

Donkey Anaphora in Sign Language II: The Presuppositions of Pronouns*

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In previous work (Schlenker 2010), we suggested that data from French and American Sign Language (LSF and ASL) bring new light to the debate between *E-type* and *dynamic approaches* to donkey anaphora.¹ Specifically, we argued that (i) sign language data favor dynamic analyses over E-type analyses, and that (ii) among dynamic analyses, they favor recent approaches in which *all* quantifiers (rather than just indefinites) introduce discourse referents. In the present paper, we provide data that further constrain theories of donkey anaphora.

(i) First, we show that, contrary to what is predicted by early dynamic theories, dynamic binding is *not* blocked by operators such as negation. Rather, dynamic binding can ‘cross’ such operators as long as a non-emptiness presupposition on the denotation of the pronoun is satisfied – which could be made compatible with some more recent dynamic proposals (e.g. Brasoveanu 2006).

* Part I of this analysis, devoted to the debate between E-type and dynamic approaches, appears as Schlenker 2010. A summary of some of our research on donkey anaphora, intended for an audience of non-specialists, can be found in Schlenker 2011b (some of the data and analyses also appear in the present paper, especially for the discussion of disjunctive antecedents).

Note: The present piece was completed in June 2010. Most of it is superseded by Schlenker, to appear, and Schlenker, 2012; *the latter articles should be consulted for more precise data, transcriptions and analyses.*

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¹ See for instance Gee and Kegl 1983 and Kegl 2003 [written in 1976] for some early references on indexing in ASL.

- (ii) Second, we suggest that in some cases involving disjunctive antecedents, ASL and LSF display a subtle pattern in which (a) null sign language pronouns behave like overt pronouns in English; (b) overt sign language pronouns are more constrained and make some readings ineffable. We explain these data by postulating that *any locus which is activated by an overt index must be presupposed to denote a non-empty set of individuals*.
- (iii) Third, we suggest that pronouns can co-occur with some proper names that display a ‘donkey’ behavior – which provides additional evidence for the claim, made in Geurts 1999, that proper names can in some cases display an anaphoric behavior.
- (iv) Fourth, we discuss preliminary data from ASL that bear on ‘complement anaphora’ is effected in sign language (e.g. *Few students came to class. They stayed home instead* – where *they* refers to the students who *didn’t* come to class).

In the following, sign language sentences are glossed in capital letters. Non-manual markings are omitted. Subscripts correspond to the establishment of locations (‘loci’) in signing space – thus *aONE* is the word ‘one’ signed in locus *a* (letters are assigned from right to left from the signer’s perspective). Pronouns, glossed as *IX* (for ‘index’) can then point back towards these locations. 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, indexes can also be used to *establish* a locus). In addition: *CL* is used for nominal classifiers; *arc* is used for plural pronouns; *a-GIVE-b* is used for the verb *GIVE* with incorporated subject (= *a*) and indirect object (= *b*) arguments.

1. Dynamic vs. E-Type Approaches to Donkey Anaphora: Summary of Part I

There are two main approaches to the problem of donkey anaphora, which is characterized by the fact that a pronoun is dependent on a quantifier that does not c-command it (e.g. *If John owns a donkey, he beats it*). Proponents of dynamic approaches take the pronoun to be a logical variable, but they revise the semantics of quantification so as to allow an indefinite to bind a variable that is not within its scope. *Older dynamic approaches* took this measure to apply solely to indefinites; *recent dynamic approaches* have extended it to all quantifiers. By contrast, proponents of *E-type analyses* take the pronoun to go proxy for a definite description (with *it* = *the donkey*, or *the donkey that John owns*); in order to satisfy its uniqueness presupposition, they combine this approach with an analysis of *if*-clauses as quantifiers over situations.

While competing accounts make very different claims about the coindexing relations that should be found in the syntax, these relations are not morphologically realized in spoken language. But they arguably are realized in sign languages, namely through pointing. We suggested in Schlenker 2010 that data from French and American Sign Language favor *recent dynamic approaches*.

- (i) First, in those cases in which E-type analyses and dynamic analyses make different predictions about the formal connection between a pronoun and its antecedent, dynamic analyses are at an advantage. Some of the main examples are illustrated in (1): even though the antecedents play entirely symmetric roles (since if *x and y meet*, it is also the case that *y and x meet*), the pronouns have no trouble indexing their antecedent, as is expected within dynamic approaches. By contrast, E-type approaches would typically

predict a failure of reference in this case, because the descriptions *the person that met someone* and *the person that someone met* should denote the precise same thing.²

(1) ASL

WHEN _aONE AND _bONE a-MEET-b

Literally: ‘When someone and someone meet,

a. IX-a TELL IX-b HAPPY a-MEET-b (Inf 1, 2, 306)

he [= the former] tells him [= the latter] that he is happy to meet him.’

b. IX-b TELL IX-a HAPPY a-MEET-b (Inf 1, 2, 306)

he [= the latter] tells him [= the former] that he is happy to meet him.’

(2) LSF

EACH-TIME _aSTUDENT _bSTUDENT THE-TWO-a,b MEET,

Literally: ‘Each time a student and a student meet,

a. a-GIVE-b CIGARETTE. (Inf F, 3, 39)

he [= the former] gives him [= the latter] a cigarette.’

b. b-GIVE-a CIGARETTE. (Inf F, 3, 39)

he [= the latter] gives him [= the former] a cigarette.’

(ii) Second, it appears that the same formal mechanism is used irrespective of the indefinite or non-indefinite nature of the antecedent, which argues for recent dynamic approaches over older ones. Examples from ASL and LSF involving the quantifier *less than five* are given in (3)-(4): in both cases, the pronoun is formally anaphoric on an antecedent which is not an indefinite, but a downward-monotonic quantifier.

(3) ASL

IF LESS FIVE _aSTUDENT COME PARTY, IX-arc-a WILL BE-BORED

‘If fewer than five students come to the party, they will get bored.’ (Inf 1; i, 1)

(4) LSF

IF LESS FIVE _aSTUDENT COME PARTY, IX-arc-a BE-BORED

‘If less than five students come to the party, they will be bored.’ (Inf C; 210)

In the rest of this paper, we discuss data that should further constrain theories of donkey anaphora.

² For this very reason, Elbourne 2005 predicts a failure of reference in (i) (in English), where the two indefinites play entirely symmetric roles:

(i) #If a bishop and a bishop meet, he greets him.

We do not attempt in the present paper to explain the deviance of (i), but observe that it does not appear to extend to ASL and LSF counterparts of this sentence.

2. Binding Across Negation

Early dynamic approaches (be it DRT or dynamic logic) posited that negation – and many other operators – ‘break’ the formal connection between a pronoun and its antecedent (e.g. Kamp 1981, Heim 1982, Kamp and Reyle 1993, Groenendijk and Stokhof 1991). One might initially think that such a measure is justified by the deviance of (5)b:³

- (5) a. John has an umbrella. It is red.
b. #John doesn’t have an umbrella. It is red.

On closer inspection, however, there are two ways in which one could account for the deviance of (5)b:

Theory I: Dynamic binding is subject to strict formal constraints. In particular, a quantifier cannot bind out of a negation.

Theory II: Dynamic binding is not subject to strict formal constraints, but pronouns come with a presupposition that they denote a non-empty set of individuals.

Theory I is implemented in standard dynamic accounts. Theory II is motivated by the intuition that the first sentence in (5)b *fails to have existential import*, in the sense that one cannot infer from it that the maximal set of umbrellas that John has is non-empty (note that this analysis is also compatible with standard E-type accounts; it is for other reasons that these were dismissed in Part I). The idea is that it is this failure of existential import, rather than the presence of negation *per se*, which is responsible for the deviance of the sentence.

The natural way to decide between Theory I and Theory II is to add a further negation on top of (5)b: if negations always block dynamic binding, the resulting anaphoric link should be just as impossible with two negations as with one; on the other hand, if the problem in our initial example was caused by existential import, it should be solved when a second negation is added, since semantically the two negations ‘cancel each other out’. English data might initially seem to favor Theory II:

- (6) It is not true that John doesn’t have an umbrella. I have just seen it: it is red.

There is a difficulty, however: some dynamic theories (e.g. Kamp and Reyle 1993) allow for an E-type mechanism of anaphora *in addition to* dynamic binding. If so, it might be that in (6) dynamic binding of *it* (in *I have just seen it*) by *an umbrella* is indeed blocked by the negations, but that *it* is really an E-type pronoun with the meaning: *the umbrella*, or *John’s umbrella*.

Sign language has the advantage of making anaphoric relations morphologically explicit. Since we argued in Part I that an E-type approach cannot deal with some of the

³ Note that although (5)b could potentially involve a wide scope reading for the existential quantifier relative to negation, this is extremely unlikely, as it would make the first sentence trivially true. The natural reading is one on which the sentence means that *John doesn’t have any umbrella*.

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crucial data, we will take pointing to represent some version of (dynamic) binding. The key question, then, is whether examples such as (6) are realized by pointing towards the locus introduced by *an umbrella*, despite the presence of two intervening negations.

The following examples suggest that such an indexing is in fact possible. (7)a involves dynamic binding in a simple assertive environment. (7)b displays the deviance which is expected under both Theory I and Theory II: *some Republican* is in the scope of the negative expression *no Democrat*, and as a result the pronoun cannot index *some Republican*. The crucial data are in (7)c, where we see that adding a negation – which has the effect of re-establishing the kind of existential import seen in (7)a – makes the anaphoric link possible again (a follow-up question was also used to make sure that the pronoun was indeed understood to refer to *the Democrat who cosponsors the bill with a Republican*).

(7) ASL

a. _aONE DEMOCRAT PERSON WILL CO SUPPORT HEALTH BILL WITH _bREPUBLICAN PERSON. BUT IX-a WILL a-GIVE-b A-LOT MONEY. (Inf 1, 2, 225)

‘Some Democrat will cosponsor the healthcare bill with some Republican, but he [= the Democrat] will give him [= the Republican] a lot of money.’

b. * IX-1 THINK NO _aDEMOCRAT CL WILL CO SUPPORT HEALTH BILL WITH _bREPUBLICAN CL. IX-1 THINK IX-a WILL a-GIVE-b A-LOT MONEY. (Inf 1, 2, 228)

c. IX-1 DON’T-THINK NO _aDEMOCRAT CL WILL CO SUPPORT HEALTH BILL WITH _bREPUBLICAN CL. IX-1 THINK IX-a WILL a-GIVE-b A-LOT MONEY. (Inf 1, 2, 228-229)

‘I don’t think no Democrat will cosponsor the healthcare bill with a Republican. I think he [=the Democrat] will give him [= the Republican] a lot of money.’

Follow-up: Who will give money? That Democrat who cosponsors.

The same facts hold in LSF, although the syntax of our informant’s examples is quite different. Here two separate sentences are used to expression the negation of the universal negative statement. Literally, it comes out as something like: *No member of UMP will accept to write a bill with a member of PS* [= the Social Party] – *this is not true*. Despite this rather complex syntax, the initial position of the indefinite for a *member of PS* remains available for further anaphoric uptake:

(8) LSF

Note: UMP is the (right-wing) governing party in France; PS is the opposition socialist party

_aPERSON UMP IX-a ACCEPT WRITE LAW WITH _bPERSON PS – NONE; IX TRUE NOT. BUT IX-b MONEY b-GIVE-a.

‘It is not true that no UMP member will accept to write a bill with a PS member of PS. But he [= the member of UMP] will give him [= the UMP member] money.’
(Informant F, 3, 107)

It should be noted that the data in (7)-(8) also make another point: the sign language analogues of the negative quantifier *no Republication* can also introduce a discourse referent which can be used for further anaphoric uptake. When the initial sentence is unembedded, this is not possible because the quantifier has no existential import. But upon embedding under negation, the quantifier does acquire existential import (since *not [no P] Q* is equivalent to *[some P] Q*), and an anaphoric connection becomes possible again. This is as is expected under Theory II, but not under Theory I.

3. Disjunctive Antecedents

3.1. Disjunctive Antecedents in English

In English, a pronoun can have what appear to be ‘disjunctive antecedents’:

(9) If Mary sees a donkey or a horse, she waves to it. (Elbourne 2005)

(10) If Mary catches a fish or John traps a rabbit, Bill cooks it (Stone 1992)

In these examples, *it* may denote *whichever donkey or horse Mary sees* (in (9)) or *whichever fish Mary catches and whichever rabbit John traps* (in (10)). Importantly, this pattern is also possible when a disjunction of full propositions is involved, as in (10).

Stone 1992 notes that these examples pose difficulties for standard dynamic semantics. Still, Brasoveanu 2008 (fn. 94) and Wang 2005 (section 7.5) offer some solutions within their own dynamic frameworks. For instance, Brasoveanu postulates that a disjunction has the effect of making available a discourse referent that denotes *the sum* of the objects that witness the truth of the disjuncts. Here we will briefly sketch a slightly different solution, which is based on two simple assumptions (see also Schlenker 2011a for discussion).

Assumption 1 (van den Berg 1996, Nouwen 2003, Brasoveanu 2006): All quantifiers (not just indefinites) introduce discourse referents, often with maximality conditions. To give a simplified example, *fewer than five donkeys* in (11) is taken to introduce a discourse referent *X* in the Logical Form in (11)b, and it is specified that (i) *X* denotes the maximal set of donkeys that John owns, (ii) the denotation of *X* includes fewer than five objects, and (iii) John stands in the relation of *beating* to the denotation of *X*. The interpretive procedure should be set up so as to guarantee that the discourse referent *X* is given existential force.⁴

(11) a. John owns [fewer than five donkeys]_x. He beats them_x.

b. $\langle 5(X) \{X = \text{Max } X': \text{donkey}(X') \ \& \ \text{John owns } X'\} \ \& \ \text{John beats } X$

Paraphrase: ‘The maximal set *X* of donkeys that John owns contains fewer than five individuals, and John beats *X*.’

⁴ Condition (iii) is redundant given (i).

It was suggested in Part I of the present study that this type of analysis has the advantage of accounting for non-trivial sign language facts, since negative quantifiers, just like indefinites, *can* be indexed by ASL and LSF pronouns.

Assumption 2: Pronouns can have split antecedents, as in (12), where multiple indexing is essential to account for the observed ambiguity (any multiple indexing is possible, as long as the indices taken together denote a plurality of individuals).

(12) [Each boy]_i told [each girl]_k that [each teacher]_m thought they_{i+k / i+m / k+m / i+k+m} should work together.

With this background, we analyze Stone's example as in (13), where *X* denotes the maximal set of fish that Mary catches, and *Y* denotes the maximal set of rabbits that John traps. As a result, *it*_{X+Y} denotes the sum of these two sets (and the fact that *it* carries singular features should yield a presupposition that in each situation satisfying the antecedent, this sum contains exactly one object).

(13) If Mary catches [a fish]_X or John traps [a rabbit]_Y, Bill cooks *it*_{X+Y}

3.2. Disjunctive Antecedents in ASL and LSF

ASL and LSF give rise to a complex pattern in such examples. For simplicity we will concentrate on sign language versions of (14):

(14) [An African-American male]_X or [an Asian-American male]_Y will win the next presidential election. He_{X+Y} will win by a landslide.

(i) When separate positions are assigned to the two antecedents, an overt pronoun is usually impossible.⁵ But ASL and LSF can also make use of null pronouns – and these give rise to the very reading we obtain in English.

(ii) In addition, it is possible in both languages to assign *the same position* to both noun phrases (this appears to be a default position, in front of the signer - see for instance Neidle et al. 2000 for discussion). In such cases, both a null pronoun and an overt pronoun can be used to produce the meaning of (14).

The pattern is summarized in (15) and immediately illustrated with ASL and LSF examples.

⁵ We found one possible exception to this generalization in LSF. One native informant (and another informant who started learning the language when he was 6 years old) produced examples in which separate loci were introduced for the disjunctive antecedents, and the donkey pronoun was realized by pointing *in the middle* of the two loci (this could conceivably be the 'default' locus indexed by pronouns when no specific loci have been introduced for the antecedents). This pattern very clearly failed with our ASL informant. Furthermore, when our native LSF informant watched herself signing this sentence (a routine procedure when judgments are subtle), she found the example to be deviant. Further fieldwork is needed to establish clear generalizations in this domain.

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(15) Availability of the meaning of (14) in ASL and LSF

	Antecedents in different positions	Antecedents in the same (default) position
Null Pronoun	A. possible	B. possible
Visible Pronoun	C. impossible	D. possible

(16) Disjunctive antecedents in ASL

a. No locus: ok null pronoun, ok overt pronoun (IX-m points towards the middle position m)

_mAFRICAN-AMERICAN OR _mASIAN-AMERICAN. IX-m / Ø WIN LARGE
(Informant 1, 2, 185)

b. Different loci: ok null pronoun, * overt pronoun

_aAFRICAN-AMERICAN OR _bASIAN-AMERICAN WILL WIN NEXT PRESIDENT ELECTION. *IX [any indexing, including arc indexing⁶ of both positions] / Ø WIN LARGE (Informant 1, 2, 185)

(17) Disjunctive antecedents in LSF

Note: PC is the acronym of the French Communist Party.

a. Same locus: ok null pronoun, ok overt pronoun (IX points towards the middle position m)

IF _mCL GREEN OR _mCL PC WIN, IX-m / Ø FIND MINISTER
'If a Green candidate or a communist candidate wins, he will find ministers'
(Informant F, 4, 58-59)

b. Different loci: ok null pronoun, ?? overt pronoun (IX-m points towards the middle position m)

IF _aCL GREEN OR _bCL PC WIN, ??IX-m⁷ / Ø FIND MINISTER
'If a Green candidate or a communist candidate wins, he will find ministers.'
(Informant F, 4, 58-59)

It can also be checked that an ASL counterpart of Stone's example with full propositional disjuncts is possible, but only if the pronoun is null:

⁶ Arc indexing is used for plurals, including pronouns with split antecedents – in which case the arc includes both antecedents.

⁷ As noted in fn. 4, our native LSF informant did produce some instances of this pattern, but found them to be deviant when she watched them on the video.

- (18) IF _aMARY CATCH _bFISH OR _cJOHN TRAP _dRABBIT, BILL WILL COOK Ø / ??
IX [any indexing]
'If Mary catches a fish or John traps a rabbit, Bill will cook it.' (Inf 1, 2, 231)

3.3. Analysis

We propose to derive this complex pattern from the two assumptions we used above to account for disjunctive antecedents in English (Assumptions 1 and 2), together with a third assumption about the presupposition of pronouns and indexes:

Assumption 3. (i) Each pronoun (of any kind) must denote something: the discourse referents it carries must (taken together) denote a non-empty set. In addition, (ii) this condition applies to each pointing gesture (= index) in sign language: the discourse referents carried by the position it points towards must (taken together) denote a non-empty set.

In the English sentence in (14), the only requirement is that $X+Y$ should denote something (by Assumption 3, (i)) – a condition which is satisfied when the first sentence is true. A sign language sentence with a null pronoun is subject to the same condition, since it involves no pointing gesture at all (Cells A and B of (15)). When separate positions are introduced for X and Y , an overt sign language pronoun could only refer to $X + Y$ by pointing to the position for X and also to the position for Y . But this would require that X be non-empty and that Y be also non-empty (by Assumption 3, (ii)) – which cannot be since only one person can win the presidential election (this accounts for Cell C). Finally, when X and Y are associated with the same position, one can point towards that position as long as $X+Y$ is non-empty (conditions (i) and (ii) of Assumption 3 are equivalent in this case); this explains why the English pattern is regained in this case (Cell D).

We could have tried to analyze the data in a different way, by postulating that ASL and LSF just do not have the right lexical resources to have a singular pronoun with split antecedents (i.e. with several indices). This might make excellent sense because there presumably wouldn't be much use for a *singular* pronoun indexing several loci. Specifically, this alternative analysis could go like this:

-Overt sign language pronouns do *not* differ from English pronouns with respect to examples like (14): they do in principle allow a singular pronoun to carry two variables, which correspond to the discourse referents introduced by the indefinites that appear in the two disjuncts.

-However sign language differs from English in that with overt pronouns indexing must be overtly realized: when the disjuncts are assigned different loci, the pronoun must point towards both loci.

-But that is impossible for lexical reasons: those sign language pronouns that can point towards several loci simultaneously all happen to be plural – which gives rise to a presupposition failure in the case at hand.

To exclude this hypothesis, we considered examples in which the indefinites that appear in each disjunct are themselves plural; this should guarantee that the presuppositions of the plural pronoun should be satisfied on a ‘donkey’ reading. The fact that the desired reading *fails* to arise shows that plurality *per se* cannot be responsible for the difference between overt and null pronouns in ASL and LSF.

In (19), the only reading we obtain is that *all four* of John, Mary, Bill and Ann will be proud they married before the others. We do not get the reading (presumably a more natural one) in which *that couple that gets married first* will be proud that it married before the others.

(19) ASL

Context: Several weddings are to take place successively.

_a[JOHN MARY] OR _b[BILL ANN] WILL MARRY FIRST. IX-arc-a,b WILL PROUD MARRY BEFORE OTHERS.

‘[John and Mary] or [Bill and Ann] will get married first. They [= all four] will be proud that they married before the others’. (Inf 1, 2, 192)

A similar conclusion can be reached on the basis of the LSF data in (20).

(20) LSF

Context: There is a race by teams of three.

a. Same locus: ok null pronoun, ok overt pronoun (*IX-arc* points towards the middle position *m*)

a1. IF IX-*m* THREE _mFRENCH OR THREE _mGERMAN, MEDAL GOLD.

‘If three Frenchmen or three Germans win, they’ll get a gold medal.’ (Inf F, 4, 63-64)

a2. IF THREE _aFRENCH OR THREE _bGERMAN, IX-arc-*m* MEDAL GOLD.

‘If three Frenchmen or three Germans win, they’ll get a gold medal’. (Inf F, 4, 63-64; 65)

b. Different loci: ok null pronoun, ?? overt pronoun

b1. IF THREE _aFRENCH OR THREE _bGERMAN, MEDAL GOLD. ‘If three Frenchmen or three Germans win, they’ll get a gold medal.’ (Inf F, 4, 63-64)

b2. IF THREE _aPERSONS FRENCH OR THREE _bGERMAN WIN, ??IX-arc-a,b MEDAL GOLD. (Informant F, 4, 67-68)

The informant’s reaction was that (20)b2 was odd because one understood that everybody (three Frenchmen and three Germans) would win a gold medal. Importantly, then, we *failed* to get a (‘donkey’) reading on which the pronoun refers to *whoever wins*. The

problem did not arise when the two antecedents were assigned the same locus, as in (20)a1-a2. Thus the plural examples replicate the pattern we saw in the singular.

We conclude that this alternative analysis is not viable, and that our initial analysis should be preferred. If it is correct, there is a subtle but real difference between (overt) signed pronouns and other pronouns: the latter are only subject to part (i) of Assumption 3 (= the indices *taken together* should denote a non-empty set of individuals); by contrast, overt signed pronouns are subject to a more stringent requirement: if an index points towards a locus, the discourse referents that correspond to that locus should (together) denote a non-empty set of individuals.

4. Donkey Proper Names

Geurts (1999) argued on the basis of examples such as (21) that proper names can play a role similar to ‘donkey pronouns’:

- (21) If a child is christened ‘Bambi’, and Disney Inc. hear about it, then they will sue Bambi’s parents. (Geurts 1999 p. 205)

It is immediate that in this example *Bambi* cannot function as a rigid expression denoting the (one and only) person named ‘Bambi’ in the actual world. Rather, it seems to play the same role as the description *the person named ‘Bambi’*, read *de dicto* with respect to the conditional.

It is of some interest to see whether similar data can be replicated in sign language. For while ASL and LSF proper names can appear on their own, just as they do in English, they may also be accompanied with an index, as is illustrated for LSF in (22).

- (22) IX-1 KNOW SARKOZY SAME GISCARD. IX-b SARKOZY YOUNG. IX-a GISCARD OLD.

‘I know Sarkozy and Gisard. He [= Sarkozy] is young and he [= Giscard] is old.’ (Inf G, 7, 78)

It is not clear what this example shows: no locus is initially introduced, so it seems the loci are *first* introduced in the second occurrence.

This peculiarity makes it possible to test rather directly Geurts’s claim. If indeed proper names can have the behavior of donkey pronouns, the index that optionally accompanies them should point towards their indefinite antecedent. As seen below, this expectation is met in LSF and ASL alike.

- (23) a. FRANCE IF ONE WOMAN_a ONE SON NAME JEAN OTHER SON_b NICOLAS, IX-b ADORE PRESIDENT SARKOZY.

‘In France, if a woman has a son named Jea_a and another <named> Nicolas_b, Nicolas loves President Sarkozy.’ (Inf G, 7, 75)

- b. FRANCE IF ONE WOMAN_a ONE SON NAME JEAN OTHER_b NICOLAS, IX-b NICOLAS ADORE SARKOZY.

‘In France, if a woman has a son named Jean and another <named> Nicolas, Nicolas loves Sarkozy.’ (Inf G, 7, 75)

- (24) WHEN_a WOMAN HAVE_b SON NAME JOHN <??>_b SON NAME PETER, a-IX LIKE b-IX JOHN MORE THAN? c-IX PETER

‘When a woman has a son named John and a son named Peter, she likes John more than Peter’. (Inf 1, 2, 245; cf. 246)

5. Complement Anaphora: preliminary data

Following recent dynamic accounts, we argued earlier that negative quantifiers like *few* introduce discourse referents that denote the maximal set of individuals that satisfy both the restrictor and the nuclear scope (e.g. *the students that came to class*) (‘max set anaphora’); this analysis makes it possible to account for (25)b, in which *they* denotes the students who came to class.

- (25) a. Few of my students came to class. They stayed home instead.
b. Few of my students came to class, but they asked good questions.
c. Few of my students came to class. They are not a serious class.

But this analysis does not account for two further possibilities:

-In (25)a, *they* refers to the students who did *not* come to class, i.e. to the complement of the set denoted by the discourse referent – hence the term ‘complement anaphora’.

-In (25)c, *they* denotes the entire set of students (we will call this ‘restrictor anaphora’).

The analysis of these readings is a matter of some debate. It has sometimes been thought that complement anaphora results from a different mechanism from max set anaphora – maybe one that is based on pragmatic reasoning rather than on semantics proper (see Nouwen 2003 for a recent discussion). The preliminary data we obtained from ASL suggest a nuanced answer to this question:

-All three readings can be obtained with purely anaphoric means, namely by (i) establishing a locus for the antecedent, and (ii) pointing back to this locus to express coreference.

-However, the anaphoric resources used can be different in the three cases (we do not claim, however, there are no cases of ambiguity in other sentences).

Specifically, our ASL informant could render these examples by using three different arcs (i.e. half-circles) to refer to different groups.

-Arc *ab* was used to refer to the entire group of students (restrictor anaphora).

-Arc *a*, which appeared to be a sub-part of arc *ab*, referred to the group of students who came (max set anaphora).

-Arc *b*, which appeared to be (roughly) the complement of *a* within *ab*, referred to the group of students who didn’t come (complement anaphora).

In this way, all three readings could be expressed unambiguously with purely anaphoric means.

The simplest form of this pattern is illustrated in (26). The initial sentence establishes a first discourse referent with *IX-arc-ab*, which refers to the entire set of students; it also establishes a discourse referent with *IX-arc-a* for the maximal set of

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students who came to class. In the example of complement anaphora in (26)a, it is *b*, the complement of *a* within *ab*, which is indexed in the second sentence. In the example of max set anaphora in (26)b, it is the locus *a* which is indexed. And in (26)c, where the entire set of students is referred to in the second sentence, the entire locus *ab* is indexed.

(26) POSS-1 STUDENT IX-arc-ab FEW IX-arc-a a-CAME CLASS.

‘Few of my students came to class.’

a. IX-arc-b b-STAY HOME

‘They [= the students who didn’t come] stayed home instead.’ (Inf 1, 4, 130)

b. IX-arc-a a-ASK-1 GOOD QUESTION

‘They [= the students who came] asked good questions.’ (Inf 1, 4, 130)

c. IX-arc-ab NOT SERIOUS CLASS.

‘They [= the entire group of my students] are not a serious class.’ (Inf 1, 4, 130)

It appears that this pattern can be replicated in quantified examples, which suggests that the loci that are established for the three different groups of students are not just the result of a deictic reading (i.e. one in which these groups are somehow taken to be salient in the context of discourse).

(27) *Context*: Each year, I teach only one course: Ling 101

a. MOST YEAR-YEAR, STUDENT IX-arc-ab FEW IX-arc-a a-COME CLASS:
IX-arc-b STAY HOME.

‘Most years, few of my students come to class: they [= the students who don’t come] stay home instead.’ (Inf 1, 4, 225)

b. MOST YEAR-YEAR, STUDENT IX-arc-ab FEW IX-arc-a a-COME CLASS
BUT IX-arc-a a-ASK-1 GOOD QUESTION.

‘Most years, few of my students come to class, but they [= the students who come] ask good questions.’ (Inf 1, 4, 225)

c. MOST YEAR-YEAR, STUDENT IX-arc-ab FEW IX-arc-a a-COME CLASS.
IX-arc-ab NOT SERIOUS CLASS.

‘Most years, few of my students come to class; they [= the entire groupe of my students] are not a serious class.’ (Inf 1, 4, 225)

Further research will have to establish how robust these examples are, and whether they can be replicated in other sign languages. One additional question, raised by Rick Nouwen (p.c.), is whether these readings are possible with all quantifiers, or only negative ones. This is crucial because in English the ‘complement anaphora’ reading in (25)a becomes impossible when *few* is replaced with *most*. If the anaphoric mechanisms found in ASL are applicable with all quantifiers, this might suggest that we are dealing with a rather different phenomenon in ASL and in English.

5. Concluding Remarks

We hope to have shown that sign language data can be of great relevance to address some theoretical debates in formal semantics. Our main conclusions – which will no doubt have to be refined or corrected when more informants and more sign languages are considered – can be summarized as follows.

- (i) Sign language data favor dynamic analyses over E-type analyses.⁸
- (ii) Among dynamic analyses, they favor recent approaches in which *all* quantifiers (rather than just indefinites) introduce discourse referents.
- (iii) They suggest that negative expressions do not always disrupt the relation between a pronoun and its antecedent. Rather, two negative expressions can cancel each other out and thus ‘restore’ the anaphoric potential that is apparently destroyed by a single negation – which suggests that blocking of anaphora by negative expressions results from a presuppositional problem (= the existential presupposition of the pronoun is not satisfied), rather than from a strictly formal problem.
- (iv) In examples involving disjunctive antecedents, there are subtle differences between overt sign language pronouns on the one hand, and null sign language pronouns and English pronouns on the other. They can be explained if we posit a distinction between the signed and the spoken modality: every locus that is activated by an *overt* index must be presupposed to contain discourse referents that (together) have a non-empty denotation; for pronouns that do not overtly index their antecedents (be they null sign language pronouns or English pronouns), the only condition is that the *sum* of the indices they carry should have a non-empty denotation.
- (v) Sign language data can bring light to further issues in the debate on donkey anaphora. First, the optional co-occurrence of indexes with proper names seems to validate Geurts’s claim (1999) that proper names can have ‘donkey’ readings. Second, it appears that ‘maximal set’ anaphora, ‘complement anaphora’, and ‘restrictor anaphora’ are all available in ASL, and can be realized with three different varieties of indexing.

⁸ As noted in Dekker 2004, the two approaches might in the end converge. If the E-type analysis becomes close to a notational variant, it is clear that sign language data won’t be able to decide the debate.

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