (Schlenker 2016), within a theory in which features can be disregarded under ellipsis because they may be inherited by way of morpho-syntactic agreement. In this case, a feature F on a pronoun *pro* can remain uninterpreted if *pro* is bound by an element with feature F – henceforth 'deletion under agreement' (see Heim 1991, 2008, Kratzer 2009, Schlenker 1999, 2003, Stechow 2004). The mechanism is illustrated in (36) where the gender/person features her_i and my_i remain uninterpreted. But it must be borne in mind that this just one example of a family of diverse analyses that take the 'disappearing act' of some specifications under ellipsis and related constructions to be restricted to featural elements.

- (35) a. Optionally delete the feature F of a variable v^F if (i) v^F appears next to a λ -abstractor λv^F , and the appearance of λv^F is triggered by an expression with feature F , or (ii) v^F is bound by λv^F .
 b. λ -abstractors inherit the features of the expressions that trigger their appearance.
- (36) In my study group,
 a. only Mary did her homework (... therefore John didn't do his).
 a'. only Mary λi^{fem} t_i did her_i homework
 b. only I did my homework (... therefore others didn't do theirs).
 b'. only I $\lambda i^{\text{+st}}$ $t_i^{\text{+st}}$ did my_i homework

By contrast, a Syntactically Unconstrained view is stated in (37), according to which redundant elements can be disregarded under ellipsis, whether or not they can be taken to be inherited under binding. This view comes in two versions depending on whether all redundant elements can be ignored, or only features can be.

- (37) Liberal Erasure (informal version)
 If within its local context a complex expression E has the same denotation
 a. Strong version: as a structurally simpler expression E' obtained by only deleting features from E ,
 b. Weak version: as a structurally simpler expression E'
 then E can be replaced with E' for purposes of ellipsis resolution and alternative computation. (refined from Schlenker 2014)

To illustrate (following Schlenker 2016), a pronoun $[pro_i \textit{ fem}]$ with feminine gender features will fall under (37) if the contribution of *fem* is purely presuppositional, with for instance $[[\textit{fem}]]^{c, s, w} = \lambda x: x$ is female in $c_w \cdot x$ (i.e. *fem* triggers a presupposition failure unless its individual argument is female in the word of the context; and when it does not trigger a failure, it yields the same result as the identity function). In this case, if the entire pronoun can be used felicitously, the denotation of pro_i must be female, and hence the contribution of *fem* is redundant. As a result, for purposes of ellipsis resolution and alternative computation, $[pro_i \textit{ fem}]$ can be replaced with pro_i . On the Weak but not on the Strong version, the same rule will also apply to non-featural material. Thus if we are in a context in which it is known that there are exactly four French swimmers, the denotation of *the four French swimmers* is identical to that of *the French swimmers*, and thus the latter expression can replace the former for purposes of ellipsis resolution and alternative computation.

We will establish that the locative specifications of some individual-denoting loci can be ignored under ellipsis (and the focus-sensitive particle *ONLY*) when they can be taken to be inherited under binding. We will not be able to exclude the more liberal view under which they can be ignored in all circumstances. We will then display a striking phenomenon in which ellipsis can yield readings that are impossible with overt material. The reason is this: as we saw at the outset, indexical pronouns cannot undergo Locative Shift. But for our ASL consultant, bound loci under ellipsis can give rise to locative-shifted readings even when the elided clause is under an indexical pronoun. In other words, it appears that overt Locative Shift cannot target indexical pronouns, but that covert Locative Shift (under ellipsis) is not so constrained.

4.1 Locative specifications of individual-denoting loci can be ignored under binding

The acceptability of (38)b contrasts with the deviance of (38)d and suggests that the locative specifications of the locative-shifted locus *c* can be disregarded under ellipsis.

- (38) JOHN OWN APARTMENT [FRENCH CITY]_a SAME OWN APARTMENT [AMERICAN CITY]_c.
 'John owns an apartment in a French city and he owns an apartment in an American city.'
 a. ^{6,7} THERE-c POSS-b APARTMENT NICE. THERE-a NOT.
 There [= in the American city] his apartment his nice. There [in the French city] it's not.'
 b. ⁷ THERE-c POSS-c APARTMENT NICE. THERE-a NOT.
 There [= in the American city] his apartment his nice. There [in the French city] it's not.'
 c. ⁶ THERE-a POSS-b APARTMENT NICE. THERE-a POSS-b APARTMENT NOT NICE.
 There [= in the American city] his apartment his nice. There [in the French city] his apartment is not nice.'
 d. ^{4,3} THERE-c POSS-c APARTMENT NICE. THERE-a POSS-c APARTMENT NOT NICE.
 (Judgments 6, 4, 3)
 ([ASL, 27, 65](#); 3 judgments)

This observation does not decide between the views sketched in (34). On a Syntactically Constrained view, we could take the locative-shifted locus to be made of two parts, one of them bound by the original locus *b* for *JOHN*, and one by *THERE* with locus *c*. This option might be surprising at first, but there are in fact well-established cases of binding with split antecedents in other languages, in the case of plural pronouns, as in (39), where *our* is partly bound by the subject quantifier. A simplified analysis is given in (39)b, where $x_1+x_1\{1st\}$ is a sum of a variable bound by the subject quantifier, and a variable x_i constrained (whether for morpho-syntactic or semantic reasons) to denote the speaker of the speech act.

- (39) a. Each of my former wives remembers our fights. (Schlenker 2003)
 b. $[\forall x_i: \textit{former-wife}(x_i)] x_i, \textit{remembers the-fights-of}(x_1+x_1)$

On this view, the first sentence of (38)b could conceivably be given the analysis in (40)b, where $\langle a, x^e \rangle$ is a pair of loci denoting a locative slice of the individual denoted by *b*, specifically the slice of John corresponding to his being in the relevant American city.

- (40) a. THERE-c POSS-c APARTMENT NICE.
 b. THERE-c λx^e POSS- $\langle b, x^e \rangle$ APARTMENT NICE.

These observations extend to locative deletion under *ONLY*, as is seen in (41).

- (41) JOHN OWN APARTMENT [FRENCH CITY]_a SAME OWN APARTMENT [AMERICAN CITY]_c.
 'John owns an apartment in a French city and he owns an apartment in an American city.'
 a. ^{6,7} ONLY THERE-c POSS-b APARTMENT NICE.
 Only there [= in the American city] is his apartment nice.'
 b. ⁷ ONLY THERE-c POSS-c APARTMENT NICE.
 Only there [= in the American city] is his apartment nice.'
 ([ASL, 27, 64](#); 3 judgments)

4.2 Can locative specifications be ignored without restriction?

We cannot exclude that, for our ASL consultant, locative specifications can be ignored under ellipsis in a rather unrestricted fashion. Consider the following paradigm:

- (42) JOHN OWN APARTMENT [FRENCH CITY]_a SAME OWN APARTMENT [AMERICAN CITY]_c.
 BEFORE IX-b LIKE POSS-c APARTMENT.
 'John owns an apartment in a French city, and he also owns an apartment in an American city. Before, he liked his American apartment.'
 a. ^{6,2} NOW **IX-b** NOT
 => now he doesn't like his American apartment
 b. ^{5,2} NOW **IX-a** NOT
 => now he doesn't like his French /American apartment
 c. ^{5,7} NOW **THERE-a** NOT
 => now he doesn't like his French/American apartment
 ([ASL, 28, 03](#) (see also 28, 07d); 4 judgments)

In (42)a, we obtain a strict reading relative to the locus specification, which is unsurprising given that the second sentence doesn't mention another locative specification. The sentences of interest are (42)b,c, which are degraded but yield two readings. On both readings, John is now in the French city, as specified by the use of the locus *a* in the second sentence. On one reading, John (in the French city) doesn't like his American apartment. This is expected if the locative features of the possessive *POSS-c* present in the antecedent VP are preserved, since *c* is associated with the American city. But we also obtain a kind of bound variable reading (relative to the locative specification) on which John (in the French city) doesn't like his *French* apartment. Now in the antecedent sentence, the subject is the pronoun *IX-b*. It indexes the neutral locus associated with *JOHN*, which does not come with any locative specification. Thus we cannot argue that the locative features of the possessive are somehow inherited by agreement under binding. The only way to explain their disappearance under ellipsis is to allow for a very liberal process of locative deletion under ellipsis. Still, the fact that the sentences are somewhat degraded might suggest that this mechanism is costly.

Since the further data we have are both complex and somewhat preliminary, they are discussed in the Appendix.

4.3 Locative specifications of individual-denoting loci can be preserved under ellipsis

Standard theories of ellipsis resolution certainly don't *force* features to be deleted under ellipsis (unless other requirements come into play). While the features that appear on the bound variable may trigger a failure, but if they don't, they won't affect the interpretation because the value of the bound pronoun is fully determined by the binding process. Interestingly, things are different with Locative Shift, since it makes it possible to refer to a situation-stage of an individual. In such cases, it can be crucial that locative specifications are preserved under ellipsis. This process was illustrated in the elided part (26)a above: the elided clause *IX-b* NOT ~~SEE SELF-top~~ gave rise to a reading according to which the subject-denotation Peter didn't see himself *being at the top*. Several other examples that lead to the same conclusion are discussed in the Appendix.

The same pattern is found in (43), which behaves roughly like the overt control in (44). While one could think that *LOOK* and *FILM* are interpreted with locative objects ('look there', 'film there'), the bound variable interpretation makes this a bit unlikely. More importantly, the second person

example in (45) entirely lacks this reading: the last sentence means that the addressee didn't want the signer to watch and film the first gymnast in particular positions. This is expected if (43) and (44) involve Locative Shift, which cannot target indexical pronouns, as we saw in Section 3.2. On the other hand, if the objects of *LOOK* and *FILM* are interpreted as 'there', it is mysterious why the mechanism of pragmatic strengthening that gives the illusion of a bound variable reading in the third person case is inapplicable in the second person case.

- (43) REMEMBER? TWO-YEAR AGO GYMNAST COMPETITION. BAR SELF BAR-TILT-CL_/.
'Remember? Two years ago there was a gymnastics competition. The bar was tilted. -

REMEMBER TWO GYMNAST MUST STAND MOVE IX-b-NEUTRAL-top JUMP-JUMP
Remember - two gymnasts had to move on the bar and then

ROTATION. SO BAR-TILT-CL_/.
perform rotations. So with the bar tilted,

ONE GYMNAST IX-a WANT IX-1 LOOK \square FINISH FILM \square IX-. OTHER GYMNAST IX-c NOT.

LOOK \square ... \square IX-

- a. ^{5.7} R-high L-high
one gymnast wanted me to watch him (standing) on the right and then film him standing on the left. The other gymnast didn't (want me to do the same with him).'
- b. ^{6.7} R-high L-low
one gymnast wanted me to watch him (standing) on the right and then film him hanging on the left. The other gymnast didn't (want me to do the same with him).'
- c. ⁶ R-low L-high
one gymnast wanted me to watch him hanging on the right and then film him standing on the left. The other gymnast didn't (want me to do the same with him).'
- d. ^{6.7} R-low L-low
one gymnast wanted me to watch him hanging on the right and then film him hanging on the left. The other gymnast didn't (want me to do the same with him).'
- (ASL, 29, 33; 3 judgments. See the Supplementary Materials for interpretive subtleties.)

- (44) Same as (43), except for the last sentence.

...OTHER GYMNAST IX-c NOT WANT IX-1 LOOK \square FINISH FILM \square IX-

LOOK \square ... \square IX- (with the same specifications in the penultimate and in the last sentence)

- a. ^{6.3} R-high L-high
one gymnast wanted me to watch him (standing) on the right and then film him standing on the left. The other gymnast didn't want me to watch him (standing) on the right and then film him standing on the left.'
- b. ^{6.3} R-high L-low
one gymnast wanted me to watch him (standing) on the right and then film him hanging on the left. The other gymnast didn't want me to watch him (standing) on the right and then film him hanging on the left.'
- c. ^{6.3} R-low L-high
one gymnast wanted me to watch him hanging on the right and then film him standing on the left. The other gymnast didn't want me to watch him hanging on the right and then film him standing on the left.'
- d. ^{6.3} R-low L-low
one gymnast wanted me to watch him hanging on the right and then film him hanging on the left. The other gymnast didn't want me to watch him hanging on the right and then film him hanging on the left.'
- (ASL, 29, 34; 3 judgments. See the Supplementary Materials for interpretive subtleties.)

- (45) REMEMBER? TWO-YEAR AGO GYMNAST COMPETITION. BAR SELF BAR-TILT-CL_/.
'Remember? Two years ago there was a gymnastics competition. The bar was tilted. Remember -

REMEMBER THE-TWO-2,a MUST STAND MOVE IX-b-NEUTRAL-top JUMP-JUMP Remember
- the two of you had to move on the bar and then

ROTATION. SO BAR-TILT-CL.
perform rotations. So with the bar tilted,

IX-a WANT IX-1 LOOK \square FINISH FILM \square . IX-2 NOT WANT WANT IX-1 LOOK \square FINISH
FILM \square

LOOK \square ... \square (with the same specifications the the penultimate and in the last
sentence)

a. ⁶ R-high L-high
he wanted me to watch him (standing) on the right and then film him standing on the left. You didn't
want me to watch him (standing) on the right and then film him standing on the left.'

b. ⁶ R-high L-low
he wanted me to watch him standing on the right and then film him hanging on the left. You didn't want
me to watch him standing on the right and then film him hanging on the left.'

c. ⁶ R-low L-high
he wanted me to watch him hanging on the right and then film him standing on the left. You didn't want
me to watch him hanging on the right and then film him standing on the left.'

d. ⁶ R-low L-low
he wanted me to watch him hanging on the right and then film him hanging on the left. You didn't want
me to to watch him hanging on the right and then film him hanging on the left.'

(ASL, 29, 32; 3 judgments. See the Supplementary Materials for interpretive subtleties.)

4.4 *Locative specifications of individual-denoting loci can yield new readings under ellipsis*

4.4.1 *Data*

We turn to cases that are similar to those of the preceding section, except that the elided clause has a first person subject. Remarkably, this gives rise to readings that cannot be obtained with an overt counterpart of the elided clause. The reason is that, as we saw in the preceding section, the elided clause can preserve locative specifications of the antecedent. This leads to cases in which an elided second person subject binds an elided object pronouns *with locative specifications*, despite the fact that overt second person pronoun do not normally undergo Locative Shift, as we saw in Section 3.2 (and again in example (45)).

Let us modify (26) by replacing the third person elided clause *IX-a NOT* with a first person version, *IX-1 NOT*, as in (46). Unsurprisingly, the overt control in (46)b, with an attempt to locative-shift a first person locus, is sharply deviant. But strikingly, the target sentence with ellipsis in (46)a yields precisely the reading that one would expect *if* the elided first person reflexive pronoun underwent Locative Shift. In other words, ellipsis yields a reading that cannot be obtained without it.

- (46) JOHN_a THE-TWO-a,1 RECENT VISIT PISA FAMOUS BUILDING LEANING-//.
'John and I recently visited Pisa's famous Leaning Tower.'

THE-TWO-a,1 WALK LONG TOP. IX-1 PHOTO-rep [wavy line along /], FINISH
We walked to the top. I took pictures, and afterwards

- a. ^{6.2} IX-a SEE SELF-top, IX-1 NOT
John saw himself being high up, I didn't.'
=> the speaker didn't see himself being high up in the tower (4/4 judgments) [and likely anywhere in the tower (2/4 judgments)]
- b. ^{2.2} IX-a SEE SELF-top, IX-1 NOT SEE SELF-top.
- c. ⁷ IX-a SEE SELF-a, IX-1 NOT.
John saw himself, I didn't.'
=> the speaker didn't see himself (4/4 judgments)
- d. ⁷ IX-a SEE SELF-a, IX-1 NOT SEE SELF-1.
John saw himself, I didn't see myself.'
=> the speaker didn't see himself (4/4 judgments)
(ASL, 20, 80; 4 judgments)

It can be further ascertained that the reading with second person and locative specifications under ellipsis is probably not due to a process of pragmatic enrichment, as there is a contrast between the meaning of (47)a (= locative specifications preserved) is very different from the reading obtained in (47)c (= overt first person reflexive with no locative specifications). One can further check that the attempt to locative-shift the first person reflexive pronoun in (47)b is sharply deviant (the third person case with a difference in locative specification between the subject and the reflexive is degraded, but far less so).

- (47) JOHN_a IX-2 IX-1 **THE-THREE-a,1,2** RECENT VISIT PISA FAMOUS BUILDING LEANING-//.
'John and I recently visited Pisa's famous Leaning Tower.'

THE-THREE-a,1,2 WALK LONG TOP. **IX-2** PHOTO-rep [wavy line along /], FINISH
We walked to the top. I took pictures, and afterwards

- a. ^{5.2} IX-a SEE SELF-top, IX-1 NOT (Judgments: 6, 5, 4, 6)
John saw himself being high up, I didn't.'
- b. ^{2.2} IX-a SEE SELF-top, IX-1 NOT SEE SELF-top. (Judgments: 3, 2, 2, 2)
- c. ^{5.7} IX-a SEE SELF-top, IX-1 NOT SEE SELF-1. (Judgments: 7, 5, 5, 6)
- d. ⁷ IX-a SEE SELF-a, IX-1 NOT. (Judgments: 7, 7, 7, 7)
(ASL, 34, 2726; 4 judgments)

Let us now consider (48), which just involves an elided version of the example discussed in (45). In (45), just as in (46)b, Locative Shift cannot be applied to an overt second person locus: while the sentences are acceptable, this is on a strict reading on which the elided VP is make reference to the gymnast mentioned in the first sentence. By contrast, the examples with ellipsis in (48) yield exactly the reading that one would expect *if* the addressee-denoting pronouns in the elided VP underwent Locative Shift on a bound reading.¹⁶ In addition, the semantic contrast obtained in (49) suggests that it is genuinely the presence of some locative specifications rather than a pragmatic process of enrichment that is responsible for the spatial inferences obtained.

¹⁶ Some details of the video make some standing vs. hanging contrasts unclear. As our consultant noted, in this video the right side of the bar is too high to allow for 'standing'-related contrasts (see Supplementary Materials, [JL 14.10.15]).

- (48) REMEMBER? TWO-YEAR AGO GYMNAST COMPETITION. BAR SELF CL-TILT-/.
'Remember? Two years ago there was a gymnastics competition. The bar was tilted.

REMEMBER THE-TWO-2,A MUST STAND MOVE IX-B-NEUTRAL-top JUMP-JUMP
Remember - you and he had to move on the bar and then

ROTATION. SO BAR-TILT-CL-/
perform rotations. So with the bar tilted,

IX-a WANT IX-1 LOOK \square FINISH FILM \square IX-2 NOT.

LOOK \square ... \square

- a. ⁶ R-high L-high
he wanted me to look at him on the right side and then film him standing on the left side. You didn't (want me to do the same with you (3/3 judgments) / with him (1/3 judgment))'.
- b. ^{6.3} R-high L-low
he wanted me to look at him on the right side and then film him hanging on the left side. You didn't (want me to do the same with you (3/3 judgments) / with him (1/3 judgment))'.
- c. ⁶ R-low L-high
he wanted me to look at him hanging on the right side and then film him standing on the left side. You didn't (want me to do the same with you (3/3 judgments) / with him (1/3 judgment))'.
- d. ^{6.3} R-low L-low
he wanted me to look at him hanging on the right side and then film him hanging on the left side. You didn't (want me to do the same with you (3/3 judgments) / with him (1/3 judgment))'.
(ASL, 29, 31; 3 judgments)

- (49) REMEMBER? TWO-YEAR-AGO GYMNAST COMPETITION. BAR SELF CL-TILT-/.
'Remember? Two years ago there was a gymnastics competition. The bar was tilted.

REMEMBER THE-TWO-2,A MUST STAND CL-MOVE IX-B-NEUTRAL-top JUMP-JUMP
Remember - you and he had to move on the bar and then

ROTATION. SO BAR-TILT-CL-/
perform rotations. So with the bar tilted,

IX-a WANT IX-1 LOOK \square R-low FINISH FILM \square IX-L-high.

he wanted me to watch him while he was [hanging] on the on the right (= high) end of the bar, and then film him while he was [standing] on the low (= lower) part of the bar.

- a. ^{6.7} IX-2 NOT.
you didn't (want me to watch you while you were [hanging] on the on the right (= high) end of the bar, and then film you while you were [standing] on the low (= lower) part of the bar.'
- b. ⁷ IX-2 NOT WANT IX-1 LOOK-2 FINISH FILM IX-2.
you didn't want me to watch you and then film you.'
(ASL, 34, 2734; 3 judgments. See the Supplementary Materials for detailed inferences.)

4.4.2 Possible analysis

While the phenomenon is complex, we believe we can posit the generalization in (50).

- (50) Tentative Generalization
a. Overt indexical loci cannot undergo Locative Shift.
b. Covert loci bound by indexical loci can undergo Locative Shift.

One simple way to derive this generalization is to build on the fact that under VP-ellipsis bound pronouns of the antecedent VP can be copied without their features. Thus if the constraint against

locative-shifted indexical pronouns pertains to a formal incompatibility between indexical and locative specifications (for instance because they occupy the same morpho-syntactic slot), the generalization need not be surprising.¹⁷

An alternative (sketched in Schlenker 2011a) is to go back to the rule we rule posited in (20), which requires that deictic loci correspond roughly to the position of their denotation if it is present in the discourse situation. This rule had the benefit of explaining why deictic pronouns cannot undergo Locative Shift (although it does not explain why the facts are less sharp for non-indexical deictic pronouns than for first and second person pronouns). Now one could stipulate that this rule solely applies to *overt* loci. This might make some sense because the rule makes crucial reference to the alignment of the locus relative to the speaker and its denotation: this notion of 'alignment' in space makes no sense for covert elements, which might be why the rule doesn't apply to elided pronouns.

4.5 *Theoretical conclusions*

We conclude that, within our ASL data, some aspects of the behavior of locative specifications are clear, and others are not.

1. It is clear that locative-shifted loci can be bound, including by elements that do not have the same locative specifications.
2. The application of Locative Shift may affect meaning. This happens when a locative-shifted locus is dependent on a non-locative-shifted antecedent that is not interpreted with the same locative specification (be it for semantic or pragmatic reasons).
3. This semantic contribution sometimes appears to be at-issue, although it is too early to tell whether this is so because of the semantics, or because of a pragmatic process of accommodation (e.g. presupposition accommodation).
4. Under ellipsis, locative specifications may be preserved, which sometimes affects interpretation. This is because the binder of a locative-shifted locus may determine which individual it denotes, while the locative specification may determine where this individual is located.
5. There are also cases in which locative specifications are disregarded under ellipsis. In particular, a locative specification may be disregarded under binding by an individual or spatial expression with the same locative specification.
6. Overt indexical pronouns cannot usually undergo Locative Shift. There is suggestive evidence that elided indexical pronouns are not so constrained. It may be because they are devoid of indexical features, or because the prohibition against locative-shifted indexical pronouns is limited to overt elements.
7. There might also be cases in which locative specifications are disregarded under ellipsis although their binder does not carry the same locative specifications. It is too early to tell whether this argues for a very liberal system of erasure (along the lines of (37)), or whether the binder should in such cases be taken to carry covert versions of the relevant specifications (as was advocated in some cases in Schlenker 2014).

5 **Extension to LSF**

Our data from LSF are less extensive and less stable than those we have from ASL, but they do suggest the following conclusions: (i) Locative Shift exists in LSF as well; (ii) it targets non-indexical loci more easily than indexical ones; (iii) it can be used with highly iconic loci; (iv) it can affect truth conditions; and (v) some locative specifications may be disregarded under ellipsis, although the precise conditions are not clear. Other questions addressed with respect to ASL will not be taken up

¹⁷ Importantly, however, we should not state that all bound variables are exempt from prohibition against locative-shifted indexical loci. This would incorrectly predict that the overt sentence in (46)b should be acceptable, since the locative-shifted reflexive in the second sentence certainly can certainly be bound by the first person subject.

for LSF, either because we have no data, or because our data are highly unstable, with judgments that radically changed from one session to the other.¹⁸

5.1 Basic examples: third and second person loci

A simple instance of Locative Shift is displayed in (51)b, and it can be seen in the inferences obtained that it has interpretive consequences. It should be noted that *PIERRE_b* is signed on the left, which makes it unlikely that no locus or a default locus is associated with it.

- (51) RECENTLY PIERRE_b NEW-YORK_a b-MOVE-a. FRIENDS POSS-__ IX-1 CHAT.
 'Recently Pierre moved to New York. I chatted with
 POSS-__ =
 a. ^{6.6} POSS-b
 his friends.'
 => I chatted with Pierre's friends / Pierre's Paris friends
- b. ^{6.4} POSS-a (judgments: 7, 7, 7, 7, 4)
 his New York friends.'
 => I chatted with Pierre's New York friends
 (LSF, 50, 18; 5 judgments)

Importantly, a similar example with a second person pronoun replacing *PIERRE* suggests that Locative Shift does not like to target indexical pronouns. This replicates effects we saw in ASL. But this also provides a counterargument against an alternative interpretation of (51)b, according to which it means something like 'the New York friends': if this possibility is open in the third person case, one would expect it to be open in the second person case as well, contrary to fact.

- (52) RECENTLY IX-2 NYC_a b-MOVE-a. FRIENDS POSS-__ IX-1 CHAT.
 'Recently you moved to New York. I chatted with
 POSS-__ =
 a. ⁷ POSS-2
 your friends.'
 b. ³ POSS-a
 (LSF, 50, 46; 3 judgments)

5.2 Iconic examples

We turn to cases in which Locative Shift targets positions on an iconic representation that are not specifically introduced as loci. The paradigm in (53) pertains to a visit the Leaning Tower of Pisa.

Notation: PISA_TOWER_\\ transcribes a representation of the tower leaning to the left from the signer's perspective. GO-UP-CL_{person_}-circ-\ transcribes a circular motion of a person classifier along the path of the leaning tower. top represents a position towards the top of the tower sign \\.

- (53) ITALY PISA_TOWER_\\ PIERRE GO-UP-CL_{person_}-circ-\ IX-1
 'Pierre went up the Leaning Tower of Pisa. I
 a. ^{6.8} 1-SEE-top¹⁹ IX-top.
 saw him at the top.'
 b. ^{4.4} 1-SEE-neutral IX-top.
 c. ^{6.6} 1-SEE-top HAND POSS-top.
 saw his hand while he was at the top.'
 d. ^{4.8} 1-SEE-neutral HAND POSS-top. (Judgments: 3, 5, 7, 5 4)
 (LSF, 34, 53; 5 judgments)

¹⁸ The latter fact might suggest that there are contextual or pragmatic factors that we do not understand. The LSF consultant we worked with usually has stable judgments, and it is thus noteworthy that Locative Shift is an exception.

¹⁹ (53)a,b involved a hesitation after the verb.

In (53)a, the verb *SEE* takes an object agreement marker pointing towards the top of the tower, as is the object pronoun. The meaning is that the signer saw Pierre at the top of the tower, not that he saw the top of the tower itself – which suggests that the object agreement marker denotes an individual rather than a spatial location. Results are degraded in (53)b, where a neutral rather than an agreeing version of *SEE* is used, while the object pronoun stays the same. (53)c,d are similar to (53)a,b, except that the object pronoun has been replaced with a possessive *HAND POSS-top*, with Locative Shift applied to the possessive. The result is rather acceptable (although the consultant once noted that he prefers the order object-verb to verb-object), and it becomes degraded again when the verb *SEE* fails to index the top of the tower. Certainly *HAND POSS-top* doesn't mean *the hand of the top of the tower*, or even *the hand associated with the top of the tower*, which strongly suggests that Locative Shift has indeed been applied. Still, these data, do not distinguish between three hypotheses. One is that Locative Shift can target both the object agreement of *SEE* and the possessive *POSS*. The other is that Locative Shift applies to the object agreement marker of *SEE*, and is then inherited by the possessive. The third is that there is only a weakened version of Locative Shift in this case, because the initial occurrence of *PIERRE* is signed in a potentially neutral position, hence may not introduce an explicit locus.

The same conclusions apply to the example in (54). Here too, *PIERRE* is arguably signed in neutral space. It is not clear for us whether the pointing sign that appears at the beginning of the second sentence of the discourse is location- or individual-denoting, but it is clear that in (54)b,c the possessive pronoun indexes a locus that is individual-denoting but corresponds to Pierre's position on the tower.

Notation: *PISA_TOWER_* transcribes a representation of the tower leaning to the left from the signer's perspective. *FILM-* transcribes an upward motion of the verb for *FILM* along the path of the leaning tower.

- (54) ITALY *PISA_TOWER_* *PIERRE* GO-UP-CL_{person_\}-circ-\ IX-1 *FILM_*.
 'Pierre went up the Leaning Tower of Pisa. I filmed his ascent.'
 a. ^{2,3} IX-a *HAND POSS-a* a-SHOW-1. (judgments: 1, 1, 5)
 b. ⁷ IX-b *HAND POSS-b* b-SHOW-1.
 He showed his hand in the middle of the tower.'
 c. ⁷ IX-top *HAND POSS-top* top-SHOW-1.
 He showed his hand at the top of the tower.'
 (LSF, 34, 99; 3 judgments)

5.3 Ignoring locative specifications under ellipsis

It is a general fact that, under ellipsis, bound loci can be disregarded in some ways. In (55), the locus for subject *PIERRE* is re-established in various positions at the beginning of the antecedent clause, with interpretive consequences. In three out of four judgments, pronouns in the VP give rise to bound variable readings, and these entail that the elided VP can disregard the locative specifications of the antecedent pronouns.²⁰ This is unsurprising since the identity of the antecedent loci presumably had to be disregarded to obtain a bound reading. The deviance of the control with an overt locus mismatch in (56)b is also expected. (Note that there is an infelicity in some of the examples: in (55)a, Pierre is understood not to be within the tower where he shows his hand.)

Notation: *PISA_TOWER_* transcribes a representation of the tower leaning to the left from the signer's perspective. *FILM-* transcribes an upward motion of the verb for *FILM* along the path of the leaning tower.

²⁰ As see in the Supplementary Materials, the consultant noted on the last trial that the order of *PIERRE IX-a* was suboptimal, and that *IX-a PIERRE* would have been better.

- (55) ITALY PISA_TOWER_\ \ PIERRE_a YANN_b THE-TWO-a,b GO-UP-CL_{person_}-circ-\ . IX-1 FILM_\ .
'In Italy, Pierre and Yann went up the Leaning Tower of Pisa (together). I filmed their ascent.
- a. ⁵ PIERRE IX-a HAND POSS-a a-SHOW-1. YANN IX-top NOT. (Judgments: 7, 5, 4, 4)
'Pierre (outside the tower?) showed his hand. Yann, at the top, didn't.'
- b. ^{6,2} PIERRE IX-bottom/middle HAND POSS- bottom/middle bottom/middle -SHOW-1. YANN IX-top NOT. (Judgments: 7, 7, 7, 4)
'Pierre showed his hand at the bottom (or middle) of the tower. At the top, Yann didn't.'
- c. ⁶ PIERRE IX-top HAND POSS-top top-SHOW-1. YANN IX-top NOT. (Judgments: 7, 6, 7, 4)
'Pierre showed his hand at the top of the tower. At the top, Yann didn't.'
(LSF, [35, 23](#); 4 judgments)
- (56) ITALY PISA_TOWER_\ \ PIERRE_a YANN_b THE-TWO-a,b GO-UP-CL_{person_}-circ-\ . IX-1 FILM_\ .
'In Italy, Pierre and Yann went up the Leaning Tower of Pisa (together). I filmed their ascent.
- a. ^{1,8} PIERRE IX-a HAND POSS-a a-SHOW-1. YANN IX-top HAND POSS-a a-SHOW-1 NOT.
- b. ^{1,8} PIERRE IX-bottom HAND POSS- bottom bottom-SHOW-1. YANN IX-top HAND POSS-bottom bottom-SHOW-1 NOT.
- c. ^{6,2} PIERRE IX-top HAND POSS-top top-SHOW-1. YANN IX-top HAND POSS-top top-SHOW-1 NOT.
At the top of the tower, Pierre showed his hand. At the top, Yann didn't show his hand.'
(LSF, [35, 29](#); 5 judgments)

The paradigm in (57) shows that a locative mismatch between a second person subject and an overt pronoun it binds is unacceptable. This may be because such mismatches are generally unacceptable for our consultant, and/or because second person loci cannot undergo Locative Shift. Strikingly, the locative mismatch becomes far more acceptable under ellipsis, as seen in the paradigm in (58). Most of the inferential judgments are compatible with the view that the spatial specifications are preserved under ellipsis, since the locative features that apply to Pierre also constrain the position of the addressee in the relevant situation. This finding could suggest that the prohibition against locative-shifted indexical pronouns is obviated under ellipsis, something we also found in ASL. But our data do not prove this: a plausible alternative is that the preceding discourse suggests that Pierre and the addressee were together (due to the expression *THE-TWO*) when they had the opportunity to show their hands, in which case the reading obtained is compatible with the view that the elided pronouns are entirely devoid of locative specifications.²¹ More work will be needed to tease apart these two possibilities.

- (57) ITALY PISA_TOWER_\ \ PIERRE IX-2 THE-TWO-neutral,2 GO-UP-CL_{person_}-circ-\ . IX-1 FILM_\ .
'In Italy, Pierre and yourself went up the Leaning Tower of Pisa (together). I filmed your (i.e. your and his) ascent.
- a. ^{6,5} PIERRE IX-a HAND POSS-a a-SHOW-1. IX-2 HAND POSS-2 2-SHOW-1 NOT.
Pierre showed his hand. You didn't show your hand.'
- b. ^{2,7} PIERRE IX-bottom HAND POSS-bottom bottom -SHOW-1. IX-2 HAND POSS- bottom \square -SHOW-1 NOT.

²¹ This remark was explicitly made on two separate days by our consultant about (58)b,c (see Supplementary Materials, [LD 15.02.12], [LD 15.02.18]).

c. ^{2.7} PIERRE IX-top HAND POSS-top top-SHOW-1. IX-2 HAND POSS-top 2-SHOW-1 NOT.

(LSF, [41, 28](#); 4 judgments)

(58) ITALY PISA_TOWER_\ \ PIERRE IX-2 THE-TWO-neutral,2 GO-UP-CL_{person}-circ-\.
'In Italy, Pierre and yourself went up the Leaning Tower of Pisa (together).
IX-1 FILM-\.
I filmed your (i.e. your and his) ascent.

a. ^{6.5} PIERRE IX-a HAND POSS-a a-SHOW-1. IX-2 NOT.
Pierre showed his hand. You didn't.

b. ^{6.2} PIERRE IX-bottom HAND POSS- bottom bottom -SHOW-1. IX-2 NOT.
At the bottom Pierre showed his hand. You didn't.'
=> you didn't show your hand at the bottom of the tower (4/6 judgments)

c. ^{6.3} PIERRE IX-top HAND POSS-top top-SHOW-1. IX-2 NOT.
At the top Pierre showed his hand. You didn't.'
=> you didn't show your hand at the top (4/6 judgments)
(LSF, [34, 117](#); 6 judgments)

To conclude, some essential properties of ASL Locative Shift can be replicated in LSF, but our data are not sufficiently fine-grained or stable to license strong inferences about the more subtle points of the discussion. Still, they suggest that Locative Shift exists in LSF (with constraints that we do not understand very well), that it targets non-indexical loci more easily than indexical ones, that it can be used with highly iconic loci, that it can affect truth condition, and that some locative specifications may be disregarded under ellipsis.

6 Locative Shift in gestures

We will now suggest that some important properties of Locative Shift in ASL can be replicated with some uncommon varieties of speech-accompanying gestures in spoken language. While our discussion is exploratory, this research direction should serve two purposes. First, from a theoretical and typological perspective, sign language with iconicity should be compared to speech-plus-gestures rather than to speech alone, as intimated by Goldin-Meadow and Brentari, to appear. It is thus essential to understand whether Locative Shift can be replicated in spoken language, in particular with gestures. Second, the gestures we will consider are probably quite rare – although this point would have to be established rigorously. If so, they make it possible to test grammatical/semantic knowledge that speakers have with very little direct evidence for. In case the judgments we discuss are robust, they might conceivably derive from general properties of Universal Grammar and/or iconic representations, which might explain why Locative Shift is found in several sign languages.

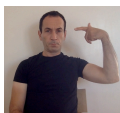
6.1 Background on pro- and co-speech gestures

6.1.1 Gestural verbs with object agreement

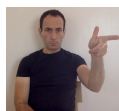
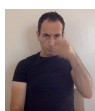
While constraints on the alignment between co-speech gestures and spoken words have been investigated in some detail (e.g. Loehr 2004, Ebert et al. 2011), grammatical constraints on the shape of gestures themselves have been studied less often. But Schlenker and Chemla, to appear, argue that some non-trivial properties of sign loci can be replicated with some pointing gestures in spoken language. They call them 'pro-speech gestures' because they replace rather than accompany spoken words (for a typology of inferences triggered by different kinds of gestures, see Schlenker 2017a; and for the fine-grained semantic properties of pointing gestures that co-occur with Noun Phrases, see Anvari 2016).

For present purposes, Schlenker and Chemla make three relevant observations, the first two of which are confirmed with experimental means.

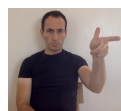
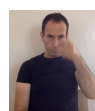
(i) First, they argue that a (possibly simplified) version of the locus system of sign language exists with gestures. Their study focuses on gestural verbs with object agreement. They note that a gesture with the meaning of *shooting* can be realized in different ways depending on whether it targets the speaker (glossed as *SHOOT-1*), or addressee (glossed as *SHOOT-2*), or a third person (*SHOOT-a*).²² The distinction between speaker-, addressee- and third person-denoting loci mirrors one that is found in sign language. Importantly, deviance is obtained when *SHOOT* targets a third person locus to refer to the addressee. (A complicating factor is that the second person form *SHOOT-2* also plays the role of a neutral form, unmarked for person; this is why it is glossed as *SHOOT(-2)*.)



(59) a. I am going to SHOOT-1_ .
'I am going to shoot myself.'



b. You, I am going to SHOOT(-2)_ / ?? SHOOT-a_ .
'I am going to shoot you.'



c. John, I am going to SHOOT(-2)_ / SHOOT-a_ .
'I am going to shoot John.'

(ii) Second, Schlenker and Chemla observe on the basis of introspective judgments and experimental data that these agreement markers can be disregarded under ellipsis, as in (60) – a behavior that mirrors that of object agreement markers in ASL, and also of phi-features in spoken language, as discussed in (13) above.

(60) Your brother, I am going to PUNCH-a / SLAP-a / SHOOT-a, and then
a. ['stripping'] you, too.
b. [VP-ellipsis] you, I will as well.

(iii) Third, Schlenker and Chemla note that pro-speech verbs can target high loci, just like agreement verbs in ASL. And in this case as well, height specifications can be disregarded under ellipsis in the same way as phi-features in spoken language.

(61) *Context*: The speaker is of normal height, and is talking to a very short person, whose brother is very tall.



Your giant brother, I am going to PUNCH-a^{high} / PUNCH(-2)^{high} / SLAP-a^{high} / SLAP(-2)^{high} / SHOOT-a^{high} / SHOOT(-2)^{high}, and then

a. ['stripping'] you, too.
b. [VP-ellipsis] you, I will as well.





We will generalize these observations along three dimensions. First, we will explore cases in which a pro-speech gesture points towards a locus (by contrast, Schlenker and Chemla, to appear, only use object agreement to index loci). Second, we will focus on cases in which several third person loci are introduced. Third, we will study their interaction with locative loci in order to show that sign language Locative Shift might have a gestural counterpart.

6.1.2 Pro- vs. co-speech gestures

But first, why focus on pro-speech gestures, rather than on the more common category of co-speech gestures? Following Schlenker and Chemla, to appear, we do so for three reasons. One is that we are interested in the behavior of gestures under ellipsis. But co-speech gestures can be ignored under

²² Several gestural verbs with object agreement involve violent and objectionable actions. They are included in scientific discussions because few gestural verbs have been studied in detail so far, and thus it would be unwise to reduce the database.

ellipsis, as noted in Schlenker 2015b, 2017b; this explains the meaning contrast between (62)a and (62)b

- (62) a. This politician was (i)  (ii) . That one will never be.
=>the second politician won't (i) be hanged/killed (ii) have his hand chopped off.
- b. This politician was (i)  **punished** (ii)  **punished**. That one will never be.
=>the second politician won't be punished

The second reason to focus on pro-speech gestures is that a pointing gesture accompanying an individual-denoting pronoun could be interpreted in two ways: it could display the denotation of the pronoun, or indicate where this denotation is to be found – which is precisely the issue we are interested in. By contrast, when a pointing gesture fully replaces the individual argument of a verb, we can be confident that it provides an individual denotation (possibly *accompanied* with locative specifications).

The third reason to focus on pro-speech gestures is that they share a crucial property of many signs: they are an essential part of the message, rather than a parasitic accompaniment; this distinction is crucial in some typologies of iconic enrichments (Schlenker 2017a), and thus this property might make for a particularly good comparison with sign language (not a minimal one, since gestures are not words, unlike signs, and in particular they do not usually have the rich conventional meanings that signs have).

6.2 Multiple loci and Locative Shift in gestures

While Schlenker and Chemla (to appear) concentrate on cases in which at most one third person locus appears, we will need to consider cases in which a multiplicity of loci are introduced, some individual-denoting and some location-denoting. We will introduce these loci by way of co-speech gestures, and retrieve them by way of pro-speech gestures, our main target. It is of course noteworthy that besides performance limitations, there does not seem to be an upper limit on the number of loci that can be introduced in this way – which makes spoken language gestures far closer to sign language than is usually thought.

We will discuss English and French examples, partly to have a slightly broader empirical base than would be the case with just one language, but also because the behavior of French clitics sometimes makes it possible to test properties that are hard to test in English (specifically, gestural verbs usually prefer to come at the end of a clause, and thus it is useful to be able to have the object appear as a clitic before the verb).

Our initial paradigm is illustrated in (63).

Notation: *IX-i* refers to a pointing finger towards locus *i*, *IX-hand-i* to a pointing hand towards *i*. Pro-speech pointing is represented in normal capital letters. Co-speech pointing is represented in superscripts on the spoken expression it co-occurs with (as in *Jean*^{*IX-hand-a*}).

- (63) Since John^{*IX-hand-a*} can't seem to work with you^{*IX-hand-2*}, I'll have him transferred to New York^{*IX-hand-c*}. And if later I need to downsize, you know who I'll fire?
a. <#>*IX-2*
[= you]
b. ?? *IX-a*
[intended: John]
c. *IX-c*
[= John]

John is associated with locus *a*, the addressee with locus 2, and *New York* with locus *c*. Pointing can be towards locus 2, yielding the pragmatically odd reading on which the addressee Jean rather than the city will be hired. It seems that the locus for *John* has undergone Locative Shift. Unsurprisingly, if the discourse is changed so as to *deny* that John will be transferred to New York, the data change and Locative Shift becomes impossible, as seen in (64).

- (64) Since John^{IX-hand-a} can't seem to work with you^{IX-hand-2}, I'll **won't** him transferred to New York^{IX-hand-c}. And if later I need to downsize, you know who I'll fire?
 a. <#>IX-2
 [= you]
 b. IX-a
 [= John]
 c. *IX-c
 [= intended: John]

Strikingly, minimally different examples in which the second person locus is targeted by Locative Shift yield rather sharp unacceptability.

- (65) Since you^{IX-hand-2} can't seem to work with John^{IX-hand-a}, I'll have you transferred to New York^{IX-hand-c}. And if later I need to downsize, you know who I'll fire?
 a. IX-2
 you
 b. IX-a
 John
 c. *IX-c
 [intended: you]

We conclude that (i) multiple individual or locative loci can be used in speech-accompanying gestures, that (ii) Locative Shift can target third person loci, but that (iii) it cannot target second person loci. We believe that a much more thorough investigation of Locative Shift with gestures should be conducted, in particular to test the more fine-grained properties that we unearthed in ASL.

7 Conclusions

7.1 Empirical conclusions

We have shown that (i) ASL some individual loci can undergo Locative Shift, that (ii) this can have semantic consequences, and that (iii) shifting can target highly iconic loci, including ones that were not explicitly introduced. We argued that the readings obtain suggest that a locus that underwent Locative Shift denotes a situation-stage of an individual, and hence has a more fine-grained semantics than a locus that hasn't undergone Locative Shift. In addition, (iv) shifting seems to be degraded with indexical loci, and possibly with non-indexical deictic loci as well. This can be explained in at least two ways: if indexical and possibly deictic loci have a locative specification that is already filled; or if loci established by iconic means (via the extra-linguistic situation) are fixed, possibly because they are non-arbitrary.

We also studied the interaction between Locative Shift and ellipsis, and concluded: (v) that Locative Shift can target bound variables, including when the antecedent has different or no locative specifications; (vi) that locative specifications may be preserved or ignored under ellipsis. Concerning cases in which locative specifications are preserved under ellipsis, we saw (vii) that these cases may give rise to bound, elided readings in which locative specifications have semantic consequences, and that (viii) this might include covert indexical loci, which seem to admit Locative Shift (unlike overt indexical loci). Concerning cases in which locative specifications are not preserved under ellipsis, (ix) some clear cases might involve agreement between a locative-shifted locus and an antecedent with the same locative specifications; (x) further cases might involve an antecedent that does not display the same locative specifications, but can be interpreted in accordance with them; and (xi) there might even be cases in that argue for a mechanism of liberal 'deletion' of locative features under ellipsis.

Points (i)-(iv) as well as (ix) were replicated in LSF, although many questions are left open for that language.

We then argued that Locative Shift might exist in English with pro-speech gestures, and that it can target third person-denoting gestural loci but not second-person-denoting loci. A much more

thorough investigation could and should be conducted to determine whether further properties of Locative Shift can be replicated with gestures.

7.2 Theoretical directions

We turn to some theoretical directions for future research.

(i) An initial question concerns the potential difference between earlier cases of high and low loci, which could be iconically modulated (Schlenker et al. 2013, Schlenker 2014), and instances of Locative Shift. It is not clear to us that there is a difference: once it has been established that a locative locus denoting a situation s may do double duty as denoting a situation stage of individual i , i_at_s , there is no reason this mechanism couldn't be extended to cases in which the position of the individual i is identified with the spatial position of his head or of the upper part of his body. For this to be possible, it is essential that Locative Shift can apply even in the absence of an explicitly introduced locative locus; but we saw examples of precisely this in ASL. In a special case, this mechanism could give rise to the appearance of high and low loci discussed in the literature, including ones that are highly iconic (e.g. 'high' loci realized very low because the relevant individual is tall but is upside down).²³

(ii) Another question is how one should think of locative specifications of loci. There are at least three ways to go. First, they could have the same status as *phi*-features; if so, one would expect that they give rise to agreement phenomena. Second, they might be non-grammatical lexical material. Third, they might be thought of as gestures that are incorporated into some grammatical signs.

The first two possibilities are self-explanatory. The third was discussed in a different context by Aristodemo 2017 in connection with the adjective *FULL* in Italian Sign Language (LIS). Aristodemo noticed that this adjective is realized with an iconic element that modifies its meaning, yielding akin to 'completely full'. She argued that this contribution is comparable to that of some co-speech gestures e.g. in Italian. Both types of cases, non-trivial patterns of projection were obtained (within the 'cosuppositional' analysis of co-speech gestures in Schlenker, to appear d). And in both cases, the iconic component could be freely disregarded under ellipsis. Thus one could in principle propose a similar analysis with a sign-cum-gesture in the case of locative-shifted loci.

The choice will depend on generalizations about ellipsis in general, and about the behavior of locative specifications under ellipsis. In spoken language, it is relatively uncontroversial that (a) co-speech gestures can be ignored under ellipsis, as we stated at the outset; (b) non-gestural material can only be ignored under restricted conditions – possibly only grammatical material can be ignored, and possibly only under agreement. If it turns out that locative specifications can be ignored without restriction, we might have an argument for treating them as incorporated gestures. If they can only be ignored under restricted conditions, we might be able to conclude that they display the behavior of grammatical elements, although the details will depend on one's theory of ellipsis and on the precise generalization one obtains about locative specifications under ellipsis.²⁴

7.3 Typological questions

We end with some questions about the place of Locative Shift in the typology of pronominal marking. One to the precise phonetic realization of this marking, and another pertains to the typological existence of locative marking on pronominal elements.

²³ Schlenker et al. 2013 argue that high loci are preferably evaluated with respect to the actual context of utterance, rather than with respect to counterfactual worlds. This might be due to the special cases they considered, in which the height of an individual is not thought of as something that changes quickly. Be that as it may, we have not performed similar tests about standard cases of Locative Shift.

²⁴ An important cautionary note should be added. We observed in connection with the results of Schlenker and Chemla, to appear, that pro-speech gestural verbs may carry agreement-like markers. If so, saying that the 'high locus' specification of $SLAP(-2)^{high}$ in (61) is a 'gesture' won't help to explain its behavior under ellipsis, since the entire expression $SLAP(-2)^{high}$ is itself a gesture.

Concerning phonetic realization, we saw that in ASL and LSF, a locative locus is fully co-opted to realize a locative-shifted individual locus. As a result, the literature describes cases of ambiguity between an individual and a spatial reading, as we saw in (4). But this needn't preclude the possibility that signers might occasionally phonetically distinguish to some extent between a spatial and an individual reading of a locative-shifted locus. More phonetic work would be needed to address this issue.

Turning to the typological question, Locative Shift involves locative/situation marking on a pronominal. This differs from indexical/gender marking found in English with respect to the nature of the categorization, and also the fact that the target property is not fixed relative to a given context (but see fn. 23). Other types of nominal marking share these properties. Proximate-obviative systems are a case in a point, which situate the denotation of a third person element argument relative to the salience of other third person elements. Specifically, they situate the relevant individuals in a kind of salience space rather than in ordinary space. As described in Dahlstrom 1991 (p. 91) Bloomfield 1962 p. 38 Frantz 1966 p. 51 Hockett 1966 p. 60 (and summarized in Schlenker 1999), the major property of obviative systems is that they provide a distinction between different types of third person markers: a proximate one, which refers to an individual which is somehow the point of reference for a particular discourse; an obviative one, which can be seen as marking reference to some 3rd person element different from the proximate one (it might help to paraphrase the obviative marker as: 'the other'); and, in some cases, a further obviative which is different from the first two. Schlenker 1999, 2016 suggests that the past-pluperfect-double pluperfect system of some languages plays a similar function in the temporal domain, with an ordering of temporal proximity rather than of salience.²⁵

More directly relevant cases are sometimes alluded to. In online discussions²⁶, Martina Wiltschko makes reference to a tense marker that appears on nouns in general and pronouns in particular in Upriver Halkomelem, as described by Galloway's Grammar on upriver Halkomelem (Galloway 1993 p. 383); but as Wiltschko states, in the relevant examples both the pronoun and the clause as a whole are marked for tense, which makes it hard to decide whether the denotation of the pronoun is on its own constrained by tense marking. Modern Welsh has a possibly temporal/modal distinction on pronouns.²⁷ Thus there might be other cases in which pronominal elements can take situation marking, but connections with Locative Shift are elusive at this point.

²⁵ Technically, the analysis of Schlenker 1999, 2016 takes temporal expressions as spelling out several variables simultaneously – one corresponding to the denote time, and one or several corresponding to the times with respect to which it is ordered (other theories of tense share this property).

²⁶ <https://linguistlist.org/issues/14/14-1205.html>

²⁷ King 1993 writes: "In the overwhelming majority of cases, **ti** is the singular form for *you*, with **di** confined" to other circumstances, including "as the subject in Future I: **os gweli di fe** *if you see him*, **pan gyrhaeddi di** *when you arrive*, **Fyddi di ddim yn hir, na fyddi?** *You won't be long, will you?*".

Appendix.

ASL: Can locative specifications be ignored without restriction under ellipsis?

1. The following ASL paradigm provides a potential argument in favor of a relatively liberal process of deletion under ellipsis of locative/height specifications, although the analysis is complex.

Notation: / represents the tilted bar, with the right side pointing up. *IX-right-bar* indexes the right-hand part of the bar, *IX-right-bar-high* a position above that (corresponding to a gymnast's head in upright position). *IX-left-bar* indexes the left-hand part of the bar, *IX-right-bar-low* a position below that (corresponding to the gymnast's head in upside down position).

- (66) SHOW HAVE GYMNAST STAND-CL BAR SELF CL-TILT-/. SO BAR FIRST GYMNAST IX-a START STAND MOVE IX-right-bar JUMP-JUMP ROTATION IX-left-bar JUMP-JUMP ROTATION.
'At a show, some gymnasts had to stand on a bar which was titled. The first gymnast did its moves, jumped and rotated on the right, then jumped and rotated on the left.
- a. ⁷ IX-right-bar PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar NOT.
While standing on the right of the bar he presented himself well. On the left of the bar, he didn't.'
- b. ^{6.5} **IX-right-bar PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar-low NOT.**
While standing on the right of the bar he presented himself well. While hanging on the left he didn't present himself well.'
- c. ⁷ IX-right-bar-high PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar NOT.
While standing on the right of the bar he presented himself well. On the left of the bar, he didn't.'
- d. ^{6.5} IX-right-bar-high PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar-low NOT.
While standing on the right of the bar he presented himself well. While hanging on the left he didn't present himself well.'
- (ASL, [28, 79](#), 2 judgments)

They key sentence is in (66)b: the subject of the elided VP indicates that the gymnast is on the lower end of the bar and in hanging position. Thus one would expect that copying the antecedent VP with all its locative specifications should yield deviance, since these specifications imply that the gymnast is in standing position on the higher end of the bar. But the sentence appears to be quite acceptable, with the intended meaning. It can be checked that the overt controls (with the overt copying of the antecedent locative specifications) are deviant, as seen in (67)b-(68)b. So one must conclude that the locative specifications of the antecedent are disregarded in (66)b. But the subject of the antecedent VP is not realized high, and thus we cannot argue that the locative specifications of the antecedent reflexive are inherited through morpho-syntactic agreement, unlike the case in (66)d.

(67) **Control 1: preserving the height but not the horizontal specification of the antecedent**

- SHOW HAVE GYMNAST STAND-CL BAR SELF CL-TILT-/. SO BAR FIRST GYMNAST IX-a START STAND MOVE IX-right-bar JUMP-JUMP ROTATION IX-left-bar JUMP-JUMP ROTATION.
'At a show, some gymnasts had to stand on a bar which was titled. The first gymnast did its moves, jumped and rotated on the right, then jumped and rotated on the left.
- a. ⁵ IX-right-bar PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar NOT PRESENT SELF-left-bar-high GOOD.
While standing on the right of the bar he presented himself well. While standing on the left of the bar, he didn't present himself well.'
- b. ³ IX-right-bar PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar-low NOT PRESENT SELF-left-bar-high GOOD.
- c. ^{5.5} IX-right-bar-high PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar NOT PRESENT SELF-left-bar-high GOOD.
While standing on the right of the bar he presented himself well. While standing on the left of the bar, he didn't present himself well.'
- d. ⁴ IX-right-bar-high PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar-low NOT PRESENT SELF-left-bar-high GOOD.
([ASL, 28, 81](#); 2 judgments)

(68) **Control 2: preserving the height and the horizontal specifications of the antecedent**

SHOW HAVE GYMNAST STAND-CL BAR SELF CL-TILT-/. SO BAR FIRST GYMNAST IX-a START STAND MOVE IX-right-bar JUMP-JUMP ROTATION IX-left-bar JUMP-JUMP ROTATION.
 'At a show, some gymnasts had to stand on a bar which was tilted. The first gymnast did its moves, jumped and rotated on the right, then jumped and rotated on the left.

- a. ² IX-right-bar PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar NOT PRESENT SELF-right-bar-high GOOD.
 b. ^{1.5} IX-right-bar PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar-low NOT PRESENT SELF-right-bar-high GOOD.
 c. ² IX-right-bar-high PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar NOT PRESENT SELF-right-bar-high GOOD.
 d. ^{1.5} IX-right-bar-high PRESENT SELF-right-bar-high GOOD. THERE-left-bar IX-left-bar-low NOT PRESENT SELF-right-bar-high GOOD.

(ASL, 28, 82; 2 judgments)

One possible conclusion is thus that locative deletion is quite liberal, and doesn't require that the deleted feature be identical to a feature of its binder. But there is an alternative analysis, namely that in (66)b a *covert* 'high' feature appears on the boldfaced subject – and thus triggers the deletion under ellipsis of the same 'high' features that appears on the reflexive. A similar idea was explored to account for some cases of feature deletion under ellipsis and *only* in Schlenker 2014. Specifically, in (69) the subject of the first sentence did not carry visible 'high' features, but these were taken to be covertly present because they were semantically licensed – and could thus trigger feature deletion (on a Syntactical Unconstrained view of feature deletion, such a measure wouldn't be useful, of course).

(69) *Context*: Tomorrow there is a swimming competition. A French team with a giant in it competes against a German team with a dwarf in it.

⁷ [FRENCH VERY VERY HEIGHT MAN]_a LIKE PEOPLE SUPPORT **IX-a^{high}**. IX-b GERMAN SHORT-PERSON NOT.

Preferred reading: bound variable

'The very tall French man likes people who support him. The short German person doesn't.' (ASL, 17, 61; Schlenker 2014)

Thus more sophisticated data are needed to decide the issue.

2. The key is to consider cases in which a referential subject binds a variable which is understood to denote the same individual *but in a different position*: this would make it impossible to argue that the same covert locative features appear on the subject and on the bound element. Let us consider the following paradigm, with positions displayed in (71).

(70) REMEMBER? TWO-YEAR AGO GYMNAST COMPETITION. BAR SELF CL-TILT-/. REMEMBER Remember? Two years ago there was a gymnastics competition. The bar was tilted. Remember that FIRST GYMNAST IX-a MUST STAND **RIGHT**. OTHER GYMNAST IX-c MUST HANG **LEFT**. the first gymnast had to stand on the right, while the other gymnast had to hang on the left. SO BAR-TILT-CL-/, So with the bar tilted,

FIRST GYMNAST IX-__ WANT IX-1 PHOTO-neutral POSS-__ HAND. OTHER GYMNAST IX-__ NOT.

a. ⁷ IX-__ POSS-__ IX-__ =
 R-high R-high L-low

the first gymnast wanted me to take a picture of his hand while he is standing on the right; the other gymnast didn't (want me to take a picture of his hand while he is hanging on the left).'

b. ^{6.3} **a** **R-high** **L-low**

the first gymnast wanted me to take a picture of his hand while he is standing on the right; the other gymnast didn't (want me to take a picture of his hand [3/3 judgments] [while he is hanging on the left]) /

had done a good job).'

1/3 judgment: One gymnast thought he had done a good job standing on the bar. The other gymnast didn't (think he himself had done a good job standing on the bar).'

1/3 judgment [= last]: One gymnast thought [while on the bar?] he had done a good job standing on the bar. The other gymnast didn't think he himself had done a good job.'

b. ⁷ SELF-a (i.e. SELF-a^{neutral})

One gymnast thought he had done a good job. The other gymnast didn't (think he himself had done a good job).'

c. ^{6.3} SELF-a^{low}

2/3 judgments: One gymnast thought he had done a good job hanging from the bar. The other gymnast didn't think he had done a good job hanging from the bar.'

1/3 judgment [= last judgment]: One gymnast thought [while on the bar?] he had done a good job hanging from the bar. The other gymnast didn't think he had done a good job.'

(ASL, 23, 46; 3 judgments)

(74)c has the same logic, with a mismatch between the positional information concerning the subject (standing position) and the reflexive (hanging position). Here it would seem that the 'hanging' specification is not deleted under ellipsis – but of course this need not show that it cannot be deleted.

(74) GYMNAST COMPETITION TWO GYMNAST MUST STAND BAR-horizontal EASY

'In a gymnastics competition two gymnasts had to stand on a bar – easy –

FINISH $\overset{\wedge}{\text{STAND}}$ HANG(hard/wow expression).
and then...hang from it.

^{6.7} FIRST GYMNAST WHILE TURN-a IX-a^{high} THINK SELF-a^{low} GOOD JOB. OTHER WHILE TURN-b IX-b^{low} NOT.

While standing on the bar, the first gymnast thought she had done a good job hanging. While hanging, the other gymnast didn't (think she herself had done a good job hanging).'

=> while standing, the first gymnast thought that she had done a good job hanging; while hanging, the second gymnast thought that she herself had done a good job hanging (2/3 judgments)

=> during her routine, the first gymnast thought she had done a good job; during her own routine, the second gymnast thought that she herself had done a good job (1/3 judgment)

(ASL, 23, 56c; 3 judgments; a-b, not reported here, have SELF-a^{low} replaced with SELF-a^{high} and SELF-a^{neutral} respectively - see the Supplementary Materials for judgments)

In the example with *ONLY* in (75), the subject appears at neutral height while the embedded subject reflexive appears low. This preferably gives rise to a reading on which the locative specifications of the reflexive are preserved in the focus dimension, but our consultant mentioned on one occasion the existence of an ambiguity, with an additional reading on which the locative specifications are not preserved in the focus dimension.

(75) GYMNAST COMPETITION TWO GYMNAST MUST STAND BAR-horizontal EASY

'In a gymnastics competition two gymnasts had to stand on a bar – easy –

FINISH $\overset{\wedge}{\text{STAND}}$ HANG(hard/wow expression).
and then...hang from it.

^{6.7} ONLY FIRST GYMNAST IX-a^{neutral} THINK SELF-a^{low} GOOD JOB.

'Only the first gymnast thought she had done a good job on her hanging portion.'

=> the first gymnast thought she had done a good job on her hanging portion, the other gymnast didn't think she herself had done a good job on her hanging portion (4/4 judgments)

=> the first gymnast thought she had done a good job on her hanging portion, the other gymnast didn't think she herself had done a good job on her routine (1/4 judgment)

(ASL, 23, 52c; 4 judgments; a-b, not reported here, have SELF-a^{low} replaced with SELF-a^{high} and SELF-a^{neutral} respectively - see the Supplementary Materials for judgments)

In the minimally different example involving ellipsis in (76), our less extensive judgments (just two) suggest that the locative specifications of the embedded subject reflexive are preserved under ellipsis.

(76) GYMNAST COMPETITION TWO GYMNAST MUST STAND BAR-horizontal EASY

'In a gymnastics competition two gymnasts had to stand on a bar – easy –

FINISH STAND HANG(hard/wow expression).

and then...hang from it.

^{6.5} ONE IX-a THINK SELF-a^{low} GOOD JOB. OTHER IX-b NOT.

One gymnast thought had done a good job on her hanging portion. The other gymnast did not (think she herself had done a good job on her hanging portion).'

(ASL, 23, 46c; 2 judgments; a-b, not reported here, have SELF-a^{low} replaced with SELF-a^{high} and SELF-a^{neutral} respectively - see the Supplementary Materials for judgments)

We conclude that our ASL consultant often preserves under ellipsis locative specifications that cannot be inherited by an agreement-like mechanism, but we cannot exclude a more liberal process whereby even such specifications are optionally disregarded under ellipsis. More research is needed on this topic.

Supplementary Materials: Raw Data

Raw ASL data can be downloaded in .doc format at the following URL:

<https://drive.google.com/file/d/0B7Mz-VKVeYNKbm5XSVNIcE1UOG8/view?usp=sharing>

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