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Daniel Hardt
University of Pennsylvania

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Abstract

While it is generally agreed that an elliptical Verb Phrase must be identical to its antecedent, the precise formulation of the identity condition is controversial. I present a semantic identity condition on VP ellipsis: the elided VP must have the same meaning as its antecedent. I argue that a semantic identity condition is superior to a syntactic condition on both empirical and theoretical grounds. In addition, I show that the proposed condition differs significantly from previously proposed semantic conditions, in that other approaches do not take into account the dynamic nature of semantic representation.
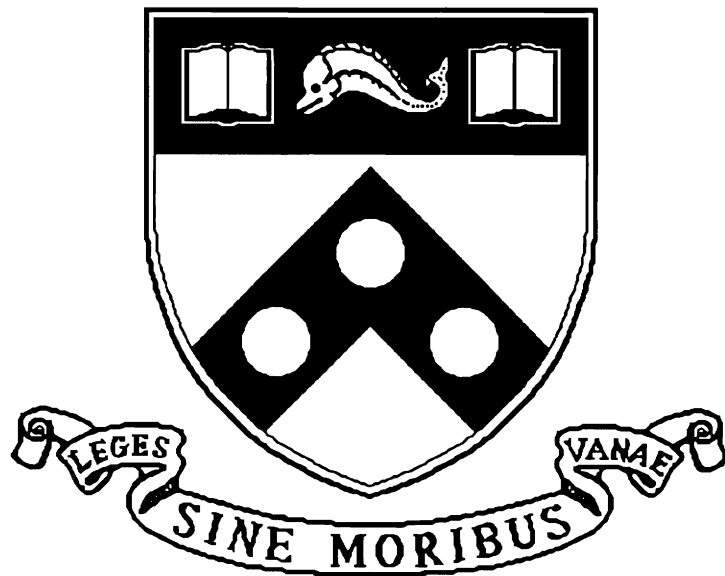
Comments

VP Ellipsis and Semantic Identity

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Daniel Hardt

University of Pennsylvania
School of Engineering and Applied Science
Computer and Information Science Department

Philadelphia, PA 19104-6389

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Daniel Hardt
University of Pennsylvania

1. Introduction

The grammar of English provides a broad array of elliptical constructions, where what is communicated goes beyond what is explicitly stated. One example of this is verb phrase ellipsis, in which a verb phrase is elided, its position marked only by an auxiliary verb. It is generally agreed that VP ellipsis is governed by an identity condition, to the effect that an identical copy of the antecedent is "reconstructed" at the ellipsis site. A basic question arises as to whether the identity condition is to be stated in syntactic or semantic terms.

There is a well known body of evidence which indicates that VP ellipsis is governed by a semantic identity condition. Consider the following example (Sag and Hankamer (1982)):

(1)   A: Do you think they will like me?
       B: Of course they will.

Here, the only reading of the elliptical VP is "like you"; this preserves the meaning of the antecedent "like me", but it requires that the target and antecedent VP are not syntactically identical. Similarly, examples such as

(2)   Wendy is eager to **sail around the world** and Bruce is eager to **climb Kilimanjaro,** but neither of them can because money is too tight.

have been taken to indicate that inference is sometimes required to resolve VP ellipsis, or at least that VP ellipsis must be defined at the level at which inferential relations are definable (Webber (1978)). In sum, it appears that VP ellipsis interacts in a fundamental way with external, non-linguistic mechanisms such as indexicality and inference, which suggests that it must be dealt with at a semantic level.

The most prominent account of VP ellipsis is the "logical form identity theory", due independently to Sag (1976) and Williams (1977). While this theory has sometimes been described as a semantic theory, Partee and Bach (1981) observe that it violates a basic requirement imposed by Montague: namely, that the "logical form" language must be "dispensable". The LF identity theory requires that the LF representation of the elided VP be equivalent to that of the

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[1] I am indebted to Robert Frank, Aravind Joshi, Shalom Lappin, Mats Rooth, Ivan Sag, and Bonnie Webber for valuable discussion and suggestions.

antecedent VP, up to alphabetic variance. This has the effect of requiring that a variable bound outside the antecedent VP be bound by the same token operator in the target. As Partee and Bach point out, this requirement is dependent on "global properties of the IL (intensional logic) representation". This appears to violate compositionality as well as the dispensability of the IL representation language.

The essential point here is that the meaning of a VP cannot be taken simply to be a property; a VP determines a property only relative to a given context. If there is a variable free within the VP, the VP meaning does not determine the value of that variable. So there is no reason to assume that the variable would receive the same value in the antecedent context and the target context, and indeed, the Montagovian framework does not permit the statement of such a requirement. But this is precisely what is required by the LF identity theory.

The following dilemma presents itself: while there are a variety of facts that appear to require a semantic identity condition, the widely accepted Sag/Williams LF identity theory is incompatible with standard model-theoretic approaches to semantics. In this paper, I will argue that the LF identity condition can be rejected in favor of a semantic condition. Using examples involving pronouns free within the antecedent VP, I show that the LF identity condition is violated. Next, I sketch a dynamic system of semantic interpretation in which the identity condition is formulated. I examine additional cases involving variables within the antecedent VP: indexical pronouns, traces, and reciprocals. The semantic identity is shown to apply in all these cases, while a syntactic identity is enforced in none of them.

Next I look at a "discourse effect" in VP ellipsis, that of "combined antecedents". In the current proposal, the semantic identity condition is mediated by a discourse model, much as pronominal anaphora is taken to be mediated by a discourse model. That is, the antecedent causes an associated semantic object to be stored in a discourse model, to be accessed by a subsequent anaphoric expression. It is well known that combinations of distinct entities in the discourse model can become available as antecedents for plural pronouns. I argue that an analogous phenomenon is evidenced with VP ellipsis; that is, combinations of distinct properties can become available as antecedents for VP ellipsis. Finally, I examine and reject two arguments that have been given in favor of alternative syntactic approaches.

2. The Logical Form Identity Theory

The logical form identity theory was proposed independently by Sag (1976) and Williams (1977). A basic principle in this account is the Derived Verb Phrase rule (Partee (1975)), which allows a VP to be represented at Logical Form (LF) as a lambda expression in which the subject is lambda-abstracted. Given this representation, an identity condition follows from the lambda calculus itself: this

is the notion of an *alphabetic variant*. Two lambda expressions are alphabetic variants if they differ at most in the naming of bound variables. Applied to VP ellipsis, this condition requires that the antecedent and target VP's must match exactly in the names of any free variables.

A free variable in the antecedent VP is either bound by an operator outside the VP, or it is "globally free". The LF identity theory requires that a globally free variable must refer to the same object in antecedent and target. A variable bound by an operator O outside the VP in the antecedent must be bound by O in the target as well. This requirement is also imposed in the higher order matching approach of Dalrymple et al. (1991).

In fact, this restriction can be violated in a variety of ways, as shown by the following examples[2]:

(3)   Every boy$_i$ in Bill's class wanted Mary to **kiss him**$_i$, but three boys$_j$ in John's class actually asked her to [kiss him$_j$].
        (bound - bound)

(4)   Every boy$_i$ thinks Professor Davidson will **like his**$_i$ **work**, but in Bill's$_j$ case, I think she actually will [like his$_j$ work].
        (bound - free)

(5)   Speaking of Mary$_i$, John **asked her**$_i$ **out**.
        Really – I'm surprised that any girl$_j$ would want him to [ask her$_j$ out].
        (free - bound)

(6)   If Tom$_i$ was having trouble in school, I would **help him**$_i$.
        On the other hand, if Harry$_j$ was having trouble, I doubt that I would [help him$_j$].
        (free - free)

These examples show that a variable can be bound by distinct operators in antecedent and target ("bound-bound"), or it can be bound in one and free in the other, or indeed, free in both, with distinct referents. It appears, then, that the binding of a pronoun by a particular token operator is not part of the identity condition governing VP ellipsis. This is a welcome conclusion, as it allows us to reject the LF identity condition in favor of an identity condition defined purely in terms of model-theoretic denotations of VP's. I now turn to the definition of such an identity condition.

3. A Semantic Identity Condition

In this section, I sketch an approach to semantic interpretation in which the identity condition on VP ellipsis is formulated. The approach is a dynamic one,

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[2]In these examples, the elided material is displayed in brackets.

as developed in Discourse Representation Theory (Kamp (1981), Heim (1982)) and related theories. In a dynamic approach, meanings are taken to be relations on discourse contexts. The meaning of a VP in this approach is a three place relation on a property, an input discourse model, and an output discourse model. This means that a VP expresses a certain property only relative to a particular discourse context.

3.1. A System of Semantic Interpretation

The semantic interpretation system I will adopt is based on The Incremental Interpretation System (Pereira and Pollack (1991)), which is a computational implementation of the dynamic approach. One difference between this approach and other dynamic systems is the use of assumption storage and discharge. This is essentially the mechanism of Cooper storage (Cooper (1983)) for quantifier scope, but it is applied here to a much broader range of phenomena.

A semantic object is represented as a pair, consisting of a (possibly empty) assumption set, and a sense. Each assumption encodes a dependency on context, while the sense can be thought of as an ordinary truth-conditional meaning representation. Taken together, the assumption:sense pair represents the file change potential of an expression, just as in other dynamic systems. However, there is a certain flexibility of derivation which distinguishes this system from others. For example, a pronoun represents a constraint on the input discourse model, requiring the existence of an appropriate individual. In this system, this constraint is not necessarily applied to the input discourse model at the point when the pronoun is encountered in the derivation. An assumption is stored at that point, which may be discharged at some later stage in the derivation. Each assumption will be represented as a triple, $<x,T,P>$, where x is a parameter, T is the assumption type, and P represents constraints on the parameter x. The assumption can be thought of as an instruction for determining the contextual meaning of the associated parameter.

Below, I will give simplified versions of Pereira and Pollack's treatment of quantifiers, indefinites, and pronouns. Then I give a semantic account of VP ellipsis, using similar mechanisms.

3.1.1. Quantifiers

The treatment of quantifiers in the Incremental Interpretation system essentially duplicates that of Cooper (1983). A quantified NP is represented by storing a quantifier assumption, together with a parameter representing the sense. At some later stage in the derivation, the quantifier assumption is discharged, determining the scope of the quantifier, and capturing the parameter. There are two general rules for quantifiers, governing the introduction and discharge of quantifier assumptions. A quantified NP is represented as:

$\{<x,q,n>\}$: x

where x is a parameter, q is the quantifier, and n is the common noun. For example, "every jet" is represented:

$[\![every\ jet]\!] = \{<x,every,jet>\}$: x

The discharge of a quantifier assumption is represented as follows:

$\{<x,q,s>\}$: $p_t \Rightarrow$:(q s x) p

For example:

$\{<x,every,jet>\}$: fly(x) $\Rightarrow$: (every jet x) fly(x)

That is, the quantifier is discharged at some point in which a object of type t (proposition) has been constructed, thus determining the scope of the quantifier. The restricted quantifier is prefixed to the sense to express this.

3.1.2. Indefinites: Evoking Entities

In DRT and related approaches, an indefinite NP evokes a new entity in the discourse model. In the Incremental Interpretation system, an indefinite is represented as the following assumption-sense pair:

$[\![a\ man]\!] = \{< x, indef, MAN >\}$:x

The sense is simply the parameter x. The assumption represents an instruction to create a new entity of the appropriate type. This is achieved by the eventual discharge of the assumption, as follows:

$\{A, <x, indef, P>\}$: s $\Rightarrow$ A:s[e/x]
     such that e $\notin$ DM$_{in}$ AND P(e) AND e $\in$ DM$_{out}$

In this case, an entity e is determined, subject to the constraint that it be a "new" entity (not in the input discourse model), and that P holds of e.

3.1.3. Pronouns: Accessing Entities

The semantic representation of the pronoun "he" is as follows:

$[\![he]\!] = \{< x, var, MALE >\}$: x

The assumption includes the parameter name x, the assumption type "var", and the constraints ("MALE") placed on the object. The discharge of a "var" assumption is:

{A, <x, var, P>}: s ⟹ A:s[e/x]
      such that e ∈ DM_{in} AND P(e) AND DM_{in} = DM_{out}

Here, the entity e must be an element of DM_{in}, and the constraint P must hold of e. (Another possibility is that x is "captured" by a quantifier. The details of this are not of interest here.)

3.2. Rules for VP Ellipsis

In this section, I give rules for VP ellipsis, on an analogy with the rules given above for pronominal reference.

3.2.1. Verb Phrases: Evoking Properties

Just as indefinite NP's evoke entities, a VP evokes a property. I define a new assumption type to implement this, termed "pred". For example, the VP "help him" is represented:

[[*help him*]] = {<P, pred, TRUE >, < x, var, MALE >}: help(_, x)

There are two assumptions: in addition to the "var" assumption associated with the pronoun, there is a "pred" assumption associated with the verb. The pred assumption has a parameter P, it is of type "pred", and the constraints are simply "TRUE", i.e., no constraints are imposed. (Perhaps aspectual features might be relevant here for the "pred" assumption, but this will not be dealt with here.)
    The discharge of the "pred" assumption is defined as follows:

{A, <P,pred,TRUE>}: s ⟹ A:s
      such that A:s ∈ DM_{out} AND s must be of type "property"

Upon discharge, the "pred" assumption causes the current semantic representation of the VP to be added to the discourse model. Note that undischarged assumptions may be stored as part of the VP meaning. This allows a "sloppy" reading for pronouns within the antecedent VP.

3.2.2. VP Ellipsis: Accessing Properties

Just as a pronoun accesses an entity stored in the discourse model, an elliptical VP accesses a property. An assumption type "epred" ("elliptical predicate") is introduced for this purpose, as shown in the following example:

[[*did*]] = {<P, epred, TRUE >}: **did**

The discharge of the "epred" assumption is given as follows:
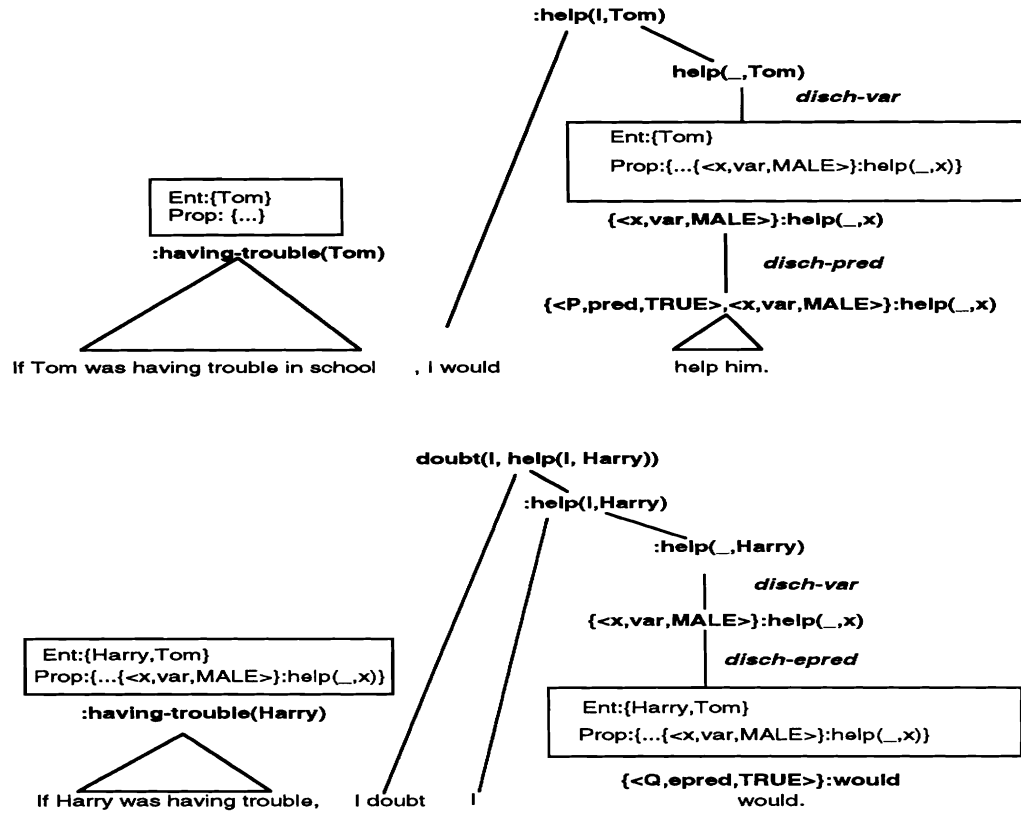
Figure 1: Derivation of Example (6)

$\{<P, \text{epred, TRUE} >\}$: did $\Rightarrow$ A:s
such that A:s ϵ DM_{in} AND DM_{in} = DM_{out}

Upon discharge, the "epred" assumption accesses some property (represented by an assumption:sense pair, A:s) stored in the input discourse model.

To illustrate the resultant system, a derivation of example (6) is depicted in Figure 1. Derivation trees of the antecedent and target sentences are given. Each node of a derivation tree contains an assumption:sense pair, together with the current state of the discourse model (displayed in a box). For brevity, the discourse model is sometimes suppressed, as are some derivation steps. The antecedent VP "help him" is represented by the assumption:sense pair

$\{<P, \text{pred, TRUE} >, < x, \text{var, MALE} >\}$: help($\_$, x)

The assumptions could be discharged in either order. In the depicted derivation, the "pred" assumption is discharged, causing the VP meaning to be added to the discourse model, with the "var" assumption as yet undischarged. Next, the "var" assumption is discharged, selecting "Tom" in the current discourse model, and the derivation proceeds to construct the representation **help(I,Tom)**. Now consider the elliptical VP "would". Here, the "epred" assumption is discharged, selecting the property associated with "help him" from the discourse

model. Next, the "var" assumption is discharged, this time selecting "Harry" from the current discourse model.

It should be clear that the readings in examples (3) to (5) can be similarly derived. In each case, there is a free variable within the antecedent VP. To derive the "sloppy" reading, the assumption for the variable is undischarged when the VP meaning is stored in the discourse model, allowing the variable meaning to be determined independently in the antecedent and target contexts.

Next, I examine cases with other types of variables within the antecedent VP. I begin with the case of indexical pronouns.

4. Indexicals

In example (1), repeated below, I argued that it is the meaning of the antecedent "like me" that is preserved under ellipsis, rather than its syntactic representation[3].

(7)   A: Do you think they will like me?
        B: Yes, I think they will.

As mentioned above, the only reading is "I think they will [like you]". This is because of the special nature of indexical pronouns, such as "me". Like other uses of pronouns, indexicals determine an individual in context, based on constraints such as number, gender, and the like. What is special about indexicals is that they contribute an individual, rather than a selection-function, to the meaning of an expression.

This is a widely accepted semantic distinction between indexicals and other referential terms, most familiar from the work of Kaplan. Once this distinction is incorporated into our semantic interpretation system, the semantic identity condition gives the desired results for VP ellipsis.

This treatment of indexicals has been illustrated by contrasting an indexical "I" with an equivalent referential term: "the speaker". (Nunberg (1991))

(8)   I could have been a contender.

(9)   The speaker could have been a contender.

Consider an utterance of these sentences by John Smith. While example (9) could be made true by a (possible) state of affairs in which the speaker was someone other than John Smith and was a contender, this would not make example (8) true.

In the current system, this difference is treated by imposing a special requirement on indexicals, namely, that the associated assumption must be discharged

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[3]Based on examples such as these, Sag and Hankamer (1984) sketch a model-theoretic identity condition on VPE that is rather similar in spirit to the current theory. See also Fodor and Sag (1984), and Sag (1981).

immediately, replacing the parameter with the denoted individual. This require-
ment, which reflects a general semantic fact about indexicals, gives the desired
result in the VP ellipsis case.

The indexical "me" is represented:

$$[\![me]\!] = \{<\text{x,var(index),SPEAKER}>\}:\text{x}$$

Before combining with the verb "like", the assumption must be discharged,
replacing the parameter x with the current speaker, whom I will call "Smith".
Thus the only possible antecedent for the elliptical VP will be

$$\{\}:\text{like}(\_, \text{Smith})$$

So the only possible meaning for the elliptical VP is "like Smith".

5. Other Variables

I have argued that a pronoun is semantically associated with a free variable,
together with an assumption expressing constraints on its eventual referent. I
will now examine two cases in which variables are introduce by alternative
syntactic forms: first, I look at the case of traces, where a variable is unexpressed
syntactically, under familiar syntactic constraints. Then, I look at reciprocals,
where a variable is introduced, again together with syntactic constraints. In each
case, the syntactic constraints are not enforced under ellipsis.

5.1. Traces

In the following examples, the antecedent VP contains a trace in a relative
clause.

(10)   He took the job that no one **wanted [e]**, and got the girl that everyone
        did. (from ad for the film "Career Opportunities")

(11)   China is a country that Joe wants to **visit [e]**, and he will too, if he
        gets an invitation there soon. (Webber 78)

(12)   China is a country that Joe doesn't **want to visit [e]**. India is a
        country that he does, and he will, when he saves enough money for
        a ticket.

In example (10), the antecedent is "wanted [e]". In the target, the trace is
bound by a distinct relative-clause forming operator. On the LF identity theory,
the trace in the target would have a different index from that in the antecedent,
violating alphabetic variance. In examples (11) and (12), there is a trace in the
antecedent, although the target is not within a relative clause, and a syntactic
trace would not be permitted. I will assume that there are syntactic constraints

governing the distribution of traces, and that these constraints are not imposed in the semantics. Semantically, traces will simply be treated as variables dependent on context in much the same way that pronouns are; that is, they introduce a "var" assumption. The only difference is that, for traces, there are no semantic constraints (eg, number/gender) on the eventual referent.

$$[\![e]\!] = \quad \{< x, \text{var}, \text{TRUE} >\}: x$$
$$[\![visit\ [e]]\!] = \quad \{< x, \text{var}, \text{TRUE} >\}: \text{visit}(\_, x)$$

This treatment allows examples (10) - (12), in which the trace in the antecedent is either bound differently in the target, or becomes a free variable. Webber (1978) suggests that example (11) involves an inference of the following form:

China is a country that Joe wants to visit $\Rightarrow$ Joe wants to visit China.

In her account, the inferred sentence provides the appropriate antecedent for the elliptical VP ("visit China").

A new inference schema would be required to account for example (12), since the trace refers to China in the antecedent, but India in the target. The current account provides an explanation for all three examples without any appeal to inference.

These examples suggest that, under ellipsis, traces are relatively unconstrained. This accords with the semantic treatment of a VP with a trace given here. It is difficult to imagine a syntactic identity condition, whether at a Surface Structure or Logical Form level, which would be consonant with these examples.

5.2. Reciprocals

Next, I turn to cases in which the antecedent VP contains a reciprocal. Reciprocals impose two syntactic constraints: they must be locally bound, and they require a plural subject. In the following example, the target occurs in a context where both these requirements are violated.

(13)   Irv and Martha wanted to dance with each other, but Martha couldn't, because her husband was there. (Webber 1978)

It is generally held that reciprocal expressions apply a predicate distributively (cf. Bennett (1974), Heim, Lasnik and May (1991)): in this case, the predicate is λ x.dance(x,y). The free variable y is fixed by context. The predicate for the antecedent "dance with each other" is semantically represented:

$[\![dance\ with\ each\ other\ ]\!] = \{< y, \text{var}, Q >\}: \text{dance}(\_,y)$
     (where Q requires y to be salient in context)

In example (13), this predicate is applied distributively to Irv and Martha in the source, and applied to Martha in the target, where Irv is a salient referent for the parameter y.

Now consider the following variants:

(14)   *Irv and Martha wanted to dance with each other. Susan couldn't, because her husband was there.

(15)   Irv and Martha wanted to dance. Susan couldn't, because her husband was there.

(16)   Mr. and Mrs. Smith were tango champions last year. This year Mr. Smith and Mrs. Jones were going to dance with each other. Mrs. Smith couldn't, because of a sprained ankle.

Example (14) is infelicitous, since the referent corresponding to Susan's partner is not salient. This contrasts with example (15), involving "intransitive" dance. Here, there is no requirement that the "partner" be salient. Finally, example (16) is markedly better than (14), simply because it is pragmatically clear who the partner for Mrs. Smith would be.

The syntactic constraints imposed by reciprocals are clearly not imposed under ellipsis; I have suggested that there is a pragmatic constraint that the free variable must have a salient referent. Since it is less stringent than the syntactic constraint, this constraint only becomes observable under ellipsis.

6. A Discourse Effect: Combined Antecedents

There are cases of VP ellipsis in which the antecedent is combined from two or more separate VP's. This presents a problem for a syntactic account of VP ellipsis, since there is no syntactic object consisting of the combination of two separate VP's. If antecedent properties are stored in the discourse model, as I am suggesting, the possibility of combined antecedents for VP ellipsis is not surprising. For example, it is well known that combinations of entities can become the antecedent for a plural pronoun, giving rise to the following sort of discourse rule:

$$\{x...y...\} \Rightarrow \{x...y...[x,y]\}$$

This rule has the effect of adding a combination of x and y to a discourse model containing the entities x and y, as required by examples such as the following:

(17)   **John** arrived in the morning. **Mary** arrived in the afternoon. They left together in the evening.

A similar phenomenon is found with VP ellipsis. Consider the following example:

(18)   After the symmetry between left-handed particles and right-handed anti-particles was broken by the kaons in the 1960s, a new symmetry was introduced which everybody swears is unbreakable. This is between left-handed particles **moving forwards in time**, and right-handed anti-particles **moving backwards in time** (none do, in any practical sense, but that does not worry theorists too much). *From:* The Economist, *4 August 1990, p.69. Bonnie Webber, p.c.*

The meaning of the elided VP ("none do") is, I take it, "left-handed particles don't move forwards and right-handed particles don't move backwards in time". The antecedent must therefore consist of a combination of properties associated with two VP's: "moving forwards in time" and "moving backwards in time". Such an example indicates the necessity for a rule allowing the set of properties in the discourse model to be expanded, as follows:

$$\{P...Q...\} \Rightarrow \{P...Q...[P,Q]\}$$

That is, if the discourse model contains two properties P and Q, it may also contain the property resulting from the combination of P and Q.

Another example is the following:

(19)   So I say to the conspiracy fans: **leave him alone. Leave us alone.** But they won't. *From:* The Welcomat, *5 Feb 92, p.25*

Here the meaning of the elliptical VP is: "they won't leave him alone and they won't leave us alone".

This phenomenon has been noted in the literature, in particular by Webber (1978), in which the following examples were given:

(20) a. I can **walk**, and I can **chew gum**.

b. Gerry can too, but not at the same time.

(21)   Wendy is eager to **sail around the world** and Bruce is eager to **climb Kilimanjaro**, but neither of them can because money is too tight.

Webber suggests that inference schemas may account for these examples. However, it appears that the "combining" operation which is generally available for objects in the discourse model is sufficient to account for these examples.

It remains to specify the semantics of a combined property. There are at least two possibilities: the combined property may be applied to an "ordinary" subject, or to a subject that is itself a combination.

[P,Q] x = Px AND Qx.

[P,Q] [x,y] = Px AND Qy.

Example (21), in which combined properties are applied to combined entities, is derived as follows. The elliptical VP "can" is represented as the combination of the properties denoted by "sail around the world" and "climb Kilimanjaro", and the pronoun "them" is also a combination, formed from "Wendy" and "Bruce". Ignoring the complication introduced by the quantifier "neither", the application of the combined property to the combined entity is:

[sail around the world, climb Kilimanjaro] [Wendy, Bruce] =
    sail around the world(Wendy) AND climb Kilimanjaro(Bruce)

This account predicts that a "distributed" reading of this sort is only possible when the subject and the elliptical VP both represent combined objects. This appears to be the case, as shown by the following example, in which the subject of the elliptical VP is not a combination:

(22)   I can **walk**, and I can **chew gum**. Harry and John can too.
       (can't mean Harry can walk and John can chew gum)

It is well known that semantic objects in a discourse model must sometimes be combined to serve as the antecedent for subsequent anaphoric expressions. These combining operations are clearly beyond the scope of syntactic theories, since they can operate on objects in distinct sentences. The fact that similar operations are available for VP ellipsis is therefore strong evidence that VP ellipsis cannot be treated syntactically, but rather, in terms of a semantic condition on objects stored in a discourse model.

7. Some Apparent Problem Cases

In this section, I examine two cases that appear to contradict the predictions of this approach. The first case is an example due to Sag (1976), in which it is argued that the LF identity theory rules out a sloppy reading that would be available on my approach. In the second case, it appears that material within the elided VP is subject to syntactic binding theory conditions. It has been argued that this is evidence that VP ellipsis involves syntactic reconstruction rather than a semantic identity condition.

7.1. An Unavailable Sloppy Reading

The following contrast was pointed out by Sag (1976):

(23)   John said Mary hit him, and Bill did, too.

(24)   John said Mary hit him, and Bill said she did, too.

Sag argues that, while example (23) has both a strict and sloppy reading, example (24) permits only the strict reading. This is predicted by the LF identity theory, since sloppy readings are only possible for variables that corefer with the subject. The same prediction is made by the approach of Dalrymple et al. (1991). On the current approach, both readings are permitted, since sloppy readings arise from a general interaction with the discourse model, and are not restricted to variables that corefer with the subject.

Whatever the explanation for this contrast, it cannot be explained based simply on subject coreference, as in the LF identity theory. This would also rule out the following example:

(25)   John said Mary hit him, Bill said she did, and Harry said she did.

Here, the sloppy reading is available – in fact it seems to be preferred. The following example pragmatically requires the sloppy reading, although again the sloppy pronoun does not corefer with the subject of the elided VP.

(26)   John$_i$ admitted that Mary had bribed him$_i$.

(27)   Bill$_j$ admitted that she had too. [bribed him$_j$]

Similarly the LF identity theory would rule out the following discourse:

(28)   Did anyone admit that Mary had bribed him?

(29)   JOHN admitted that she had.

On the LF theory, no reading would be possible here, since the pronoun "him" must be bound by "anyone" in the target, although it is outside of its scope.

It may be felt that these examples have a slightly artificial quality. This can perhaps be ascribed to the availability of a more concise form, in which the matrix VP is elided. In the following examples, the matrix VP cannot be elided, because contrastive stress is required within the matrix VP:

(30) a. John admitted that Mary had bribed him.

      b. Bill didn't ADMIT that she had. He implied it though.

(31) a. John admitted that Mary had bribed him.

      b. Bill didn't admit that MARY had. But he admitted that SOMEBODY had.

In these examples, only the sloppy reading is possible, and (at least to my ear) the artificiality is removed.

7.2. Apparent Binding Theory Effects

Another potential problem with a semantic identity condition relates to binding theory effects: it has been argued that binding theory effects are found under ellipsis. Given that binding theory conditions are imposed at a syntactic level, such effects could not be captured by a purely semantic identity condition. Consider the following example (Fiengo and May (1990)):

(32)   * Mary introduced John$_i$ to everyone that he$_i$ did.

The infelicity of this example can be explained, according to Fiengo and May, by appealing to the Principle C violation of its non-elliptical counterpart:

(33)   * Mary introduced John$_i$ to everyone that he$_i$ introduced John$_i$ to.

However, there are well-known examples in which binding theory conditions do not apply under ellipsis. The following are grammatical examples whose non-elliptical counterparts would be ruled out by binding theory principles:

(34)   (Principle A) Betsy couldn't imagine herself dating Bernie, but Sandy could. (Sag 1976)

(35)   (Principle B) Even if George won't, Barbara will vote for him.

(36)   (Principle C) John got to Sue's apartment before she did. (Dalrymple (1991)).

These examples show that binding theory principles do not apply indifferently to elliptical sentences and their non-elliptical counterparts, as would be expected under a syntactic identity condition. This suggests that the ungrammaticality of example (32) results from pragmatic factors specific to that example.

Consider the non-elliptical grammatical counterpart of (32).

(37)   Mary introduced John$_i$ to everyone that he$_i$ introduced HIMSELF to.

The example remains awkward, with stress on "himself" facilitating comprehension. It has frequently been observed that material requiring stress can generally not be elided. In general, surprising or "new" material cannot be elided; the fact that John had already introduced himself to people that Mary introduced him to is certainly new and surprising.

Consider the following examples:

(38)   Frank couldn't imagine Betsy$_i$ dating Bernie, but she$_i$ could.

(39)   Mary didn't consider Bill$_i$ to be the best candidate for the job, although he$_i$ did.[4]

These examples are, according to my informants, completely acceptable, although their non-elliptical counterparts violate the binding theory in the same way that (32) does. This indicates that, whatever the source of the unacceptability of (32), it is not to be explained by appealing to the binding theory, and thus, it does not constitute evidence for syntactic reconstruction.

8. Conclusions

There has been a persistent intuition that VP ellipsis involves "sameness of meaning" – in other words, it is governed by a semantic identity condition. An essential feature of meanings is that they are relativized to contexts; once this is recognized, it is possible to clearly distinguish between the predictions of a semantic identity condition and that of the LF identity theory. The LF identity theory requires that elements bound by operators outside the antecedent VP must remain bound by the same operator in the target. This ignores the possibility that the target context may differ significantly from the antecedent context, and in just such cases, the constraints of the LF theory are violated.

I have shown that a semantic identity condition, suitably formulated in a dynamic system, accounts for this phenomenon involving variables that are free in the antecedent VP. I have looked at cases involving variables in a wide variety of syntactic incarnations, including pronouns, traces, and the variables introduced in reciprocal constructions. In all of these cases, semantic identity is preserved under ellipsis, even at the expense of changes in syntactic form.

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[4]This example was suggested to me by Robert Frank.

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Department of Computer and Information Science
University of Pennsylvania
Philadelphia, PA 19104-6228
hardt@unagi.cis.upenn.edu