

Iconic Features*

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Abstract. Sign languages are known to display the same general grammatical properties as spoken languages ('Universal Grammar'), but *also* to make greater use of iconic mechanisms. In Schlenker et al., to appear, it was argued that loci (= positions in signing space corresponding to discourse referents) can have an iconic semantics, in the sense that certain geometric relations among loci (subset and relative complementation, as well as high/low position relative to the signer) are preserved by the interpretation function. Here we ask whether plural and height specifications of loci display the formal behavior of *phi*-features in remaining uninterpreted in focus- and ellipsis-constructions (as in the bound readings of *Mary admires herself, and John does too*, and of *Only Mary admires herself*). Data from ASL and LSF show that plural and height specifications may indeed remain uninterpreted in these constructions; furthermore, there are cases in which a single high locus is construed iconically *and* left uninterpreted in the course of ellipsis resolution. We argue that our data are compatible with two theories. According to the Strong View, plural and height specifications of loci display exactly the behavior of spoken language features. According to the 'Weak View', our data just show that plural and height specifications share the behavior of features *and other non-assertive elements* in being separable from the referential terms they specify. Our LSF data are compatible with the Weak View; our ASL might provide support for the Strong View. While we only aim to open the debate about the featural status of iconic specifications, the question is of some importance: if features are innate and primitive elements of grammar, and if some of them have an intrinsically geometric semantics, the signed modality might play a greater role than is usually thought at the very core of Universal Grammar.

Keywords: sign language, features, iconicity, universal grammar

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Sign languages are known to display the same general grammatical properties as spoken languages ('Universal Grammar'), but *also* to make greater use of iconic mechanisms. In an attempt to reconcile insights of the 'formalist' and of the 'iconic' camps in sign language research¹, Schlenker et al. (to appear) argued that loci (= positions in signing space corresponding to discourse referents) can *both* be logical variables and iconic representations of what they denote, in the sense that certain geometric relations among loci are preserved by the interpretation function. Specifically, it was suggested that subset and relative complementation relations among plural loci as well as the high/low position of a locus relative to the signer can be preserved by the interpretation function. Still, these specifications were otherwise taken to have the same kind of semantics as *phi*-features in spoken language features. In particular, it was argued that height specifications have a presuppositional semantics, somewhat similar to that of gender features of pronouns. Should plural and height specifications of loci really be analyzed as features in the same sense as standard *phi*-features? A positive answer would have some import: if features are innate and primitive elements of grammar, and if some of them have an intrinsically geometric semantics, the signed modality might play a greater role than usually thought at the very core of Universal Grammar.

We begin to address this question by asking whether plural and height specifications of loci display the formal behavior of *phi*-features in remaining uninterpreted in focus- and ellipsis-constructions, as in the bound readings of *Mary admires herself*, and *John does too*, and *Only Mary admires herself (... therefore John doesn't admire himself)*. Data from ASL and LSF show that plural and height specifications may indeed remain uninterpreted in these contexts; furthermore, there are cases in which high loci are *simultaneously* interpreted iconically and left uninterpreted in the course of ellipsis resolution. We argue that our data are compatible with two theories. According to the Strong View, plural and height specifications of loci display exactly the behavior of spoken language features. According to the Weak View, our data just show that plural and height specifications share the behavior of features *and other elements* in being separable from the referential terms they specify. While we only aim to open the debate, we will see that our ASL data provide an argument for the Strong View, while our LSF data can only argue for the Weak View.

1 Grammar and Iconicity in Sign Language Pronouns

1.1 Grammatical properties of sign language pronouns²

In sign language, the relation between a pronoun and its antecedent is often mediated by *loci*. These are positions in signing space that can be introduced by noun phrases, and retrieved by pronouns (Sandler and Lillo-Martin 2006). Thus in (1)a, *BUSH_a* and *OBAMA_b* establish a locus by virtue of being signed in the corresponding position; in (1)b, the signs for *former senator* and *current senator* are immediately followed by the pointing signs *IX-a* and *IX-b* respectively, and these to establish the initial loci *a* and *b*, which are then retrieved by the pronouns (also signed as pointing signs *IX-a* and *IX-b*) which appear in the second sentence:³

- (1) a. IX-1 KNOW BUSH_a IX-1 KNOW OBAMA_b. IX-b SMART BUT IX-a NOT SMART.
 'I know Bush and I know Obama. He [= Obama] is smart but he [= Bush] is not smart.'
 b. IX-1 KNOW [PAST SENATOR PERSON] IX-a IX-1 KNOW [NOW SENATOR PERSON] IX-b. IX-b SMART BUT IX-a NOT SMART.
 'I know a former senator and I know a current senator. He [= the current senator] is smart but he [= the former senator] is not smart.' (4, 179)

Since there appears to be an arbitrary number of possible loci, it was suggested that these do not spell out morpho-syntactic features, but rather are the overt realization of formal indices (Lillo-Martin and Klima

¹ See for instance Lillo-Martin and Klima 1990, Neidle et al. 2000, Sandler and Lillo-Martin 2006 for the 'iconic camp', and Cuxac 1999, Taub 2001, and Liddell 2003 for the 'iconic camp'. Kegl 2004 (written in 1977) already incorporated iconic insights into the formal tradition with respect to the analysis of directional verbs.

² This section borrows from Schlenker et al. 2013.

³ ASL sentences are glossed in capital letters. Subscripts correspond to the establishment of positions ('loci') in signing space. Pronouns are usually realized through pointing ('indexing') towards a locus, and they are also glossed as *IX-a*, *IX-b*, etc. Further information about glossing conventions is given in Section 1.3.

1990, Sandler and Lillo-Martin 2006; but see Kuhn 2013 for an argument in favor a variable-free reinterpretation of loci). While pointing can have a variety of uses in sign language (Sandler and Lillo-Martin 2006, Schlenker 2011a), we will restrict attention to pronominal uses. Importantly, there are some striking similarities between sign language pronouns and their spoken counterparts – which makes it desirable to offer a unified theory:

–Sign language pronouns obey at least some of the syntactic constraints on binding studied in syntax. For instance, versions of the following rules have been described for ASL (Lilla-Martin 1991, Sandler and Lillo-Martin 2006, Koulidobrova 2011): Condition A; Condition B; Strong Crossover.
 –In simple cases, the same ambiguity between strict and bound variable readings is found in both modalities (see Lillo-Martin and Sandler 2006; many more cases will be discussed below):

- (2) IX-1 POSS-1 MOTHER LIKE. IX-a SAME-1,a.

Ambiguous: I like my mother. He does too [= like my / like his mother] (1, 108)

–Similarly, the same cases of 'donkey anaphora', or apparent binding without c-command, are found in sign and in spoken language (Schlenker 2011b).

It is thus a reasonable hypothesis that the pronominal systems of sign and spoken language share at least a common core.

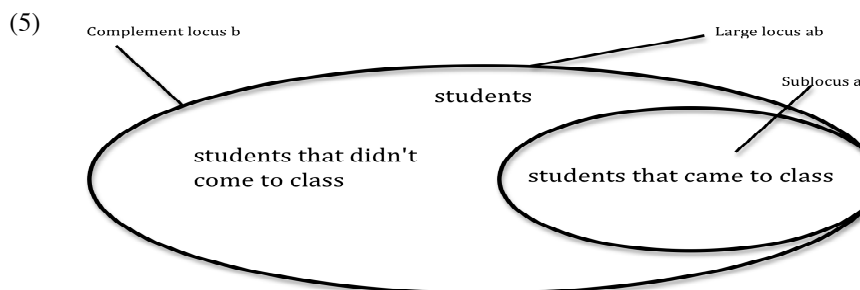
1.2 Iconic properties of sign language pronouns

However, it was argued in Schlenker et al., to appear (following much earlier work, among others Kegl 2004 and Liddell 2003) that there are iconic effects in sign language pronominals, and that these effects do not appear to have an exact counterpart in spoken language. As announced, we will here concentrate on plural and height specifications.⁴

□ Plural specification of loci

It was shown in Schlenker et al., to appear, that the range of readings available for the plural pronouns in (3) is replicated when a single default locus is used, but that the deviance of the 'complement set' reading can be obviated when embedded loci are used, as is illustrated for ASL in (4) (the main data were replicated for LSF in Schlenker et al., to appear). Throughout, ratings are given on a 7-point scale (with 7 = best; when examples are cited from Schlenker et al., to appear, we refer the reader to the original paper for raw scores).

- (3) a. *Complement Set Anaphora*: #Most students came to class. They stayed home instead.
 b. *Maximal Set Anaphora*: Most students came to class, and they asked good questions.
 c. *Restrictor Set Anaphora*: Most students came to class. They are a serious group.
- (4) POSS-1 STUDENT IX-arc-ab MOST IX-arc-a a-CAME CLASS.
 'Most of my students came to class.' (8, 196; 8, 197; 8, 206; 8, 224)
 a. 7 IX-arc-b b-STAY HOME 'They stayed home.'
 b. 7 IX-arc-a a-ASK-1 GOOD QUESTION 'They asked me good questions.'
 c. 7 IX-arc-ab SERIOUS CLASS. 'They are a serious class.'



⁴ Schlenker et al. 2013 discuss one further case of 'formal iconicity', one in which directional verbs target different parts of structured loci, analyzed as simplified pictures rather than just as points.

In (4)a, a large locus notated as *ab* (but signed as a normal plural locus) represents the set of all students. A sublocus *a* represents the set of students that came to class. And once the large locus *ab* and the sublocus *a* have been made available, the complement locus *b* becomes automatically available, and it denotes the students who didn't come to class.

Schlenker et al. (to appear) hypothesized that assignment functions assign values to loci, and they further assumed that:

R1. geometric properties of plural loci (*qua* areas of space) guarantee that if a locus *A* and a sublocus *a* have been introduced, a complement locus (*A-a*) thereby becomes available;

R2. relations of inclusion and relative complementation among loci are preserved by the interpretation function *via* constraints on assignment functions.

Schlenker et al. (to appear) took the grammar to make available (i) a discourse referent for the maximal set and the restrictor set, but (ii) no discourse referent for the complement set (see Corblin 1996, Geurts 1997, Nouwen 2003). In this respect, the grammar of ASL is similar to the grammar of English, as analyzed by Nouwen 2003. For this reason, when a default locus is used, ASL roughly behaves like English, and complement set anaphora is highly restricted (because of (ii)). In case embedded loci are used, however, ASL allows for complement set anaphora. But this is not due to an essential grammatical difference between sign and spoken language. Rather, the rules in R1 and R2 conspire to make available a locus that denotes the complement set. The reasoning is as follows:

–If *a* is a proper sublocus of a large locus *ab*, we can infer by R1 that (*ab-a*) (i.e. *b*) is a locus as well.

–By R2 we can infer that $s(a) \subset s(ab)$ [= preservation of inclusion by assignment functions] and that $s(b) = s(ab)-s(a)$ [= preservation of relative complementation].

In this analysis, then, it was essential that plural loci have some intrinsically geometric properties, namely subthood and relative complementation, which can be preserved by assignment functions. But it was not determined whether in *other* respects plural specification of loci behave like *phi*-features.

□ *Height specifications of loci*

While loci are usually established in a single horizontal plane, occasionally they may be signed high or low. Our point of departure lies in the inferences that one obtains when high or a low loci are used to refer to an individual. An ASL example from Schlenker et al., to appear, is given in (6) (similar ones were described for LSF we refer the reader to the original paper for raw scores for the ASL and LSF examples).

- (6) YESTERDAY IX-1 SEE R [= body-anchored proper name]. IX-1 NOT UNDERSTAND IX-a^{high / normal / low} (ASL)
 'Yesterday I saw R [= body-anchored proper name]. I didn't understand him.' (11, 24; 25)
 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

These inferences are preserved under negation, which provides initial motivation for treating them as presuppositional in nature.

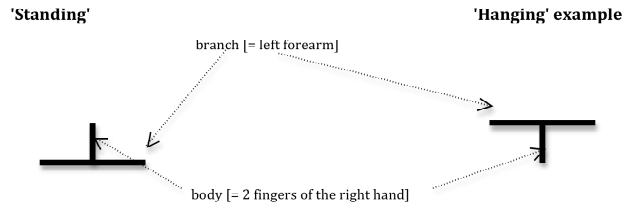
Importantly, high and low loci can appear under binding, with the expected results from a presuppositional perspective: bound variables with high or low loci in a nuclear scope are acceptable to the extent that the restrictor ranges over individuals that satisfy the relevant properties, as illustrated in (7)–(8) (here too, similar examples were described for LSF):

- (7) NO TALL MAN THINK IX-1 LIKE IX-a (ASL)
 'No tall man thinks that I like him.' (11, 27; 11, 31; e12.07.24)
 a. 7 High locus
 b. 6 Normal locus
 c. 3 Low locus
- (8) NO DWARF THINK IX-1 LIKE IX-a (ASL)
 'No dwarf thinks that I like him.' (11, 28; 11, 32; e12.07.24)
 a. 2 High locus
 b. 6 Normal locus
 c. 7 Low locus

As argued in Schlenker et al., to appear, it will not do to treat height specifications of loci as providing information about an *intrinsic* property of their denotations, for instance in terms of being tall or

short. Rather, in at least some of their uses they provide information about the spatial position of the upper part of a person's body. This is shown by the paradigm in (10), where the signer attempted to keep the middle of the initial classifier representing a philosopher at a constant height, as shown in (9). But the *orientation* of the denoted person – in standing, lying or hanging position – had consequences for the acceptability of high and low loci: the same tall philosopher could be referred to with a high locus when he was in standing position, and with a low locus when he was in hanging position.

- (9) Rough position of the index and middle finger of the dominant hand and of the non-dominant hand in examples (10)



- (10) *Context*: People have conversations in the weirdest of positions. (ASL; simplified from Schlenker et al., to appear)

TREE BRANCH VERY TALL LINGUIST PERSON CL-_____a SAME VERY TALL PHILOSOPHER PERSON CL-_____b. IX-a^{1/2/3/4/5} UNDERSTAND IX-b^{1/2/3/4/5}.

'[A very tall linguist]_a was (a) standing on (b) hanging from a branch and [a very tall philosopher]_b was (a) standing on (b) hanging from a branch. He_a understood him_b.'

Levels (1 = top; 5 = bottom)

a. CL-_____ = CL-stand

translation = 'standing on' (10, 106; 109; 137; 11, 16)

1.5.33 2.6.33 3.6.67 4.5 5.3

b. CL-_____ = CL-hang

translation = 'hanging from' (10, 105; 108; 136; 11, 18)

1.3 2.3.33 3.5.67 4.7 5.4

In this paradigm, the sentence is kept constant, except for two parameters: the classifiers in loci *a* and *b* may correspond to a person in standing or hanging position, as represented in (9); and the pronouns *IX-a* and *IX-b* index 5 different levels in each case. While extreme positions are dispreferred, the heights that can be targeted are a bit higher in the 'standing' than in the 'hanging' condition. In essence, the interpretation function seems to be preserving a certain ordering: if a locus *i* is above a neutral locus *n*, the denotation of *i* must be above the denotation of *n* on some salient ordering; and when talking about people in physical situations, it would seem that the salient ordering in question is often given by the relative positions of their upper bodies. This was captured in the following parts of the analysis developed in Schlenker et al., to appear:

- (11) *Height specifications (3rd try)*

Let *c* be a context of speech, *s* an assignment function and *w* a world (with *c_a* = the author of *c*; *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*,

$[[IX-i]]^{c,s,w} = \#$ iff $s(i) = \#$ or $li - nl \neq 0$ and $h_c(s(i)) - h_c(s(n)) \neq \alpha_c(h(i) - h(n))$.

If $[[IX-i]]^{c,s,w} \neq \#$, $[[IX-i]]^{c,s,w} = s(i)$.

In words: 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 imposes that

orderings be preserved (with the more stringent constraint that distances be preserved *modulo* the parameter α ; weaker conditions were also explored in Schlenker et al., to appear). Since bodies are not points, further hypotheses were needed to determine which parts of locus denotations mattered in the relevant ordering; an initial hypothesis is that when it comes to people, their upper bodies matter:

(12) Partial hypothesis (slightly modified from Schlenker et al., to appear)

When evaluating the height of loci denotations,

- a. the position of c_a is assessed by considering the real or imagined position of the upper part of the body of c_a in c_w ;
- b. if $s(i)$ is a person, the position of $s(i)$ corresponds to the position of the upper part of the body of $s(i)$ in c_w .

It was further shown in Schlenker et al., to appear, that the same generalizations hold of ASL reflexive pronouns indexing loci of different heights. For this reason, it is not possible to argue that index pointing alone is affected by height specifications; ASL reflexives, which index loci in a different way (thumb upwards, rather than pointing towards the locus), are subject to the very same locus specifications.

In the present piece, we will argue that (i) the projection-based semantics hinted at in Schlenker et al., to appear, is needed in order to account for the height specifications of loci; but that (ii) height specifications share in one crucial respect the property of the *phi*-features that have been investigated in spoken languages, in that they can be ignored in the process of ellipsis resolution and focus alternative computation. (The analysis in (11), which solely makes reference to heights, will prove insufficient to capture the fine-grained behavior of loci, and a semantics based on geometric projections will have to be used.)

1.3 Elicitation: the 'Playback Method'⁵

Before we introduce our findings, we should say a word about our elicitation method. In ASL and LSF alike, it involved three steps.

(i) First, we elicited sentences of interest with a deaf native signer (Deaf child of Deaf, signing parents). Our emphasis was on the construction of controlled paradigms, usually of two to four sentences. All examples were videotaped.

(ii) Second, we showed the resulting videos to the same signer, asking him to rate the sentences on a 7-point scale.

(iii) Step (ii) was usually repeated several times, often on separate days, in order to assess the stability of our informant's judgments. Unless otherwise noted, ASL judgments are based on a single Deaf signer, with repeated judgment tasks on separate days; LSF judgments are based on two native signers.

Ratings were normally on a 7-point scale, with 7 = best and 1 = worst; when there were different numbers of trials per informant, the first rating gives equal weight to all trials, and the second rating [in square brackets] gives equal weight to all informants. Thus 3.6 [3.56] right before a sentence means that the average rating across trials was 3.6, and across informants 3.56. (The present piece is emphatically not an experimental paper, but we hope that our methods could pave the way for one if and when necessary.)

In the following, sign language sentences are glossed in capital letters (*-rep* indicates that a sign is repeated). Non-manual markings are omitted. Subscripts correspond to the establishment of locations ('loci') in signing space. Letters are assigned from right to left from the signer's perspective. Pronouns, glossed as *IX* (for 'index'), can point back towards previously established loci. In such cases, the locus is suffixed to the pronoun, so that *IX-a* is a pronoun that points towards (or 'indexes') locus *a*; the numbers 1 and 2 correspond to the position of the signer and addressee respectively (importantly, as discussed in connection to (1)b above, indexes can also be used to *establish* a locus). *IX-arc-a* refers to a plural pronoun indexing locus *a*, and *rep* is used when a sign is repeated. An expression which is signed in locus *a* is signed with *a* as a subscript; this is in particular the case of classifiers, e.g. *CL_a* stands for a classifier signed in locus *a*. When an expression indexes a default locus, we write it without a letter index (e.g. *IX* rather than *IX-a*). Specifications are sometimes added to distinguish different classifiers – e.g. *CL-hang* stands for a classifier denoting a person in hanging position.

2 Uninterpreted features in English: ellipsis and *only*

On one standard theory (e.g. Cooper 1983, Schlenker 2003a,b, Heim 2008, Sauerland 2008), some or all *phi*-features have a presuppositional semantics. In order to argue that some *phi*-features are the result of agreement, we must find cases in which these features are morphologically present but could not be

⁵ This description is similar to that of Schlenker et al. 2013.

interpreted – which isn't entirely trivial. Consider for instance (13)a, with some possible Logical Forms in (13)b-c. While *her* agrees in features with *Mary*, this is a context in which these features *can* be interpreted.

- (13) a. Mary did her homework.
 b. Deictic Logical Form
 Mary did her_i homework
 c. Bound Logical Form
 Mary $\lambda i \ t_i$ did her_i homework
 d. $[[\lambda i \ t_i \text{ did } her_i \text{ homework}]]^{c, s, w} = \lambda x: x \text{ is female in } c_w \text{ and had some homework to do. } x \text{ did } x\text{'s homework in } w$

- (14) Let c be a context of speech, w a world, and s be an assignment function (with c_a = the author of c ; c_w = the world of c). If f is a feminine feature and i is in index,
 $[[pro-f_i]]^{f, s, w} = \#$ iff $s(i) = \#$ or $s(i)$ is not female in the world of c . If $[[pro-f_i]]^{f, s, w} \neq \#$, $[[pro-f_i]]^{c, s, w} = s(i)$.

Specifically, in (13)a the coreferential reading can only be obtained if the sentence is evaluated with respect to an assignment function s for which $s(i)$ is *Mary*; and in such a case, the presuppositional contribution of the gender feature of *her* can be interpreted without difficulty. The same situation arises in (13)c, though in a more complicated way: in standard trivalent theories of presupposition, assuming the lexical entry in (14), the constituent $\lambda i \ t_i \text{ did } her_i \text{ homework}$ has the meaning in (13)d, a trivalent property which yields a failure if it is 'fed' an argument x that's not a female. But since the denotation of *Mary* is a female, this problem does not arise.

By contrast, two cases have been discussed in the literature in which features arguably do go uninterpreted.

□ Ellipsis

Consider ellipsis first. (15)a-b have readily available bound variable readings, but the homologous sentences obtained in (15)a"-b" by making the elided clause overt lack such a reading.

- (15) In my study group,
 a. Mary did her homework, and John did too.
 \Rightarrow available bound variable reading in the second clause
 a'. Mary $\lambda i \ t_i$ did her_i homework, and John $\lambda i \ t_i$ did [~~do~~ ~~her_i~~ homework] too
 a". Mary did her homework, and John did her homework too.
 \Rightarrow no bound variable reading in the second clause
 b. I did my homework, and John did too.
 \Rightarrow available bound variable reading in the second clause
 b'. I $\lambda i \ t_i$ did my_i homework, and John $\lambda i \ t_i$ did [~~do~~ ~~my_i~~ homework] too
 b". I did my homework, and John did my homework too.
 \Rightarrow no bound variable reading in the second clause

The facts in (15)a"-b" are unsurprising if gender and first person features are semantically interpreted (for instance as presuppositions on the value of variables). By contrast, the availability of a bound variable reading in (15)a-b is surprising if VP ellipsis is taken to be resolved by a process that reconstructs a VP that is representationally parallel to its antecedent; it would seem that *phi*-features escape this parallelism requirement. While one might try to do without a representational component altogether in the theory of ellipsis, there are independent obstacles to such an account; for as shown by Rooth 1992, the availability of a bound variable reading in (5)a but not (5)b suggests that the presence of a bound variable in the former but not in the latter makes a crucial difference.

- (16) a. 5 is (obviously) less than or equal to itself, and (of course) 7 is too.
 \Rightarrow true
 b. 5 is (obviously) less than or equal to 5, and (of course) 7 is too.
 \Rightarrow false
 c. 5 is (obviously) less than or equal to 5, and (of course) the same is true of 7.
 \Rightarrow true
 d. 5 is (obviously) less than or equal to 5, and (of course) 7 _{is less than or equal to itself} too.
 \Rightarrow true
 (slightly modified from Rooth 1992)

Rooth proposes that a non-representational theory can provide a natural account of (16)d within a theory based on focus, but that it doesn't suffice for (16)b. In Rooth's theory, the squiggle operator \sim in (17) introduces a presupposition that its right argument (= the index 1 in (17)) should denote a proposition that belongs to the focus value of its left argument (= the clause $[7_{2,F}[t_2 \text{ is less than or equal to itself}_2 / 7]]$).

(17) $[5 \text{ is less than or equal to } 5]_1 \text{ and } [7_{2,F}[t_2 \text{ is less than or equal to itself}_2] \sim 1]$

This condition is satisfied in (17): the proposition that 5 is less than or equal to 5 is indeed a proposition (i.e. a semantic object) which is an alternative to the proposition that 7 is less than or equal to itself. If ellipsis resolution in (16)b didn't have a representational component, we would obtain the same result and make the incorrect prediction that the sentence has an apparent bound variable reading. As Rooth concludes, ellipsis resolution is sensitive to the form of the antecedent, and more specifically to the presence of bound variables in it; but then one must posit that the representational component is somehow allowed to ignore the barred features in (15)a'-b', for otherwise a presupposition failure would be obtained.

In (18)a-b, the same point is made with respect to the contribution of singular and plural features: the elided clause can be interpreted with a bound variable interpretation, but an overt version of the same sentence only yields a strict reading, as shown in (18)a"-b"

(18) *Context*: There is a swimming competition by teams of various sizes. Four German swimmers form a team, as does a single French swimmer.

a. The German swimmers think that they will win, and the French swimmer does too.

a'. [the German swimmers] $\lambda i t_i$ think that they_i will win, and [the French swimmer] $\lambda i t_i$ does [**think that they_i will win**] too.

a". The German swimmers think that they will win, and the French swimmer thinks that they will win, too.
=> no bound variable reading

b. The French swimmer thinks that he will win, and the German swimmers do too.

b'. [the French swimmer] $\lambda i t_i$ thinks that he_i will win, and [the German swimmers] $\lambda i t_i$ do [**think that he_i will win**] too.

b". The French swimmer thinks that he will win, and the German swimmers think that he will win, too.

It is also important to note that these results probably do not derive from a general quirk of presupposition projection: in (19), there is no clear contrast between the ellipsis construction and its fully explicit equivalent, as both trigger a presupposition that John cheated on the exam.

(19) In my study group,

a. Mary regrets cheating on the exam, but John doesn't.

b. Mary regrets cheating on the exam, but John doesn't regret cheating on the exam.

While the details won't matter until Section 6, we can posit that the representational component of ellipsis resolution is insensitive to the barred elements in (15)a'-b'-(18)a'-b' because of a rule of optional *LF deletion of a feature F under binding by an element that carries F* (Heim 2008, Stechow 2002); we will talk of feature 'deletion' without necessarily being committed to the details of this analysis.

□ Association with focus

The same generalizations hold of the bound variable readings obtained under the focus-sensitive particle *only* in (20):

(20) In my study group,

a. only Mary did her homework (... therefore John didn't do his).

a'. only Mary $\lambda i t_i$ did ~~her~~_i homework

a". Mary did her homework and the others didn't do her homework.

=> no bound variable reading

b. only I did my homework

b'. only I $\lambda i t_i$ did ~~my~~_i homework

b". I did my homework and others didn't do my homework.

=> no bound variable reading

(21) *Context*: There is a swimming competition by teams of various sizes. Four German swimmers form a team, as does a single French swimmer.

a. Only the German swimmers think that they are the best (... therefore the French swimmer doesn't think that

he is the best).

a'. only the German swimmers $\lambda i t_i$ think that ~~they~~_i are the best.

a". The German swimmers think that they are the best and the French swimmer doesn't think that they are the best.

=> no bound variable reading

b. Only the French swimmer thinks that he is the best.

b'. only the French swimmer $\lambda i t_i$ thinks that ~~he~~_i is the best

b". The French swimmer thinks that he is the best and the German swimmers don't think that he is the best.

=> no bound variable reading

In each of these cases, there is no inference that the alternatives to the subject satisfy the presuppositions imposed by the feature of the pronoun: in (20)a, there is no inference that all group members are females; in (20)b, we certainly don't get an inference that all group members are speakers. In (21)a, there is no inference that all the alternatives to *the German swimmers* are (non-singleton) pluralities; for if this were the case, given our context the sentence would be *trivially* true rather than informative, since *the French swimmer* couldn't be an alternative to *the Germany swimmers*. Similarly, in (21)b there is no requirement that the alternatives to *the French swimmer* be singular, as this would prevent one to draw the inference that *the German swimmers don't think that they (collectively) are the best* (all we could get is an inference that no German swimmer thinks that he – singularly – is the best, but this is insufficiently informative: if the German swimmers are egalitarian-minded, we can still draw from (21)b the inference that they don't think that they, collectively, are the best).

Here too, it would seem that other presupposition triggers pattern differently from *phi*-features:

(22) In my study group,

a. only Mary regrets cheating on the exam.

=> other members [possibly: all other members] of my study group cheated on the exam.

b. Mary regrets cheating on the exam but the others don't regret cheating.

=> other members [possibly: all other members] of my study group cheated on the exam.

Theory-neutrally, we get the same kind of inferences in (22)a as we do in (22)b – possibly that all the other group members satisfy the presupposition of *regret cheating on the exam*, and hence cheated on the exam.⁶ This is in sharp distinction to the case of (20)a"-b" and (21)a"-b", which do not behave like (20)a-b and (21)a-b respectively: the latter have a bound variable reading in which the *phi*-features can presumably be ignored, but the former do not have such a possibility.

The full analysis of focus-sensitive constructions goes beyond the present paper. Suffice it to say that a rule with the effects stated in (23) would have roughly correct results in standard presuppositional examples, such as (22), but not in (20)-(21).⁷

(23) $[[\text{only DP}_F \text{ VP}]]^{f,s,w} = \#$ iff (i) $[[\text{DP VP}]]^{c,s,w} \neq 1$, or (ii) for some object x such that x is an alternative to $[[\text{DP}]]^{c,s,w}$ in the context of speech c , $[[\text{VP}]]^{c,s,w}(x) = \#$. If $\neq \#$, $[[\text{only DP}_F \text{ VP}]]^{f,s,w} = 1$ iff for every object x such that x is an alternative to $[[\text{DP}]]^{c,s,w}$ in c , $[[\text{VP}]]^{c,s,w}(x) = 0$.

Clause (23)(i) requires that *only DP_F VP* presupposes that *DP VP* – hence in (22)a a presupposition that Mary regrets cheating on the exam. Clause (23)(ii) requires that every alternative to the subject should satisfy the presuppositions of the predicate – hence a requirement in (22)a that every member of my study group cheated on the exam. If the gender features of *her* were interpreted in (20)a, we would obtain a presupposition that every member of my study group is female – which is incorrect.

When we turn to ASL and LSF, it will prove difficult to test examples such as (18)b and (21)b, where it is a singular feature that must be disregarded. The reason is that what might initially be described as a singular pronoun appears in both languages to have plural-denoting uses; an example from ASL is

⁶ We are glossing over some complexities of *regret*, in particular the fact that *John regrets Q-ing* plausibly presupposes lexically that *John believes that he Q-ed*; a step of further strengthening is then needed to derive the inference that John *in fact* Q-ed. In our context, the latter presupposition is rather clear, and hence we don't discuss how it is obtained from the weaker presupposition. (Note that we selected *regret* as a trigger because it triggers rather strong presuppositions.)

⁷ See Schlenker 2009 (Appendix E) for a discussion of presupposition projection under *only* which is broadly compatible with this analysis.

given in (24), where the matrix subject is clearly plural but the embedded subject can be either plural or singular.⁸

(24) *Context*: Tomorrow there is an individual swim competition among 10 swimmers.

THREE-arc_a SWIMMER ALL THINK __ WILL BLOW-AWAY MOST OTHER SWIMMER

a. 7 __ = IX-a

b. 7 __ = IX-arc-a

'Three swimmers think that they will dominate most other swimmers.' (14, 181; 14, 182; 14, 192)

This will leave us with examples such as (18)a and (21)a. Due to the interpretive contrast between the elided sentence in (18)a and its unelided counterpart in (18)a", the former sentence is a fairly convincing case of an uninterpreted feature. But things are different for (21)a, as the paraphrase in (21)a" is by no means syntactically minimal. In fact, it has been argued on independent grounds that the meaning of plural features is semantically underspecified, and allows plural variables to range over singleton individuals, as is the case in (25) – which is falsified if at least one of my students solved *one or several* difficult problems.

(25) None of my students has solved difficult problems (Spector 2007)

The non-singularity inference is thus taken by several authors (e.g. Sauerland 2005, Spector 2007) to be a pragmatic inference rather than a semantic one. Importantly, this singularity inference is not expected to arise in the scope of negative operators; and since *only* displays the behavior of such an operator (for instance in its ability to license NPIs in English), we will not learn much from the appearance of plural loci under *ONLY* in sign language; by contrast, ellipsis environments will prove informative.

3 Uninterpreted plural features

We start by considering uninterpreted instances of plural features of the *arc* variety [= produced with a semi-circular motion of the index finger], which were shown in Schlenker et al., to appear, to have some iconic uses. (We will argue in Section 6 that the failure of certain control conditions suggests that one should not conclude that feature specifications of loci display in every respect the behavior of phi-features, but just that they are separable from the loci they appear on.) As announced above, if sign language plural features have the same underspecified semantics as spoken language plural features, the ellipsis test will be more informative than the *only* test (though we include both).

3.1 Uninterpreted plural features in ASL

We considered two tests that arguably involve ellipsis because they involve a missing VP: sentences of the form *DP SAME*⁹, and sentences of the form *DP NOT* (the target sentences were part of larger paradigms; we come back to relevant points of comparison in Section (6), where the crucial judgment tasks were iterated several times).¹⁰

(26) *Context*: Tomorrow there is a swimming competition. A team of 6 French swimmers competes against a single German swimmer.

7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT IX-arc-a. IX-b¹¹ GERMAN SWIMMER
SAME-a,b.

⁸ Note that this example does not involve Role Shift.

⁹ We primarily tested the agreeing version of *SAME* (with a Y shape, sometimes glossed as *SIMILAR*, as in <http://www.signingsavvy.com/sign/SIMILAR/17/1>). Initial tests with an alternative, non-agreeing version of *SAME* (with two index fingers brought together, as in <http://www.signingsavvy.com/sign/SAME/368/1>) yielded similar results (17, 25; 17, 26).

¹⁰ Because the sentences in (26) and (27) were parts of longer paradigms involving possessives, the semantic questions were stated in a broad enough way to apply to these other cases as well, namely: *do we infer that the German swimmers like [or: do NOT like] (i) people who support their own team? (ii) people who support the French team?* We asked more specific questions (with a singular *the German swimmer* etc) in related tests that also showed a bound variable reading to be available (e.g. 14, 229; 14, 230; 17, 2 for *SAME*; 17, 23; 17, 24 for *NOT*).

¹¹ IX-b seems to be partly merged with *GERMAN*.

Preferred reading: bound variable (= the German swimmer likes people who support him)
 'The 6 French swimmers like people who support them. The German swimmer does, too.'
 (17, 37; 17, 39; 17, 60; 17, 68; 17, 140)

- (27) *Context:* Tomorrow there is a swimming competition. A team of 6 French swimmers competes against a single German swimmer.

7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **IX-arc-a**. IX-b GERMAN SWIMMER NOT.
 Preferred reading: bound variable (= the German swimmer does not like people who support him).
 'The 6 French swimmers like people who support them. The German swimmer doesn't.'
 (17, 36; 17, 38; 17, 59; 17, 67; 17, 139)

We believe it is important not to draw inferences on the basis of *SAME* alone. The reason is that *SAME* could be construed as a predicate meaning *is similar* (in fact, *SIMILAR* is a standard gloss); if so, the construction under study might not involve VP ellipsis at all, but just some implicit arguments needed to determine to whom and in what respects the individual argument of *SAME* is similar. The difference matters: as we saw in Rooth's contrast between (16)b and (16)c, non-elliptical constructions with *same* do not always offer a good diagnostic of the presence of bound variables. We will see in Section 6.1 that the presence of a bound variable in the antecedent is in fact crucial to obtain a salient bound variable reading, which might alleviate the worry. Still, missing VPs with *NOT* offer a useful complement to constructions based on *SAME*; this is because it is implausible that *NOT* on its own is a predicate: it is very likely that such constructions do involve a missing VP after the negation, which makes an ellipsis-based analysis rather plausible.

While the context and the use of the singular pronoun *IX-b* made it clear that there was a single German swimmer, the semantic question following was (erroneously) stated with a plural (= *do we infer that the German swimmers like [or: do NOT like] (i) people who support their own team? (ii) people who support the French team?*). It is thus worth noting that the bound variable reading was also available in examples that were constructed a bit differently: in (28) and (29), the context was heavily biased in favor of a bound variable reading, and the sentences were acceptable; and when their interpretation was checked (with a singular, this time: *do we infer that the German swimmer, etc.*), it was indeed a bound variable one.

- (28) *Context:* Tomorrow there is a swimming competition. A team of 11 French swimmers competes against a single German swimmer.

RS _____
 EVERYONE LIKE WHAT PEOPLE LIKE IX-1. SO

IX-arc-a 11 FRENCH SWIMMER LIKE PEOPLE SUPPORT IX-arc-a. [THAT GERMAN SWIMMER]_b
 SAME-a,b.

Preferred reading: bound reading

'Everybody likes people who like him. So the 11 French swimmers like the people who support them, and that German swimmer does too.'
 (14, 227; 14, 228; 17, 1)

- (29) *Context:* Tomorrow there is a swimming competition. A team of 11 French swimmers competes against a single German swimmer.

RS _____
 [FRENCH PEOPLE]_a LIKE WHAT PEOPLE LIKE IX-1. WAIT(ONE) OPPOSITE COMPARE
 [GERMAN PEOPLE]_b OFTEN HATE SELF-b.
 RS _____
 IX-b LIKE WHAT PEOPLE LIKE OTHER PEOPLE. SO

IX-arc-a 11 FRENCH SWIMMER LIKE PEOPLE SUPPORT IX-arc-a. IX-b GERMAN SWIMMER NOT.

Preferred reading: bound variable

'French people like people who like them, whereas Germans are often self-hating. So the 11 French swimmers

like people who support them, but the Germanswimmer doesn't'
(17, 23; 17, 24)

For completeness, we show that similar data can be found with *only* constructions, although for reasons outlined above (= the weak semantics of plurals in downward-monotonic environments) this is not particularly informative.

- (30) *Context*: Tomorrow there is a swimming competition. A team of 11 French swimmers competes against a single German swimmer.

RS _____

[FRENCH PEOPLE]_a LIKE WHAT PEOPLE LIKE IX-1. WAIT(ONE) OPPOSITE COMPARE
[GERMAN PEOPLE]_b OFTEN HATE SELF-b.

RS _____

IX-b LIKE WHAT PEOPLE LIKE OTHER PEOPLE. SO
ONLY IX-arc-a ELEVEN FRENCH SWIMMER LIKE PEOPLE SUPPORT IX-arc-a.

Preferred reading: bound variable

'French people often like themselves. By contrast, German often hate themselves. For this reason, only the eleven French swimmers like people who support them.'

(14, 241; 14, 242; 17, 11; 17, 20)

3.2 *Uninterpreted plural features in LSF*

We now extend our main results to LSF. There were some non-trivial differences of judgments between our two LSF informants when it came to bound variable readings. One, IJ, freely accepted bound readings in sentences that neither involved reflexive pronouns nor Role Shift, a context-shifting operation whereby the signer adopts another character's perspective. The other informant, IH, often dispreferred bound readings, unless Role Shift or a reflexive was used. Importantly, the preference for strict readings was found even in the absence of any feature mismatch.¹² As we will see in Section 4.2, however, the same signer allowed for bound variable readings with feature mismatch when reflexives were used with high loci. But this measure couldn't easily be used here, as he does not distinguish between a singular and a plural form of the reflexive.¹³ Thus in the rest of this section, we will focus on IJ's judgments, and

¹² An example of the difference between IH and IJ is given in (i) and (ii) [the context involves several German swimmers because we were interested in a contrast between cases in which the first sentence started with the plural *PERSON-pl_b*; for neither informant was there any contrast between the cases with and without feature mismatch).

Context [= the same for (i) and (ii)]: There is a swimming competition by teams. The French team has only 1 member. The German team has 4.

- (i) PERSON_b SWIM GERMAN THINK IX-b SWIM GOOD. PERSON_a SWIM FRENCH SAME.

IH: strict reading [3 iterations]; IJ: bound variable reading [1 iteration]

'A German swimmer thinks that he swims well. The French swimmer does, too.'

(30, 87; 30, 89; 30, 11; 31, 10; 31, 27)

- (ii) PERSON_b SWIM GERMAN THINK IX-b SWIM GOOD. PERSON_a SWIM FRENCH NOT.

IH: strict reading [3 iterations]; IJ: bound variable reading [1 iteration]

'A German swimmer thinks that he swims well. The French swimmer doesn't.'

(30, 88; 30, 90; 30, 116; 31, 11; 31, 28)

(While the data above seem robust for IH, he did occasionally obtain bound variable readings in the absence of Role Shift or of a reflexive, hence more work is needed on this issue.)

¹³ One could explore a slightly different strategy in future research. While for IH the reflexive pronoun appears to be number-neutral, it can co-occur with a normal plural pronoun, as shown by the rating in (ib').

- (i) a. 5^{IH} SARKOZY LIKE SELF-a.
b. 4.5^{IH} SARKOZY LIKE IX-a SELF-a.
a'. 1.5^{IH} PERSON-rep POLITICIAN LIKE SELF-a.
b'. 6^{IH} PERSON-rep POLITICIAN LIKE IX-arc-a SELF-a.
(31, 8; 31, 9; 31, 26)

corresponding add *IJ* as a superscript on the ratings (we made this decision because we do not have examples combining plurals and reflexives, as would have been necessary to force bound variable readings for IH; note that it would be important in the future to establish, as we have assumed here, that the IH displays a *general* preference for strict reading irrespective of the existence of a feature mismatch: if feature mismatch contributes to this preference, this will somewhat weaken the point of this section. We come back to this point in the conclusion.)

As was the case in ASL, we explored two environments that might involve ellipsis, involving *SAME* and *NOT* (as in ASL, we think that the environments with *NOT* are more crucial tests than those with *SAME*).

- (31) *Context*: There is a swimming competition by teams. The French team has a member. The German team has four.

7^{IJ} FOUR SWIM_b GERMAN THINK IX-arc-b SWIM GOOD. PERSON SWIM FRENCH SAME.

Reading^{IJ}: bound variable

'The four German swimmers think that they swim well. The French swimmer does not.'

(29, 16; 29, 18; 30, 26; 30, 75; 30, 113 [IH 29, 29; 30, 85])

- (32) *Context*: There is a swimming competition by teams. The French team has a member. The German team has four.

6.5^{IJ} FOUR SWIM_b GERMAN THINK IX-arc-b SWIM GOOD. PERSON SWIM FRENCH NOT.

Reading^{IJ}: bound variable¹⁴

'The four German swimmers think that they swim well. The French swimmer does not.'

(29, 17; 29, 19; 30, 27; 30, 76; 30, 114 [IH: 29, 30; 30, 86])

- (33) *Context*: There is a swimming competition by teams. The French team has a member. The German team has four.

7^{IJ} FOUR PERSON-pl SWIM_b GERMAN ONE PERSON SWIM FRENCH ONLY IX-arc-b THINK IX-arc-b SWIM GOOD.

Reading^{IJ}: bound variable available (not necessarily the only available reading)¹⁵

'Only the four German swimmers think that they swim well.'

(30, 81; 30, 82; 30, 120 [IH 30, 93])

We conclude that with respect to ellipsis and focus tests, ASL informant JL and LSF informant IJ allow for bound variable readings that require that a feature be disregarded (IH's preference for strict readings made it hard to test this phenomenon with him). It might thus be tempting to conclude that ASL and LSF plural features behave *in every respect* like their English counterparts. But as we saw at the outset this isn't the case: when they are embedded within each other, plural ASL and LSF loci give rise to

Thus one could attempt to force bound variable readings while investigating cases of number mismatch by

¹⁴ Due to a typo in our written semantic question, the question involved an erroneous double negation for the bound variable option, namely: 'does one understand that the French swimmer does not think that he himself swims badly' (we meant 'well'). But it is clear in the LSF video recordings of IJ's answer that he understood the question as we meant it (29, 19; 30, 27; 30, 76; 30, 114).

¹⁵ The same problem as in fn. 14 arose when we first tested the sentence with IJ (30, 82), and it was corrected in the second test (30, 120). In the first trial, IJ took the sentence to be ambiguous; but unlike what the case in the videos discussed in fn. 14, he did not paraphrase the two readings, and hence it is not possible to check exactly how he understood the semantic question.

Due to a typo in our written semantic question, the question involved an erroneous double negation for the bound variable option, namely: 'does one understand that the French swimmer does not think that he himself swims badly' (we meant 'well'). But it is clear in the LSF video recordings of IJ's answer that he understood the question as we meant it (29, 19; 30, 27; 30, 76; 30, 114).

'complement set' readings that are not available in English. Thus the conclusion should be that *despite* their ability to give rise to 'iconic' readings, plural ASL and LSF loci also display the formal behavior of *phi*-features. (As we will see in Section 6, we will not be able to conclude that they necessarily *are* features, but at least that they must be *separable* from the loci they apply to.)

4 Uninterpreted Height Features

While plural loci have a clear counterpart in English, this is not the case of high and low loci. We now suggest that these have in some respects the behavior of *phi*-features. First, as argued in Schlenker et al., to appear, their detailed semantics is (in on informant's ASL) reminiscent of that of gender features. Second, as we argue in this piece, height specifications can be ignored in ellipsis and focus-sensitive constructions.

4.1 Height Features in ASL

4.1.1 Detailed Semantics¹⁶

The lexical entry Schlenker et al. (to appear) gave for height specifications was indexical: in each case, the denotation of the relevant variable is constrained to have a certain property *in the world of the context c* rather than in world of evaluation *w* (the indexical ingredient of the rule is encoded in the underlined part of (34): the measure function h_c provided by the context *c* measures the height of denotations *in world c_w of the context c*). In this respect, the rule was modeled after a simple analysis of gender features, given in

- (34) Let *c* be a context of speech, *w* a world, and *s* be an assignment function (with c_a = the author of *c*; c_w = the world of *c*).

If *f* is a feminine feature and *i* is in index,

$[[\text{pro-}f_i]]^{c,s,w} = \#$ iff $s(i) = \#$ or **$s(i)$ is not female in the world of *c***. If $[[\text{pro-}f_i]]^{c,s,w} \neq \#$, $[[\text{pro-}f_i]]^{c,s,w} = s(i)$.

The indexical nature of this rule made an important difference in intensional environments, as shown for gender features in (35):

- (35) Bill wore a dress and make-up and John didn't realize that he was a man. He said that he/#she looked great and that he/#she was staring at him. (Sharvit 2008)

The embedded pronouns *he/#she* have the semantics of variables, and given the discourse they refer to the individual Bill. If the feminine features were interpreted with respect to the world of evaluation, we would obtain a 'de dicto' reading and *she* would be acceptable, contrary to fact. The data thus suggest that these features are interpreted with respect to the world of the actual context (of speech) rather than with respect to the worlds (or contexts) compatible with what John said.

Schlenker et al. (to appear) argued that in their ASL data high loci have an analogous behavior: in (36)a, the 'high locus' component of *IX-b* can apparently not be read *de dicto*, for if it were, the discourse should make perfect sense given the first sentence. The judgments can be explained if the 'high locus' component is obligatorily read *de re*, as is predicted by the indexical lexical entry in (34):

- (36) POSS-1 COUSIN IX-a WRONGLY THINK POSS-1 YOUNG BROTHER TALL. IX-a THINK IX-b^{high/normal} BASKETBALL PLAYER.
 'My cousin wrongly think that my younger brother is tall. He thinks he is a basketball player.' (10, 66; 67; 11, 11; 11, 79)
 a. 3 High locus
 b. 7 Normal locus

If *WRONGLY THINK* in (37) is replaced with *KNOW*, the sentence becomes acceptable with a high locus:

- (37) POSS-1 COUSIN IX-a KNOW POSS-1 YOUNG BROTHER TALL. IX-a WRONGLY THINK IX-b^{high/normal} BASKETBALL PLAYER. (10, 68; 69; 11, 12; 11, 80)
 'My cousin knows that my younger brother is tall. He wrongly thinks he is a basketball player.'

¹⁶ This section directly borrows its material from Section 3.3. of Schlenker et al., to appear.

- a. 7 High locus
- b. 7 Normal locus

This is as expected given our semantics: the first sentence of (37) is factive, unlike its counterpart in (36); as a result, it establishes that the brother is tall in the world of the context, which licenses the use of a high locus in the second sentence.

As noted in Schlenker et al., to appear, the indexical analysis of gender features encounters difficulties in more involved examples, such as (38):

(38) My students wrongly think that I have a sister, and they are convinced that she is basketball player.

The problem is that the first sentence establishes that the speaker has no sister, and hence it isn't clear what it means for the denotation of the pronoun to be female *in the actual world* (which individual is the pronoun supposed to denote in that world?). An analysis is needed to explain why this case allows for something more than the *de re* reading we posited for our earlier examples. Descriptively, it appears that when the antecedent of the pronoun has no existential import with respect to the actual world, the gender features of the pronoun can be interpreted with respect to counterfactual worlds. The analysis of this phenomenon is a matter of debate (see Yanovich 2010 and Sudo 2012 for recent discussions). But it is interesting to note that the same data and hence difficulties arise with high loci, as shown by (39); importantly, the 4-sentence set was signed on a single video, and judgments were thus obtained in a contrastive fashion.

- (39) a. POSS-1 BROTHER SHORT BUT POSS-1 STUDENT IX-arc-a THINK POSS-1 BROTHER TALL. IX-arc-a THINK IX-a^{high / normal} BASKETBALL PLAYER.
'My brother is short, but my students think my brother is tall. They think he is a basketball player.' (10, 81; 82; 96; 11, 14; 11, 22; 11, 81)
1. 4 High locus
2. 7 Normal locus
- b. IX-1 HAVE NO BROTHER, BUT POSS-1 STUDENT IX-arc-a THINK IX-1 HAVE TALL BROTHER. IX-arc-a THINK IX-b^{high / normal} BASKETBALL PLAYER.
'I have no brother, but my students think I have a tall brother. They think he is a basketball player.'
1. 7 High locus
2. 5.8 Normal locus

The judgments in (39)a replicate the type of paradigm we saw in (36): a *de dicto* interpretation of the contribution of the high locus appears to be degraded. By contrast, when the antecedent has no existential import with respect to the actual world, the *de dicto* interpretation becomes available: in (39)b1, the 'high locus' component of IX-b is interpreted relative to the worlds compatible with respect to the students' beliefs.

Importantly, the semantic results discussed in this section show that there is a non-trivial interpretive property – namely, an indexical interpretation in some cases but not in others – which is common to height specifications and to gender features. While the results reported in Schlenker et al., to appear, were stable for one ASL signer, they would need to be replicated with other ASL signers, and they have yet to be tested in LSF or other sign languages. But even if the generalization could be established more strongly, it wouldn't prove that height specifications are the formal analogues of *phi*-features, only that they have an indexical semantics which is reminiscent of it. It is thus interesting to ask whether height specifications of loci give rise to agreement-like phenomena, as *phi*-features do. We now turn to ellipsis and focus constructions and suggest that in these environments height specifications can be semantically ignored while morphologically present, just like *phi*-features.

4.1.2 Ellipsis and focus constructions

Strikingly, we obtain the same pattern with mismatched height specifications of loci under ellipsis-like constructions with (the agreeing form of) *SAME* and with *NOT*; for reasons noted above, we take the facts with *NOT* to be of greater theoretical import.¹⁷ In all cases, we find the same generalization:

¹⁷ Slightly different results were obtained when agreeing *SAME* was replaced with a non-agreeing form:

–Both a high locus and a normal locus are acceptable to refer to the giant. Using a low locus is of course degraded.

–The preferred reading of *SAME*, *NOT* and *ONLY* constructions is the bound variable one, even when a high locus is used – despite the fact that this reading requires that the high locus specification should be disregarded when the VP denotation takes as an argument the German dwarf.

- (40) *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.
 [FRENCH VERY HEIGHT¹⁸ MAN]_a LIKE PEOPLE SUPPORT **IX-a**. IX-b GERMAN DWARF_b SAME-a,b.
 a. 7 **IX-a** = high locus
 Preferred reading: bound variable
 b. 7 **IX-a** = normal locus
 Preferred reading: bound variable
 c. 4.5 **IX-a** = low locus
 Preferred reading: bound variable
 (17, 62; 17, 65; 17, 75)
- (41) *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.
 [FRENCH VERY HEIGHT MAN]_a LIKE PEOPLE SUPPORT **IX-a**. IX-b GERMAN DWARF NOT.
 'The very tall French man likes people who support him. The German dwarf doesn't.'
 a. 7 **IX-a** = high locus
 Preferred reading: bound variable
 b. 7 **IX-a** = normal locus
 Preferred reading: bound variable
 c. 5 **IX-a** = low locus
 Preferred reading: bound variable
 (17, 61; 17, 64; 17, 69; 17, 141)
- (42) *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.
 COMPARE [FRENCH VERY HEIGHT MAN]_a [GERMAN DWARF]_b ONLY HEIGHT_a LIKE PEOPLE SUPPORT **IX-a**.
 'Comparing the very tall French man and the German dwarf, only the tall man likes people who support him.'
 a. 7 **IX-a** = high locus
 Preferred reading: bound variable
 b. 7 **IX-a** = normal locus
 Preferred reading: bound variable
 c. 5 **IX-a** = low locus
 Preferred reading: bound variable
 (17, 71; 17, 72; 17, 98; 17, 142)

(i) [FRENCH VERY TALL MAN]_a LIKE PEOPLE SUPPORT **IX-a**. IX-b GERMAN DWARF SAME.

a. 6 **IX-a** = high locus

Preferred reading: Session 1: bound variable; Session 2: strict

b. 6 **IX-a** = normal locus

Preferred reading: Session 1: bound variable; Session 2: bound variable or strict

c. 3.5 **IX-a** = low locus

Preferred reading: bound variable

(17, 63; 17, 66; 17, 76)

¹⁸ We asked the signer to use the vertical version of the sign for *MEASURE* rather than the standard word for *TALL* (seen for instance at <http://www.signingsavvy.com/search/tall>). The reason was that the latter sign involves a movement upwards and could be taken to introduce a morphological bias in favor of high loci. This is not the case of the sign used here.

4.2 Height Features in LSF

As noted, one of our LSF informants has a strong preference for strict readings unless one uses a reflexive pronoun or resorts to Role Shift; while he initially found the latter less than perfect in the third person (preferring strategies with Role Shift and a 1st person reflexive pronoun), reflexives made it possible for us to obtain data on the availability of bound variable readings from both of our LSF informants (importantly, just like normal pronouns, reflexive pronouns can index high, low or normal loci in LSF¹⁹).

Examples with missing VPs give rise to the same generalizations as in ASL: bound readings are possible (in fact, due to the presence of the reflexive, they appear to be obligatory); and they do arise in the presence of a high locus specification which must be ignored when the VP denotation takes as argument a dwarf. By contrast with our ASL data, where use of the high locus was optional and a normal locus could be used as well, high loci appear to be preferred in this case in our LSF data.

- (43) GIANT_a LIKE **SELF-a**. DWARF_b SAME.
'The giant likes himself. The dwarf does, too.'

a. 6 (6.2) **SELF-a** = high locus
Bound variable reading in 2 trials out of 3
b. 4 (4) **SELF-a** = normal locus
Bound variable reading in 2 trials out of 3
c. 1.3 (1.2) **SELF-a** = low locus
Bound variable reading in 2 trials out of 3
(28, 58; 28, 59; 28, 80; 31)

- (44) GIANT_a LIKE **SELF-a**. DWARF_b NOT.
'The giant likes himself. The dwarf doesn't.'

a. 6 (6.2) **SELF-a** = high locus
Bound variable reading in 2 trials out of 3
b. 4 (4) **SELF-a** = normal locus
Bound variable reading in 2 trials out of 3
c. 1.3 (1.2) **SELF-a** = low locus
Bound variable reading in 2 trials out of 3
(28, 60; 28, 61; 28, 81; 31, 2)

- (45) GIANT_a DWARF_b IX-a ONLY LIKE **SELF-a**.

a. 6 (6.2) **SELF-a** = high locus
Bound variable reading in 2 trials out of 3
b. 4 (4) **SELF-a** = normal locus
Bound variable reading in 2 trials out of 3
c. 1.3 (1.2) **SELF-a** = low locus
Bound variable reading in 2 trials out of 3
(28, 62; 28, 63; 28, 82; 31, 3)

Our data thus suggest that when bound variable readings are available to begin with, they remain available in case a high locus specification must be disregarded by ellipsis resolution or focus computation, which makes these specifications similar in this respect to *phi*-features.

5 Correlating iconic use and feature deletion

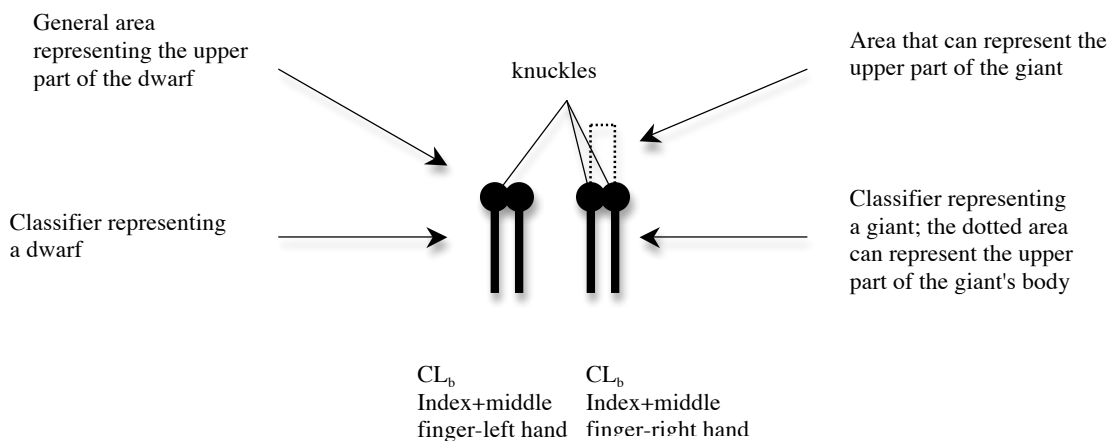
In Section 4, we only investigated high, normal and low locus specifications. But if iconic analyses are on the right track, there should be many further positions in which loci can in principle appear. In this section, we investigate ASL and LSF examples that make full use of the projective properties of loci; and we

¹⁹ This holds in ASL as well; the data we have in this respect parallel those with non-reflexive pronoun that were discussed in Section 4.1.2. ASL reflexive pronoun with height specifications are discussed in Section 5.1 below.

correlate this use with contexts of feature deletion, in order to drive home the point that one and the same token can simultaneously display a highly iconic and a highly grammatical behavior. This was achieved by considering sentences in which (i) the individuals mentioned are in various positions, represented by finger classifiers [so as to see the effect of fine-grained geometric requirements on the mapping between loci and their denotations], (ii) individuals of various heights are mentioned [so as to rule out a superficial analysis in terms of the morphology of the classifier rather than its denotation], and (iii) a clause with ellipsis is added which could not be interpreted without a process akin to feature deletion. For reasons we will come to, our paradigms are a bit clearer in LSF than in ASL.

In order to motivate the discussion of people in odd positions, we considered situations in which astronauts had to train in a variety of positions. The situations involved a tall and a short astronaut, each represented (in each language) by a two-finger classifier, as in (46). We then described minimally different situations in which the individuals' bodies were rotated in different ways; we wanted to see whether the points indexed would then be displaced in accordance to a geometric projection.

(46) Giant and dwarf: schematic representation (from the signer's perspective)



In line with (12)a, we will assume that a pronoun usually points towards the area of a locus which is the projection of the *upper part* of the body of the denoted individual. As a result, we expect that when the latter is rotated, so is the point targeted by the pronoun. We will argue that this is indeed the case.

5.1 Deletion of iconic features in ASL

We start with the ASL paradigm in (47) (the first two sentences, which just set up the context, were signed once per video; the rest – starting with *IX-a HEIGHT* – was signed in versions a. and b.)²⁰:

(47) HAVE TWO ROCKET PERSON ONE_a HEIGHT_a ONE_b SHORT_b. THE-TWO-a,b PRACTICE DIFFERENT VARIOUS-POSITIONS [positions shown].

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

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

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

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

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

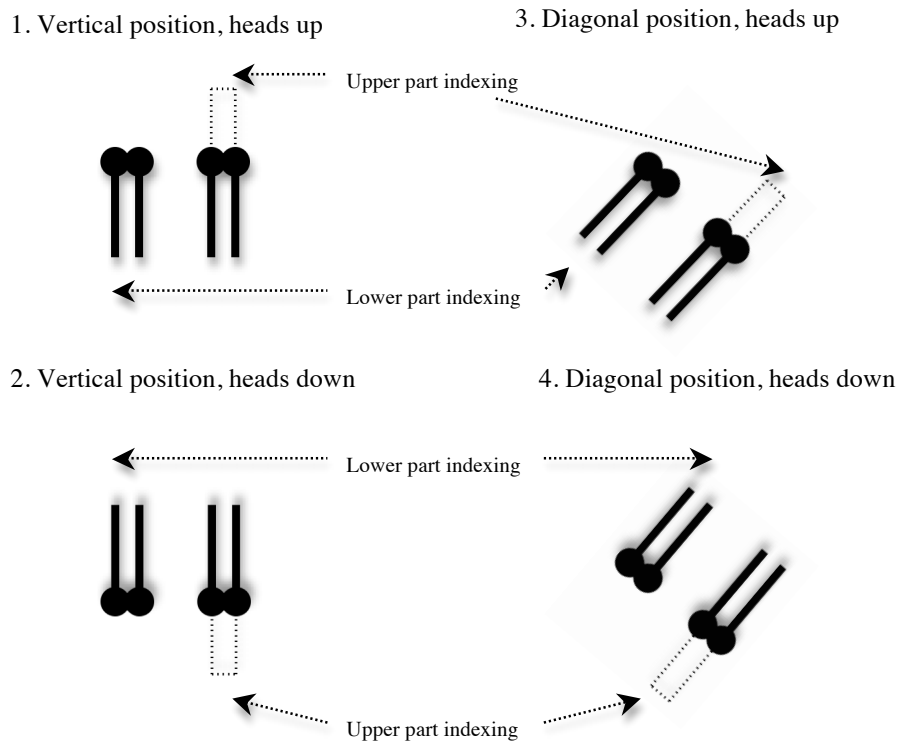
b. [intended:] The tall one liked himself. The short one didn't like himself.'

(17, 178; 17, 179; 17, 180; 17, 181)

²⁰ Thanks to Jon Lamberton for help with the gloss.

Our goal was to show that (i) 'tall person' indexing could be higher than 'short person' indexing; that (ii) 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; and that (iii) this 'upper part of body' position could be ignored in the course of ellipsis resolution. Thus (47) (i) makes reference to a giant and a dwarf, and (ii) they are rotated as shown in (48); finally, (iii) the comparison between the second sentence of (47)a and the second sentence of (47)b makes it possible to assess whether copying the height features of the first sentence could yield to an interpretable result. We have displayed in (48) the approximate target of upper part vs. lower part indexing in the various situations.

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



(49) Results

	Readings	1. Vertical, heads up	2. Vertical, heads down	3. Diagonal, heads up	4. Diagonal, heads down
a. IX-b_lower_part NOT	bound variable (all cases)	6	6	7	6
b. IX-b_lower_part NOT LIKE SELF-b_upper_part	bound variable (all cases)	3	4	3	4
Videos		17, 178; 17, 182	17, 179; 183	17, 180; 17, 184	17, 181; 17, 185

In the first sentence of each discourse (= *IX-a_upper_part LIKE SELF-a_upper_part*), the upper part of the locus is targeted by the pronoun *IX-a* and by the reflexive *SELF-a*. Importantly, however, it is not the case that the target locus is 'high' in all cases: as the denoted person is rotated, so is the structured locus (namely *a*) that denotes it – and as result, in 'upside down' situations the upper part of the locus is in fact *low* in signing space. The second sentence of each discourse comes in two versions, both starting with a subject pronoun (namely *IX-b_lower_part*) that targets the 'lower part' of locus *b* to denote a short person. In the first version (= a. in (47) and (49)), a bare negation *NOT* is found – presumably followed by an elided VP. The result is in all cases rather acceptable. In the second version (= b. in (47) and (49)), a full VP is found with a reflexive with an 'upper part' specification copied from the antecedent clause. This gives

rise to a mismatch between the height specification of the subject *IX-b_lower_part* of the second clause and its object pronoun *SELF-b_upper_part* – and the result is in all cases deviant.

In this paradigm, then, (i) the locus *a* is used iconically, in the sense that its position in signing space depends on the precise position of the upper part of the body of the denoted individual. Furthermore, (ii) this does not seem to be the result of a purely morphological requirement whereby a particular part of the two-finger classifier must systematically be used for purposes of anaphora, since different levels can be targeted depending on whether the denoted individual is tall or short. Finally, (iii) the height specification of locus *a* displays the behavior of a *phi*-feature in that it can be disregarded in the course of ellipsis resolution – for otherwise we couldn't explain the contrast between (47)a and (47)b (at least on the assumption that ellipsis has a strong representational component).

This paradigm is by no means perfect, however.

–First, 'lower part' indexing was really quite low, as very roughly represented in (48); for instance, in the 'upright' situation, *IX-b* targets a position *under* the classifier representing the short astronaut. From an iconic perspective, this is puzzling: one would expect that when a dwarf is denoted, the part of the classifier corresponding to his head is targeted – but certainly it shouldn't be *under* the classifier position in the 'upright' situation. It is possible, of course, that the initial introduction of the two classifiers (in bold in (47)) did not provide a faithful indication of the position of the relevant structured loci; or it could be that pointing just isn't that precise in that case.

–Second, we didn't attempt to assess how good 'upper part' indexing is relative to, say, 'neutral' indexing. We tried to do so in two richer paradigms, with partly unclear results (which is why they are not reported here). In particular, it seemed that in 'vertical, heads down' situations the expected effects (whereby 'upper part' indexing should target a *lower* position than 'lower part' indexing) were at best quite weakened.

–Third, more sophisticated methods – probably experimental ones – would be needed to assess in detail which points are targeted in each case. We leave this point for future research.

5.2 Deletion of iconic features in LSF

We turn to LSF, where we partly obtained clearer results. The general context (which was not systematically repeated when the informant had seen earlier relevant examples) is described in (50):

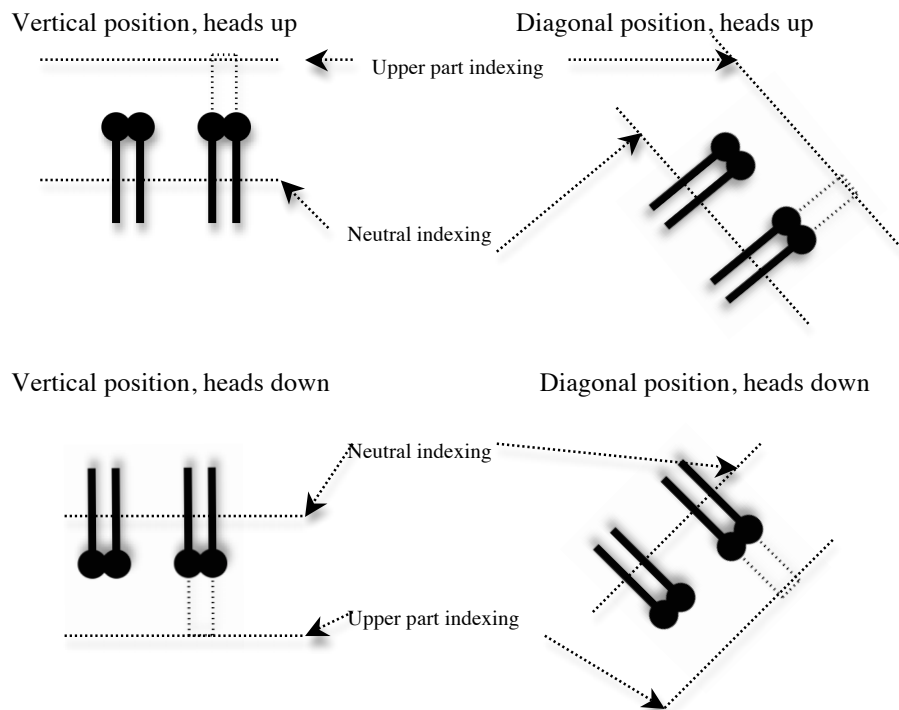
- (50) TIME TRAINING EARTH WORLD PERSON_a-moving ASTRONAUT IX-a MUST TRAIN POSITION FIXED [position 1 position 2 position 3].

'During training, astronauts must train to remain fixed in upright, horizontal, inclined, and upside down position.'

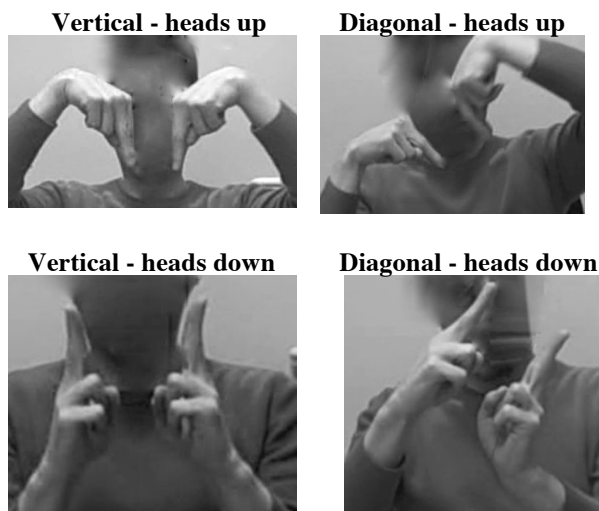
(28, 120)

In all cases, the giant classifier was on the right and the dwarf classifier was on the left (from the signer's perspective), as is shown in (51); relevant frames of the classifiers appear (from the addressee's perspective) in (52).

(51) Giant and dwarf: rotations – schematic representation from the **signer's perspective**



(52) Giant and dwarf: video frames from the **addressee's perspective**



Our target sentences are in (53). The first sentence was signed once per video, followed by three versions of the second sentence (for *GIANT* and *DWARF*, we selected words that are signed at normal levels in signing space, so as not to introduce any morphological bias).

(53) *Context*: Giants are often self-satisfied.

PERSON_a GIANT CL-two_fingers-[position]_a CL-person_b DWARF CL-two_fingers-[position]_b THE-TWO-a,b
TRAIN.

CL-two_fingers-[position]_a CL-two_fingers-[position]_b. IX-a LIKE SELF-a, IX-b NOT.

(30, 62; 30, 64; 30, 65; 30, 66)

We varied two parameters in the second sentence:

(i) the position of the classifiers (= [position] in (53)), which were in vertical or diagonal position, with heads up or heads down (hence 4 positions)

(ii) the precise point targeted by the giant-denoting pronouns *IX-a/SELF-a* on the one hand and the dwarf-denoting pronoun *IX-b* on the other, with three conditions:

- a. giant = neutral; dwarf = neutral
- b. giant = upper part; dwarf = neutral
- c. giant = neutral; dwarf = upper part

(i) was similar to what we tested in ASL, except for the 'diagonal', heads down' situation (heads pointing downwards approximately 45 degrees to the right in LSF, and to the left in ASL [signer's perspective]). (ii) was somewhat different: we only tested two positions ('neutral' vs. 'upper part of the locus'): the central position remained roughly constant across conditions (towards the middle the two fingers), and the 'upper part' position was higher in the 'heads up' conditions and lower in the 'heads down' conditions. In addition, by including a 'neutral - neutral' condition, we could assess the use of 'upper body' loci in a comparative manner, with reference to the acceptability of neutral height loci.

The results are in (54); due to initial differences across our two informants, we report the results separately.²¹

(54) Results

	Readings	1. Vertical, heads up		2. Vertical, heads down		3. Diagonal, heads up		4. Diagonal, heads down	
		IJ	IH	IJ	IH	IJ	IH	IJ	IH
a. IX-a_neutral LIKE SELF-a_neutral, IX-b_neutral NOT.	bound variable (all cases)	6.3	6	6.3	6	6.7	6	6.3	6
b. IX-a_upper_part LIKE SELF-a_upper_part, IX-b_neutral NOT.	bound variable (all cases)	7	6	7	6	7	6	7	6
c. IX-a_neutral LIKE SELF-a_neutral, IX-b_upper_part NOT.	bound variable (all cases)	1	3.3	1	4	1	3.3	1	4
Videos		30, 64; 30, 67; 30, 71; 30, 124	30, 99; 31, 13; 31, 30	30, 65; 30, 68; 30, 72; 30, 125	30, 100; 31, 14; 31, 31	30, 62; 30, 63; 30, 70; 30, 123	30, 98; 31, 12; 31, 29	30, 66; 30, 69; 30, 73; 30, 126	30, 101; 31, 15; 31, 32

The following conclusions can be drawn at this point.

–For both informants, targeting the same (intermediate) position for GIANT and for DWARF is a possibility.

–For informant IJ, there was a very sharp contrast when different heights were targeted; in such cases, the giant-denoting pronoun had to target the upper part locus and the dwarf-denoting pronoun had to target the neutral locus (the approximate positions of these lines are displayed in (51)). This is as is expected on a projective analysis, since a giant is taller than a dwarf.

–For informant IH, there was such an effect in heads up positions, and the effect was less consistent in heads down positions.

²¹ The difference is primarily due to the first test with informant IH; upon the second and third tests, patterns similar to those of IJ emerged.

–In all cases, the second sentences was read with a bound variable reading. This suggests that the height features of the first reflexive could be disregarded in the elided clause. Specifically: the fact that the 'giant = neutral; dwarf = upper part' condition is worse than the 'giant = neutral; dwarf = neutral' condition suggests that one cannot use 'upper part' indexing to refer to the dwarf. But then the acceptability of the elided clause in 'giant = upper part; dwarf = neutral' condition suggests that the reflexive is in that case copied *without* its 'upper part' features.²²

To conclude this study, we asked both informants whether some body part represented the head of the dwarf, and if so which. The same types of responses were given by both informants: in the 'heads up' position, the knuckles represent the head. Interestingly, and contrary to what the simplified picture in (51) suggests, in the 'heads down' position a lower position was sometimes taken to represent the head – on the palm rather than on the fingers.²³ The explanation for this asymmetry might not be hard to find. In the 'heads up' position, the palm was flexed and thus the largest area around the fingers that could represent a straight body were the two fingers themselves. By contrast, in the 'heads down' position, the palm was in the plane defined by the two fingers, and as a result a larger area could be taken to represent a straight body. Relevant frames of the videos are represented in (52).

While they would require a more rigorous investigation, our ASL and LSF data suggest several conclusions.²⁴

1. Just considering the subject pronouns *IX-b*, which denotes the dwarf, it is clear that the point targeted by the pronoun is not at a fixed height in space, but rather that it targets a designated part of a structured locus. As the structured locus is rotated, the indexed point 'moves' in space in a corresponding fashion.
2. It is not possible to argue that in all cases this fact is purely morphological, i.e. that a classifier comes with a designated position – say the knuckles for the two-finger person classifier – which must be indexed for purposes of anaphora. The reason is that different points of the structured locus can be indexed depending on whether one refers to tall or to short people.
3. While there might be a slight preference for differential indexing across the dwarf vs. giant cases, it also seems to be possible to index both individuals in the same position relative to the classifier (roughly, the knuckle position).
4. In our examples, a reflexive *SELF-a* indexed the same position as the giant-denoting pronoun *IX-a*. In the second sentence, the subject pronoun *IX-b* had to index a position appropriate for a dwarf – and thus *IX-b* could not index a point lying too far on top of the knuckles. Nevertheless, the elided clause could be interpreted with a bound reading, *even in cases in which there was a mismatch between the position of locus a and the position that the elided pronoun SELF-b would have been expected to index.*

We conclude that in these examples we see a highly iconic use of loci, but also a rule akin to feature deletion that allows some features to be ignored in the course of ellipsis resolution.

5.3 Refining the iconic semantics

The semantics for pronouns in (11) turns out to be insufficient to handle the 'rotation' cases discussed here. The heart of the matter is that this semantics only makes reference to the preservation by the interpretation function of the relative height of loci, whereas what we need is a requirement that a structured locus should be the projection within the signing space of the object it denotes. As it happens, Schlenker et al., to appear, did have to make use of structured loci, but for another phenomenon, namely directional verbs (in this, they followed insights of Kegl 2004 and Liddell 2003). The idea was that even though pronouns usually index a *point*, the latter is part of a larger *structured locus*, hence an enrichment of theoretical framework: the idea was that assignment functions sometimes assign values to structured loci, as specified in (55).

²² We do not have an explanation for the fact that informant IH is more tolerant of the 'wrong' indexing in 'heads down' positions; but we note that instances of 'partial iconicity', whereby some rotations were not fully effected, were also found in another domain, that of directional verbs, as discussed in Schlenker et al., to appear (Section 4.2.2.).

²³ IJ and YD initially distinguished (in the same way) between the 'heads up' and 'heads down' situation. IH remained consistent. By contrast, in a separate session, IJ gave the same answer (with the knuckles representing the head) in all cases. (Target videos: 30, 62; 30, 64; 30, 65; 30, 66; judgments in videos 30, 74; 30, 102; 30, 127; 31, 33.)

²⁴ More sophisticated methods would be needed to assess in a quantitative fashion the precise points that are indexed in various conditions. For instance, in some videos it might be that the signer targeted an excessively high position in the 'dwarf - upper part' condition, which might introduce a bias in the examples.

- (55) Assignment functions assign values to **structured areas** of space ('area loci', with an intrinsic 'head' and 'foot' position) rather than to **points** of space ('point loci'). Lower-case letters (e.g. *a*) designate point loci; capital letters (e.g. *A*) designate area loci; assignment functions assign values to variables and capital letters. (We extend this notational convention to *I*, *2*, which are traditionally used to designate the speaker and addressee; we take these to stand for point loci, the corresponding area loci being *I* and *II*.) (Schlenker et al., to appear)

We will propose, as a very first approximation, the rule in (56), which in essence states that a pronoun indexing a point locus *i* will trigger a presupposition failure unless (i) the structured locus *I* is the projection onto the signing space of the denotation *s(i)* of *i* (according to some salient projection); and in addition (ii) the point locus *i* corresponds within *I* to the upper part of the body of *s(i)* according to the same projection.

(56) *Pronouns*

Let *c* be a context of speech, *s* an assignment function and *w* a world (with *c_a* = the author of *c*; *c_w* = the world of *c*). We assume that *c* determines a projection π_c from the salient situations in *c_w* to the signing space of *c_a*.

If *i* is a locus and π_c a projection from the salient situations in *c_w* to the signing space of *c_a*,

$[[IX-i]]^{c,s,w} = \#$ iff $s(i) = \#$ or [*s(i)* is human and it is not the case that (*I* is the projection of *s(i)* in the signing space of *c_a* according to π_c , and *i* is within *I* the projection of the upper part of the body of *s(i)*)]. If $[[IX-i]]^{c,s,w} \neq \#$, $[[IX-i]]^{c,s,w} = s(i)$.

With the simple assumptions in (57), we can provide a very simple illustration, as in (58)"

- (57) a. $[[like]]^{c,s,w} = \lambda x \lambda y: \#$ iff $x = \#$ or $y = \#$; 1 iff $x \neq \#$ and $y \neq \#$ and $like'_w(x)(y) = 1$
 b. For all loci *i*, $[[SELF-i]]^{c,s,w} = [[IX-i]]^{c,s,w}$

- (58) Assume that the locus *a* denotes individual *x*.

$[[IX-a \text{ LIKE SELF-}a]]^{c,s,w} = [[like]]^{c,s,w}([SELF-a]]^{c,s,w})([[IX-a]]^{c,s,w})$
 $= \#$ iff $[[SELF-a]]^{c,s,w} = \#$ or $[[IX-a]]^{c,s,w} = \#$; 1 iff $like'_w([SELF-a]]^{c,s,w})([[IX-a]]^{c,s,w}) = 1$;
 $= \#$ iff it is not the case that [the structured locus *A* is the projection of individual *x* ($= s(a)$) in the signing space of *c_a* according to π_c , and point *a* is within *A* the projection of the upper part of the body of individual *x*; if it is different from $\#$, $[[IX-a \text{ LIKE SELF-}a]]^{c,s,w} = like_w(x)(x)$.

This is very preliminary, for several reasons. First, much more would have to be said about the workings of projections, possibly using the framework of Greenberg 2012. Second, these details would be needed to ensure that (56) can capture as a special case the results about height preservation in vertical position captured by (11). Third, the problem discussed in (39) above with respect to the purely indexical (context-dependent, not world-dependent) character of (11) will arise with (56) as well. Finally, the rule we posited is both too general and too narrow: too narrow, because it only handles constraints on pronouns denoting humans; and too broad, because it assumes that all such cases involve structured loci, which is unlikely to be true. We leave the necessary refinements for future research.

6 Two Interpretations

We will now argue that these data can be interpreted in two ways, one strong and one weak. The key issue is this: in the literature, it is often implicitly assumed that rules of deletion in ellipsis and in focus environments are *characteristic* of (some) features. This incorporates two implicit claims: (i) that some features can be ignored in these environments; (ii) that non-featural elements cannot be so ignored. As we will see, there seem to be exceptions to (ii) in ASL and LSF (and we are not all certain that it fully holds of French and English either).

(59) **Strong View vs. Weak View**

Observation: In ASL and LSF, plural and height specifications can be deleted in ellipsis and *only* environments.

a. Strong View: Deletion is true of some features and of no non-featural elements. Therefore in ASL and LSF plural and height specifications of loci are features.

b. Weak View: Deletion is true of some features and possibly of some non-featural elements that are separable from variables. Therefore in ASL and LSF plural and height specifications of loci share an important property of features (their separability from the variables they appear on), but they need not be features.

As it turns out, our initial arguments do not suffice to support the Strong View. The reason is that both in ASL and LSF, some elements that are unlikely to be featural can in fact undergo deletion. We suggest that in some cases at least, a principle of 'liberal erasure', stated in (60), is at work. The same type of principle is independently – but more precisely – discussed in Sauerland 2013, as in (61):

(60) Liberal Erasure (informal version)

If the local context of a complex expression E of type e has the same denotation as a structurally simpler expression E' , then E can be replaced with E' for purposes of ellipsis resolution and alternative computation.

(61) Sauerland's hypothesis (Sauerland 2013)

"Obligatory, purely presuppositional morphemes don't contribute to alternative interpretation." Within a Roothian alternative semantics, let a be an element of type τ , and let id be the identity function for objects of type τ (we write as $id_{\langle S \rangle}$ the identity function restricted to a set S of objects of type τ , i.e. the function which is only defined over S , and which is the identity function for arguments in that set). Then:

$\llbracket a \rrbracket^{\mathbb{F}}_t = \{id\}$ if for some $S \subseteq D$ $\llbracket a \rrbracket^{\mathbb{F}} = id_{\langle S \rangle}$, or for all x in the domain of $\llbracket a \rrbracket^{\mathbb{F}}$, $\llbracket a \rrbracket^{\mathbb{F}}(x) = 1$;
 $= \{\llbracket a \rrbracket^{\mathbb{F}}\}$ otherwise.

Importantly, either version of the rule is stated in a way that does not make reference to *phi*-features per se; rather, *all* expressions that have a purely presuppositional contribution (or are in a sense 'redundant') are taken to behave on a par.

As we will see, the problem takes a different form in our ASL and in our LSF data. In ASL, our informant has subtle but stable contrasts between plural and height specifications on the one hand, and non-featural elements on the other; in LSF, our data are not fine-grained enough to display such contrasts, or these contrasts do not exist.

6.1 ASL

We have several ASL cases that initially argue for the weak interpretation of our data: in several cases, it appears that 'redundant' elements can be ignored in the case of ellipsis resolution or focus computation. An example is given in (64); the context was intended to force a bound variable reading, and to compare the behavior of the plural pronoun *IX-arc-a* (= 'them') to the complex expression *IX-arc-a 11* (= 'the 11 of them'). On the assumption that only *features* can be disregarded in the course of ellipsis resolution, we would expect a bound variable to be possible with *IX-arc-a* (because the plural features can be disregarded) but impossible with *IX-arc-a 11* (because in the latter case the presupposition induced by *11* clashes with the properties of the singular subject of the second sentence).

(62) *Context:* Tomorrow there is a swimming competition. A team of 11 French swimmers competes with a team of 12 German swimmers.

RS _____

EVERYONE LIKE WHAT PEOPLE LIKE IX-1. SO

'Every individual likes people who like him. So

a. 7 IX-arc-a 11 FRENCH SWIMMER LIKE PEOPLE SUPPORT **IX-arc-a**. IX-arc-b 12 GERMAN SWIMMER SWIMMER SAME-a,b.

the 11 French swimmers like people who support them. The 12 German swimmers do, too.'

Preferred reading: bound variable

b. 5.5 IX-arc-a 11 FRENCH SWIMMER LIKE PEOPLE SUPPORT **IX-arc-a 11**. IX-arc-b 12 GERMAN SWIMMER SWIMMER SAME-a,b.

the 11 French swimmers like people who support the 11 of them. The 12 German swimmers do, too.'

Preferred reading: bound variable

(14, 223; 14, 224; 17, 19)

(62)b appears to be somewhat degraded, but does seem to have a bound variable reading. It is clear that the numeral *11* that appears in bold in (62)b must somehow be disregarded for this reading to be obtained. The same conclusion can be reached on the basis of examples with *NOT* and *ONLY*, as in (63)b and (64)b (though in our single trial on (63)b, the strict and the bound reading were thought to be equally available).

- (63) *Context:* Tomorrow there is a swimming competition. A team of 11 French swimmers competes against a single German swimmer.

RS _____

[FRENCH PEOPLE]_a LIKE WHAT PEOPLE LIKE IX-1. WAIT(ONE) OPPOSITE COMPARE
[GERMAN PEOPLE]_b OFTEN HATE SELF-b.

RS _____

IX-b²⁵ LIKE WHAT PEOPLE LIKE OTHER PEOPLE. SO

'The French like people who like them. By contrast, the German are often self-hating. They like people who like other people. So

a. 7 IX-arc-a 11 FRENCH SWIMMER LIKE PEOPLE SUPPORT **IX-arc-a**. IX-b GERMAN SWIMMER NOT.

the 11 French swimmers like people who support them. The German swimmer doesn't.'

Preferred reading: bound variable

b.7 IX-arc-a 11 FRENCH SWIMMER LIKE PEOPLE SUPPORT **IX-arc-a 11**. IX-b GERMAN SWIMMER NOT.

the 11 French swimmers like people who support the 11 of them. The German swimmer doesn't.'

Preferred reading: bound variable or strict [= equally available]

(17, 23; 17, 24)

- (64) *Context:* Tomorrow there is a swimming competition. A team of 11 French swimmers competes against a single German swimmer.

RS _____

[FRENCH PEOPLE]_a LIKE WHAT PEOPLE LIKE IX-1. WAIT(ONE) OPPOSITE COMPARE
[GERMAN PEOPLE]_b OFTEN HATE SELF-b.

RS _____

IX-b LIKE WHAT PEOPLE LIKE OTHER PEOPLE. SO

'The French like people who like them. By contrast, the German are often self-hating. They like people who like other people. So

a. 6.3 **ONLY** IX-arc-a 11 FRENCH SWIMMER LIKE PEOPLE SUPPORT **IX-arc-a**.

only the 11 French swimmers like people who support them.'

Preferred reading: bound variable

b. 6.3 **ONLY** IX-arc-a 11 FRENCH SWIMMER LIKE PEOPLE SUPPORT **IX-arc-a 11**.

only the 11 French swimmers like people who support the 11 of them.'

Preferred reading: bound variable

(14, 241; 14, 242; 17, 11; 17, 20)

As it turns out, there is one type paradigm in which our ASL informant found stable contrasts: plural and height specifications could be ignored by ellipsis and *ONLY* constructions, while two further types of non-assertive elements couldn't. Consider for instance the case of negative ellipsis in (65):

- (65) *Context:* Tomorrow there is a swimming competition. A team of 6 French swimmers competes against a single German swimmer.²⁶

a. 7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **IX-arc-a**. IX-b GERMAN SWIMMER NOT.

Preferred reading: bound variable (all 4 trials)

b. 6.2 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **IX-arc-a SIX**. IX-b GERMAN

²⁵ Note that this is an instance of a 'singular' pronoun used with a plural denotation.

²⁶ For all sentences, the semantic question was stated as follows: " Meaning: do we infer that the German swimmers do NOT like (i) people who support their own team? (ii) people who support the French team?"

SWIMMER NOT.

Preferred reading: strict (all 4 trials)

c. 7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **THE-SIX-arc_a** IX GERMAN SWIMMER NOT.

Preferred reading: strict (all 4 trials)

a'. 7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **POSS-a TEAM**. IX-b GERMAN SWIMMER NOT.

Preferred reading: bound variable (all four trials)

b'. 6. 7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **POSS-a FRENCH TEAM**. IX GERMAN SWIMMER NOT.

Preferred reading: strict (all 4 trials)

c'. 7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **FRENCH TEAM**. IX-b GERMAN SWIMMER NOT.

Preferred reading: strict (all 4 trials)

(17, 36; 17, 38; 17, 59; 17, 67; 17, 139)

While all the sentences were deemed acceptable, their preferred readings were not the same: our informant obtained bound readings for (65)a and (65)a', and strict readings for all other cases. This is interesting: (65)a' just involves a bound variable, while (65)a involves a plural feature that must somehow be ignored by ellipsis. All other cases involve non-assertive modifiers.²⁷

In a similar context, a bound reading was also obtained in a case of height mismatch between the elided clause and its antecedent, as seen in (66): high loci behave like plurals and *phi*-features more generally rather than like non-assertive modifiers (unsurprisingly, low loci are degraded).

(66) *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.

[FRENCH VERY TALL MAN]_a LIKE PEOPLE SUPPORT **IX-a**. IX-b GERMAN SHORT NOT.

'The very tall French man likes people who support him. The short German man doesn't.'

a. 7 high locus

Preferred reading: bound variable

b. 7 normal locus

Preferred reading: bound variable

c. 5 low locus

Preferred reading: bound variable

(17, 61; 17, 64; 17, 69; 17, 141)

The same conclusions can be drawn on the basis of the sentences with *SAME* in (67)-(68).

(67) *Context*: Tomorrow there is a swimming competition. A team of 6 French swimmers competes against a single German swimmer.

a. 7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **IX-arc-a**. IX-b²⁸ GERMAN SWIMMER SAME-a,b

Preferred reading: bound variable

b. 6.2 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **IX-arc-a SIX**. IX-b GERMAN SWIMMER SAME-a,b

Preferred reading: strict

c. 7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **THE-SIX-arc_a**. IX-b GERMAN SWIMMER SAME-a,b

Preferred reading: strict

a'. 7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **POSS-a TEAM**. IX-b GERMAN SWIMMER SAME-a,b

Preferred reading: bound variable

b'. 6.7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **POSS-a FRENCH TEAM**. IX-b

²⁷ As seen in the complete ratings, our ASL informant also noted on several occasions that a strict reading was available (but less strong) for (65)a-a', and one one occasion he noted that a bound variable reading was available (but less strong than the strict reading) in (65)b.

²⁸ *IX-b* and *GERMAN* appear to be partially merged.

GERMAN SWIMMER SAME-a,b

Preferred reading: strict

c'. 7 IX-arc-a 6 FRENCH SWIMMER LIKE PEOPLE SUPPORT **FRENCH TEAM**. IX-b GERMAN SWIMMER SAME-a,b

Preferred reading: strict

(17, 37; 17, 39; 17, 60; 17, 68; 17, 140)

- (68) *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.

[FRENCH VERY TALL MAN]_a LIKE PEOPLE SUPPORT **IX-a**. IX-b GERMAN SHORT SAME-a,b.

a. 7 high locus

Preferred reading: bound variable

b. 7 normal locus

Preferred reading: bound variable

c. 4.5 low locus

Preferred reading: bound variable

(17, 62; 17, 65; 17, 75)

For reasons mentioned above, examples with *ONLY* are not very informative to assess the deletion of plural features; but we did test them for high loci, and the same generalizations appear to hold as in ellipsis environments.

- (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.

COMPARE FRENCH VERY TALL MAN_a GERMAN DWARF_b ONLY TALL_a LIKE PEOPLE SUPPORT

a. 7 **IX-a-high**

Preferred reading: bound variable

b. 7 **IX-a-normal**

Preferred reading: bound variable

a'. 7 **POSS-a TEAM**

Preferred reading: bound variable

b'. 6.7 **POSS-a FRENCH TEAM**

Preferred reading: strict

c'. 7 **FRENCH TEAM**

Preferred reading: strict

(17, 73; 17, 74; 17, 99; 17, 143)

Two conclusions can be drawn. First, something like 'Liberal Erasure', or Sauerland's more articulated version of it, appears to apply to a variety of categories that can *to some extent* be eliminated because their contribution is non-assertive. Second, however, in well-controlled paradigms our informant can ignore mismatches triggered by plural and height specifications much more easily than those triggered by other modifiers. If confirmed, this fact might suggest that in these context of these paradigms features can readily be deleted but other lexical elements cannot be – which would argue for the Strong View, according to which plural and height specifications really do display the behavior of *phi*-features in ellipsis and focus-sensitive environments.

6.2 LSF

Our LSF data do not provide evidence for a contrast between plural and height specifications on the one hand and other non-assertive elements on the other. We tried to contrast the behavior of *IX-arc-b* to that of *THE-FOUR_b* (= a plural pronoun with an incorporated numeral), 7 *IX-arc-b* and *IX-arc-b* 7 ('the 7 of them', with the second order being dispreferred); no clear contrast ever emerged, and bound variable readings were usually available. We included a condition without any bound variable in the antecedent – and checked that they gave rise to strict readings only.

We only report below on the comparison between *IX-arc-b*, *THE-FOUR_b*, and a condition without variables (*GERMAN TEAM*). In positive and negative ellipsis as well as in *only* environments, informant LD, who generally allowed for bound readings without reflexives, did not distinguish between number

mismatch and numeral mismatch (we only provide IJ's judgments below, since for reasons discussed above informant YD seemed to prefer strict readings irrespective of mismatch problems whenever a non-reflexive was used; his ratings are provided in the Appendix).

- (70) *Context*: Tomorrow there is a swimming competition by teams. There is a German team with 4 members, and a French team with 3 members.

4 PERSON-_{rep_b} GERMAN KNOW PERSON-_{rep_a} LIKE
'The 4 Germans know people who like

a. 7 IX-arc-b. 3 FRENCH SAME.
them. The 3 Frenchmen do, too.'

Preferred reading: bound variable

b. 7 THE-FOUR_b. 3 FRENCH SAME.

the four of them. The 3 Frenchmen do, too.'

Preferred reading: bound variable

c. 6.5 GERMAN TEAM. 3 FRENCH SAME.

the German team. The 3 Frenchmen do, too.'

Preferred reading: strict

(27, 49; 27, 50; 27, 54 [IH 28, 2])

- (71) *Context*: Tomorrow there is a swimming competition by teams. There is a German team with 4 members, and a French team with 3 members.

4 PERSON-_{rep_b} GERMAN KNOW PERSON-_{rep_a} LIKE
'The 4 Germans know people who like

a. 7 IX-arc-b. 3 FRENCH NOT.

them. The 3 Frenchmen don't.'

Preferred reading: trial 1 = strict; trial 2 = bound variable

b. 7 THE-FOUR_b. 3 FRENCH NOT.

the four of them. The 3 Frenchmen don't.'

Preferred reading: trial 1 = strict; trial 2 = bound variable

c. 7 TEAM GERMAN. 3 FRENCH NOT.

the German team. The 3 Frenchmen don't.'

Preferred reading: trial 1 = strict; trial 2 = strict

(27, 47; 27, 48; 27, 53; [IH 28, 1])

- (72) 27, 51

Context: Tomorrow there is a swimming competition by teams. There is a German team with 4 members, and a French team with 3 members.

ONLY 4 PERSON-_{rep_b} GERMAN KNOW PERSON-_{rep_a} LIKE
'Only the 4 Germans know people who like

a. 7 IX-arc-b.

them.'

Preferred reading: trial 1 = strict; trial 2 = bound variable

b. 7 THE-FOUR_b.

the four of them.'

Preferred reading: trial 1 = strict; trial 2 = bound variable

c. 7 TEAM GERMAN.

the German team. '

Preferred reading: trial 1 = strict; trial 2 = strict

(27, 51; 27, 52; 27, 55; [IH 28, 3])

While in *NOT* and *ONLY* conditions informant IJ displayed variation, he never found a contrast between the readings obtained with *IX-arc-b* and the *THE-FOUR_b*. By contrast, he was consistent in only obtaining a strict reading with *GERMAN TEAM*, as is expected.

Thus we cannot argue in favor of the Strong View on the basis of the LSF data (although they do argue for the Weak View). Needless to say, the fact that we didn't find a difference between number and numeral mismatch is no proof that it doesn't exist; it might be that it will become evident when better controlled paradigms are investigated.

7 Conclusion

In sum, we have shown that plural and height specifications of loci have a dual face. On the one hand, they have a strong iconic component: in 'complement set' readings of plurals, relations of inclusion and relative complementation among plural loci are preserved by the interpretation function; in cases of 'change of position', high loci can appear at various positions in signing space depending on the position of (the head of) the individual they denote. On the other hand, these specifications display the behavior of grammatical features, in the sense that they can be disregarded by rules – ellipsis resolution and focus computation – which are known to have an ability to ignore *phi*-features. Furthermore, we showed in the case of height specifications of loci that it is possible to correlate the two phenomena in examples that include a high locus which is both used iconically *and* disregarded by a rule of ellipsis resolution.

Still, there are two possible interpretations of our data. On the Weak View, these iconic specifications of loci just share with features the property of being *separable* from the variables they appear on. In this respect, they might just be like other expressions whose contribution is purely presuppositional, and the finding would just be that iconic specifications are 'abstract enough' to be separable from the variable they constrain. Our LSF data are compatible with this weak interpretation. On the Strong View, plural and high specifications share a *characteristic* property of features. As we saw, it might well be that elements with a non-assertive contribution can to some extent be ignored by ellipsis and focus constructions. Still, in ASL our informant has stable contrasts between plural and height specifications on the one hand, and other redundant elements on the other – which might suggest that the former really are featural in the end. Be that as it may, the featural nature of plural and height specifications should be further investigated: if features are part of an innate inventory made available by Universal Grammar, it would be of some importance to know that some features have an intrinsically geometric interpretation.

Some important questions remain for future research, both from an empirical and from a theoretical standpoint.

–On an empirical level, can the same generalizations be replicated with more rigorous methods, involving more informants and a more precise assessment of the geometry of loci? Such refinements would be important in view of the contrast between our ASL data, where we found an argument for the Strong View, and our LSF data, where we didn't. It might be that with more fine-grained methods some distinctions will in the end arise in LSF (or they might disappear in ASL!).

–On a theoretical level, can further arguments be found for the view that some specifications of loci are *both* iconic and featural? A natural extension of the present work might involve directional verbs. By definition, directional verbs target one or several loci whose denotations fill one or several of their argument slots; for this reason, they are thought to have an anaphoric or agreement component (e.g. Lillo-Martin and Meier 2011). At the same time, they have an iconic component: different directional verbs target different parts of a structured locus depending on their meaning, and 'rotation' arguments can be used to argue that these specifications are projective in nature (for instance, when the 'head' of a structured locus is targeted, the precise point that gets indexed will depend on the position of the denotation). Directional verbs lend themselves to two extensions of the present project. First, one could directly argue that their morpho-syntactic behavior shows that they are featural in nature – which of course presupposes a detailed understanding of this behavior, as well as a comparison with possible spoken language counterparts. Second, one extend to the height specifications of directional verbs the arguments we developed in the text about ellipsis and focus environments. In principle, one could ask whether these featural specifications can be ignored in the same way as the height specifications of pronouns.

Finally, we saw when we distinguished between the Weak and the Strong View that in the end our analysis depends on a detailed understanding of the mechanism by which features (and possibly other elements) can

be disregarded in the course of ellipsis resolution and focus computation; this broader question is bound to have repercussions on the present project.²⁹

²⁹We should end with a speculation. It might be surprising that we didn't find *more* of a bias against feature mismatch in ellipsis and focus environments. In spoken language, it would seem that all other things being equal, feature mismatch is weakly dispreferred. Thus to my ear the bound reading is less easily available in (i)a (= gender mismatch) than it is in (i)b (= no mismatch):

- (i) a. Mary likes her mother, and John does, too
- b. Peter likes his mother, and John does, too.

The reason might be superficial: maybe ellipsis resolution is a bit easier when the missing VP is *phonologically* identical to its antecedent. Interestingly, in the sign language cases under investigation, this surface phonological condition is never satisfied. This is because in each of our examples the bound variable in the antecedent came with its own locus, and the elided VP involved a different locus, appropriate to the subject of the second clause. This means that the phonological mismatch to obtain a bound reading *whether or not* there was in addition a height/number mismatch; and this might explain why we did not find a contrast between bound readings with vs. without height/number mismatch. (On the other hand, we might expect that in *all* cases strict readings are preferred to bound readings. Our data are mixed: this was the pattern we discerned in LSF informant IH's judgments, since he preferred strict readings unless bound readings were made nearly obligatory by the presence of a reflexive pronoun.)

Appendix I. Uninterpreted Plural Features in De Se Readings

In the main text, we discussed two cases in which *phi*-features initially appear to remain uninterpreted in English: ellipsis and focus-sensitive constructions. A third case of uninterpreted features was reported in the literature; it pertains to the De Se interpretation of some embedded pronouns. Specifically, it was observed (e.g. Sauerland, cited in Schlenker 2003) that in 'De Se' readings of attitude reports, some rules might be needed to guarantee that some features go uninterpreted. Consider (73)a:

- (73) a. John (a transsexual) hopes to become a woman, and he hopes PRO to buy himself (*herself) a car.
 b. John hopes λi PRO_i to buy ~~himself~~_i a car.

On a relatively standard treatment of De Se attitude reports, we should have the semantic result in (74):

- (74) $[[(73)b]]^{\langle f, s, w \rangle} = \#$ iff for some $\langle \text{individual}, \text{world} \rangle$ pair $\langle x', w' \rangle$ compatible with what John hopes for in w , $[[\lambda i$ PRO_i to buy himself_i]] $^{\langle f, s, w' \rangle}(x') = \#$. If $\neq \#$, $[[(i)b]]^{\langle f, s, w \rangle} = 1$ iff for each $\langle \text{individual}, \text{world} \rangle$ pair $\langle x', w' \rangle$ compatible with what John hopes for in w , $[[\lambda i$ PRO_i to buy himself_i]] $^{\langle f, s, w' \rangle}(x') = 1$.

With a standard possible worlds semantics for *hope*, the first sentence of the discourse in (73)a establishes that for each $\langle \text{individual}, \text{world} \rangle$ pair $\langle x', w' \rangle$ compatible with what John hopes for in w , x' is a woman in w' ; but this means that a presupposition failure is incorrectly predicted for the sentence. The problem disappears if we posit that the gender features can be morphologically inherited from the matrix subject and ignored in the semantic component, as illustrated in

- (75)
- | | | | |
|-------------------------|------------------|-----------------------------|-------|
| John hopes λi | PRO _i | to buy himself _i | a car |
| | | | |
| Binding | Binding | | |
| Morphological Agreement | | | |

Now in this case there are some alternative solutions; for instance, Schlenker 2003, suggests that in (73)a *PRO* might be read both De Re and De Se; establishing a mechanism that ensures this is in principle feasible due to the widespread assumption that De Se readings entail the corresponding De Re readings, so that one can think of De Se readings as De Se readings *with additional requirements*.³⁰ But Sauerland noted long ago that there are some cases in which such a theory won't work (cited in Schlenker 2003; see Sudo 2012 for a recent discussion):

- (76) We all sometimes believe that we're the only person in the world.

Each of the relevant individuals' belief would seem to be irreducibly singular, of the form: *I am the only person in the world*. It is hard in this case to see how the plural features can be interpreted. If they remain uninterpreted, the problem disappears, as in (77):

- (77) We think λi ~~we~~_i are the only person in the world

While this phenomenon is directly relevant to our present concerns, it raise two issues. First, the truly convincing cases only pertain to plural pronouns, and hence such examples wouldn't add much to our analysis of height features. Second, in ASL and LSF there is a competition between distributive and non-distributive plural pronouns. Only the latter were shown in Schlenker et al., to appear, to have an iconic semantics. But the relevant De Se reading of (77) is distributing, and it might be expected to be expressed using a distributive pronoun (or a different strategy altogether, one involving Role Shift, which can be thought of as an overt realization of context shift).

We present some preliminary data below. Our main goal was to assess whether there was a *contrast* between simple plurals and plurals co-occurring with numerals: if plural specifications are features, we might expect that they are subject to deletion, while numerals are not; and hence (*modulo* the issue of the competition with distributive pronouns) that embedded subject plurals but not embedded subject

³⁰ Schlenker 1999 discusses possible cases in which De Se readings might fail to entail the corresponding De Re readings, but comes to no firm conclusion on the issue.

numerals might give rise to De Se readings in environments such as (77). This was tested both with the verb *SAY*, as in (78), and with the verb *THINK*, as in (79).

- (78) *Context*: Tomorrow there is an individual swim competition among 10 swimmers.
 THREE-arc SWIMMER ALL SAY __ WILL BLOW-AWAY MOST OTHER SWIMMER
Meaning question: Does each of the swimmers say: (i) I will blow away the other swimmers (ii) We will blow away the other swimmers?
 a. 7 __ = IX-arc-a
 Reading: (i) or (ii) ('likely (ii)' was added in the first trial but not in the second)
 b. 7 __ = THE-THREE-arc-a
 Reading: (ii)
 (14, 187; 14, 188; 17, 41)
- (79) *Context*: Tomorrow there is an individual swim competition among 10 swimmers.
 THREE-arc SWIMMER ALL SAY __ WILL BLOW-AWAY MOST OTHER SWIMMER
Meaning question: Does each of the swimmers say/think³¹: (i) I will blow away the other swimmers (ii) We will blow away the other swimmers?
 a. 7 __ = IX-arc-a
 Reading: (i) or (ii) ('likely (ii)' was added in the first trial but not in the second)
 b. 7 __ = THE-THREE-arc-a
 Reading: (ii)
 (14, 189; 14, 190; 17, 42)

The contrast is subtle but suggestive: the embedded subject numeral does not allow for its plural component to be disregarded, as one expects; but with a simple plural pronoun, 'feature deletion' seems to arise.

As things stand, we have not been able to replicate such contrasts in LSF: in the relevant contexts, simple plural pronouns patterns with numerals; distributive markers pattern differently, as suggested by (80) (the second sentence [IX-a GERMAN SAME] was intended to test whether a strict or a bound variable reading was obtained; informant IJ systematically obtained bound readings, while informant IH had some strict readings but wasn't fully consistent).

- (80) *Context*: There is an individual swimming competition. A single swimmer will win. There are 4 French swimmers, a single German swimmer, and all are arrogant.

[4 SWIMMER FRENCH]_b THINK __ WIN. IX-a GERMAN SAME.

'The 4 French swimmers think that they will win. The German swimmer does, too.'

- a. 6.4 (6.2) __ = IX-arc-b
 1st sentence suggests that each Frenchman thinks: 'We/the French swimmers will win.'
- b. 6.4 (6.2) __ = THE-FOUR_b
 1st sentence suggests that each Frenchman thinks: 'We/the French swimmers will win.'
- c. 6.4 (6.2) __ = IX-b-rep
 1st sentence suggests that each Frenchman thinks: 'I will win.'
 (30, 22; 30, 23; 30, 28; 30, 77; 30, 92; 30, 119)

³¹ We erroneously used *say* in the first trial, and corrected this to *think* in the second.

Appendix II. Ratings

Ratings are given on a 7-point a scale, preceded by the initials of the informant and date (in year.month.day format) in which they were obtained. Judgments are arranged by chronological order, and in each case we provide:

–Column 1: number of the example cited in the text (the video in which the sentence appeared is cited in the text).

–Columns 2 and up: video on which the judgment was recorded, followed by the initials of the informant and date (in year.month.day format), followed by the rating. For instance, the first rating below means that:

the judgment corresponding to example (24)a in the text was recorded in video 14, 182; this judgment was given by informant JL on October 20, 2012 (i.e. 12.10.20), and the rating obtained was of 7.

When semantic questions were added, they are explicitly mentioned (in English translation for semantic questions that appeared in French)

(24)a	14, 182	[JL 12.10.20]=	7	14, 192	[JL 12.10.21]=	7
b			7			7

Meaning: do we infer that the German swimmers like (i) people who support their [= the Germans'] own team? (ii) people who support the French team?

(26)	17, 39	[JL 13.05.07-2]=	7	i	17, 60	[JL 13.05.08]=	7	i (ii possible)	17, 68
		[JL 13.05.14]=	7	i (ii possible)	17, 140	[JL 13.05.17]=	7	i (ii possible) i.e. i>ii	

Meaning: do we infer that the German swimmers do NOT like (i) people who support their own team? (ii) people who support the French team?

(27)	17, 38	[JL 13.05.07-2]=	7	i	17, 59	[JL 13.05.08]=	7	i (ii possible)	17, 67
		[JL 13.05.14]=	7	i (ii possible)	17, 139	[JL 13.05.17]=	7	i (ii possible) i.e. i>ii	

(28)	14, 228	[JL 12.10.21-2]=	6	17, 1	[JL 13.05.06]=	6
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Meaning [added 13.05.06]: Does one understand that the German swimmer likes (i) people who support the French swimmers? (ii) people who support the German swimmer?

17, 1	[JL 13.05.06]=	ii
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Meaning: do we infer that (i) the German swimmer doesn't like people who support him? (ii) the German swimmer doesn't like people who support the 11 French swimmers

(29)Judgment: a	17, 24	[JL 13.05.07]=	7	i
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Meaning: do we infer that (i) the German swimmer doesn't like people who support him? (ii) the German swimmer doesn't like people who support the 11 French swimmers?

(30)Judgment: a	14, 242	[JL 12.10.22]=	7	i	17, 11	[JL 13.05.06]=	6	i	17, 20	[JL 13.05.07]=	6	i
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Fn. 12 (i)

30, 89	[13.04.17 IH]=	6	30, 115	[IJ 13.04.30]=	7	31, 10	[IH 13.05.27]=	6
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Meaning: does one understand that the French swimmer thinks that (i) the German swimmers under discussion [second version: the-sg or the-pl German swimmer(s) under discussion] swim well? (ii) he himself swims well?

30, 89	[13.04.17 IH]=	i	30, 115	[IJ 13.04.30]=	ii	31, 10	[IH 13.05.27]=	i
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Fn 12 (ii)

30, 90	[13.04.17 IH]=	6	30, 116	[IJ 13.04.30]=	6	31, 11	[IH 13.05.27]=	6
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Meaning: does one understand that the French swimmer does NOT think that (i) the German swimmers under discussion [second version: the-sg or the-pl German swimmer(s) under discussion] swim well? (ii) he himself swims well?

b.	30, 90	[13.04.17 IH]=	ii	30, 116	[IJ 13.04.30]=	ii	30, 116	[IJ 13.04.30]=	i
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fn. 13

a.	31, 9	[IH 13.05.27]=	6	31, 26	[IH 13.06.04]=	4
b.			3			6
a'.			2			1
b'.			6			6

(31)	29, 18	[IJ 13.02.27]=	7	29, 29	[IH 13.02.28]=	6	30, 26	[IJ 13.03.22]=	7
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30, 75	[IJ 13.04.04]	7	30, 85	[13.04.17 IH]=	6	30, 113	[IJ 13.04.30]=	7
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Meaning: does one understand that the French swimmer thinks that (i) the German swimmers swim well? (ii) he himself swims well?

29, 18	[IJ 13.02.27]=	ii	29, 29	[IH 13.02.28]=	i	30, 26	[IJ 13.03.22]=	ii
--------	----------------	----	--------	----------------	---	--------	----------------	----

30, 75	[IJ 13.04.04]	ii	30, 85	[13.04.17 IH]=	i	30, 113	[IJ 13.04.30]=	ii
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(32)	29, 19	[IJ 13.02.27]=	7	29, 30	[IH 13.02.28]=	6	30, 27	[IJ 13.03.22]=	7
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30, 76	[IJ 13.04.04]	6	30, 86	[13.04.17 IH]=	6	30, 114	[IJ 13.04.30]=	6
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Meaning: does one understand that the French swimmer does NOT think that (i) the German swimmers swim well? (ii) he himself swims badly [corrected to 'well' after 13.04.30]?

29, 19	[IJ 13.02.27]=	ii	29, 30	[IH 13.02.28]=	i	30, 27	[IJ 13.03.22]=	ii
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30, 76	[IJ 13.04.04]	ii	30, 86	[13.04.17 IH]=	ii	30, 114	[IJ 13.04.30]=	ii
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(33)	30, 82	[IJ 13.04.04]	7	30, 93	[13.04.17 IH]=	6	30, 120	[IJ 13.04.30]=	7
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Meaning: does one understand that the French swimmer does NOT think that (i) the German swimmers swim well? (ii) he himself swims badly [corrected to 'well' after 13.04.30]?

30, 82	[IJ 13.04.04]	i et ii	deux possibilites	30, 93	[13.04.17 IH]=	i	30, 120	[IJ 13.04.30]=	ii
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Meaning: do we infer that the German dwarf LIKES (i) people who support him [= the dwarf] ? (ii) people who support the French giant?

fn. 17, (i)a.	17, 66	[JL 13.05.08]=	6	i	17, 76	[JL 13.05.14]=	6	ii (i possible)	
b.			6	i			6	i/ii (almost equal readings)	

c.				4	i			3	i (ii possible)
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Meaning: do we infer that the German dwarf **LIKES** (i) people who support him [= the dwarf] ? (ii) people who support the French giant?

(40)a.	17, 65	[JL 13.05.08]=	7	i (ii possible)	17, 75	[JL 13.05.14]=	7	i (ii possible in all these examples, but is strongest in a.)
b.			7	i (ii possible)			7	i
c.			5	i (ii possible)			4	i

Meaning: do we infer that the German dwarf does **NOT** like (i) people who support him [= the dwarf] ? (ii) people who support the French giant?

(41)a.	17, 64	[JL 13.05.08]=	7	i (ii possible)	17, 69	[JL 13.05.14]=	7	i (ii possible)	17, 141	[JL 13.05.17]=	7	i (ii possible) i.e. i>ii
b.			7	i (ii possible)			7	i (ii possible)			7	i (ii possible)
c.			5	i (ii possible)			5	i (ii possible)			5	i (ii possible)

Meaning: do we infer that the German dwarf does **NOT** like (i) people who support him [= the dwarf] ? (ii) people who support the French giant? (abbreviated replies for the semantic questions)

(42)a.	17, 72	[JL 13.05.14]=	7	i	17, 98	[JL 13.05.15]=	7	i (ii possible)	17, 142	[JL 13.05.17]=	7	i (ii possible) i.e. i>ii Also, in a. ii is stronger than in b. or c.
b.			7	i			7	i (ii possible)			7	i (ii possible)
c.			4	i			4	i (ii possible)			7	i (ii possible)

(43)a.	28, 59	[IJ 13.02.05]=	7		28, 80	[IH 13.02.07]=	5	31, 1	[IH 13.05.27]=	6
b.			4				3			5
c.			1				1			2

Meaning: What does one understand concerning the dwarf? One understands: (i) the dwarf likes the giant; (ii) the dwarf likes himself [= the dwarf].

a.	28, 59	[IJ 13.02.05]=	ii		28, 80	[IH 13.02.07]=	ii		31, 1	[IH 13.05.27]=	ii
b.			ii				ii				ii
c.			ii				ii				ii

(44)a.	28, 61	[IJ 13.02.05]=	7		28, 81	[IH 13.02.07]=	5	31, 2	[IH 13.05.27]=	6
b.			4				3			5
c.			1				1			2

Meaning: What does one understand concerning the dwarf? One understands: (i) the dwarf does **NOT** like the giant; (ii) the dwarf does **NOT** like himself [= the dwarf].

a.	28, 61	[IJ 13.02.05]=	ii		28, 81	[IH 13.02.07]=	ii		31, 2	[IH 13.05.27]=	ii
b.			ii				ii				ii
c.			ii				ii				ii

(45)a.	28, 63	[IJ 13.02.05]=	7		28, 82	[IH 13.02.07]=	5	31, 3	[IH 13.05.27]=	6
b.			4				3			5
c.			1				1			2

Meaning: What does one understand concerning the dwarf? One understands: (i) the dwarf does **NOT** like the giant; (ii) the dwarf does **NOT** like himself [= the dwarf].

a.	28, 63	[IJ 13.02.05]=	ii		28, 82	[IH 13.02.07]=	i		31, 3	[IH 13.05.27]=	ii
b.			ii				i				ii
c.			ii				i				ii

(49)

Meaning [same question for all positions]: do we infer that the dwarf does **NOT** like: (i) himself [= the dwarf]? (ii) the giant?

1a.	17, 182	[JL 13.05.18]=	6	i
1b.			3	i

2a.	17, 183	[JL 13.05.18]=	6	i
2b.			4	i

3a.	17, 184	[JL 13.05.18]=	7	i
3b.			3	i

4a.	17, 185	[JL 13.05.18]=	6	i
4b.			4	i

(53)-(54)

Vertical - Heads up

a.	30, 67	[IJ 13.03.27]=	7		30, 71	[IJ 13.04.04]	6	30, 99	[13.04.17 IH]=	6	30, 124	[IJ 13.04.30]=	6	31, 13	[IH 13.05.27]=	6	31, 30	[IH 13.06.04]=	6
b.			7				7			6			7			6			6
c.			1				1			4			1			3			3

Meaning: Does one understand that the dwarf does **NOT** like (i) the giant? (ii) himself?

a.	30, 67	[IJ 13.03.27]=	ii	30, 71	[IJ 13.04.04]	ii	30, 99	[13.04.17 IH]=	ii	30, 124	[IJ 13.04.30]=	ii	31, 13	[IH 13.05.27]=	ii	31, 30	[IH 13.06.04]=	ii
b.			ii			ii			ii			ii			ii			ii
c.						ii			ii			ii			ii			ii

Vertical - Heads down

a.	30, 68	[IJ 13.03.27]=	7	30, 72	[IJ 13.04.04]	6	30, 100	[13.04.17 IH]=	6	30, 125	[IJ 13.04.30]=	6	31, 14	[IH 13.05.27]=	6	31, 31	[IH 13.06.04]=	6
b.			7			7			6			7			6			6
c.			1			1			6			1			3			3

Meaning: Does one understand that the dwarf does **NOT** like (i) the giant? (ii) himself?

Matching: Does one understand that the given does NOT meet the given? (if) himself:																							
	V	D		J	V	D		J	V	D		J	V	D		J	V	D	J				
a.	30, 68	[IJ 13.03.27]=		ii	30, 72	[IJ 13.04.04]		ii	30, 100	[13.04.17 IH]=		ii	30, 125	[IJ 13.04.30]=		ii	31, 14	[IH 13.05.27]=	ii	31, 31	[IH 13.06.04]=		ii
b.				ii				ii				ii				ii			ii				ii
c.								ii				ii				ii			ii				ii

Diagonal - Heads up

a.	30, 63	[IJ 13.03.27]=	7	30, 70	[IJ 13.04.04]	6	30, 98	[13.04.17 IH]=	6	30, 123	[IJ 13.04.30]=	7	31, 12	[IH 13.05.27]=	6	31, 29	[IH 13.06.04]=	6
b.			7			7			6			7			6			6
c.			1			1			4			1			3			3

Meaning: Does one understand that the dwarf does NOT like (i) the giant? (ii) himself?

a.	30, 63	[IJ 13.03.27]=	ii	30, 70	[IJ 13.04.04]	ii	30, 98	[13.04.17 IH]=	ii	30, 123	[IJ 13.04.30]=	ii	31, 12	[IH 13.05.27]=	ii	31, 29	[IH 13.06.04]=	ii
b.			ii			ii			ii			ii			ii			ii
c.						ii			ii			ii			ii			ii

Diagonal - Heads down

a.	30, 69	[IJ 13.03.27]=	7	30, 73	[IJ 13.04.04]	6	30, 101	[13.04.17 IH]=	6	30, 126	[IJ 13.04.30]=	6	31, 15	[IH 13.05.27]=	6	31, 32	[IH 13.06.04]=	6
b.			7			7			6			7			6			6
c.			1			1			6			1			3			3

Meaning: Does one understand that the dwarf does NOT like (i) the giant? (ii) himself?

a.	30, 69	[IJ 13.03.27]=	ii	30, 73	[IJ 13.04.04]	ii	30, 101	[13.04.17 IH]=	ii	30, 126	[IJ 13.04.30]=	ii	31, 15	[IH 13.05.27]=	ii	31, 32	[IH 13.06.04]=	ii
b.			ii			ii			ii			ii			ii			ii
c.						ii			ii			ii			ii			ii

(62) a.	14, 224	[JL 12.10.21-2]=	7	17, 19	[JL 13.05.07]=	7
b.			5			6

Meaning [added 13.05.07]: Does one infer that (i) the German swimmers like people who support them [= the German swimmers]? (ii) the German swimmers like people who support the French swimmers?

a.	17, 19	[JL 13.05.07]=	i
b.			i (ii possible)

(63) Meaning: do we infer that (i) the German swimmer doesn't like people who support him? (ii) the German swimmer doesn't like people who support the 11 French swimmers?

a.	17, 24	[JL 13.05.07]=	7	i
b.			7	i/ii

Meaning: do we infer that (i) the German swimmer doesn't like people who support him? (ii) the German swimmer doesn't like people who support the 11 French swimmers?

(64) a.	14, 242	[JL 12.10.22]=	7	i	17, 11	[JL 13.05.06]=	6	i	17, 20	[JL 13.05.07]=	6	i
b.			7	i		6	i			6	i	

Meaning: do we infer that the German swimmers do NOT like (i) people who support their own team? (ii) people who support the French team?

(65) a.	17, 38	[JL 13.05.07-2]=	7	i	17, 59	[JL 13.05.08]=	7	i (ii possible)	17, 67	[JL 13.05.14]=	7	i (ii possible)	17, 139	[JL 13.05.17]=	7	i (ii possible) i.e. i>ii
b.			7	ii			6	ii			6	ii			6	ii (i possible)
c.			7	ii			7	ii			7	ii			7	ii
a'.			7	i (ii possible)			7	i			7	i			7	i (ii possible)
b'.			7	ii			7	ii			7	ii			6	ii
c'.			7	ii			7	ii			7	ii			7	ii

Meaning: do we infer that the German dwarf does NOT like (i) people who support him [= the dwarf] ? (ii) people who support the French giant?

(66) a.	17, 64	[JL 13.05.08]=	7	i (ii possible)	17, 69	[JL 13.05.14]=	7	i (ii possible)	17, 141	[JL 13.05.17]=	7	i (ii possible) i.e. i>ii
b.			7	i (ii possible)			7	i (ii possible)			7	i (ii possible)
c.			5	i (ii possible)			5	i (ii possible)			5	i (ii possible)

Meaning: do we infer that the German swimmers like (i) people who support their [= the Germans'] own team? (ii) people who support the French team?

(67) a.	17, 39	[JL 13.05.07-2]=	7	i	17, 60	[JL 13.05.08]=	7	i (ii possible)	17, 68	[JL 13.05.14]=	7	i (ii possible)	17, 140	[JL 13.05.17]=	7	i (ii possible) i.e. i>ii
b.			7	ii			6	ii			6	ii			6	ii (i possible)
c.			7	ii			7	ii			7	ii			7	ii
a.			7	i			7	i			7	i			7	i (ii possible)
b.			7	ii			7	ii			7	ii			6	ii
c.			7	ii			7	ii			7	ii			7	ii

Meaning: do we infer that the German dwarf LIKES (i) people who support him [= the dwarf] ? (ii) people who support the French giant?

(68) a.	17, 65	[JL 13.05.08]=	7	i (ii possible)	17, 75	[JL 13.05.14]=	7	i (ii possible in all these examples, but is strongest in a.)
b.			7	i (ii possible)			7	i
c.			5	i (ii possible)			4	i

Meaning:

a-b: do we infer that the German dwarf does NOT like (i) people who support him [= the dwarf] ? (ii) people who support the French giant?

a', b', c': do we infer that the German dwarf does NOT like (i) people who support his [= the dwarf's] team ? (ii) people who support the French giant's team?

(Abbreviated answers)

(69) a.	17, 74	[JL 13.05.14]=	7	i (ii possible) ²	17, 99	[JL 13.05.15]=	7	i (ii possible) [ii stronger in a than b or a']	17, 143	[JL 13.05.17]=	7	i (ii possible) i.e. i>ii
b.			7	i			7	i (ii possible)			7	i (ii possible)
a'.			7	i			7	i (ii possible)			7	i (ii possible)
b'.			7	ii			6	ii			6	ii
c'.			7	ii			7	ii			7	ii

(70) a.	27, 50	[IJ 13.01.17]=	7		27, 54	[IJ 13.01.22]=	7		28, 2	[IH 13.01.24]=	6	
b.			7				7				6	

³²The informant made several remarks, including the following: 'High IX locus seems to have a greater effect here, making meaning ii possible; I believe this effect should also apply in earlier examples, but it was not noted.' This might suggest that feature mismatch does marginally help in bringing out the strict reading.

c.			6			7			2
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Meaning: Does one understand that the French know (i) the people who like the German team? (ii) the people who like the French team?

a.	27,50	[IJ 13.01.17]=	ii	27,54	[IJ 13.01.22]=	ii	28,2	[IH 13.01.24]=	i) 6 ii) 2
b.			ii			ii			i) 6 ii) 2
c.			i			i			i) 6 ii) 2

(71)a.	27,48	[IJ 13.01.17]=	7	27,53	[IJ 13.01.22]=	7	28,1	[IH 13.01.24]=	6
b.			7			7			7
c.			7			7			3

Meaning: Does one understand that the French do NOT know (i) the people who like the German team? (ii) the people who like the French team?³³

a.	27,48	[IJ 13.01.17]=	i	27,53	[IJ 13.01.22]=	ii	28,1	[IH 13.01.24]=	i) 7 ii) 1
b.			i			ii			i) 6 ii) 1
c.			i			i			i) 6 ii) 1

(72)a.	27,52	[IJ 13.01.17]=	7	27,55	[IJ 13.01.22]=	7	28,3	[IH 13.01.24]=	7
b.			7			7			5
c.			7			7			5

Sens: on comprend que les Français NE connaissent PAS (i) les personnes qui aiment l'équipe allemande? (ii) les personnes qui aiment l'équipe française?

a.	27,52	[IJ 13.01.17]=	i	27,55	[IJ 13.01.22]=	ii	28,3	[IH 13.01.24]=	i) 7 ii) 2
b.			i			ii			i) 7 ii) 2
c.			i			i			i) 7 ii) 2

(78)a.	14,188	[JL 12.10.20]=	7	17,41	[JL 13.05.07-2]=	7
b.			7			7

Meaning: Does each of the swimmers say: (i) I will blow away the other swimmers (ii) We will blow away the other swimmers

a.	14,188	[JL 12.10.20]=	i/ii (likely ii)	17,41	[JL 13.05.07-2]=	i/ii
b.			ii			ii

(79)a.	14,190	[JL 12.10.20]=	7	17,42	[JL 13.05.07-2]=	7
b.			7			7

Meaning: Does each of the swimmers say (1st trial) / think (2nd trial): (i) I will blow away the other swimmers (ii) We will blow away the other swimmers

a.	14,190	[JL 12.10.20]=	i/ii (likely ii)	17,42	[JL 13.05.07-2]=	i/ii
b.			ii			ii

(80)a.	30,23	[IH 13.03.06-2]=	6	30,28	[IJ 13.03.22]=	7	30,77	[IJ 13.04.04]	7	30,92	[13.04.17 IH]=	5	30,119	[IJ 13.04.30]=	7
b.			6			7			7			5			7
c.			6			7			7			5			7

Meaning: Does one understand that the 4 French swimmers think: (i) "We are going to win" (or: "The French swimmers are going to win"), (ii) "I am going to win"?

a.	30,23	[IH 13.03.06-2]=	i	30,28	[IJ 13.03.22]=	i	30,77	[IJ 13.04.04]	i	30,92	[13.04.17 IH]=	i	30,119	[IJ 13.04.30]=	i
b.			i			i			i			i			i
c.			ii			ii			ii			ii			ii

Meaning: Does one understand that the German swimmer³⁴: (i) "They [= the French swimmers] are going to win", (ii) "I am going to win"?

a.	30,23	[IH 13.03.06-2]=	i	30,28	[IJ 13.03.22]=	ii	30,77	[IJ 13.04.04]	ii	30,92	[13.04.17 IH]=	i	30,119	[IJ 13.04.30]=	ii
b.			i			ii			ii			i			ii
c.			i			ii			ii			ii			ii

³³ Here and in a few other cases, LSF informant IH provided numerical ratings for the availability of each reading.

³⁴ The word 'think' was missing here.

References

- Barberà, Gemma: 2012, *The Meaning of Space in Catalan Sign Language (LSC). Reference, Specificity and Structure in Signed Discourse*. PhD thesis, University Pompeu Fabra, Barcelona (available on the author's website).
- Cooper, Robin: 1983, *Quantification and Syntactic Theory*, Reidel, Dordrecht.
- Cogill-Koez, D.: 2000, Signed language classifier predicates: Linguistic structures or schematic visual representation? *Sign Language and Linguistics*, 3(2):153-207.
- Corblin, Francis: 1996, Quantification et anaphore discursive: la référence aux complémentaires. *Langages* 123, 51–74.
- Cuxac, Christian: 1999, French Sign Language: Proposition of a Structural Explanation by Iconicity. In A. Braort et al. (eds), *Gesture-based Communication in Human-Computer Interaction*. Springer, pp. 165-184.
- Emmorey, Karen: 2002, *Language, Cognition and the Brain. Insights from Sign Language*. Mahwah, NJ: Lawrence Erlbaum and Associates
- Emmorey, Karen and Herzig, Meliassa: 2003, Categorical versus gradient properties of classifier constructions in ASL. In *Perspectives on classifier constructions in sign languages*, ed. by K. Emmorey, 221–46. Mahwah, NJ: Lawrence Erlbaum Associates.
- Geurts, Bart: 1997, Book review of Linda M. Moxey and Anthony J. Sanford, *Communicating Quantities*. 1993. *Journal of Semantics* 14(1), 87–94.
- Giorgolo, Gianluca: 2010, *Space and Time in Our Hands*, Uil-OTS, Universiteit Utrecht.
- Heim, Irene and Angelika Kratzer: 1998, *Semantics in Generative Grammar*, Blackwell, Oxford.
- Features on bound pronouns
- I Heim - Phi-theory: Phi-features across modules and interfaces, 2008
- Hou, Lynn Y. and Meier, Richard P.: 2012, Idiosyncratic first-person object forms of directional verbs in ASL. Handout of a talk given at the American International Morphology Meeting, University of Massachusetts - Amherst, September 22, 2012
- Jacobson, P.: 2012, Direct Compositionality and ‘Uninterpretability’: The Case of (Sometimes) ‘Uninterpretable’ Features on Pronouns. *Journal of Semantics* 29 (3): 305-343.
- Kegl, Judy: 2004, ASL Syntax: Research in progress and proposed research. *Sign Language & Linguistics* 7:2. Reprint of an MIT manuscript written in 1977.
- Koulidobrova, Elena: 2011, SELF: Intensifier and ‘long distance’ effects in American Sign Language (ASL). Manuscript, University of Connecticut.
- Kuhn, Jeremy: 2013, ASL Loci: Variables or Features? Manuscript (Qualifying Paper), New York University.
- Landman, Fred: 1996, ‘Plurality’, in S. Lappin (ed.), *The Handbook of Contemporary Semantic Theory*, Blackwell, Cambridge.
- Liddell, Scott K.: 2003, *Grammar, Gesture, and Meaning in American Sign Language*. Cambridge: Cambridge University Press.
- Lillo-Martin, Diane: 1991. *Universal grammar and American Sign Language: Setting the null argument parameters*. Dordrecht: Kluwer Academic Publishers.
- Lillo-Martin, Diane and Klima, Edward S.: 1990, Pointing out Differences: ASL Pronouns in Syntactic Theory. In Susan D. Fischer & Patricia Siple (Eds.), *Theoretical Issues in Sign Language Research*, Volume 1: Linguistics, 191-210. Chicago: University of Chicago Press.
- Lillo-Martin, Diane and Meier, Richard: 2011, On the linguistic status of 'agreement' in sign language. *Theoretical Linguistics* 37, 3-4: 95–141
- Macken, E., Perry, J., and Haas, C.: 1993, Richly grounding symbols in ASL. *Sign Language Studies*, (81):375-94.
- Neidle, Carol, et al.: 2000, *The Syntax of American Sign Language: Functional Categories and Hierarchical Structure*. MIT Press.
- Nouwen, Rick: 2003, *Plural pronominal anaphora in context*. Number 84 in Netherlands Graduate School of Linguistics Dissertations, LOT, Utrecht.
- Quer, Josep: 2005, Context shift and indexical variables in sign languages. In: *Proceedings of Semantic and Linguistic Theory (= SALT) XV*. Ithaca, NY: CLC Publications.

- Rooth, Mats: 1992, Ellipsis redundancy and reduction redundancy. In Steve Berman and Arild Hestvik, editors, *Proceedings of the Stuttgarter Ellipsis Workshop*, number 29 in *Arbeitspapiere des Sonderforschungsbereichs 340*.
- Sallandre, Anne-Marie: 2003, *Les unités du discours en Langue des Signes Française. Tentative de catégorisation dans le cadre d'une grammaire de l'iconicité*. PhD dissertation, Université de Paris 8.
- Sandler, Wendy and Lillo-Martin, Diane: 2006, *Sign Language and Linguistic Universals*. Cambridge University Press.
- Sauerland, U. J. Anderssen and J. Yatsushiro: 2005, The plural is semantically unmarked. In Kepser, S. and M. Reis(eds.), *Linguistic Evidence*. Berlin; de Gruyter.
- Sauerland, Uli: 2008, On the semantic markedness of ϕ -features. In D. Harbour, D. Adger, and S. Béjar (Eds.), *Phi theory: Phi features across modules and interfaces*, pp. 57–82. Oxford: Oxford University Press
- Sauerland, Uli: 2013, Presuppositions and the Alternative Tier. Poster, Semantics and Linguistic Theory (SALT) 2013, UC Santa Cruz.
- Schlenker, Phillippe. 1999. Propositional Attitudes and Indexicality: A Cross-Categorical Approach. Doctoral Dissertation, MIT.
- Schlenker, P.: 2003a, A Plea for Monsters, *Linguistics & Philosophy* 26: 29-120
- Schlenker, P.: 2003b, Indexicality, Logophoricity, and Plural Pronouns, *Research in Afroasiatic Grammar II (Selected papers from the Fifth Conference on Afroasiatic Languages, Paris, 2000)* ed. J. Lecarme, 409-428
- Schlenker, P.: 2005, Non-Redundancy: Towards A Semantic Reinterpretation of Binding Theory, *Natural Language Semantics* 13, 1:1-92
- Schlenker, P.: 2009, Local Contexts. *Semantics & Pragmatics*, Volume 2, Article 3: 1-78, doi: 10.3765/sp.2.3
- Schlenker, Philippe, 2011a, Iconic Agreement. *Theoretical Linguistics* 37, 3-4: 223–234.
- Schlenker, Philippe: 2011b, Donkey Anaphora: the View from Sign Language (ASL and LSF). *Linguistics & Philosophy* 34, 4: 341-395.
- Schlenker, Philippe: to appear, Complement Set Anaphora and Structural Iconicity in ASL. To appear in *Snippets*.
- Schlenker, Philippe and Lamberton, Jonathan: to appear, “Formal Indices and Iconicity in ASL”. To appear in Maria Aloni, Vadim Kimmelman, Floris Roelofsen, Galit Weidman Sassoon, Katrin Schulz and Matthijs Westera (eds.), *Logic, Language and Meaning: 18th Amsterdam Colloquium*, Springer.
- Schlenker, Philippe and Mathur, Gaurav: 2012, A Strong Crossover Effect in ASL. Manuscript, Institut Jean-Nicod and Gallaudet University.
- Sharvit, Yael: 2008, The Puzzle of Free Indirect Discourse. *Linguistics & Philosophy*, 31:353-395.
- Shaw, Emily and Delaporte, Yves: 2010, New Perspectives on the History of American Sign Language. *Sign Language Studies* 11, 2: 158-204.
- Spector, Benjamin: 2007, Aspects of the Pragmatics of Plural Morphology: On Higher-order Implicatures. In Uli Sauerland and Penka Stateva (eds.), *Presuppositions and implicatures in compositional semantics*, 243–281
- Stechow, Arnim von. 2002. Feature deletion under semantic binding: Tense, person, and mood under verbal quantifiers. *NELS* 33 .
- Sudo, Yasutada: 2012, *On the Semantics of Phi Features on Pronouns*. Doctoral dissertation, MIT.
- Taub, Sarah F.: 2001, *Language from the body*. Cambridge University Press.
- Wilbur, Ronnie: 2003, Representations of Telicity in ASL. In: *Chicago Linguistics Society* 39, 354–368.
- Yanovich, Igor 2010 On the Nature and Formal Analysis of Indexical Presuppositions. In *Lecture Notes in Computer Science*, vol. 6284, New Frontiers in Artificial Intelligence, pages 272-291
- Zucchi, Sandro: 2012, Formal Semantics of Sign Languages. *Language and Linguistics Compass* 6/11: 719–734.