

The Semantics of Ellipsis*

Paul Elbourne

Queen Mary, University of London

There are four phenomena that are particularly troublesome for theories of ellipsis: the existence of sloppy readings when the relevant pronouns cannot possibly be bound; an ellipsis being resolved in such a way that an ellipsis site in the antecedent is not understood in the way it was there; an ellipsis site drawing material from two or more separate antecedents; and ellipsis with no linguistic antecedent. These cases are accounted for by means of a new theory that involves copying syntactically incomplete antecedent material and an analysis of silent VPs and NPs that makes them into higher order definite descriptions that can be bound into.

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1 Introduction

There is a common view of ellipsis according to which an elided phrase¹ requires a linguistic antecedent (Hankamer and Sag 1976) and the relationship between elided phrase and antecedent is one of identity of Logical Form (LF) or meaning (Sag 1976, Williams 1977).

Hankamer and Sag (1976) argued that ellipsis had to have a linguistic antecedent on that basis of examples like these:

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¹I use the term *elided phrase* simply as a descriptive term, without wishing to advocate the view on which such phrases are underlyingly present and deleted in the phonology. The same goes, later, for my use of the term *NP-deletion*.

- (1) (*Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop.*)
Sag: It's not clear that you'll be able to.
- (2) (*Sag produces a cleaver and makes as if to hack off his left hand.*)
Hankamer: Don't be alarmed. He never actually does.

We are supposed to imagine these examples being acted out, as it were, so that there is no linguistic antecedent for the ellipsis in each case, only an accompanying action. Hankamer and Sag claim that (1) cannot felicitously be understood as “It's not clear that you'll be able to push that ball through that hoop,” even though it is obvious what action is being referred to. An analogous claim is made for (2). Hence the requirement for linguistic antecedents.

Ellipsis is thought to be based on the meaning or LF of the antecedent phrase because of cases like the following, which is taken from Heim and Kratzer 1998. In (3), the elided VP can only be understood in the same way as the scopally ambiguous antecedent VP. That is, if we understand the antecedent with *a drawing* scoping above *every teacher*, we have to understand the elided VP this way too; and analogously for the other scopal construal.

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

If the resolution of ellipsis makes reference directly to the meaning of the antecedent and requires us to understand the same meaning at the ellipsis site, it is obvious that we can achieve this result. We can also achieve this result by supposing that ellipsis resolution makes reference to the syntactic level of LF, where the quantifiers will have moved to positions that reflect their scopal ordering in the semantics (May 1977, 1985). For example, we might have something like (4) as an LF representation of (3).

- (4) Laura T [_{VP} a drawing₁ [_{VP} every teacher₂ [_{VP} show t₁ to t₂]]]
Lena did not [_{VP} a drawing₁ [_{VP} every teacher₂ [_{VP} show t₁ to t₂]]]

Then we could suppose that ellipsis consists simply of copying an antecedent

LF into the ellipsis site, or of optionally not pronouncing a piece of syntactic structure when its LF is identical to that of some antecedent.

This view is commonly linked to an account of strict and sloppy readings that sees them as deriving from the pronouns in the antecedent being referential and bound respectively. The strict and sloppy readings of a representative example are given in (5) (Ross 1967).

- (5) a. John loves his mother and Bill does too.
 b. ‘...Bill loves Bill’s mother.’ (Sloppy)
 c. ‘...Bill loves John’s mother.’ (Strict)

If the pronouns in the VPs are ambiguous between referential and bound, we have a neat account of this ambiguity (Keenan 1971). We can suppose that the sloppy reading results from the pronoun being bound, as in (6), and the strict reading results from the pronoun being referential, as in (7), where it is to be understood that the sentence is interpreted with respect to a variable assignment that maps 1 to John.

- (6) *Sloppy*
 John [$\lambda_2 t_2$ love his₂ mother] and Bill [$\lambda_2 t_2$ love his₂ mother]

- (7) *Strict*
 John [$\lambda_2 t_2$ loves his₁ mother] and Bill [$\lambda_2 t_2$ love his₁ mother]

Again, reference to either the meaning or the LF of the antecedent would suffice for the correct interpretation to be obtained at the ellipsis site.

The view that the strict-sloppy ambiguity is to be dealt with in terms of referential versus bound pronouns is independent in principle of the theses that ellipsis requires a linguistic antecedent and that the relationship between antecedent and elided phrase is one of identity of meaning or LF; but in practise these three theories are often combined. I will call the composite view that assumes all three *the common view*.

It has been known for some time that the common view is at best only partially enlightening and that it may very well be utterly false. There are four phenomena that seem to be incompatible with it.

The first phenomenon is that of sloppy readings appearing when they cannot possibly be the result of pronouns in VPs being bound. Some examples, with sources, follow:

- (8) The policeman who arrested John read him his rights, but the policeman who arrested Bill didn't. (Wescoat 1989)
- (9) John's coach thinks he has a chance, and Bill's coach does too. (Rooth 1992)
- (10) If John has trouble at school, I'll help him, but if Bill does, I won't. (Hardt 1999)
- (11) (*John and Bill both have cats.*) When I met John, I talked to his cat, but when I met Bill, I didn't.

Take (8), for example. It clearly has a reading, "...but the policeman who arrested Bill didn't read Bill his rights." But this cannot be the result of the pronouns in the antecedent VP being bound. If they were bound, the antecedent would have the denotation $[\lambda x. x \text{ read } x \text{ 's rights}]$. If one understands this after the subject of the second sentence, one obtains the meaning "The policeman who arrested Bill didn't read himself his own rights." This is clearly not the meaning that the sentence in fact has. Analogous considerations hold for sentences (9)–(11). Some though not all speakers obtain a reading for (9) that can be paraphrased "John's coach thinks John has a chance and Bill's coach thinks Bill has a chance." If I say (10), I say that if Bill has trouble at school I will not help him, Bill; and if I say (11) I say that when I met Bill I did not talk to his, Bill's, cat. None of these examples can be accounted for by the theory that sees sloppy readings of pronouns as arising from VP-internal pronouns being bound. They have in common the feature that the intuitive antecedent of the

relevant pronoun in the antecedent VP does not c-command it. In the sentences above, for example, *John* cannot c-command the pronouns *him*, *his* or *he* in the first conjunct. I will call readings like these *binderless sloppy readings*.

The second phenomenon that seems incompatible with the common view arises in connection with sentences like the following:

- (12) When John had to cook, he didn't want to. When he had to clean, he didn't either. (Hardt 1999, Schwarz 2000)

This example clearly has a reading “When John had to cook, he did not want to cook, and when he had to clean, he did not want to clean.” How it arrives at this reading is entirely mysterious on the common view. The ellipsis in the first sentence seems straightforward enough. We take *cook* to be the antecedent, and resolve the ellipsis so as to produce a meaning “When John had to cook, he did not want to cook.” The VP of the matrix clause in the first sentence will be [_{VP} want to cook]; or if the ellipsis is not resolved in the syntax but at some level of semantic representation, there must be a VP denotation something like [$\lambda x. x$ wants to cook]. This VP is the only plausible antecedent for the ellipsis in the matrix clause of the second sentence. But any resolution procedure reliant on identity of meaning or LF structure then predicts that the second sentence will have to mean “When John had to clean, he did not want to cook.” This is not the case, however. Thus the common view faces another significant problem. I will call examples like these examples of *ellipsis-containing antecedents*.

Note that the problem of ellipsis-containing antecedents arises in other configurations than that just given, where the antecedent for VP-ellipsis contained VP-ellipsis. The following examples involve NP-deletion:

- (13) Every police officer who arrested some murderers insulted some, and every police officer who arrested some burglars did too. (Elbourne 2001)
- (14) After the books went on sale, thirteen shoppers who had bought some earlier complained; but after the magazines went on sale, only two did.

(Eytan Zweig, personal communication)

- (15) When John wanted to cook, he met some people who didn't want him to; and when he wanted to clean he met some too.

(13), on one natural reading, means “Every police officer who arrested some murderers insulted some murderers and every police officer who arrested some burglars insulted some burglars.”² There is NP-deletion in the first conjunct: *insulted some* is understood as “insulted some murderers.” We then have VP-ellipsis in the second conjunct: *did too* intuitively takes *insulted some* as its antecedent; but instead of being understood as “insulted some murderers,” it is understood as “insulted some burglars.” An exactly analogous problem arises in connection with (14), which means “After the books went on sale, thirteen shoppers who had bought some books earlier complained; but after the magazines went on sale, only two shoppers who had bought some magazines earlier complained.” So the problem arises also when the antecedent of NP-deletion contains NP-deletion. The fourth logical possibility is VP-ellipsis within the antecedent of NP-deletion, and we see this in (15). On one reading, this means “When John wanted to cook, he met some people who didn't want him to cook; and when he wanted to clean he met some people who didn't want him to clean.” Again, there is no obvious way in which the common view, which posits straightforward identity of meaning or LF structure between antecedent and ellipsis, can account for these examples.

The third problem that faces the common view arises when an ellipsis site seems to be related to more than one antecedent, and to draw material from both. Some well-known examples are the following:

- (16) Bob wants to sail round the world and Alice wants to climb Kilimanjaro, but neither of them can, because money is too tight. (Webber 1978)

²There is possibly an ambiguity between “insulted some of the murderers he arrested” and “insulted some other murderers.” This is not relevant here. See Elbourne 2001 for further discussion.

- (17) I did everything Mary did. Mary swam the English Channel and Mary climbed Kilimanjaro, and I did too. (Fiengo and May 1994)
- (18) Whenever Max uses the fax or Oscar uses the Xerox, I can't. (Fiengo and May 1994)

The interpretations of these examples are tricky. (17) is the easiest. It pretty clearly means "...and I swam the English Channel and climbed Kilimanjaro too." One wants to paraphrase (18) "Whenever Max uses the fax or Oscar uses the Xerox I cannot use the fax or the Xerox," but attention must be paid that we do not analyze the sentence as meaning "...I cannot do either." The correct interpretation seems to be something like "...I cannot use whichever one is being used." Similarly, the ellipsis in (16) cannot be resolved "...neither of them can do either," but must mean something like "neither of them can do the thing they want." These facts are clearly beyond the ability of the common view to capture. There are similar cases that involve NP-deletion, as pointed out in Elbourne 2001:

- (19) John needs a hammer. Mary needs a mallet. They're going to borrow Bill's.

This seems to mean "They're going to borrow Bill's hammer and mallet." I will refer to examples like these as involving *split antecedents*.

The fourth problem for the common view is that some cases of VP-ellipsis and NP-deletion require no linguistic antecedents whatsoever. Many people find the original examples of Hankamer and Sag (1976), repeated here, quite felicitous:

- (20) (*Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop.*)
Sag: It's not clear that you'll be able to.
- (21) (*Sag produces a cleaver and makes as if to hack off his left hand.*)
Hankamer: Don't be alarmed. He never actually does.

And there are many examples about which there is no debate whatsoever. The following list of VP-ellipsis cases is adapted from Merchant forthcoming, which should be consulted for original references:

- (22) (*John attempts to kiss Mary while driving.*)
John, you mustn't.
- (23) (*A piece of chocolate cake is offered.*)
I really shouldn't.
- (24) (*As an invitation to dance.*)
Shall we?
- (25) (*Mary gets John an expensive present.*)
Mary, you shouldn't have!
- (26) (*Gesturing towards an empty chair.*)
May I?
- (27) (*Responding to the last.*)
Please do.
- (28) (*Seeing someone about to do a shot of Tequila.*)
If you can, I can too.
- (29) (*Looking at someone psyching herself up to jump across a wide gap.*)
I bet she won't.
- (30) (*Seeing someone who has just died his hair green.*)
You didn't!
- (31) (*Sitting next to someone doing something annoying.*)
Must you?
- (32) (*On witnessing someone about to do anything undesirable.*)
Don't!

Once again there are analogous cases of NP-deletion:

(33) *(There are lots of barking dogs in the yard. We look at them without speaking. I point and say:)*

Harry's is particularly noisy. (Elbourne 2001)

I will call this phenomenon *ellipsis with no linguistic antecedent*.

We have four problems, then, that the common view does not seem able to deal with, those of binderless sloppy readings, ellipsis-containing antecedents, split antecedents and ellipsis with no linguistic antecedent. In this article I lay out a theory of ellipsis that is compatible with all these data (section 2). I comment on relevant previous literature in section 3. Section 4 concludes.

It should be emphasized that I will be concentrating entirely on the semantics of ellipsis, without paying attention to any syntactic constraints there may be on when ellipsis is possible. (See Johnson 2001 for a good overview of syntactic and semantic issues connected with VP-ellipsis.) And I will be concentrating on VP-ellipsis and NP-deletion, without attempting to account for sluicing, pseudo-gapping and other kinds of ellipsis.

2 A Theory of Ellipsis

2.1 The Framework

2.1.1 Event Semantics and Little *v*

Following much work in event semantics and argument structure, I assume that VPs are predicates of events (Davidson 1967, Parsons 1990, Tenny and Pustejovsky 2000, Pylkkänen 2002), and that subjects are introduced by a special head *v* that takes the VP as its sister (Kratzer 1996, Pylkkänen 2002).

To give a flavor of the general approach, let us take the example in (34), which will have the structure in (35). The lambda-abtractor in the syntax is from Heim and Kratzer 1998.

(34) Brutus stabbed Caesar.

(35) $[[_{\text{TP}} \text{ Brutus } [\lambda_2 [_{\text{T}_{\text{past}}} [_{\text{VP}} t_2 [v [_{\text{VP}} \text{ stab Caesar}]]]]]]]$

The following lexical entries will enable vPs and VPs to be predicates of events, with the whole sentence an assertion of the existence of certain kinds of time intervals and events.³

(36) $[[_{\text{T}_{\text{past}}}] = \lambda p_{\langle s,t \rangle} . \exists t (t < \text{NOW} \ \& \ \text{at } t : \exists e p(e) = 1)$
 $[[v]] = \lambda p_{\langle s,t \rangle} . \lambda y . \lambda e . p(e) = 1 \ \& \ \text{Agent}(e, y)$
 $[[\text{stab}]] = \lambda z . \lambda e . \text{stabbing}(e) \ \& \ \text{Theme}(e, z)$

These lexical entries give the meanings displayed in Figure 1 for different parts of the tree. The sentence is interpreted with respect to a variable assignment g . Figure 1 is not necessarily a serious contender for what the syntax and semantics of this sentence actually look like. But it will be useful to have something concrete to work with.

2.1.2 Pronouns and Names

I will follow Postal (1966), Stockwell, Schachter and Partee (1973), Abney (1987), Longobardi (1994), Uriagereka (1995), Elbourne (2001, forthcoming) and Neale (2005) in assuming that pronouns are basically determiners. In particular, third person pronouns are definite articles whose complements must be phonologically null (Elbourne 2001, forthcoming); these complements can be referential indices, which I take to be of type $\langle e, t \rangle$, or they can be normal NPs unpronounced because of NP-deletion. For example, the index 2 in what we would normally write as he_2 might be interpreted, by means of a variable assignment mapping 2 to John, as $[\lambda x . x = \text{John}]$; since he has the same meaning

³Some head should presumably convert the denotation of the whole sentence into a set of possible worlds or situations, and there might also be heads that contribute illocutionary force. I omit all these for simplicity's sake and write as if the denotations of sentences were truth values. I also do not properly take account of the indexical nature of tense, which presumably must make reference to the time of utterance. I gesture towards this with the term NOW in the metalanguage, which is supposed to be an indexical taking as its value the time of utterance on each occasion of use.

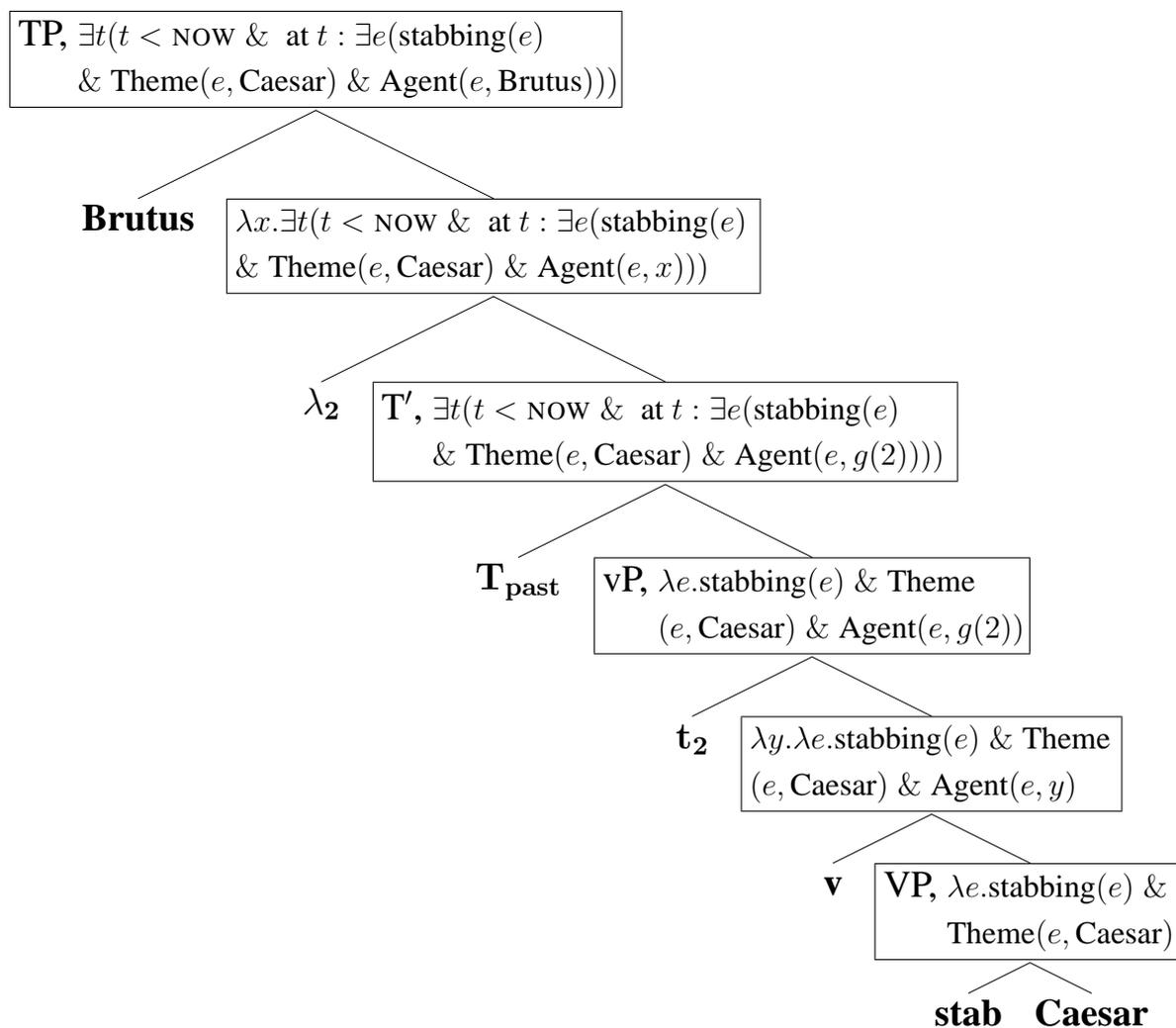


Figure 1: Brutus stabbed Caesar

as *the* (give or take ϕ -features), the interpretation of pronoun plus index in this case will be “the unique x such that x is identical to John,” or, in other words, “John.” This position has the advantage of unifying the referential and bound occurrences of pronouns with their use as donkey anaphors (Elbourne forthcoming), assuming a theory whereby donkey pronouns are analyzed as definite descriptions (Cooper 1979, Neale 1990, Heim 1990, Elbourne 2001, forthcoming).

I will follow Burge (1973), Recanati (1993), Larson and Segal (1995) and

Elbourne (forthcoming) in assuming that names are basically nouns. We often see them occurring with overt determiners, as in (37).

- (37) a. An embattled Tony Blair addressed the Commons this afternoon.
 b. Which Alfred did you mean? This Alfred?

When they appear to stand alone, they will be preceded by a special phonologically null definite determiner THE. This is paralleled by those languages like Classical Greek and some dialects of German in which names are regularly preceded by an overt definite article.

As for the semantics of names on this view, Burge's (1973) basic idea is that, for example, *Alfred* means something like "entity called Alfred," and variants of this have been proposed by the other authors just cited. In Elbourne forthcoming I propose that on most occasions of use *Alfred* will mean "entity called Alfred and identical to *a*," where *a* is an individual constant picking out a particular entity called Alfred. In this article I will just assume things like [$\lambda x.x$ is an Alfred] for the meaning of names, since their exact semantics is orthogonal to the issues of primary concern.

I will just assume that nouns are of type $\langle e,t \rangle$, and that definite articles, including pronouns, are functions from predicates of type $\langle e,t \rangle$ to individuals (Heim 1991, Heim and Kratzer 1998, von Stechow 2004, Elbourne 2005, forthcoming), as proposed originally by Frege (1893). The semantics for some relevant lexical items is shown in (38).⁴

- (38) $[[\text{the}]]^{g,h} = \lambda f_{\langle e,t \rangle} . \iota x f(x) = 1$
 $[[\text{him}]]^{g,h} = \lambda f_{\langle e,t \rangle} . \iota x f(x) = 1$

⁴The semantics given in (38) is a simplification in that we probably need to embed the whole lexical entry in a situation semantics or possible worlds semantics for full adequacy, and have definite articles be functions from properties to individual concepts, i.e. functions from circumstances of evaluation to individuals, as in Elbourne 2005, forthcoming. I overlook this complication here and continue to operate with an extensional semantics. I also overlook the ϕ -features on the pronouns, for the sake of simplicity.

$$\llbracket \text{cat} \rrbracket^{g,h} = \lambda x. x \text{ is a cat}$$

$$\llbracket \text{Alfred} \rrbracket^{g,h} = \lambda x. x \text{ is an Alfred}$$

The semantics of the metalanguage operator $\lceil \iota \rceil$ is as follows: for any function f , the denotation of $\lceil \iota x f(x) = 1 \rceil$ will be of type e, if it is defined; if there is exactly one entity x such $f(x) = 1$, the denotation of $\lceil \iota x f(x) = 1 \rceil$ will be that very individual; if there is no such individual, the whole expression will have no value. (So the expression in effect introduces a presupposition that there is exactly one such individual, since an utterance containing it will not be felicitous otherwise.) The individual that is the value of the expression will naturally vary from model to model. For example, if our universe is $\{2, 3, 4\}$, then the denotation of $\lceil \iota x x > 3 \rceil$ is 4; if the universe is $\{2, 3, 5\}$, the value of the same expression will be 5. This, simply put, is how definite descriptions differ from constants.

2.1.3 Ellipsis

In this section I will sketch a theory of ellipsis that will enable us to give a straightforward account of the sentences involving ellipsis-containing antecedents and binderless sloppy readings, and I will apply it to some relatively simple data. In the next sections I will use to analyze the problematic data that we saw in section 1.

The theory is as follows:

(39) *Theory the First*

VP-ellipsis and NP-deletion consist in the generation of bare VP and NP nodes, respectively. These structures are sent to PF. There is an LF process of resolving the ellipsis, whereby the bare nodes are replaced with a copy of a phrase of the same syntactic category drawn from the linguistic environment.

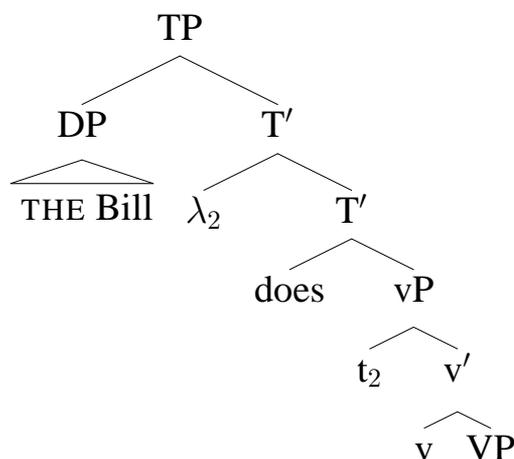


Figure 2: Bill does too

According to this account, then, a sentence involving VP-ellipsis or NP-deletion begins life as a structure that is syntactically incomplete. For example, the last sentence of (40) will have the (possibly simplified) structure in Figure 2.

(40) John loves Mary and Bill does too.

Note that in Figure 2 we have a VP node that is simply not spelled out any further. This will be possible if we adhere to a traditional conception of phrase structure rules that allows things like (41).

(41) $v' \rightarrow v \text{ VP}$

It is obviously incompatible with Chomsky's (1995) Bare Phrase Structure, according to which the idea of a phrasal node with no daughters does not make sense. I hope to show that significant empirical advantages can be gained from the traditional conception of syntactic rules.

We generate, then, a structure like that in Figure 2, and this is what is pronounced. Ellipsis resolution will then be an LF process that replaces the bare phrasal node with a copy of a phrase of the same syntactic category drawn from the linguistic environment.⁵ In the case of the current example, then, we copy the antecedent VP [_{VP} love Mary] and replace the empty VP node with it.

⁵We will need to make an addition to our theory when we return to the consideration of

Before we go on to look at how this conception of ellipsis facilitates the analysis of ellipsis-containing antecedents and binderless sloppy readings, there are a couple of potential problems to address. First, we should pause to consider the case of simple bound variables in VP-ellipsis. Consider (42).

(42) Every woman loves her mother. Even Mary does.

According to almost all current theories, *her* in the first sentence of this example is to be analyzed as being or containing a bound individual variable.⁶ I too will assume this. The current theory, then, must maintain that we start off with the LF structure in (43).

(43) Every woman λ_2 T t_2 v love her₂ mother. Even THE Mary λ_2 does t_2 v VP.

The process of LF ellipsis resolution produces the following:

(44) Every woman λ_2 T t_2 v love her₂ mother. Even THE Mary λ_2 does t_2 v love her₂ mother.

This produces the right reading, of course. And the use of the same index on the expressions bound by the subjects of the first and second sentences violates no prohibition that I know of. Difficulties with repeated use of the same index only arise if the same index is used on referential expressions with different intended referents, or on bound variables intended to be bound by different operators that lie within the scope of both (unlike in this case), or on both bound variables and an independent referential expression. Heim and Kratzer (1998:254) have proposed a principle explicitly to deal with the latter case.

ellipsis with no linguistic antecedent in section 2.5. Meanwhile, if the idea of replacing a node with something else causes unease, one could also think of ellipsis resolution as copying the daughters of a node of the same category in the linguistic environment and pasting them separately into position beneath the ellipsis node. But I personally find the version in the text less awkward.

⁶An exception is the variable-free semantics proposed by Szabolcsi (1989) and explored by Jacobson (1999, 2000) in connection with Categorical Grammar. I will not attempt to assess this work here. See Elbourne forthcoming for some critical discussion.

The second matter that a simple copying theory of ellipsis, like the present one, must address, is what Fiengo and May (1994: 218) call *vehicle change*. The question is to deal with examples like the following:

(45) I turned in my assignment, but most of the other students didn't.

The problem, of course, is that a straightforward theory of copying (or, indeed, of deletion under identity) seems to predict that the last sentence here will only be able to mean “most of the other students didn't turn in *my* assignment,” when in fact it can mean that most of the other students did not turn in *their* assignment. This need not be seen as ruling out the current approach, however. One theory that has been proposed is to see pronouns like *my* here as simple bound variables semantically devoid of ϕ -features, their ϕ -features being inherited from their binders by an agreement process at PF (Kratzer 1998, Rullmann 2004, Heim 2005), and for present purposes I will assume that something like this is the case.

2.2 Ellipsis-Containing Antecedents

Let us reconsider an example of an ellipsis-containing antecedent, (12), repeated here as (46).

(46) When John had to cook, he didn't want to. When he had to clean, he didn't either.

Recall that the problem is that (46) can mean “. . . when he had to clean, he didn't want to clean.”

It can be seen that with the theory of ellipsis just sketched, the problem is resolved quite easily. We start out with a simplified LF representation like that in (47) for the utterance in question.

(47) when John had to cook, he did not want to v VP
when he had to clean, he did not v VP

There are bare VP nodes here, and we have a choice which one we fill in first. Suppose we take the second and replace it with a copy of the matrix VP in the first sentence. We obtain the following:

- (48) when John had to cook, he did not want to v VP
 when he had to clean, he did not v want to v VP

We can then fill in the resultant bare VP nodes with simple VPs drawn from the respective preceding sentences:

- (49) when John had to cook, he did not want to v cook
 when he had to clean, he did not v want to v clean

The right meaning results. The other cases of ellipsis-containing antecedents, (13)–(15), will work analogously.

We might very well wonder if this system overgenerates. The simple answer is that it does indeed, if we suppose it not to be supplemented with other considerations. For example, the theory as it stands predicts that the following will also be a possible LF structure for (46):

- (50) when John had to cook, he did not want to v clean
 when he had to clean, he did not v want to v cook

There is nothing in Theory the First to prevent us reaching the stage shown in (48) and then looking forward to the second sentence and filling in the ellipsis in the first with the VP *clean*, and looking back to the first sentence and understanding *cook* in the final ellipsis site. But I take it that these ellipsis resolutions will be ruled out by independent factors. After all, the syntactic structure in (48) is exactly that which we see overtly spelled out in (51):

- (51) When John had to cook, he didn't want to. When he had to clean, he didn't want to either.

And it is a fact that this example cannot be understood as in (50) either. I take it then that Theory the First is correct as far as it goes, but that it must be sup-

plemented with other considerations, perhaps having to do with processing, that restrict the VPs that can be used as antecedents. Perhaps distance from the ellipsis site is one heuristic: if we consider (48) as a linear string, we see that the VP *clean* is six VPs back from the ellipsis site for which it is being considered as a possible antecedent.

2.3 Binderless Sloppy Readings

I will now consider how we should deal with cases of binderless sloppy readings. Let us reconsider (10), repeated here as (52):

(52) If John has trouble at school, I'll help him, but if Bill does, I won't.

Recall that this example can mean, "... if Bill has trouble at school I won't help Bill."

Given the analysis of pronouns as definite articles and names as predicates outlined in section 2.1.2, this case in fact reduces to the last one. Binderless sloppy readings, in other words, are also cases of ellipsis-containing antecedents. The initial (slightly simplified) structure of the current example is the following:

(53) if THE John T v have trouble at school, I will v help him NP
if THE Bill does v VP, I will not v VP

Note that it makes sense under the current conception of pronouns to say that there is NP-deletion after *him*, since *him* is a determiner. (It would differ from the normal definite article *the* in allowing NP-deletion after it.) Hence the bare NP node following *him* in (53). The resolution of the first VP-ellipsis is straightforward:

(54) if THE John T v have trouble at school, I will v help him NP
if THE Bill does v have trouble at school, I will not v VP

We now replace the remaining bare VP node with a copy of the matrix VP of the first sentence:

- (55) if THE John T v have trouble at school, I will v help him NP
 if THE Bill does v have trouble at school, I will not v help him NP

And we resolve the two instances of NP-deletion in the most straightforward way by taking antecedents in the respective sentences of the bare NP nodes:

- (56) if THE John T v have trouble at school, I will v help him John
 if THE Bill does v have trouble at school, I will not v help him Bill

Again, the correct meaning is obtained. The other examples of binderless sloppy readings will work analogously.

2.4 Split Antecedents

Recall the examples of split antecedents in (16)–(18), repeated here as (57)–(59).

- (57) Bob wants to sail round the world and Alice wants to climb Kilimanjaro, but neither of them can, because money is too tight.
 (58) I did everything Mary did. Mary swam the English Channel and Mary climbed Kilimanjaro, and I did too.
 (59) Whenever Max uses the fax or Oscar uses the Xerox, I can't.

(57) seems to be interpreted something like "...neither of them can do what they want to do." (58) means "...I swam the English Channel and climbed Kilimanjaro too." And (59) seems to mean "...I cannot use whichever machine is being used."

Given that these interpretations do not appear to have very close syntactic links to any antecedent Verb Phrases, it is tempting at this point to say that we have been on the wrong track all along, and that the interpretation of an elided

VP can be any property of events that the hearer might reasonably be expected to work out. But this would be going too far. Consider (60), which is taken from Heim 1996.

(60) The garbage can is full. *I hope that *you* will, for a change.

It is obvious here that the speaker means “I hope that you will take out the garbage.” But despite the fact that it is easy to work out the intended meaning, this example does not work as a VP-ellipsis. There must be a tighter connection with some previous VP.

One rarely considered option that might nevertheless be explored at this stage is to say that the elided VP can be interpreted as any property of events that has *some* syntactic connection with an antecedent VP. For example, we can interpret (57) as “...neither of them can do what they want to do” because we have the word *want* in a preceding VP. On this theory, (60) would not be felicitous because no plausible VP meaning can be reconstructed that would use any functions contributed by any word in the antecedent VP *is full*. In particular, neither of these words contributes anything from which the meaning “take out the garbage” can be constructed. This is too unimaginative, though. If we are allowed to create “...neither of them can do what they want to do” solely on the basis of the word *want* and a shrewd idea of what the speaker might be driving at, then surely we could construct “make the garbage can not be full any more” from the word *full* and the same kind of shrewd idea. But, to repeat, (60) does not seem to be a successful VP-ellipsis, no matter what precise way we think of understanding it.

I conclude that in these cases, then, we still have a very close connection to the antecedents. In particular, I assume that reference must be made to the exact form of the antecedent VPs, as in Theory the First.⁷ As a first step, let us reexamine the examples and see if we can come up with paraphrases that seem

⁷We will return to the cases of ellipsis with no linguistic antecedent in section 2.5.

to incorporate the exact meanings of the antecedents. My proposal is that our examples are to be paraphrased as in the (b) sentences below, where the phrases in italics hark back to the antecedent VP denotations.

- (61) a. Bob wants to sail round the world and Alice wants to climb Kilimanjaro, but neither of them can, because money is too tight.
 b. Bob wants to sail round the world and Alice wants to climb Kilimanjaro, but neither of them can perform the particular action or actions out of *sailing round the world* and *climbing Kilimanjaro* that they desire.
- (62) a. I did everything Mary did. Mary swam the English Channel and Mary climbed Kilimanjaro, and I did too.
 b. Mary swam the English Channel and Mary climbed Kilimanjaro and I performed the particular action or actions out of *swimming the English Channel* and *climbing Kilimanjaro* that Mary performed.
- (63) a. Whenever Max uses the fax or Oscar uses the Xerox, I can't.
 b. Whenever Max uses the fax or Oscar uses the Xerox, I can't perform the particular action or actions out of *using the fax* and *using the Xerox* that are being performed.

It can be seen that one form of paraphrase covers all the examples. Informally, in place of the elided VP we understand “perform the particular action or actions out of f_1 and f_2 that have property F ,” for VP meanings f_1 and f_2 and properties of VP meanings F .

I propose to spell out parts of the above paraphrase schema with LF operators. For example, the LF of the final sentence of (62a) will be that shown in Figure 3. There is a special set of lexical items with the following semantics:

$$(64) \quad \text{For all } n > 0, \llbracket \text{AND}^n \rrbracket^g = \lambda f_{1, \langle s, t \rangle} \dots \lambda f_{n, \langle s, t \rangle} \cdot \lambda h_{\langle s, t \rangle} \cdot h \leq_i f_1 \oplus \dots \oplus f_n$$

The notation is that of Link's (1983) theory of plurality. An operator AND^n takes n arguments of type $\langle s, t \rangle$ and maps them to the characteristic function of the set

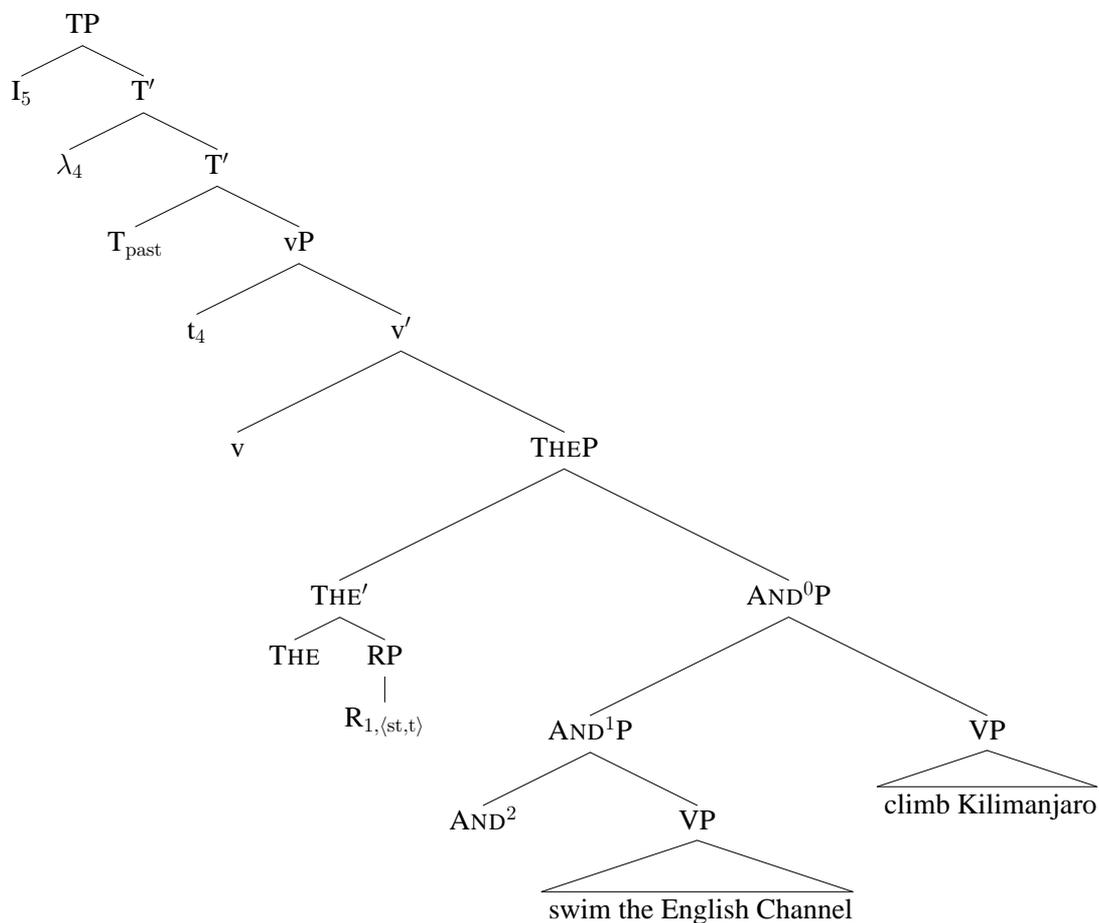


Figure 3: I did too...

of $\langle s,t \rangle$ functions that are part of the plural individual that has all and only the n arguments as atomic parts. In the present case, we have the following:

$$(65) \quad \llbracket \text{AND}^2 \rrbracket^g = \lambda f_{1,\langle s,t \rangle} \cdot \lambda f_{2,\langle s,t \rangle} \cdot \lambda h_{\langle s,t \rangle} \cdot h \leq_i f_1 \oplus f_2$$

This means that the denotation of AND^0P in the syntax is as in (66). I use the two italicized phrases to stand for the meanings of the two VPs.

$$(66) \quad \lambda h_{\langle s,t \rangle} \cdot h \leq_i \textit{swimming} \oplus \textit{climbing}$$

The point of THE and its argument $R_{1,\langle st,t \rangle}$ is to introduce the modification of the VP-meanings that we have seen to be necessary in some of the paraphrases in (61)–(63). In the present case, as it happens, this item is redundant, but I will show the argument $R_{1,\langle st,t \rangle}$ in action for the sake of illustration. (It will play a

central role in analysis of (61a) and (63a); it so happens that (62a) is simple in ways that make it a good introductory example.) Let us assume, then, that $R_{1,\langle st,t \rangle}$ is assigned the value shown in (67):

$$(67) \quad \llbracket R_{1,\langle st,t \rangle} \rrbracket^g = \lambda f_{\langle s,t \rangle}. \exists e (f(e) = 1 \ \& \ \text{Agent}(e, \text{Mary}))$$

This function is not the value of any overt linguistic constituent, but we can assume that this does not matter for LF variables. The mention of Mary doing things makes this function salient enough.

Meanwhile, the operator THE has the denotation in (68), which uses some terminology from Link 1983 defined in (69); $\ulcorner *P \urcorner$ is the plural predicate, the one that characterizes both singular entities that are P and plural entities whose atomic parts are all P .

$$(68) \quad \llbracket \text{THE} \rrbracket^g = \lambda F_{\langle st,t \rangle}. \lambda G_{\langle st,t \rangle}. \sigma f (F(f) = 1 \ \& \ G(f) = 1)$$

$$(69) \quad \sigma x P x := \iota x (*P x \ \& \ \forall y (*P y \rightarrow y \leq_i x))$$

In other words, THE takes as its arguments two properties of VP-meanings and maps them to the maximal plural individual composed of individuals that satisfy the two arguments. (I use *individual* here not to mean an entity of type e but to mean an atom within the relevant domain, which is here $D_{\langle s,t \rangle}$.)

Given these definitions, the denotation of THEP in Figure 3 is (70a), which in the present context is equivalent to (70b).

$$(70) \quad \begin{array}{l} \text{a. } \sigma f (\exists e (f(e) = 1 \ \& \ \text{Agent}(e, \text{Mary})) \ \& \ f \leq_i \text{swimming} \oplus \text{climbing}) \\ \text{b. } \text{swimming} \oplus \text{climbing} \end{array}$$

Moving upwards in Figure 3, we come to v and T_{past} , whose denotations we wrote in (36) as follows:

$$(71) \quad \llbracket T_{\text{past}} \rrbracket^g = \lambda f_{\langle s,t \rangle}. \exists t (t < \text{NOW} \ \& \ \text{at } t : \exists e f(e) = 1)$$

$$\llbracket v \rrbracket^g = \lambda f_{\langle s,t \rangle}. \lambda y. \lambda e. f(e) = 1 \ \& \ \text{Agent}(e, y)$$

These lexical entries will still suffice, but we now have to be sure to understand the notion of Agent in such a way that one can be an Agent of plural events. Let

us say that one is an Agent of a plural event if and only if one is an Agent, in the normal sense, of all the events that are atomic parts of it. We will also need to make sense of the notion of an event (a plural event, to be sure) satisfying a plural individual made up of VP-meanings. Let us say that for any event e and functions f, g of type $\langle s, t \rangle$, $f \oplus g(e) = 1$ if and only if there exist events e' and e'' such that $f(e') = 1$ and $g(e'') = 1$ and $e' \leq_i e$ and $e'' \leq_i e$.

Assuming the speaker is John, we finally arrive at the truth conditions in (72) for the whole sentence:

$$(72) \quad \exists t(t < \text{NOW} \ \& \ \text{at } t : \exists e(\text{swimming} \oplus \text{climbing}(e) = 1 \ \& \ \text{Agent}(e, \text{John})))$$

In other words, there was in the past a plural event e such that e had as its parts an event of swimming the English Channel and an event of climbing Kilimanjaro and John was the agent of e , in the new sense whereby he was the agent of every atomic part of e . These truth conditions seem to be intuitively adequate.

I will shortly go on to analyze (61a) (the sentence about the globe-trotting desires of Bob and Alice), but before doing so I should perhaps be more explicit about the new syntax of VP-ellipsis than I have been so far. The proposal is that a vP can be spelled out by the rules and rule-schemas in (73):

$$(73) \quad \begin{array}{ll} \text{vP} & \rightarrow \text{v THEP} \\ \text{THEP} & \rightarrow \text{THE}' \text{ AND}^0\text{P} \\ \text{AND}^n\text{P} & \rightarrow \text{AND}^{n+1}\text{P VP} \\ \text{AND}^n\text{P} & \rightarrow \text{AND}^{n+1} \text{VP} \\ \text{THE}' & \rightarrow \text{THE RP} \\ \text{RP} & \rightarrow \text{R}_{m, \langle st, t \rangle} \\ \text{RP} & \rightarrow \text{R}_{m, \langle e, stt \rangle} \text{ pro}_{l, e} \end{array}$$

I am not aware of any cases where the RP has to contain more than one variable of type e , so I have just listed two cases above; a more sophisticated treatment along the lines of that given to AND^0P could be devised if necessary.

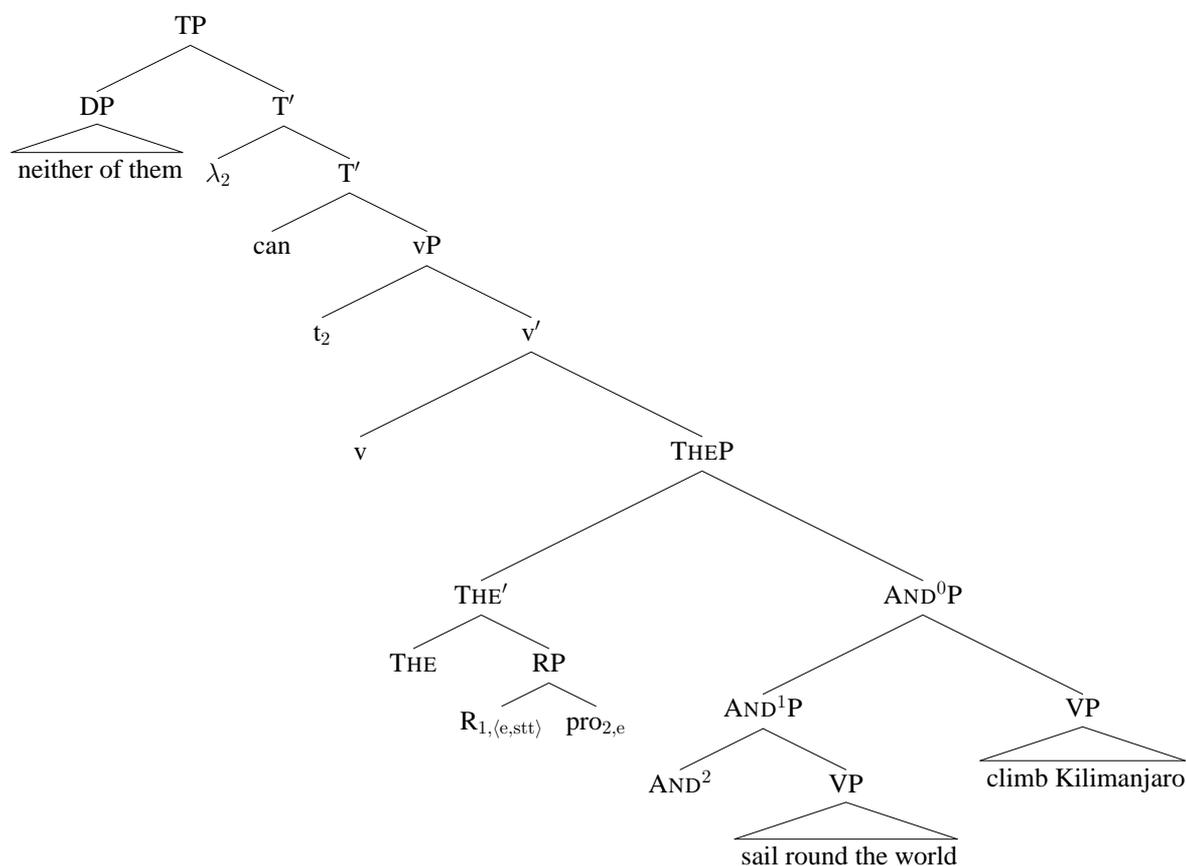


Figure 4: Neither of them can...

Let us move on to the analysis of (61a), repeated here as (74).

- (74) Bob wants to sail round the world and Alice wants to climb Kilimanjaro, but neither of them can, because money is too tight.

The LF for *neither of them can* will be that shown in Figure 4. The free variable $R_{1,(e, stt)}$ will be assigned a meaning as follows:

- (75) $\llbracket R_{1,(e, stt)} \rrbracket^g = \lambda x. \lambda f_{\langle s, t \rangle}. x$ desires that there be an event e such that $f(e) = 1$ and $\text{Agent}(e, x)$

I will avail myself of the following simple denotations for *can* and *neither of them*:

- (76) $\llbracket \text{can} \rrbracket^g = \lambda f_{\langle s, t \rangle}. \text{it is possible that there be an event } e \text{ such that } f(e) = 1$
 $\llbracket \text{neither of them} \rrbracket^g = \lambda f_{\langle e, t \rangle}. \neg \exists x ((x = \text{Bob} \vee x = \text{Alice}) \ \& \ f(x) = 1)$

Given these denotations, the truth conditions for this example come out to be as in (77). I use italicized expressions to abbreviate meanings of the VPs.

(77) $\neg\exists x((x = \text{Bob} \vee x = \text{Alice})$ and it is possible that there be an event e' such that $\sigma f(x$ desires that there be an event e such that $f(e) = 1$ and $\text{Agent}(e, x)$ and $f \leq_i \textit{sailing} \oplus \textit{climbing})(e') = 1$ and $\text{Agent}(e', x)$)

In other words, there does not exist an individual x such that x is Bob or Alice and it is possible that x be the agent of an event that satisfies the unique predicate f such that x wants to be the agent of an f -event and f is one of *sailing round the world* and *climbing Kilimanjaro*. This seems to be intuitively adequate.⁸

(63a), repeated here as (78a), will work by the same means, as suggested by the paraphrase in (78b).

(78) a. Whenever Max uses the fax or Oscar uses the Xerox, I can't.
 b. Whenever Max uses the fax or Oscar uses the Xerox, I can't perform the particular action or actions out of *using the fax* and *using the Xerox* that are being performed.

In other words, there will be two small VPs *using the fax* and *using the Xerox*, and an R variable will be assigned a denotation something like “currently being performed.” Working out an exact analysis would require us to make decisions regarding what entities *whenever* quantifies over (time intervals? situations?) and whether these are represented in the syntax. The general outlines are clear,

⁸The idea of having the variable $R_{1,(e, \text{stt})}$ provide extra descriptive material to modify syntactically more robust material is reminiscent of the approach to quantifier domain restriction that posits variables in the syntax, as proposed by von Stechow 1994, Stanley 2000 and Stanley and Szabó 2000. In particular, von Stechow (1994) sometimes has two variables in such positions, one an individual variable bound by the subject, in order to deal with sentences like *Only one class was so bad that no student passed*, where we are to understand “only one class x ... no student in x ...” The combination of a definite article plus a relation variable plus an individual variable is also reminiscent of the LF configuration posited by Heim and Kratzer (1998) to spell out donkey pronouns.

however.⁹

There are also examples of split antecedents involving NP-deletion, as we saw in (19), repeated here as (79). I will analyze the variant in (80), which is more revealing of structure since the quantifier *each* actually seems to bind into the NP-deletion site.

(79) John needs a hammer. Mary needs a mallet. They're going to borrow Bill's.

(80) John needed a hammer. Mary needed a mallet. Each borrowed Bill's.

We will need a set of rules for spelling out silent NPs parallel to the ones we saw for VPs in (73). The rules and rule-schemas in (81) will suffice.

- (81)
- | | | |
|--------------------|---|---|
| DP | → | D THEP |
| THEP | → | THE' AND ⁰ P |
| AND ⁿ P | → | AND ⁿ⁺¹ P NP |
| AND ⁿ P | → | AND ⁿ⁺¹ NP |
| THE' | → | THE SP |
| SP | → | S _{m,⟨et,t⟩} |
| SP | → | S _{m,⟨e,ett⟩} pro _{l,e} |

Translating the proposal just explored with respect to VP-ellipsis into the NP domain, we arrive, then, at the slightly simplified LF in Figure 5 for the last sentence of (80). I ignore any complexity there may be behind the surface forms *each* and *Bill's*. The new operators THE and AND² will receive the interpretations in (82) and (83), parallel to the interpretations of THE and AND².

- (82) $\llbracket \text{THE} \rrbracket^g = \lambda F_{\langle \text{et}, \text{t} \rangle} . \lambda G_{\langle \text{et}, \text{t} \rangle} . \sigma f (F(f) = 1 \ \& \ G(f) = 1)$

⁹The present apparatus can also be put into service to analyze cases of overt conjunction of VPs, as in *John walked and sang*. All that is needed is for the overt *and* in this position to mean $\lambda f_{\langle \text{s}, \text{t} \rangle} . \lambda g_{\langle \text{s}, \text{t} \rangle} . f \oplus g$. There are arguably conceptual advantages to having *and* produce a sum of entities when it appears between VPs, just as it does when it conjoins expressions of type e. See Krifka 1990 and Lasnik 1995 for detailed proposals concerning the non-boolean conjunction of VPs, and Winter 2001 for discussion.

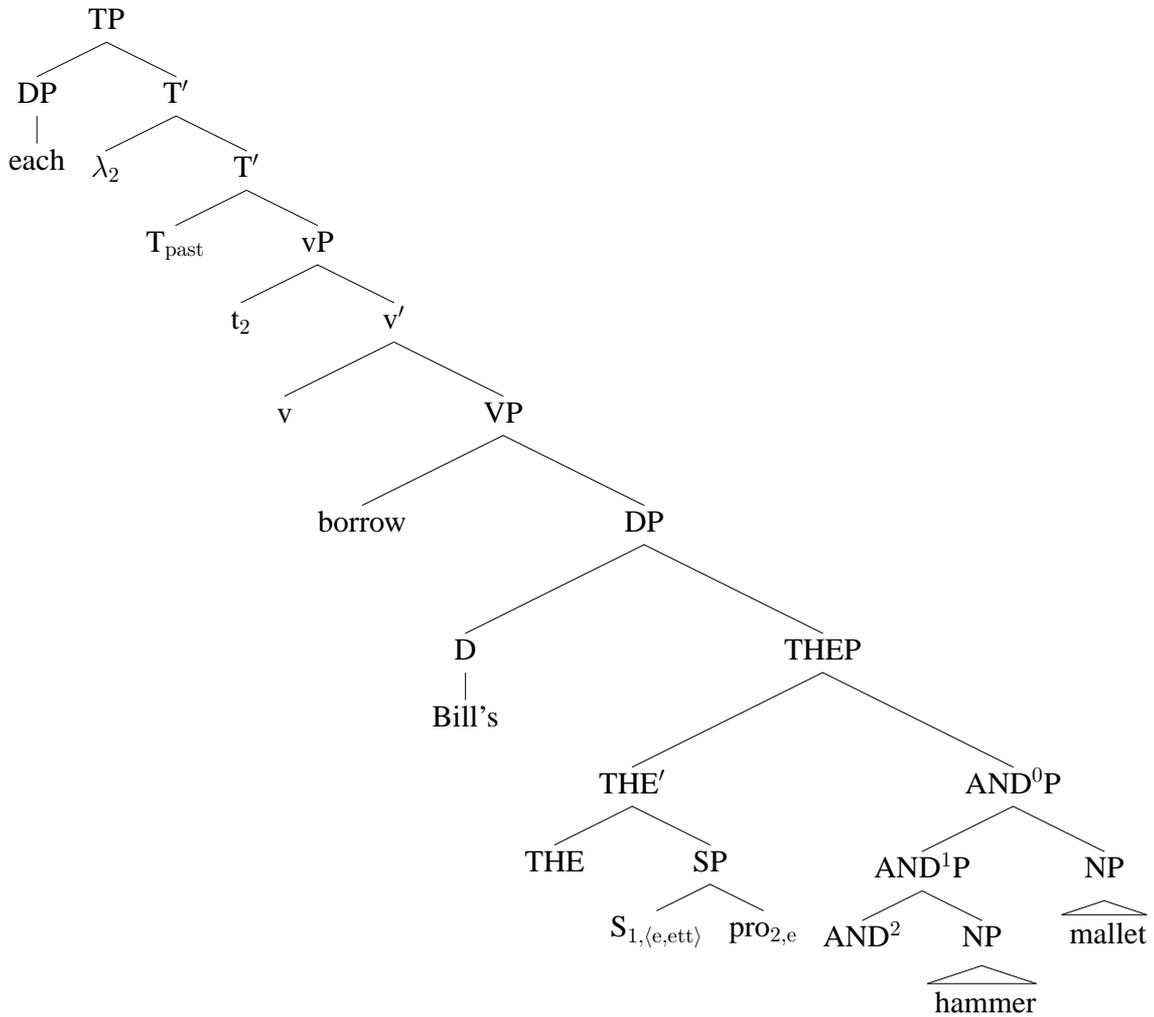


Figure 5: Each borrowed Bill's

$$(83) \quad \llbracket \text{AND}^2 \rrbracket^g = \lambda f_{\langle e,t \rangle} . \lambda g_{\langle e,t \rangle} . \lambda h_{\langle e,t \rangle} . h \leq_i f \oplus g$$

The nouns *hammer* and *mallet* receive the denotations one might expect, and the free variable $S_{1, \langle e, \text{ett} \rangle}$ will receive the following interpretation from the variable assignment g :

$$(84) \quad \llbracket S_{1, \langle e, \text{ett} \rangle} \rrbracket^g = \lambda x . \lambda f_{\langle e,t \rangle} . x \text{ needs an } f$$

$$(85) \quad \llbracket \text{hammer} \rrbracket^g = \lambda x . x \text{ is a hammer}$$

$$(86) \quad \llbracket \text{mallet} \rrbracket^g = \lambda x . x \text{ is a mallet}$$

I abstract away from the complexities inherent in the analysis of transitive in-tensional verbs like *need*. Allowing ourselves the convenient lexical entries in (87), (88) and (89) for *each*, *Bill's* and *borrow*, we arrive at the truth conditions in (90) for the last sentence of (80). I use italicized words to abbreviate the meanings of *hammer* and *mallet*.

$$(87) \quad \llbracket \text{each} \rrbracket^g = \lambda f_{\langle e,t \rangle} . \forall x ((x = \text{John} \vee x = \text{Mary}) \rightarrow f(x) = 1)$$

$$(88) \quad \llbracket \text{Bill's} \rrbracket^g = \lambda f_{\langle e,t \rangle} . \iota x (x \text{ is Bill's} \ \& \ f(x) = 1)$$

$$(89) \quad \llbracket \text{borrow} \rrbracket^g = \lambda x . \lambda e . \text{borrowing}(e) \ \& \ \text{Theme}(e, x)$$

$$(90) \quad \forall x ((x = \text{John} \vee x = \text{Mary}) \rightarrow \exists t (t < \text{NOW} \ \& \ \text{at } t : \exists e (\text{borrowing}(e) \ \& \ \text{Agent}(e, x) \ \& \ \text{Theme}(e, \iota y (y \text{ is Bill's} \ \& \ \sigma f (x \text{ needs an } f \ \& \ f \leq_i \text{hammer} \oplus \text{mallet})(y) = 1))))))$$

The claim, then, is that the last sentence of (80) is true if and only if, for all x such that x is Mary or John, x was the Agent of a borrowing event whose Theme was the unique item of Bill's that satisfied the unique predicate f such that x needed an f and f was one of *hammer* and *mallet*. This seems to be accurate.

It is time to consider how to integrate the model that we have built up for split antecedent cases with the theory that we developed in previous sections for binderless sloppy readings and ellipsis-containing antecedents. Recall Theory the First in (39), repeated here as (91):

(91) *Theory the First*

VP-ellipsis and NP-deletion consist in the generation of bare VP and NP nodes, respectively. These structures are sent to PF. There is an LF process of resolving the ellipsis, whereby the bare nodes are replaced with a copy of a phrase of the same syntactic category drawn from the linguistic environment.

We can combine this theory with the procedures we have posited to deal with the split antecedent cases by adopting the following statement:

(92) *Theory the Second*

- (i) VP and NP nodes may be bare.
- (ii) vPs may be spelled out as in (73).
- (iii) DPs may be spelled out as in (81).
- (iv) VPs and NPs in AND^0Ps and AND^0Ps must be bare.
- (v) A bare VP or NP node must be replaced at LF by a copy of a phrase of the same syntactic category drawn from the linguistic environment.

In other words we view the trees in Figures 3–5 not as being base-generated but as deriving from structures that originally had bare VPs and NP nodes in their AND^0Ps and AND^0Ps . All else proceeds as previously described, and we still retain the option of handling the ellipsis-containing antecedent cases and binderless sloppy readings with the simpler structures posited earlier.¹⁰

Before we leave these data, we should note that it is also possible to concoct labored but not ungrammatical examples that combine the traits of the various species that we have been examining. (93), for example, is a combination of a split antecedent case and a case of an ellipsis-containing antecedent:

¹⁰An alternative way of unifying Theory the First with the structures posited for split antecedent cases would maintain that VP-ellipsis and NP-deletion always involve definite description structures of the type posited in (73) and (81). In cases without split antecedents we would just have one VP or NP as part of the structure, and the operator AND^1 or AND^1 . If we suppose that some trivial property is generally available for the denotation of RP and SP when these phrases are redundant, it turns out that a definite description structure with just one NP or VP is semantically equivalent to just having the NP or VP there by itself. I marginally prefer the option given in the text because of the complexity of the structures that result in cases of ellipsis-containing antecedents if we suppose that we always have definite descriptions in ellipsis. But the issue is a subtle one, and the theory described in this note has a certain kind of unity that cannot be claimed by the one in the text.

- (93) When Bob had to sail round the world and Mary had to climb Kili-manjaro, they didn't want to; and when Bob had to swim the English Channel and Mary had to climb K2 they didn't, either.

It is simple to derive this example in the current theory: the overt *want to* is followed by a little *v* and a silent THEP containing two bare VP nodes, and before these VP nodes are filled in this structure is copied and used to resolve the VP-ellipsis in the second sentence. There are then two separate processes of resolving split antecedent ellipsis, one in each sentence.

2.5 Ellipsis with No Linguistic Antecedent

Recall the cases of ellipsis with no linguistic antecedent in (22)–(33), some of which are repeated in (94)–(98).

- (94) (*John attempts to kiss Mary while driving.*)
John, you mustn't.
- (95) (*A piece of chocolate cake is offered.*)
I really shouldn't.
- (96) (*As an invitation to dance.*)
Shall we?
- (97) (*Mary gets John an expensive present.*)
Mary, you shouldn't have!
- (98) (*There are lots of barking dogs in the yard. We look at them without speaking. I point and say:*)
Harry's is particularly noisy.

The question is how to integrate these cases into the framework developed in section 2.4.

Roughly speaking, what the examples of ellipsis with no linguistic antecedent have in common is that there is some obvious sensory (in these cases visual)

clue to the property conveyed by the unpronounced phrase. The clue need not always be an instance of the relevant action or entity before the very eyes of the speaker and hearer: there is kissing in the scenario of (94) and a dog in that of (98), but not necessarily any eating in that of (95), and certainly not any eating of the piece of cake being offered; and there may or may not be dancing actually taking place when (96) is uttered, provided that it is clear to speaker and hearer that they are at a dance. But in the cases of VP-ellipsis there must at least be an obvious result of the action in question or a stimulus towards performing it. It is hard to be more precise, and I will leave the matter here for now, pending further research.

I propose that in these cases too we have full syntactic VPs and NPs at LF.¹¹ So in (94), for example, we might have something like [_{VP} kiss me now]. We can now emend our theory to the following, which is the final version:

(99) *Theory the Third*

- (i) VP and NP nodes may be bare.
- (ii) vPs may be spelled out as in (73).
- (iii) DPs may be spelled out as in (81).
- (iv) VPs and NPs in AND⁰Ps and AND⁰Ps must be bare.
- (v) A bare VP or NP node must be filled in at LF by a VP or NP that is highly salient.
- (v) A VP or NP is highly salient if and only if:

¹¹One sometimes gets the impression that some theorists think that verb-phrase meanings that are merely contextually salient or able to be worked out, as opposed to occurring as the value of some constituent in the linguistic environment, should not come to be represented as syntactically fully-fledged VPs. It is unclear what the grounds for this view could be, however. If it ever happens that we think of things and then put our thoughts into words, which is not implausible, we are extraordinarily adept at moving from non-linguistic to linguistic modes of representation.

- (a) its denotation describes an action or thing made salient by an obvious sensory clue; or
- (b) it is a copy of a phrase of the same syntactic category drawn from the linguistic environment.

This theory should be seen as part of general linguistic competence, but it will be used by speakers and hearers in different ways. The hearer, whose job it is to try to work out what the speaker was saying, might not arrive at the precise unpronounced LF phrase that is present in the mind of the speaker, especially in cases where there is no linguistic antecedent; but communication will have proceeded well enough if the speaker comes up with something with the same or a relevantly similar meaning. See Neale 2005 for salutary discussion of the asymmetric roles of speaker and hearer.

Before leaving the current theory, there are two loose ends that should be tied up. Firstly, the theory of ellipsis outlined here is naturally one way of spelling out some details left obscure in my previous work (Elbourne 2001, forthcoming) in which I claimed that E-type anaphora was NP-deletion; but this latter thesis is independent of any particular analysis of NP-deletion.

Secondly, we should revisit example (60), repeated here as (100), to make sure that we do not end up predicting that it is good.

(100) The garbage can is full. *I hope that *you* will, for a change.

In the absence of a strong sensory clue of the kind exemplified earlier, we have to work with the antecedent VP *is full*. The example presumably fails because there is no sufficiently salient relation *R*, a possible first argument of THE, that could combine with the meaning of this VP and give the desired interpretation. Note that if a strong visual clue is offered, the example becomes better. If, for example, I hand you the brimming garbage can and utter the last sentence of (100), the sentence dramatically improves.

3 Previous Literature

In this section I briefly compare the theory advocated in this article with some other theories that try to cover some or all of the tricky cases dealt with here. I will not attempt a detailed review of the literature on ellipsis, which would be a mammoth undertaking.¹²

3.1 Rooth 1992

Rooth's influential paper proposes using entailment-like relations involving focus to characterize the relationship between elided phrase and antecedent. He claims that VP-ellipsis is permitted only if two conditions are met: first, the lexical content of the elided VP at LF must be the same as that of an antecedent VP, modulo indices on pronouns and traces; and second, the elided VP must be embedded in a constituent β such that there is a constituent α containing the antecedent VP such that the ordinary semantic value of α is a member of the set of focus alternatives generated by β . A variant of Rooth's condition is to be found in work by Merchant (2001).

Some of the details of Rooth's theory are less than satisfactory, however. He gives an analysis of binderless sloppy readings like (101) that crucially involves the DP *John* scoping out of its containing DP. This already seem dubious, since DP is normally an island. And we surely cannot extend this idea to (102) and

¹²Two theories worthy of note that I do not deal with in the main text are the higher order unification theory of Dalrymple, Shieber and Pereira (1991) and the discourse grammar theory of Prüst, Scha and van den Berg (1994). The former deals with binderless sloppy readings and might be extended to deal with (62a), the sentence about Mary swimming the English Channel and climbing Kilimanjaro; but it does not attempt to deal with ellipsis-containing antecedents and the other split antecedent cases, and I see no way of extending it so that it would. Prüst, Scha and van den Berg (1994) also account for cases like (62a) but they do not attempt to deal with the other split antecedent cases, the binderless sloppy readings or the ellipsis-containing antecedents, and again I see no way of extending their theory to achieve better coverage.

(103), where the relevant DP would have to scope out of a relative clause or an *if*-clause.

(101) John's coach thinks he has a chance, and Bill's coach does too.

(102) The policeman who arrested John read him his rights, but the policeman who arrested Bill didn't.

(103) If John has trouble at school, I'll help him, but if Bill does, I won't.

Rooth does not offer any analysis of ellipsis-containing antecedents or split antecedents.

3.2 Fiengo and May 1994

Fiengo and May (1994) attempt to account for binderless sloppy readings (and other data) by means of a complex system that exploits isomorphism of patterns of indices in trees. I will not attempt to summarize this theory here.¹³

Fiengo and May also analyze split antecedent cases such as (104).

(104) I did everything that Mary did. Mary swam the English Channel, and Mary climbed Kilimanjaro, and I did too.

About this example, they say the following (1994:195):

In this sentence, what is elided are occurrences of the VPs *swim the English Channel* and *climb Kilimanjaro* (and an occurrence of *and*). This is all we need to know to “recover” the ellipsis—that

¹³We should note, however, that Rooth already in his 1992, page 18, had published the following counterexample to Fiengo and May's theory:

(i) Yesterday John's boss told him to shape up, and today Bill's boss did.

(ii) Yesterday the guy John works for told him to shape up, and today Bill's boss did.

Since *John* and *Bill* do not occupy isomorphic positions in their respective sentences in (ii), it is unclear that Fiengo and May's account correctly predicts the sloppy reading here.

is, that the final clause is *I swam the English Channel and climbed Kilimanjaro*. That the elided occurrences must be conjoined in the representation of ([104]) just follows from the way they can “fit” into its structure.

They further suggest the following (1994:200), referring to examples like (78a) (“Whenever Max uses the fax or Oscar uses the Xerox...”):

As a general rule, the discourse sentence is also the domain from which the elided coordinating element is drawn. In a case of disjunction, for instance, *or* is reconstructed.

It appears, then, that Fiengo and May are assuming that a conjunction must be reconstructed somehow on the basis of the linguistic environment. A possible problem with this theory is that there are split antecedent cases when there is no *and* or *or* in the linguistic environment (Elbourne 2001):

(105) Mary swam the English Channel. Mary climbed Kilimanjaro. I did too.

It is unclear to me how (105) could be dealt with in Fiengo and May’s theory of split antecedent cases. It poses no problem for the theory advocated in this article, of course, since this theory does not rely on a conjunction being present in the linguistic environment.

Fiengo and May do not deal with cases of ellipsis-containing antecedents.

3.3 Hardt 1999

As far as I know, Hardt’s (1999) theory is the only one previously published that attempts to account for binderless sloppy readings, ellipsis-containing antecedents and split antecedents. It is also not difficult to see how it might be extended to deal with cases of ellipsis with no linguistic antecedent. For the purpose of illustration, I will give an informal summary of how Hardt analyzes binderless sloppy readings and ellipsis-containing antecedents.

Hardt uses a dynamic semantics incorporating a notion of *discourse center*, based on the Centering framework of Grosz, Joshi and Weinstein 1995. In particular, discourse representation structures (the “boxes” of traditional DRT (Kamp 1981)) contain special discourse markers (variables) assigned to the *center* (roughly, topic) of the discourse. This enables Hardt to explain binderless sloppy readings along the following lines. Take (106).

(106) If Tom was having trouble in school, I would help him. If Harry was having trouble, I wouldn't.

In the first sentence, the discourse center is Tom. The overt pronoun *him* is translated by a special discourse marker assigned to the center. So *help him* means something like “help the current center.” This meaning is then understood at the ellipsis site; more precisely, it is the assigned as the value of the INFL of the second sentence, which is a deictic element in this theory. In the meantime, however, the center has changed. Harry is the discourse center of the second sentence. So the second sentence ends up meaning “I wouldn't help Harry,” as desired.

The same principle can be used in cases of ellipsis-containing antecedents. Take our standard example:

(107) When John had to cook, he didn't want to. When he had to clean, he didn't either.

Hardt supposes that in the first sentence the discourse center is the property of cooking. The first VP-ellipsis is resolved by having *to* be a deictic expression that picks up the property that is the current center. We arrive at the meaning “want to cook,” then, for the end of the first sentence. The value of the deictic INFL of the second sentence is taken to be the DRT representation of *want to*, something interpretable as “want to perform the kind of action that is the current center.” And again by the time we get to this point the center has shifted,

according to Hardt. It is now the property of cleaning, and so the correct interpretation is obtained.

Even from this informal summary, it can be seen that it is important to Hardt's system that there is no syntactic structure, or at least no syntactic complexity, at ellipsis sites. The correct interpretation is arrived at by assigning denotations involving variables picking out the current center to the INFL of the ellipsis sentence. (One could also imagine a variant in which there was a deictic element in the VP position, as opposed to having INFL do this job.) But this feature of the theory, which lends it a useful flexibility and power, means that it is ill-equipped to deal with cases where there seems to be movement from ellipsis sites, as in the following examples.

(108) Which book did John read? And which book did Bill?

(109) John read every book that Bill did.

See Johnson 2001 for a summary of the controversy on whether theories without normal syntactic structures in the ellipsis sites can deal with examples like these. The upshot is not encouraging for those theories, and things seem especially difficult for the particular version that Hardt puts forward, according to which there is nothing whatsoever in ellipsis sites. By contrast, the theory advocated in the current article has normal syntactic structure in all ellipsis sites.¹⁴

¹⁴Hardt's theory also faces a knotty technical difficulty in analyzing certain seemingly simple cases of sloppy identity. Take *Tom loves his cat and John does too* (Hardt 1999:194). Using the device described above, Hardt analyzes *loves his cat* as roughly "loves the cat of the current center," and wants this meaning understood at the ellipsis site, by which time the center has changed to John. But the actual DRT representation used to express this meaning by Hardt also, necessarily given the system, contains a discourse marker for Tom's cat. Roughly speaking, and in slightly incongruous terms, we can think of *his cat* here as meaning something like "the unique x such that x is the cat of the current center and x is identical to c ," where c is a constant referring to Tom's cat. If we understand this at the ellipsis site, then, we obtain a contradiction: the claim would be that John loves the cat of the current center (himself) that is identical to c (not his own, but Tom's cat). To avoid this difficulty Hardt proposes to reconstruct an "alphabetic variant" of the original property, one that replaces the troublesome discourse marker referring to Tom's cat by another one (Hardt 1999:195). But this seems like the merest

3.4 Tomioka 1999

Tomioka 1999 analyzes binderless sloppy readings by proposing that the pronouns in such cases are actually donkey pronouns. He follows Cooper (1979) in supposing that donkey pronouns are interpreted as definite descriptions containing bound variables. So the overt *read him his rights* in (110) means something like “read the person he arrested his rights,” with “he” bound by the subject.

(110) The policeman who arrested John read him his rights, but the policeman who arrested Bill didn't.

We understand the same meaning at the ellipsis site and the correct reading is obtained.

We know, however, that the descriptive content of donkey pronouns cannot be obtained so flexibly, just by picking up contextually salient relations. If it could, the following examples would have the same status (Heim 1990, Elbourne 2001):

- (111) a. Every man who has a wife is sitting next to her.
 b. ?? Every married man is sitting next to her.

In particular, (111b) would be fully felicitous, since *her* could mean “the person he is married to.” This is not the case, however, meaning that the mechanism relied on by Tomioka is problematic. There are also problems with the assumption that donkey pronouns can contain bound individual variables. See Elbourne 2001 for further discussion.

Tomioka (1999) does not discuss ellipsis-containing antecedents or split antecedents.

stipulation. Alphabetic variants are not equivalent in dynamic systems, unlike in traditional logics. It matters whether we say, for example, $\exists xPx$ or $\exists yPy$, since the former but not the latter will be able to bind a syntactically free variable x that occurs in a later formula. As far as I can see, then, it is not only stipulative but actually illegal to solve the current problem by relying on the notion of alphabetic variance.

3.5 Schwarz 2000

Schwarz (2000, Chapter 5) analyzes cases of ellipsis-containing antecedents that involve VP-ellipsis within VP-ellipsis by having the VPs scope out and bind variables in both their overt positions and the ellipsis sites. So (112) has the LF in (113).

(112) When John had to cook, he didn't want to. When he had to clean, he didn't either.

(113) [cook] λQ [when John had to Q he didn't want to Q]
 [clean] λQ [when he had to Q he didn't want to Q]

It can be seen that the correct interpretation would result, and the antecedent and elided VPs are now identical. But surely we should assume, unless forced to do otherwise, that LF movement of VPs respects what we know about islands. Phrases cannot, of course, generally move out of *when*-clauses. The theory advocated in the current article does not posit any abnormal movement.

Schwarz (2000) does not attempt to analyze binderless sloppy readings or split antecedents.

4 Conclusion

I will refrain from summarizing my theory in this section, since I have done so already in (99). I will merely note two possible extensions of it that could profitably be explored in future research. The question at issue concerns to what extent the new definite description structure for VPs and NPs, which I have cautiously posited so far only in split antecedent cases of ellipsis, should be extended to other syntactic categories and other kinds of occasion.

First, since I have concentrated on VP-ellipsis and NP-deletion in this article, we should ask whether the LF apparatus introduced here has counterparts in other kinds of ellipsis too, such as pseudo-gapping and sluicing. The answer

presumably depends on whether other kinds of ellipsis display split antecedent effects, since it was these cases that necessitated the new structures for NPs and VPs in the current theory. A possible indicator in the case of sluicing is (114):

(114) Either John called someone or Mary called someone, but I don't know who.

This seems to have a reading "... but I don't know who was called by whichever one of them it was." This split antecedent interpretation constitutes evidence for extending the present theory at least to sluicing.

Second, we should ask whether some pronounced VPs and NPs might have the kind of definite description structure posited in this article. Evidence that this might be so comes from the so-called "respectively" readings of sentences like (115).

(115) You and I did everything that Mary and Jane did. Mary swam the English Channel, and Jane climbed Kilimanjaro, and you and I swam the English Channel and climbed Kilimanjaro too.

Fiengo and May (1994:197) point out this sentence has a reading "You and I swam the English Channel and climbed Kilimanjaro respectively." In other words, we get the split antecedent interpretation without ellipsis in cases like this. Reverting to our former schema, we might paraphrase it "You and I performed the action or actions out of *swimming the English Channel* and *climbing Kilimanjaro* that were done by the person we were imitating." This is strong evidence for elements of the VP structure posited in this article being present in a pronounced VP.

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Paul Elbourne
Department of Linguistics
School of Modern Languages
Queen Mary, University of London
Mile End Road
London E1 4NS
United Kingdom
p.d.elbourne@qmul.ac.uk