# Donkey Anaphora in Sign Language: Evidence from LSF and ASL

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**Abstract.** There are two main approaches to the problem of donkey anaphora (e.g. *If John owns <u>a donkey</u>, he beats <u>it</u>*). 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 syntactic scope. Older dynamic approaches (e.g. Kamp & Reyle 1993) took this measure to apply solely to indefinites; recent dynamic approaches extended it to all quantifiers (e.g. van den Berg 1996, Nouwen 2006, Brasoveanu 2007). By contrast, proponents of E-type analyses take the pronoun to go proxy for a definite description (e.g. *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 well as other operators) as quantifiers over fine-grained situations. Thus competing accounts of donkey anaphora make rather different claims about the coindexing relations that should be found. While these are not morphologically visible in spoken languages, they arguable are in sign languages (Sandler and Lillo-Martin 2004); these are thus an interesting testing ground for the debate. We argue that data from French and American Sign Language favor recent dynamic approaches: 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; and it appears that the same formal mechanism is used irrespective of the indefinite or non-indefinite nature of the antecedent, which argues in favor of recent dynamic approaches over older ones.

**Keywords:** anaphora, E-type anaphora, donkey anaphora, dynamic semantics, sign language, LSF, ASL

## 1 The Debate

### 1.1 The Problem

We attempt to bring new light to the debate on donkey anaphora by investigating data from two sign languages, French Sign Language (LSF) and American Sign Language (ASL). Our enterprise is motivated by the following considerations:
(i) Competing approaches to donkey anaphora make different predictions about the patterns of coindexing that are found in different examples.

(ii) In sign languages, coindexing is arguably realized overtly, by way of pointing (Sander and Lillo-Martin 2004).

(iii) Therefore sign language could bring new data to bear on this debate, which has remained open despite quite a bit of work in formal semantics.

The problem is illustrated by the examples in (1) and (2).

(1)   **Indefinites**
      a. John owns a donkey. He beats it.
      b. If John owns a donkey, he beats it.

(2)   **Non-Indefinites**
      a. John owns fewer than 5 donkeys. He beats them
      b. If John owns fewer than 5 donkeys, he beats them.

In each case, the pronoun is semantically dependent on the quantifier; but it is not c-commanded by it. This poses a problem if the following two standard assumptions are adopted:

(i) Pronouns are logical variables.

(ii) The semantics of quantifiers gives rise to a standard notion of scope, namely c-command.

Dynamic approaches preserve (i) but revise (ii). E-type approaches preserve a version of (ii) but revise (i), taking pronouns to go proxy for definite descriptions (e.g. *the donkey*, or *the donkey that John owns*). As we will see below, however, when all the necessary refinements of the E-type approach are taken into account, the two theories diverge considerably less than this cursory characterization suggests (Dekker 2004).

**1.2   E-type Approaches**

E-type approaches have the following ingredients (which depend on the approach under consideration):

(3)   **Pronouns as descriptions**
      Pronouns are treated as being (syntactically and/or semantically) descriptions in disguise. Depending on the approach, (1)a gets analyzed as in a. or b. below, where *it* has the semantics of the definite description operator.
      a. If John owns a donkey, he beats it ~~donkey he has~~
      b. If John owns a donkey, he beats it ~~donkey~~ (Elbourne)

(4)   **Quantification over situations / events**
      In order for the uniqueness presupposition of the definite description to be satisfied, proponents of E-type approaches take *if*-clauses (and more generally all operators) to quantify over very fine-grained situations or events.

(5)   **Formal Link**
      In order to account for the classical contrast between a. and b. below, E-type theories must establish a 'formal link' between the pronoun and its antecedent.

a. Every man who has a wife is sitting next to her.
b. ?* Every married man is sitting next to her (Heim 1982)
Elbourne 2005 takes the formal link to result, quite simply, from a syntactic
ellipsis of the NP (e.g. *her = the ~~wife~~*)

Importantly, this account treats the case of indefinite and non-indefinite antecedents on a par, as is illustrated in (6).

(6)     a. If John owns a donkey, he beats it ~~donkey~~.
        b. If John owns fewer than 5 donkeys, he beats them ~~donkeys~~.

### 1.3  Dynamic Approaches

Dynamic approaches share the following properties.

(7)     **Pronouns as variables**
        Pronouns are treated as logical variables, and can be coindexed with non-c-
        commanding indefinites, as illustrated in a. and b.
        a. John owns [a donkey]$_i$. He beats it$_i$
        b. If John owns [a donkey]$_i$, he beats it$_i$

(8)     **Revision of quantification**
        Quantification is revised so as to make it possible for a variable to depend on a
        non-commanding quantifier.  This can be done in purely semantic terms, by
        way of quantification over assignment function; or through  syntactic
        stipulations such as those illustrated in a. and b., where $\exists$ and $\forall$ are unselective
        quantifiers (in such an implementation, indefinites are taken to introduce
        variables).
        a. $\exists$ [John owns [a donkey]$_i$. He beats it$_i$]
        b. $\forall$ [John owns [a donkey]$_i$[he beats it$_i$]

(9)     **Formal Link: coindexing**
        Coindexing provides a formal link between a pronoun and its antecedent, and
        it has a direct semantic reflex.

Dynamic approaches differ in their treatment of donkey pronouns that depend on quantifiers that are not indefinites. To see why there is an issue in the first place, consider a the kind of truth conditions that a simple-minded extension of (8)a would predict for (10):

(10)    **Problem**
        a. John owns [at least 2 donkeys]. He beats them.
        Bad: $\exists X$ [John owns X & $\geq 2$ donkeys(X) & John beats X]
        b. John owns [fewer than 5 donkeys]. He beats them.
        Bad: $\exists X$ [John owns X & $<5$ donkeys(X) & John beats X]

It is immediate that the truth conditions captured by (10) are inadequate.
-Intuitively, (10)a entails that John beats *all the donkeys that he has*. But this

entailment is not captured in the proposed truth conditions: the fact that the pronoun refers to the *maximal* group of donkeys that John is left unaccounted for.

-The same problem arises in (10)b: the inference that John beats all the donkeys that he has is not captured. But in addition, the proposed truth conditions do not even entail that John owns fewer than five donkeys (all they entail is that it is possible to find a group of fewer than five donkeys that John owns – which is far too weak).

There are two broad solutions to the problem. One is a mixed approach (Kamp and van Eijck 1993): for indefinite antecedents, the standard dynamic line is adopted; for other antecedents, a version of the E-type approach is posited, one in which the quantifier has its 'usual' meaning and where the pronoun goes proxy for a definite description – which directly accounts for the maximality condition observed in (10)a.

(11)    **Mixed Solution** (Kamp & van Eijck 1993)
        a. Indefinites are treated in the dynamic way.
        b. Other quantifiers are treated with some version of the E-type account.

The alternative is a pure dynamic approach, one in which *all* quantifiers (not just indefinites) introduce discourse referents and can bind variables that they do not c-command. In order to address the problems seen in (10), quantifiers such as *at least two* and *fewer than five* are taken to introduce discourse referents *together with explicit maximality conditions*. As is illustrated in (10), this measure makes it possible to derive the correct truth conditions within a pure dynamic system.

(12)    **Pure Solution** (e.g. van den Berg 1996, Nouwen 2003, Brasoveanu 2007)
        a. John owns [at least 2 donkeys]. He beats them.
        $\exists$X [John owns X **& X = Max Y: donkey(Y) & John owns Y** & $\geq$2 donkeys(X) & John beats X]
        b. John owns [fewer than 5 donkeys]. He beats them.
        $\exists$X [John owns X **& X = Max Y: donkey(Y) & John owns Y** & <5 donkeys(X) & John beats X]

### 1.4. The Complexity of the Debate

The debate between dynamic and E-type approaches is more subtle than it looks at first sight. In a nutshell, some recalcitrant examples have forced the E-type approach to adopt a mechanism of quantification over extremely fine-grained situations, which looks quite a bit like quantification over assignment functions (Dekker 2004). Consider the sentences in (13):

(13)    a. A bishop met a bishop. He blessed him.
        b. If a  bishop meets a bishop, he blesses him.

The potential difficulty is immediate for Elbourne's (2005) theory: if *he* and *him* are both construed as *the bishop*, it is not clear how their uniqueness presuppositions will be satisfied. But versions of the E-type analysis that resort to a longer descriptive content are no better off: resolving *he* as *the bishop that met a bishop* and *him* as *the*

*bishop that a bishop met* won't help a bit. The difficulty is that, to put it roughly, the two bishops of the antecedent clause play entirely symmetric roles.

How can the symmetry be broken? There are in fact two difficulties, which we illustrate on the example of (13)b (which is discussed in detail in Elbourne 2005).

(i) First, situations must be made sufficiently fine grained so the 'symmetry' between the bishops mentioned in the antecedent can in principle be broken. An old insight, called 'Chierchia's Conjecture' in Dekker 2004, is that in the end situation-theoretic analyses might have to make situations as fine-grained as assignment functions. Dekker 2004 shows that with quite a few assumptions – which he takes to go against the spirit of situation theory – situations are indeed isomorphic to assignment functions. One of these assumptions is that a situation in which *bishop B meets bishop B'* is different from a situation in which *situation B' meets bishop B*. Such an assumption is accepted by Elbourne 2005, and it is an important ingredient of his solution.

(ii) Second, *even* if situations are made extremely fine-grained, the situation-theoretic analysis must endow the pronouns in the consequent clause with enough descriptive content to pick out different individuals. Suppose for instance that we took *if*-clauses to quantify over situations that are just equated with tuples of individuals – thus accepting Dekker's isomorphism between situations and tuples of individuals. We would *still* have to explain how the pronouns *he* and *him* manage to pick out different individuals in the same situation (i.e. in the same tuple). One way to do so would be to stipulate that they come with some equivalent of indices, so that for instance $he_1$ evaluated with respect to a situation s with s = <B, B'> denotes B, while in the same situation $he_2$ denotes B'. But it is immediate that such a radical step would make the situation-theoretic analysis even closer to the dynamic analysis.

These formal points are worth keeping in mind when one seeks to assess the donkey anaphora debate on empirical grounds. If indeed the two approaches can in principle converge, it might be hard to decide the debate in favor of one analysis and against any version of the other. Rather, we can only hope to show something weaker, namely that *either* one theory is incorrect, *or* it will have to borrow essential formal tools from the second. This is what we will now set out to do by considering data from sign language.

## 2  Predictions for Sign Language

### 2.1  Pronouns in Sign Language

In the sign languages that have been described, the relation between a pronoun and its antecedent is usually realized through the intermediary of *loci*, which are positions in signing space which are associated to nominal elements. A pronoun that depends on a proper name will thus point towards ('index') the locus in which the proper name was signed. Since there appears to be an arbitrary number of possible loci, it was suggested that the latter are the morphological realization of indices (Sandler and Lillo-Martin 2004). This makes it particularly interesting to use sign language to

investigate a theoretical debate that revolves around the nature of coindexing relations.

Of course, it could be that the anaphoric system found in sign language is entirely different from that found in spoken languages. If so, we would be getting from sign language morphological evidence on a *different* system from the one that prompted the debate about donkey anaphora in the first place. But despite the difference in modality, there are some striking similarities between sign language pronouns and their spoken language counterparts:

(i) In simple cases, the same ambiguity between strict and bound variable readings is found in both modalities, as is illustrated in (14) and (15).

(14)  **LSF**
　　　a. FANTASTIC. PIERRE LIKE  WIFE  aPOSS.  bIX JEAN TOO.
　　　(Informant A 369; cf. Informant C, 193)
　　　'It's fantastic. Pierre loves his wife, and Jean does too.'
　　　b. COMPLICATED.  PIERRE LIKE  WIFE aPOSS. bIX JEAN bIX TOO.
　　　(Informant A,  374; cf. Informant C, 201)
　　　'Things are complicated. Pierre loves his wife, and Jean does too.'

(15)  **ASL**
　　　IX-1 POSS-1 MOTHER LIKE. IX-a TOO. (Inf **1** 108)
　　　Ok I like my mother. He too <likes my mother>
　　　Ok I like my mother. He too <likes his mother>

(ii) Sign language pronouns appear to be constrained by at least some of the syntactic constraints on binding studied in syntax. For instance, versions of the following constraints have been described for ASL:
-Condition A
-Condition B
-Strong Crossover (recently extended to Weak Crossover)

### 2.2  The Importance of Bishop Sentences

The simplest donkey sentences appear to provide initial evidence in favor of dynamic accounts because pronouns appear to index antecedents that do not c-command them. In the following, sign language sentences are glossed in capital letters; subscripts correspond to the establishment of locations ('loci') in signing space; pronouns, glossed as IX (for 'index') as well as other expressions can then point back towards these locations; in such cases, the location is suffixed to the pronoun (e.g. IX-a is a pronoun that points words location a, while IX-b is a pronoun that points towards location b; the number 1 corresponds to the position of the signer – hence 1$^{st}$ person).

(16)  **LSF**
　　　a. ₐSTUDENT ᵦPRIEST BOTH-a,b  DISCUSSED. IX-b KNOW BIBLE IX-a
　　　NOT-KNOW

'I talked to a student and a priest. The priest knew the Bible but the student didn't know it'. (Informant **E**; 2, 62)

b. EACH-TIME $_a$LINGUIST $_b$PSYCHOLOGISTALL-THREE- b,a,1
TOGETHER WORK, IX-a HAPPY BUT IX-b HAPPY NOT.

'Whenever I work with a linguist and a psychologist, the linguist is happy but the psychologist is not happy.'(**E**; 2, 63)

These examples appear to provide initial support for dynamic analyses because they display patterns of coindexing without c-command. But they are by no means decisive. For the E-type approach could account these examples along the following lines:

(i) In sign language, a pronouns indexes the Noun Phrase that provides its descriptive content. In the implementation of Elbourne 2005, we may simply posit that a pronoun points towards the Noun Phrase which provides its antecedent under NP ellipsis. Since we already know from spoken languages that some formal link must be provided between the pronoun and its antecedent, it comes as no particular surprise that the same phenomenon can be observed in sign language.

(ii) In all cases such as (16), pronouns index exactly the syntactic element that they should – in particular under Elbourne's approach. Therefore (some) E-type approaches make exactly the same predictions as standard dynamic approaches.

When it comes to bishop sentences such as (13), however, things are different; some E-type accounts make different predictions from dynamic accounts (recall that by 'Chierchia's conjecture' and Dekker's results, there generally to develop E-type accounts that makes them converge with dynamic accounts; so we can't expect that all conceivable E-type accounts will be distinguished from dynamic accounts). One conceivable E-type account (which corresponds to my understanding of Elbourne 2005) posits that *extra-linguistic material* is used to enrich the descriptive content of the pronouns to allow them to pick out different bishops. Following Elbourne 2005, we can introduce some additional material **D** and **N** to refer to the 'distinguished' and 'non-distiguished' bishop in a situation (note that situations are sufficiently fine-grained that the two bishops can indeed play asymmetric role).

(17)     If a bishop meets a bishop, he **D** ~~bishop~~ blesses him **N** ~~bishop~~.

Crucially, the formal link between a pronoun and its antecedent is provided in this analysis by syntactic ellipsis. But in this case the very same results are obtained no matter which antecedent is used, since all that is elided is the noun *bishop*. For this reason, each pronoun could in principle take the same NP as its antecedent under ellipsis. And there certainly are other cases in which two elided NPs can the same antecedent, as shown in (18); so this possibility should be open here too.

(18)     If two bishops meet, one ~~bishop~~ blesses the other ~~bishop~~.

So we end up with the following prediction:

(19)     a. An E-type theory in which the denotations of the pronouns in bishop sentences are distinguished by extra-linguistic material allows both pronouns to have the same antecedent. Thus if pointing in sign language realizes the antecedence relation (= formal link) found in bishop sentences, both pronouns

could index the same antecedent *while denoting different individuals*.
b. For dynamic analyses, by contrast, coindexing is semantically interpreted, and thus both pronouns of a bishop sentence could not index the same antecedent.

## 3 Bishop Sentences in ASL and LSF

### 3.1 Standard Cases

The patterns of indexing found with bishop sentences in ASL are in agreement with the predictions of dynamic analyses, and contradict the version of the E-type analysis discussed above:

(20) **ASL**
WHEN $_a$ONE a-MEET-b $_b$ONE…
a. IX-a TELL IX-b HAPPY a-MEET-b (Inf 1, 2, 285; 111)
b. IX-b TELL IX-a HAPPY a-MEET-b (Inf 1, 2, 285; 111)
c. # Any patterns in which both pronominals index the same position.
'When someone meets someone, he tells him that he is happy to meet him'

(21) **LSF**
a. PRIEST $_a$IX $_b$IX ONE PRIEST a-MEET-b. $_b$IX BLESS-a.
'A priest met a priest. He blessed him.' (Informant **B**; 323)
b. WHEN ONE PRIEST $_a$CL MEETS OTHER PRIEST $_b$CL, a-GIVE-b book
'When a priest meets another priest, he gives him a book.' (Informant **A**; 28)

These patterns extend to cases in which several semantically parallel propositions are conjoined in the antecedent of the conditional:

(22) **ASL**
a. IF $_a$FRENCH MAN HERE OTHER $_b$FRENCH MAN HERE IX-a GREET IX-b (Informant 1, 2, 114)
'If a Frenchman were here and another Frenchman were here, he would greet him'
b. IF $_a$FRENCH MAN HERE OTHER $_b$FRENCH MAN HERE OTHER $_c$FRENCH MAN HERE IX-a GREET THE-TWO-b, c (Informant 1, 2, 115)
'If a Frenchman were here and another Frenchman were here and yet another Frenchman were here, the first would greet the second and the third'.

(23) **LSF**
$_a$PRIEST DISCUSS. ALSO OTHER $_b$PRIEST DISCUSS. BOOK BIBLE IX-a a-GIVE-b
'I talked to a priest. I also talked to another priest. The former gave a Bible to the latter.' (Informant **E**; 2, 69)

The latter observation matters because it has sometimes been suggested within event semantics that the thematic roles corresponding to subject vs. object of *meet* are crucial to break the symmetry between the indefinite antecedents in examples such as (20). It does not seem that this strategy can extend to cases of propositional conjunction in (22)-(23), where the antecedents bear exactly the same thematic role.

### 3.2 Intransitive Cases

Elbourne 2005 argues that in some cases a 'symmetry problem' does in fact arise in bishop sentences:

(24)    a. If a bishop meets a bishop, he greets him.
        b. #If a bishop and a bishop meet, he greets him.

Elbourne suggests that the contrast in (24) is predicted by his E-type analysis, but not by its dynamic competitors. Without taking a stand on the analysis of the English data, we note that such examples appear to be unproblematic in ASL – as is predicted by dynamic analyses if pointing is the morphological realization of coindexing. Furthermore, all indexing patters predicted by dynamic analyses are in fact realized:

(25)    **ASL**
        WHEN $_a$ONE AND $_b$ONE a-MEET-b
        a. IX-a TELL IX-b HAPPY a-MEET-b (Inf 1, 2, 306)
        b. IX-b TELL IX-a HAPPY a-MEET-b (Inf 1, 2, 306)
        'When someone meet someone, he tells him that he is happy to meet him'

(26)    **ASL**
        WHEN $_a$ONE AND $_b$ONE AND $_c$ONE MEET
        a. IX-a TELL THE-TWO-b, c HAPPY MEET
        b. IX-b TELL THE-TWO-a, c HAPPY MEET
        c. IX-c TELL THE-TWO-a, b HAPPY MEET (Inf 1, 2, 307)
        'When someone meets someone, he tells him that he is happy to meet him' 4.1
        Arguments for a Pure Dynamic Account

## 4. Anaphora to Negative Quantifiers

Having determined that the sign language data initially favor dynamic over E-type accounts, it  remains to see which version of the dynamic account best fits the sign language data. Let us remind ourselves of their main properties:

(27)    a. Mixed Dynamic Accounts
        -Donkey pronouns with indefinite antecedents are treated as variables which
        are dynamically bound.
        -Donkey pronouns with non-indefinite antecedents are treated as E-type
        pronouns.

b. Pure Dynamic Accounts
-All donkey pronouns are treated as variables which are dynamically bound.
-Non-indefinite quantifiers introduce not just discourse referents, but also maximality conditions.

Thus the prediction of pure dynamic accounts is that the formal link between a donkey and its antecedent should be the same when the latter is indefinite as when it is non-indefinite. Mixed dynamic accounts make no such prediction. We will now show that the same formal link is used whether the antecedent is an indefinite or not. This does not strictly refute the mixed account – it could be that both types of anaphoric link are realized in the same way; but it makes this account less plausible.

The striking fact, then, is that in all the following examples the very same mechanism (establishment of a locus for the antecedent, pointing towards that locus for the pronoun) is used for non-indefinite antecedents as for indefinite antecedents.

(28) **LSF**
a. LESS FIVE ${}_a$STUDENT COME PARTY.  IX-a-plural STAY.
'Less than five students came to the party. They stayed.' (Informant **A**; 37)
b. PIERRE FOUR LESS ${}_b$STUDENTS. IX-b HATE IX-a.
'Pierre has less than 4 students. They hate him.' (Informant **B**; 328)

(29) **LSF**
a.  IF LESS FIVE ${}_a$STUDENT COME PARTY, IX-a-plural BE-BORED
   'If less than five students come to the party, they will be bored.' (Informant **C**; 210)
b. IF FOUR  ${}_a$CL-plural LESS COME CLASS DANCE, IX-a-plural HAPPY NOT
'If less than four people come to the dance lesson, they won't be happy.' (Informant **A**; 233)
c. LESSON DANCE IF ${}_a$PEOPLE FEW IX-a HAPPY NOT
'If few people show up at the dance lesson, they won't be happy' (Informant **E**; 2, 73c)

### 4.2   The Presupposition of Pronouns

There are well-known cases in spoken language in which a donkey pronoun appears to have a negative quantifier *No NP* as its antecedent. However this is only possible when an existence presupposition associated with the pronoun is satisfied:

(30)    a. *?There is no bathroom. It is (not) large.
a'. ??There is no bathroom. The bathroom is (not) large.
b. Either there is no bathroom in this house, or it is in a funny place. (Partee)
b'. Either there is no bathroom in this house, or the bathroom is in a funny place.

This paradigm is unsurprising for an E-type account; for instance, on Elbourne's analysis (2005), *it* goes proxy for *the bathroom*, and thus (30)a-b are predicted to

pattern like (30)a'-b', which seems right. Furthermore, these contrasts can easily be explained given standard theories of presupposition projection: the definite description has an existence presupposition which is not satisfied in (30)a-a'; whereas it is satisfied in (30)b-b' because, quite generally, the presupposition of the second disjunct can be satisfied by the negation of the first one (e.g. Beaver 2001).

Dynamic theories could account for these data in at least two ways. In the spirit of the pure account, one could posit that variables introduced by pronouns come with an existence presupposition. Alternatively, one could posit with the mixed account that examples such as (30)b are handled by a variant of the E-type account. Once again, the sign language data argue in favor of a pure dynamic account, in the sense that the same formal link established in the sign language counterparts of (30) is exactly the same as in sentences involving indefinite antecedents.

(31)    **ASL**
        RECENTLY LOTTERY (FINISH).
        There recently was a lottery.
        a. (a)ONE WIN. IX-a / Ø WANT NAME ANONYMOUS.
        'Someone won. He wanted his name to remain anonymous'
        b. * (a)NOBODY WIN. IX-a WANT NAME ANONYMOUS. (Inf 1, 2, 217)

(32)    **ASL**
        RECENTLY LOTTERY (FINISH).
        There recently was a lottery.
        a. I NOT-THINK NOBODY WIN. I THINK IX-a / ??Ø WANT NAME
        ANONYMOUS.
        'I don't think nobody won. I think he wanted his name to remain anonymous'
        (Inf 1, 2, 221; cf. 220).
        b. EITHER NOBODY WIN OR IX-a WANT NAME ANONYMOUS.
        'Either nobody won, or he wanted his name to remain anonymous' (Inf 1, 2,
        218)
        c. EITHER NO ₐDEMOCRAT CL WILL CO SUPPORT HEALTH BILL
        WITH ᵦREPUBLICAN CL OR IX-a WILL a-GIVE-b A-LOT MONEY.
        'Either no Democrat will cosponsor the healthcare bill with a Republican, or
        he [=the Democrat] will give him [=the Republican] a lot of money. (Inf 1, 2,
        230)

(32)c is particularly striking: different loci are introduced for *Democrat* and *Republican* in the first disjunct; these loci are then indexed in the second disjunct, despite the fact that in the first disjunct the corresponding quantifiers do not have existential force. This argues for a version of pure dynamic accounts (e.g. Brasoveanu 2007) in which all non-indefinite quantifiers introduce discourse referents with maximality conditions, while the interpretation of pronouns is constrained by an existence presupposition.