

## 9 Bound and Referential Pronouns and Ellipsis

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We have had a semantics for bound-variable pronouns since chapter 5, but up to now we have ignored the referring uses of pronouns. In this chapter, we introduce a treatment of referring pronouns and attend to some consequences of the fact that every occurrence of a pronoun gives rise to a potential bound-free ambiguity. In particular, we will look at the interpretation of ellipsis constructions and show that the so-called strict-sloppy ambiguity in an elided phrase reduces to the ambiguity of pronouns in its antecedent. To set the stage for this argument, we will have to include a rudimentary sketch of a theory of ellipsis.

### 9.1 Referential pronouns as free variables

#### 9.1.1 *Deictic versus anaphoric, referential versus bound-variable pronouns*

Traditional grammar distinguishes between “deictic” and “anaphoric” uses of personal pronouns.<sup>1</sup> The terms are typically explained as follows: A pronoun is used *deictically* when it receives its reference from the extralinguistic utterance context, and it is used *anaphorically* when it “picks up its reference” from another phrase in the surrounding text. Paradigm cases of deictic uses are the demonstrative uses: that is, those accompanied by a pointing gesture which bears the main burden of fixing the reference. But the term also applies to cases where the intended referent is sufficiently salient in the utterance context even without the help of pointing. For instance, (1) might be uttered immediately after a certain man has left the room.<sup>2</sup>

- (1) I am glad he is gone.

Under the right circumstances, this utterance is felicitous, and *he* unambiguously refers to the man who just left. No previous reference to the same person need have been made; nor need the referent be physically present and available to be pointed at. This too is classified as a "deictic" use.

It is not clear, however, whether the traditional division into deictic and anaphoric uses has any role to play in linguistic theory. In the more recent tradition of formal linguistics, both generative syntacticians and philosophers of language have frequently advocated the view that a certain subset of the anaphoric uses does not differ in any theoretically relevant way from the deictic uses.<sup>3</sup> The idea is that anaphora may often be viewed as reference to a contextually salient individual as well. It seems to differ from deixis only insofar as the *cause* of the referent's salience is concerned. For instance, when the *he* in an utterance of (2) refers to Smith, this may be attributed to the fact that Smith has just been referred to in the previous sentence and that this has made him salient to the audience.

- (2) I don't think anybody here is interested in Smith's work. He should not be invited.

The mechanism by which this anaphoric pronoun acquires its reference is not really different from the mechanism by which a typical deictic pronoun (as in (1)) does. Anaphoric and deictic uses seem to be special cases of the same phenomenon: the pronoun refers to an individual which, for whatever reason, is highly salient at the moment when the pronoun is processed. There are many possible reasons why a particular individual might have become salient. Sometimes it is due to an act of pointing by the speaker; at other times it is because the individual in question has just been mentioned (by name or description) by the (current or a previous) speaker; and yet other times its salience is caused by circumstances which were not created by the speaker's linguistic or non-linguistic behavior at all.

Let us assume, then, that all deictic pronouns and also many anaphoric ones are interpreted by the same general strategy. In disambiguating the pronoun's reference, listeners assign it to the most salient individual that allows them to make sense of the utterance. This may not be the most salient individual in absolute terms, if that would lead to a reading for the utterance which conflicts with basic common sense and with the speaker's manifest beliefs and intentions. In such a case, the most salient individual will be passed over in favor of the next most salient one until a plausible overall reading is found. How this works exactly, and how salience interacts with various other factors, is not easy to say, and there is much room here for psycholinguistic research. As semanticists, we abstract away from the strategies of reference resolution and the conditions they require to succeed. We take for granted that where they do apply successfully,

the pronoun denotes a unique individual. In this respect, there is no difference between anaphora and deixis.

Can *all* examples of anaphoric pronouns be subsumed under this characterization? No. We already know that this is not feasible, for the simple reason that some pronouns don't refer to an individual at all (hence, *a fortiori*, not to the most salient individual that contributes to a sensible overall reading). We have already seen many instances of such *nonreferring* pronouns: for instance, in *such that* clauses (chapter 5) and with quantifying DPs as antecedents (chapter 7). An example of the latter sort is (3),<sup>4</sup> on the reading that this sentence receives most readily when uttered in isolation.

- (3) Every man put a screen in front of him.

The pronoun **him** here doesn't refer to an individual any more than its antecedent **every man** does. Rather, it is best treated as a *bound variable*. In the theory we have developed in the last few chapters, this means that it is co-indexed with the QR trace of its antecedent and interpreted by the following rule (repeated from chapter 5).

(4) *Pronouns and Traces Rule*

If  $\alpha$  is a pronoun or trace,  $i$  is an index, and  $g$  is a variable assignment whose domain includes  $i$ , then  $\llbracket \alpha_i \rrbracket^g = g(i)$ .

Cases like (3) conclusively show that not all anaphoric pronouns can be treated as referential. At least some of them are bound variables.

Would it be possible, on the other hand, to attempt a unification in the opposite direction and treat *all* anaphoric pronouns as bound variables? Should we, for example, reconsider our analysis of (2) above and attempt, instead, to analyze the **he** in (2) as a bound variable as well? That would require us to posit an LF for (2) in which the DP **Smith** has been raised high enough to c-command the entire two-sentence text. We assume that such LF representations cannot be generated, due to general constraints on movement.<sup>5</sup> If so, then cases of intersentential anaphora must always involve co-reference rather than variable binding. A similar argument can be made about certain cases of *intrasentential* anaphora as well: namely, those where the antecedent is very deeply embedded. Take (5), on the reading where **her** is anaphoric to **Mary**.

- (5) Most accidents that Mary reported were caused by her cat.

In order to apply a bound variable analysis to this pronoun, we would have to raise **Mary** all the way from inside the relative clause to the edge of the matrix clause. Assuming that such movement is blocked by island constraints, we have

here another example in which the relevant anaphoric relation must be co-reference rather than variable binding. We conclude, therefore, that at least some “anaphoric” pronouns are best analyzed as referring pronouns, just like the “deictic” pronouns.

We have used the term “co-reference” in opposition to “variable binding” here, and we want to draw your attention to our terminological policy in this regard. Much of the syntactic literature uses “co-reference” in an informal sense that covers bound-variable anaphora along with other semantic relations. “Co-reference” there is used much like the traditional term “anaphora”. A broad descriptive term like this can be useful in order to have short labels for the different readings of a given sample sentence and to indicate quickly which one of them we are talking about. We will use “anaphora” (and also “antecedent”) in this way below. But when we say “co-reference”, we always mean it in a narrow literal sense: two expressions (or occurrences of expressions) *co-refer* iff they refer to the same individual. It follows that if two expressions co-refer, then each of them refers to something. A bound-variable pronoun therefore cannot possibly co-refer with any expression. *Co-reference implies reference*. We cannot legislate this terminology to the general linguistic community, but for the purposes of working with this textbook, it is important that you adopt it too and maintain it consistently. Many points we will be making may otherwise be lost on you.

In summary, the descriptive category of “anaphoric” uses of pronouns appears to fall into two semantically rather different groups: *bound-variable* uses and (*co*-)*referring* uses. The traditional taxonomy “anaphoric” versus “deictic” disregards this important semantic distinction. Instead, it focuses on a subdivision within the class of referring uses, which seems to be more relevant to the theory of language use (processing) than to the theory of grammar (semantics and syntax).

### 9.1.2 Utterance contexts and variable assignments

We have yet to say how referring pronouns are represented in our LFs and treated by our semantic rules. The simplest assumption we can make at this point is that all pronouns have the same internal syntax and semantics. They must all bear an index (numerical subscript) at LF to be interpretable, and they are all interpreted by the same rule, *Traces and Pronouns*. The only thing that distinguishes referring pronouns from bound-variable pronouns is that they happen to be *free* variables. In other words, the difference between referential and bound-variable pronouns resides in the larger surrounding LF structure, not in the pronouns themselves.

Treating referring pronouns as free variables implies a new way of looking at the role of variable assignments. Until now we have assumed that an LF whose truth-value varied from one assignment to the next could *ipso facto* not represent a felicitous, complete utterance. We will no longer make this assumption. Instead, let us think of assignments as representing the contribution of the utterance situation. The physical and psychological circumstances that prevail when an LF is processed will (if the utterance is felicitous) determine an assignment to all the free variables occurring in this LF. Let's implement this formally.

If you utter a sentence like

- (6) She is taller than she

then your utterance is felicitous only if the utterance situation provides values for the two occurrences of the pronoun "she". Given that referring pronouns bear indices at LF, (6) has some representation such as (7),

- (7) She<sub>1</sub> is taller than she<sub>2</sub>

and we can think of an utterance situation as fixing a certain partial function from indices to individuals. An appropriate utterance situation for LF (7) is one that fixes values for the indices 1 and 2. That is, it is appropriate for (7) only if the variable assignment it determines includes 1 and 2 in its domain.

Let "c" stand for an utterance situation or "(utterance) context" (we use these terms interchangeably), and let "g<sub>c</sub>" stand for the variable assignment determined by c (if any). We can thus formulate the following appropriateness and truth-conditions for LFs with free pronouns.

- (8) *Appropriateness Condition*

A context c is *appropriate* for an LF  $\phi$  only if c determines a variable assignment g<sub>c</sub> whose domain includes every index which has a free occurrence<sup>6</sup> in  $\phi$ .

- (9) *Truth and Falsity Conditions for Utterances*

If  $\phi$  is uttered in c and c is appropriate for  $\phi$ , then the utterance of  $\phi$  in c is *true* if  $\llbracket \phi \rrbracket^{g_c} = 1$  and *false* if  $\llbracket \phi \rrbracket^{g_c} = 0$ .

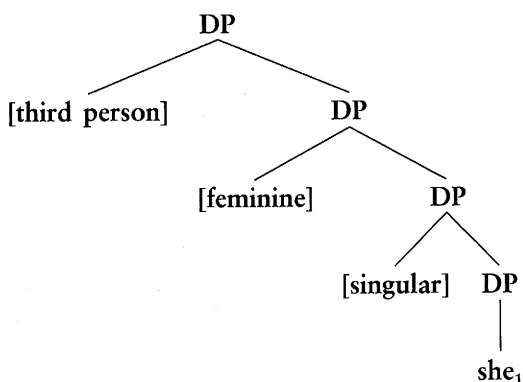
For instance, suppose that (6) with LF (7) is uttered in a situation c<sub>1</sub> which furnishes the assignment g<sub>c<sub>1</sub></sub>:

$$g_{c_1} = \begin{bmatrix} 1 \rightarrow \text{Kim} \\ 2 \rightarrow \text{Sandy} \end{bmatrix}$$

$c_1$  is appropriate for (7), and thus this is a true utterance if Kim is taller than Sandy, and a false utterance if she isn't.

What about the role which gender, person, and number features of referential pronouns play in their interpretation? For instance, if Kim or Sandy is male, then the context  $c_1$  that we just defined is not intuitively appropriate for the use of LF (7). Since both pronouns in (7) are third person feminine singular, they both must refer to female individuals distinct from the speaker and the addressee. Can we capture this intuition as well?

As it turns out, we already make the correct predictions, at least as regards the gender features. In section 5.5, when we briefly addressed the role of features in constraining the possible indexings for *bound* pronouns, we proposed in passing a presuppositional account of gender features. Here is a more explicit version. Suppose that features are nodes of their own, adjoined to the DP (at least, that the semantic composition principles treat them this way). For instance, we may have structures like:



The lowest DP-node is interpreted by the Pronouns and Traces rule, the higher ones by Functional Application. Each feature has a suitable lexical entry, for example:

$$(10) \quad \llbracket \text{feminine} \rrbracket = \lambda x : x \text{ is female} . x$$

So a feature denotes a *partial* identity function. If the DP-node above such a feature gets a denotation at all, it will be the same as the one of the next lower DP. But if the lower DP's denotation fails to have the appropriate property (for example, femaleness), the one above gets no value.

Consider now what happens if, for example, the LF (7) is uttered in a context  $c_2$  which maps the index 1 to a man. (That is,  $g_{c_2}(1)$  is male.) Although this context may qualify as "appropriate" for (7) in the technical sense of our Appropriateness Condition (8) (provided that  $g_{c_2}$  also has index 2 in its domain),

it will not provide a referent for the complete DP that corresponds to the pronoun “she<sub>1</sub>”. Instead, this DP will fail to be in the domain of  $\llbracket \cdot \rrbracket^{g_{c_1}}$ , due to (10). Therefore, the whole sentence (7) will also not be in the domain of  $\llbracket \cdot \rrbracket^{g_{c_1}}$ , and the utterance of (7) in  $c_2$  is neither true nor false. In short, the result is presupposition failure.

On this account of gender features, it is not strictly speaking impossible to use a feminine pronoun to refer to a man. But if one does so, one thereby expresses the presupposition that this man is female. This is intuitively right. If the discourse participants mistakenly believe a male referent to be female, or if they are willing to pretend that they do, then indeed an occurrence of *she* can refer to a man, without any violation of principles of grammar.

Person and number features might be treated in an analogous fashion. You may add appropriate lexical entries analogous to (10).

## 9.2 Co-reference or binding?

We have seen some clear cases of referring pronouns and also some cases that compellingly called for a bound-variable analysis. Whenever an anaphoric pronoun has a quantifier as its antecedent, for instance, it cannot be referential, at least not on the reading which we intend when we say the pronoun is “anaphoric”. Anaphoric pronouns with quantifier antecedents are the paradigm cases of bound-variable pronouns, but they are by no means the only instances of bound-variable pronouns that we find in natural language. Bound-variable readings for pronouns are not confined to sentences involving quantifiers. It is easy to see that our theory predicts them to have a much wider distribution. And we will argue that this prediction is welcome and supported by empirical evidence.

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### Exercise

The following sentence contains a pronoun (**his**), but no quantifier. (Assume our Fregean analysis of **the**, on which definite DPs have type *e*.)

- (i) The dog that greeted his master was fed.
  - (a) Give a precise paraphrase of the presupposition and assertion that (i) expresses on its most salient reading. (Imagine an out-of-the-blue

utterance, with no contextually salient candidate for the reference of **his**.)

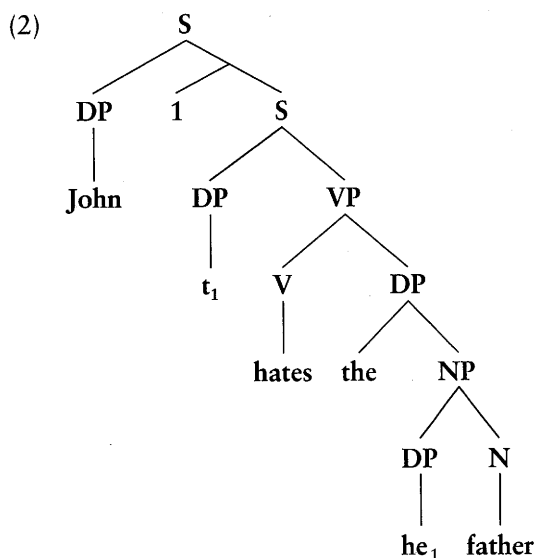
- (b) Show that this reading can be correctly predicted by means of a bound variable construal of **his**.
- (c) Argue that no referential analysis of **his** can adequately capture this same reading.

As we noted in section 9.1.1, many anaphoric pronouns with referring antecedents such as proper names are best analyzed as referring pronouns that co-refer with their antecedents. When the antecedent was in a separate sentence, or deeply embedded in an island, this co-reference analysis was virtually forced on us. But that still leaves many cases where anaphora to a referring antecedent *can* be analyzed as variable binding. Consider (1).

- (1) John hates his father.<sup>7</sup>

Disregard any reading where **his** refers to someone other than John and concentrate on the reading which is true iff John hates his own (John's) father.

There is nothing that prevents us from generating the following LF for (1).



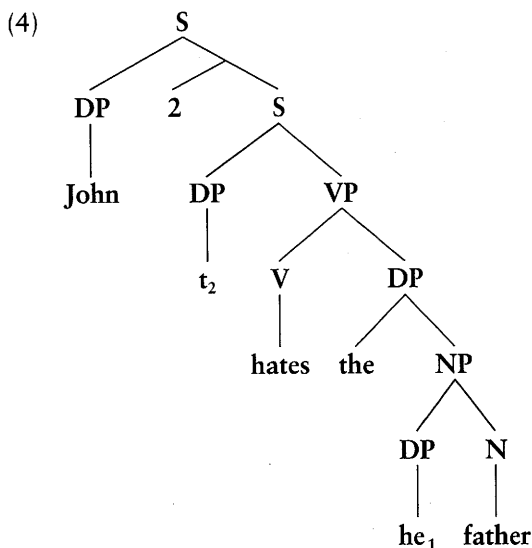
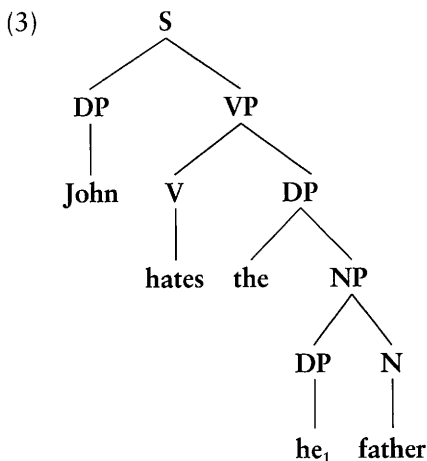
**John** has been QR'd here, and **he**<sub>1</sub> carries the same index as the trace of **John**. (Why not?) So **he**<sub>1</sub> is a bound variable. Applying our semantic rules, we find that (2) is true iff John is in the set { $x \in D : x$  hates  $x$ 's father}; that is, iff John hates John's father. Or, more pedantically, we observe that our Appropriateness Condition is trivially satisfied for (2) by an arbitrary context (since (2) contains no



free indices), and then we apply the semantic rules and the Truth and Falsity Conditions for utterances to derive that any utterance of (2) is true if John hates John's father and false if he doesn't.

So the relevant ("anaphoric") reading of (1) is adequately captured by a bound-variable analysis of the pronoun *his*.

It is just as easy, of course, to generate LFs in which the pronoun is free, either by not QR'ing **John** at all (see (3)), or by giving its trace an index different from the pronoun's (see (4)).



In (3) and (4), *he*<sub>1</sub> is free. By the Appropriateness Condition, these LFs thus require an utterance context which assigns a referent to the index 1. Among

the candidates are contexts like  $c_1$  such that  $g_{c_1} = [1 \rightarrow \text{Fred}]$ , or  $c_2$  such that  $g_{c_2} = [1 \rightarrow \text{Bill}]$ , or  $c_3$  such that  $g_{c_3} = [1 \rightarrow \text{John}]$ , etcetera. If it is  $c_3$  that prevails when (3) or (4) is uttered – and why shouldn't it be, given that John has been brought to the listener's attention by the mention of his name? – then the utterance will be true iff John hates John's father (as we can easily calculate).

So the pertinent reading of (1) can be just as adequately captured by a referential analysis of the pronoun. We have shown that LF (3) (or (4)) uttered in context  $c_3$  has precisely the same truth and falsity conditions as LF (2) (uttered in any context).

As this example illustrates, our current theory predicts a lot of “invisible” ambiguity. We have what intuitively is just one reading, with certain definite truth-conditions, but it is generated in two distinct ways: with distinct LFs, distinct denotations for many of the subsentential constituents, and distinct appropriateness conditions for the utterance context. Both analyses are consistent with our current assumptions about syntax, semantics, and pragmatics. We have no motivation for any particular constraint whose addition to the theory would render one of them unavailable. This being so, we hypothesize that both analyses are indeed grammatical. But it seems to be impossible in principle to obtain empirical confirmation for this hypothesis. All the evidence we have to go on are our intuitions about the truth-conditions of utterances of sentences like (1). And, as we have just seen, these intuitions are equally consistent with (1) being ambiguous at LF between (2) and (3) and with it unambiguously having structure (3).<sup>8</sup>

Or so it appears. In fact, the conclusion we have just stated has been challenged. A number of authors (including Partee, Keenan, Lasnik, Sag, Williams, and Reinhart<sup>9</sup>) have argued that there is truth-conditional evidence for this “invisible” ambiguity, after all. But we must look beyond the truth-conditions of sentence (1) by itself to find it. When we consider the truth-conditions of larger units (complex sentences or multisentential texts) in which (1) is followed by an elliptical continuation, we will see that the ambiguity becomes manifest, and we will get evidence that both a bound-variable reading and a co-referential reading are generated by the grammar. We reproduce this line of argument in the remainder of the chapter.

## 9.3 Pronouns in the theory of ellipsis

### 9.3.1 *Background: the LF Identity Condition on ellipsis*

The most discussed construction in the semantic literature on ellipsis is “VP ellipsis”, exemplified in (1) and (2).

- (1) He smokes. He shouldn't.
- (2) Laura took a nap, and Lena did too.

The second sentence in each text is missing a VP on the surface, but it is understood just as if there was one present ([<sub>VP</sub> **smoke**] in (1), [<sub>VP</sub> **take a nap**] in (2)). Here we will talk about VP ellipsis as well as a somewhat different construction known as "stripping" or "bare argument ellipsis". The latter is illustrated by (3)–(5).

- (3) Some people smoke, but not many.
- (4) Laura left Texas, and Lena as well.
- (5) Laura drank the milk last night, or perhaps the juice.

The main difference between the two constructions is that in bare argument ellipsis the auxiliary is absent as well. Apart from negation and adverbs like "as well", merely a bare noun phrase remains. Note also that (unlike in VP ellipsis) the remnant phrase need not be the subject, as seen in (5).

We assume that in the derivation of all these sentences, some constituent is deleted on the way from SS to PF. In VP ellipsis, it's a VP, and in bare argument ellipsis, an S. If bare argument ellipsis always deletes an S constituent, we must assume that the "remnant" argument always has been topicalized (adjoined to S) before the deletion. These assumptions, of course, would need to be justified if we were to attempt a serious syntactic analysis of the construction.<sup>10</sup>

Elliptical sentences are thus incomplete as sentences on the surface, but they nevertheless have the semantic interpretation of complete sentences. How can this be? A straightforward answer is that they are complete sentences at the level of LF. The deletion on the PF branch does not take place in the derivation from SS to LF. This way, the LFs can be interpreted by the familiar semantic rules and will wind up with run-of-the-mill sentence meanings. For instance, if *Lena as well* has essentially the same LF as the complete sentence *Lena left Texas as well*, then we don't have to say anything further about how it receives its interpretation.

The deletion operation that yields elliptical sentences is evidently not allowed to delete arbitrary material in arbitrary environments. If it were, then the text in (4) would be predicted to have many readings in addition to the one we observe. For instance, it should be able to mean that Laura left Texas and Lena also *moved*. This reading could result from deleting *moved* instead of *left Texas*.<sup>11</sup> But (4) cannot be understood in this way. We clearly judge (4) false, for instance, if Lena moved only from San Antonio to Dallas. Apparently, the material

that is deleted in the derivation of an elliptical sentence must be identical to material that is present overtly in the antecedent discourse. Roughly, the explanation for why the covert portion of the LF of **Lena as well** in (4) can be **left Texas**, but cannot be **moved**, has to be that the former expression, but not the latter, matches the overt material in the antecedent sentence **Laura left Texas**.

How exactly should this identity condition be stated, and at what level does it apply? A main insight of work on ellipsis in the 1970s was that the relevant level had to be one which was fully disambiguated with respect to interpretation.<sup>12</sup> In our framework, this is LF. Mere identity of representations at some pre-LF stage of the derivation is not sufficient to license ellipsis. To appreciate this point, we must look at examples in which non-trivial changes occur in the derivation towards LF. (The ones above are too simple.) Take a sentence in which LF movement has an essential disambiguating role to play, such as (6).

(6) Laura showed a drawing to every teacher.

(6) displays a scope ambiguity and can mean either that there was a drawing that Laura showed to every teacher, or else that for every teacher there was a drawing that Laura showed her. The two readings have distinct LFs, but the same structure at SS. Now examine your intuitions about possible meanings for the text in (7), in which (6) is followed by an elliptical sentence.

(7) Laura showed a drawing to every teacher, but Lena didn't.

The elliptical conjunct "Lena didn't" here can be understood to say that there wasn't any drawing that Lena showed to every teacher – but only if the preceding sentence is understood analogously: namely, as saying that there was a drawing that Laura showed to every teacher. Alternatively, "Lena didn't" can mean that not for every teacher was there a drawing that Lena showed her – but only when the preceding sentence means that for every teacher there was a drawing that Laura showed her. It is not possible to read the first conjunct with one scope order, and the elliptical sentence with the reverse one. This is readily explained if the elided material has to have the same LF as its antecedent, but it would not automatically follow if they merely needed to look alike at some pre-LF stage in the derivation, say SS.

We thus adopt the following general condition on ellipsis:

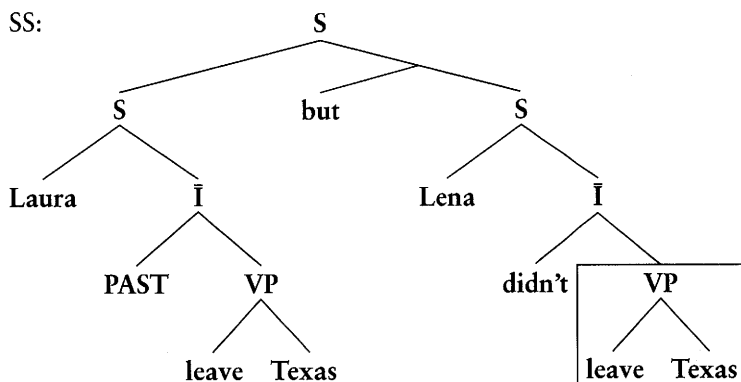
(8) *LF Identity Condition on Ellipsis*

A constituent may be deleted at PF only if it is a copy of another constituent at LF.

Before we return to the topic of pronouns, here are a few sample derivations. The first one involves VP ellipsis, the second one bare argument ellipsis with an

object remnant. The constituent to be deleted at PF is always the one that is boxed.

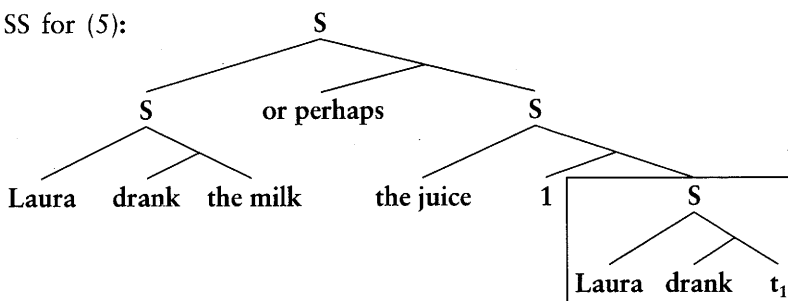
(9) SS:



In the derivation to LF, everything can stay the same in this case. The VP in the first conjunct is a copy of the deleted VP in the second conjunct, and thus it serves to fulfill the LF Identity Condition.

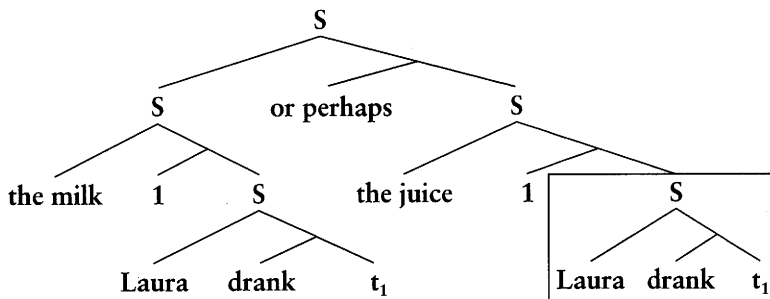
The case of bare argument ellipsis is slightly more complicated. In the SS, the remnant has already been fronted.

(10) SS for (5):



In deriving the LF, we may now QR *the milk*, leaving a trace also indexed 1.

(11)



Now we have an LF-identical antecedent for the deleted S-node.

### 9.3.2 Referential pronouns and ellipsis

What happens when the antecedents of elided phrases contain pronouns? Let us begin with examples of pronouns which are clearly referential. For instance, (12) has a natural reading on which it means that Philipp went to *Roman's* office.

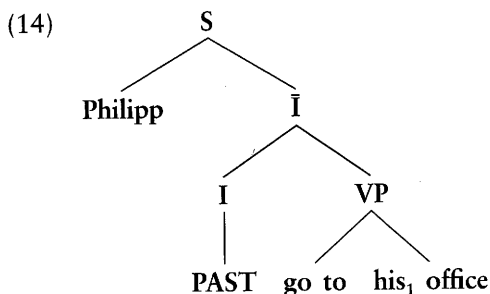
(12) (On Roman's birthday), Philipp went to his office.

Imagine that an utterance of (12), with the reading just described, is continued as follows.

(13) (On Roman's birthday), Philipp went to his office. Marcel didn't.

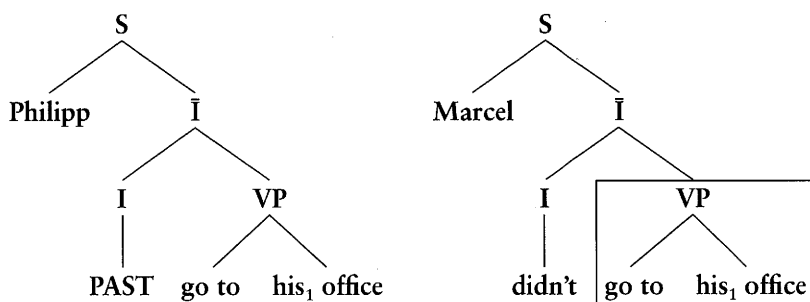
What can the continuation mean? The fact is that, given that we have understood the first sentence to mean that Philipp went to Roman's office, we must understand the second one to mean that Marcel didn't go to Roman's office. It cannot then mean that Marcel didn't go to Philipp's office, or didn't go to Felix's office, or didn't go to Marcel's office. However salient one of these other individuals may be, the only choice for the referent of the elided copy of *his* is Roman, the referent of the overt copy of *his*.

We would like our theory of ellipsis to make this prediction. Let us see what it predicts as it stands. On the reading we have specified for the first half of (13) (= (12)), its LF must contain a free pronoun. Let's say it looks as in (14), and the utterance context  $c$  is such that  $g_c(1) = \text{Roman}$ .

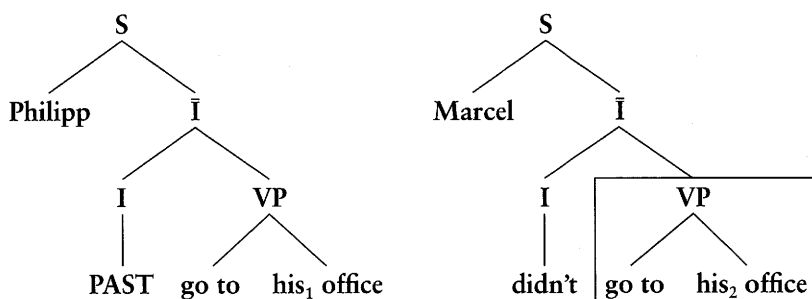


Given this first half, what options do we have for the LF of the whole text? The LF Identity Condition requires that the deleted VP in the second part be a copy of the antecedent VP. So this has to be *go to his<sub>1</sub> office* as well, and not, for instance, *go to his<sub>2</sub> office*. We predict that (15) is a grammatical LF for (13), but (16) an ungrammatical one.

(15)



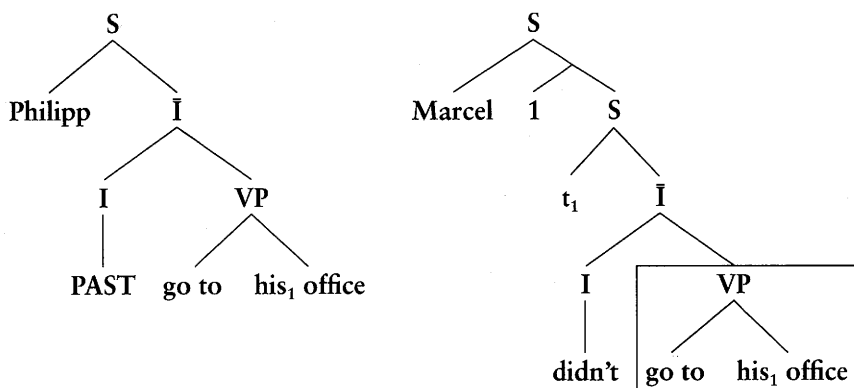
(16)\*



In the grammatical LF (15), the two occurrences of *his*<sub>1</sub> cannot fail to co-refer. Given our context *c*, the second S in (15) is true iff Marcel didn't go to Roman's office. The ungrammatical LF (16), on the other hand, could express one of the undesirable readings we seek to exclude. For example, if *c* happened to be such that *g*<sub>*c*</sub>(2) = Felix, then the second S in (16) as uttered in *c* would be true iff Marcel didn't go to Felix's office. It is a good thing, then, that the LF Identity Condition excludes (16).

Unfortunately, however, there is another possible LF which we do not yet exclude and which also expresses one of the unavailable readings. Suppose we had chosen to QR *Marcel* and to give its trace the index 1, as in (17).

(17)



No principle that we know of excludes this LF, and in particular, it does not violate our LF Identity Condition. But look at its interpretation. Given our context *c*, the first part still says that Philipp went to Roman's office, but the second part says that Marcel didn't go to *Marcel's* office. If this LF is generated for our text in (13), we are in trouble.

To close this "loophole," we need to tighten up the theory somehow. How exactly this should be done has been a matter of considerable debate in the literature on ellipsis.<sup>13</sup> For our purposes in this book, a very preliminary remedy will have to do. What appears to be causing the trouble in (17) is that we have a *free* pronoun in the first sentence but a *bound-variable* pronoun in the analogous place in the second sentence. Perhaps we should rewrite the LF Identity Condition in such a way that it is sensitive to this difference, even though it is not a difference that can be detected by merely looking inside the LF representations of the deleted phrase and its putative antecedent. Another option is to leave the LF Identity Condition as it stands, but add a general prohibition against LFs in which a given index has both bound and free occurrences. We might as well choose the second option here.

- (18) No LF representation (for a sentence or multisentential text) must contain both bound occurrences and free occurrences of the same index.

Given (18), LFs like (17) are simply not generated, whether the derivation involves PF deletion or not. (Note that the adoption of (18) makes no difference to anything other than our predictions about ellipsis. The reason for this is that every LF prohibited by (18) has "notational variants"<sup>14</sup> that are semantically equivalent with it, as well as indistinguishable from it in all respects relevant to syntactic principles other than the identity condition on ellipsis.)

With (17) as a source of unwanted readings out of the way, our LF Identity Condition predicts just what we were aiming for. Whenever the first sentence in an utterance of (13) means that Philipp went to Roman's office, the elliptical second sentence can only mean that Marcel didn't go to Roman's office. More generally, we predict that whenever a pronoun in the antecedent phrase refers to an individual *x*, then that pronoun's counterpart in the deleted phrase must refer to *x* as well. Referential pronouns keep their reference under ellipsis. This law follows from our current theory.

### 9.3.3 The "sloppy identity" puzzle and its solution

Against the background of the law we just deduced, the phenomenon of so-called sloppy identity readings can look very puzzling. Consider (13) once more.

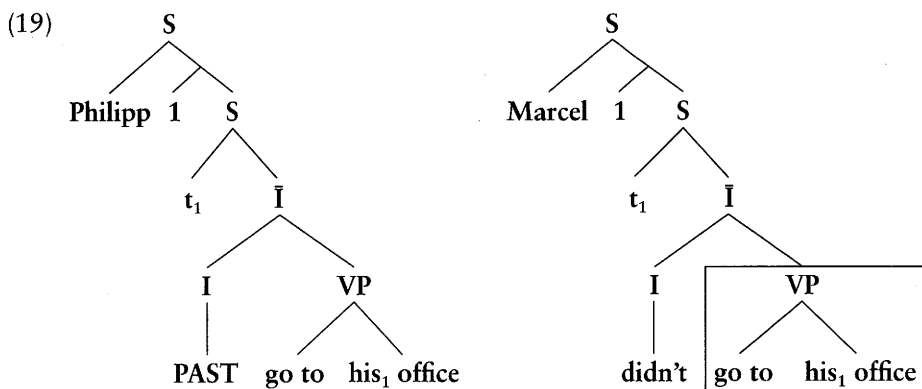


- (13) (On Roman's birthday), Philipp went to his office. Marcel didn't.

In the previous section, you were instructed to read the first sentence as "Philipp went to Roman's office", and we did not consider other interpretations. But, of course, it is also possible to read this first sentence as claiming that Philipp went to his own (Philipp's) office, for instance. In this case, what are the possible readings for the continuation "Marcel didn't"? Clearly, it is possible then to understand "Marcel didn't" as claiming that Marcel didn't go to *his* own (Marcel's) office. (This is even the most salient reading.) The text (13) as a whole can mean that Philipp went to Philipp's office and Marcel didn't go to Marcel's office (the so-called sloppy reading). Doesn't this constitute a blatant counterexample to the law we have just seen? If the antecedent VP means "go to *Philipp's* office", how can the deleted VP mean "go to *Marcel's* office" and yet have an identical LF? When the antecedent VP meant "go to *Roman's* office", the deleted VP *had to* mean "go to *Roman's* office". No "sloppy" alternative was available then. But when the antecedent VP means "go to *Philipp's* office", the deleted VP doesn't necessarily mean "go to *Philipp's* office"! Why this difference between Roman and Philipp?<sup>15</sup>

The puzzle persists only as long as we take it for granted that the overt pronoun has to be referential.<sup>16</sup> It is certainly tempting to think that whenever **Philipp went to his office** has the truth-conditions of "Philipp went to Philipp's office", it must be because **his** refers to Philipp. But we ought to know better. As we saw earlier in this chapter, the truth-conditions of "Philipp went to Philipp's office" can also come about in an entirely different way: namely, by interpreting **his** as a bound-variable pronoun. Let us examine this alternative possibility and how it affects the predictions of the LF Identity Condition.

Here is an LF for the text (13) in which the overt as well as the deleted occurrence of the pronoun have been construed as bound variables. In both sentences, the subjects were QR'd, and the same indices were chosen for their traces.



The LF in (19) expresses precisely the so-called sloppy reading of the text in (13). As we can easily calculate by our semantic rules, both trees in (19) are true iff Philipp went to Philipp's office and Marcel didn't go to Marcel's office. (19) also meets the LF Identity Condition on ellipsis, since the two VPs are identical. And it is not in violation of stipulation (18), since all occurrences of index 1 are bound in the overall representation. (19), then, shows that the "sloppy" identity reading is not, after all, a counterexample to our theory. It only seemed to be a counterexample when we reasoned on the basis of the prejudice that the pronouns here were all referring.

We have solved the sloppy identity puzzle and vindicated our assumptions about ellipsis. In doing so, we have found an indirect, yet compelling, argument for the coexistence of bound-variable readings and referential readings in anaphoric pronouns with referring antecedents. This is the argument which we announced at the end of section 9.2, where it had seemed at first as if the bound-variable reading could not possibly be told apart from a co-referential reading.

There is more to be done in order to establish these conclusions firmly. Ideally, we would like to see that our assumptions about pronouns and our assumptions about ellipsis conspire to yield exactly the right predictions about the distribution of strict and sloppy readings in all sorts of examples. As a first small step in this direction, let's make sure that our simple text (13) receives all and only the readings that it intuitively allows. We have just seen how the "sloppy" reading is accounted for, and we already saw in section 9.3.2 how to generate a "strict" reading. By a "strict" reading, we mean any reading with truth-conditions of the form "Philipp went to  $x$ 's office, and Marcel didn't go to  $x$ 's office", for some given person  $x$ .  $x$  may be Philipp, or Marcel, or a third person such as Roman. The LF in (15) above can represent any one of these readings, given an appropriate utterance context which maps the free index shared by both pronouns to the relevant person  $x$ . This is as it should be, since all such strict readings are available. The harder job is to show that we generate no unwanted sloppy readings: that is, no truth-conditions of the form "Philipp went to  $x$ 's office and Marcel didn't go to  $y$ 's office", where  $x \neq y$ , except in the one case where  $x = \text{Philipp}$  and  $y = \text{Marcel}$ .

We reason as follows. Assume there are  $x \neq y$  such that a given utterance of (13) has the truth-conditions of "Philipp went to  $x$ 's office and Marcel didn't go to  $y$ 's office". Now suppose, first, that  $x \neq \text{Philipp}$ . Then the meaning "Philipp went to  $x$ 's office" for the first conjunct cannot have come about through a bound-variable construal of *his*, but must be due to a referential construal. Hence the overt pronoun in the antecedent must be a free variable, and, by (8) and (18), its counterpart in the deleted predicate must be another free variable with the same index. Then, both pronouns refer to  $x$ , and the second conjunct means that Marcel didn't go to  $x$ 's office. Given that  $x \neq y$ , this contradicts our

initial assumption. Second, suppose that  $y \neq \text{Marcel}$ . By analogous reasoning, it follows that the elided pronoun must be a free variable, and therefore that its overt counterpart must be equally free and co-indexed. Hence the first conjunct must mean that Philipp went to  $y$ 's office – again contrary to assumption. In sum, if either  $x \neq \text{Philipp}$  or  $y \neq \text{Marcel}$ , we derive a contradiction with our initial assumption that the text has “sloppy” truth conditions (that is,  $x \neq y$ ). This proves that the case where  $x = \text{Philipp}$  and  $y = \text{Marcel}$  constitutes the only option for a grammatical “sloppy” reading.

In this section, we have analyzed a simple example of pronoun interpretation in an ellipsis construction. Our main aim has been to argue that the distinction between bound-variable anaphora and co-reference, which was forced upon us by our general analysis of pronouns, has an important role to play in explaining the emergence of “strict” and “sloppy” readings under ellipsis. If the approach we have outlined is correct, it also follows that ellipsis data can give us valuable indirect evidence about the constraints that syntax places on the LF configurations in which pronouns are bound. We will return to this point in the following chapter.

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## Exercise

Disregarding any readings where the italicized pronoun refers to a person not mentioned in the sentence, each of the following sentences is ambiguous.

- (a) Only Bill can get *his* car started.
- (b) Only Mary knows why *she* is crying.
- (c) Only Ed understood the objections to *his* theory.
- (d) Only he was asked a question that *he* understood.

Your first task is to describe what the ambiguity consists in and how the two readings differ in truth-conditions. Then choose one example and explain in detail how the two readings are accounted for under our current theory. This will involve specifying the relevant properties of the LFs for each of the readings and showing how our semantic rules apply to these LFs.

To do all this, you will have to assume a semantic value for the word **only**. Assume that this word combines with DPs of type  $e$  (at least in the present examples), but that the DPs of the form  $[_{DP} \text{only DP}]$  that it forms with them are of type  $\langle \langle e, t \rangle, t \rangle$ . Assume the following lexical entry:

$[[\text{only}]] = \lambda x \in D_e . \lambda f \in D_{\langle \langle e, t \rangle, t \rangle} . \text{for all } y \in D_e \text{ such that } y \neq x, f(y) = 0.$

You are permitted – in fact, encouraged – to abstract away from irrelevant complexity by taking the semantic values of certain complex LF chunks for granted instead of deriving them compositionally. For example, you may make assumptions like the following without argument:

$[[[_s \text{ } t_i \text{ knows why she}_j \text{ is crying}]]^g = 1 \text{ iff } g(i) \text{ knows why } g(j) \text{ is crying.}$

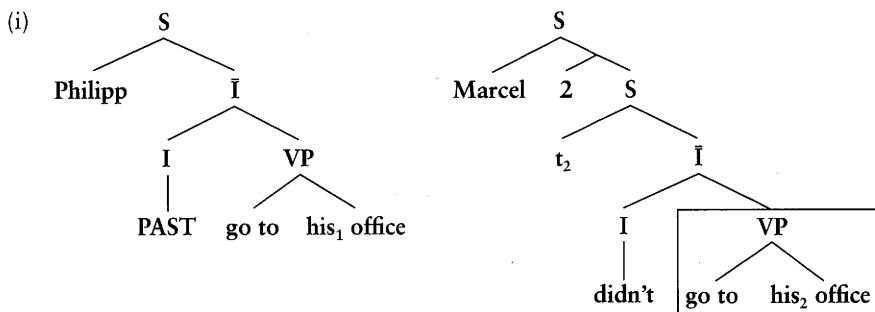
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## Notes

- 1 See, e.g., J. Lyons, *Semantics* (Cambridge, Cambridge University Press, 1977), vol. 2, ch. 15.
- 2 H. Lasnik, "Remarks on Co-reference," *Linguistic Analysis*, 2 (1976), pp. 1–22, has an example like this.
- 3 Representative authors expressing this view are Lasnik (n. 2); B. H. Partee, "Bound Variables and Other Anaphora," in D. Waltz (ed.), *Proceedings of TINLAP-2* (1978); D. Lewis, "Score-Keeping in a Language Game," in R. Bäuerle, U. Egli, and A. von Stechow (eds), *Semantics from Different Points of View* (Berlin, Springer, 1979), pp. 172–87.
- 4 From Partee, "Bound Variables."
- 5 The assumptions we are making in this paragraph about the limitations on LF movement will be scrutinized more thoroughly in chapters 10 and 11 below. But, to anticipate the results, they will hold up well enough.
- 6 Recall the definition of "free occurrence" of an index in a tree from chapter 5.
- 7 As before when we have needed an *ad hoc* account of possessive constructions, we assume that the structure of the DP is something like  $[_{DP} \text{ the } [_{NP} \text{ he father}]]$ , with a covert definite article. *Father* is a transitive noun (type  $\langle e, \langle e, t \rangle \rangle$ ), and *he* saturates its internal argument.
- 8 The possibility that only (2) and not (3) is grammatical is excluded by the fact that *his* can refer to someone other than John. Such a reading clearly requires structure (3).
- 9 See B. Partee, "Opacity, Coreference, and Pronouns," *Synthese*, 21 (1970), pp. 359–85; E. Keenan, "Names, Quantifiers, and a Solution to the Sloppy Identity Problem," *Papers in Linguistics*, 4/2 (1971); Lasnik, "Remarks"; I. Sag, *Deletion and Logical Form* (Ph.D. dissertation, MIT, 1976, distributed by Indiana Linguistics Club, and published in 1980 by Garland, New York); E. Williams, "Discourse and Logical Form," *Linguistic Inquiry*, 8 (1977), pp. 101–39; T. Reinhart, *Anaphora and Semantic Interpretation* (London, Croom Helm, 1983); and *idem*, "Coreference and Bound Anaphora: A Restatement of the Anaphora Questions," *Linguistics and Philosophy*, 6 (1983), pp. 47–88.
- 10 See Reinhart, *Anaphora*; *idem*, "Coreference"; *idem*, "Bare Argument Ellipsis" (unpubl. MS, 1985); Sag, *Deletion*; Williams, "Discourse"; D. Pesetsky, "Paths and Categories" (Ph.D. dissertation, MIT, 1982); and others.
- 11 Even further unavailable readings would be generated if we disregarded the "as well", which places some constraints of its own on the missing material. Very roughly, as *well* (and its synonyms *also* and *too*) give rise to a presupposition which is only fulfilled if the predicate they co-occur with denotes a superset of some salient predicate in the previous discourse. For instance, *Laura left Texas, and Lena moved*

too is okay, because  $\{x : x \text{ moved}\}$  is a superset of  $\{x : x \text{ left Texas}\}$ ; whereas *Laura left Texas*, and *Lena drank milk too* is weird, because  $\{x : x \text{ drank milk}\}$  cannot be taken for granted to be a superset of  $\{x : x \text{ left Texas}\}$ . We will not undertake a serious analysis of these particles here. We would like to stress, however, that not all examples of ellipsis include such a particle. See, e.g., (1), (3), (5). Therefore, the problem of overgeneration from an unconstrained deletion operation is actually even worse than it looks for (4). For instance, why shouldn't the elliptical disjunct in (5) be able to mean "... or perhaps Lena spilled the juice"?

- 12 An excellent summary of the arguments for this conclusion is found in Sag, *Deletion*, ch. 2. Sag also provides a useful overview of the literature up to 1976.
- 13 See Williams, "Discourse," and especially Sag, *Deletion*, for a broader survey of problem cases of this kind and for more general versions of our stipulation and alternatives to it. Sag, in fact, argued at length for a version of the LF Identity Condition which was much more restrictive than the combination of our (8) and (18). It was so restrictive, in fact, that it ruled out many of the derivations we present in this chapter, including (11) and (19). This, in turn, led Sag to adopt a different LF syntax for VPs. A serious introduction to the theory of ellipsis would have to include a thorough discussion of Sag's proposal and the complex collection of data that has been brought to bear on it. This would go far beyond the scope of an introductory semantics text. See R. Fiengo and R. May, *Indices and Identity* (Cambridge, Mass., MIT Press, 1994), for a useful recent overview.
- 14 For instance, (17) has variants like (i).



(17) violates (18), (i) abides by it. There is no difference in interpretation, and no difference with respect to the syntactic mechanisms which generate and license LFs – except, of course, for the LF Identity Condition, which doesn't license deletion in (i).

- 15 Presumably, it was this way of looking at the phenomenon that originally gave rise to the label "sloppy" (due to Ross – see J. R. Ross, "Constraints on Variables in Syntax" (Ph.D. dissertation, MIT, 1967), distributed by Indiana Linguistics Club). If the LF Identity Condition were *strictly* applied, it seems, such readings would be ruled out. But, as we will see right away, there is a different and more insightful way of looking at the phenomenon, which reveals that the "sloppy" reading does not really deserve to be called "sloppy" at all. It actually obeys the LF Identity Condition just as strictly as the "strict" reading. Nevertheless, the descriptive labels "sloppy" and "strict" have stuck, despite the overwhelming success of the theory that contradicted them, and so we are using them too.
- 16 Among the first authors to see this clearly were Partee ("Opacity") and Keenan ("Names, Quantifiers").