

# Linguistics 661, Issues in Semantics

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Neo-Davidsonian event semantics

## 1 (Neo-)Davidsonian logical forms

- The logical tradition:

(1) Brutus stabs Caesar  
 $\mapsto stab(b, c)$

- Davidson:

(2) Brutus stabs Caesar  
 $\mapsto \exists e.stab(e, b, c)$

- Neo-Davidsonian:<sup>1</sup>

(3) Brutus stabs Caesar  
 $\mapsto \exists e[stab(e) \wedge Agent(e) = b \wedge Patient(e) = c]$

## 2 The logic of VP adverbs

- The main argument for an implicit event ‘argument’—i.e. an event parameter in the logical forms, that is not expressed overtly in the surface form—is that it simplifies the semantics for a large class of VP adverbials.

Entailments of the following forms can be represented as **logical** consequences, without taking any consideration of what the adverbs **mean**:

1. S + Adverb  $\Rightarrow$  S
2. S + Adverb1 + Adverb2  $\Rightarrow$  S + Adverb2 + Adverb1

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<sup>1</sup>Parsons 1990 and his antecedent work; Higginbotham 1983, 1985, etc.; Carlson 1984; Schein 1992; Landman 2000; Pietroski 2004; and many others.

Because then the VP and the adverb can be treated as **conjoined** predicates of the same variable, so the logic of modification is just the logic of conjunction:

1.  $S(e) \wedge A(e) \Rightarrow S(e)$
2.  $S(e) \wedge A1(e) \wedge A2(e) \Rightarrow S(e) \wedge A2(e) \wedge A1(e)$

- Consider first the logic of adjectival modification—with the adjectives modifying a predicate nominal, predicated of an existentially quantified subject.

– We find a ‘diamond’ pattern of entailments:

- (4) Someone is a blonde, blue-eyed American.
- (5) a.  $\Rightarrow$  Someone is a blonde American.  
b.  $\Rightarrow$  Someone is a blue-eyed American.
- (6)  $\Rightarrow$  Someone is an American.

– The entailments only go **down** the diamond, not up:

- (7) Somebody is an American.
- (8) a.  $\not\Rightarrow$  Somebody is a blonde American.  
b.  $\not\Rightarrow$  Somebody is a blue-eyed American.
- (9)  $\not\Rightarrow$  Someone is a blonde, blue-eyed American.

– Modulo various restrictions that can arguably be put aside, the order of adjectives can be exchanged :

- (10) a. Somebody is a blonde, blue-eyed American.  
b.  $\iff$  Somebody is a blue-eyed, blonde American.

– And because the subject is **existentially** quantified:

- (11) a. Someone is a blonde American  
b. Someone is a blue-eyed American.
- (12)  $\not\Rightarrow$  Someone is a blonde, blue-eyed American.

These logical relations are easily captured if we assume that adjectives and nouns are conjoined predicates of the same variable. In particular, the entailments are simply a matter of logic; the meanings of the predicates are irrelevant.

- (13) a.  $\exists x[\textit{blonde}(x) \wedge \textit{blueeyed}(x) \wedge \textit{american}(x)]$   
 b. i.  $\Rightarrow \exists x[\textit{blonde}(x) \wedge \textit{american}(x)]$   
 ii.  $\Rightarrow \exists x[\textit{blueeyed}(x) \wedge \textit{american}(x)]$   
 c.  $\Rightarrow \exists x.\textit{american}(x)$
- (14) a.  $\exists x[\textit{blonde}(x) \wedge \textit{blueeyed}(x) \wedge \textit{american}(x)]$   
 b.  $\iff \exists x[\textit{blueeyed}(x) \wedge \textit{blonde}(x) \wedge \textit{american}(x)]$
- (15) a. i.  $\exists x[\textit{blonde}(x) \wedge \textit{american}(x)]$   
 ii.  $\exists x[\textit{blueeyed}(x) \wedge \textit{american}(x)]$   
 b.  $\nRightarrow \exists x[\textit{blonde}(x) \wedge \textit{blueeyed}(x) \wedge \textit{american}(x)]$

Notice that what blocks the entailment in (15) is the fact that the argument of the predicates is *existentially* quantified. In other circumstances, the inference goes through:

- (16) a. i. Every boy/John is a blue-eyed American.  
 ii. Every boy/John is a blonde American.  
 b.  $\Rightarrow$  Every boy/John is a blonde, blue-eyed American.

- Of course there are adjectives that **do not** work this way:

- (17) John is a fake former president.  
 a.  $\nRightarrow$  John is a former fake president.  
 b.  $\nRightarrow$  John is a fake president.  
 c.  $\nRightarrow$  John is a former president.  
 d.  $\nRightarrow$  John is a president.

For these, we will have to say that their meanings combine differently. But this gives no compelling reason to abandon our conjunctive (or intersective) model of the other adjectives.

We can still say, if we like, that all types of adjectives have the same type, say  $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$ . But then we must still recognize an important *sub*-type of that type, namely those functions in  $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$  whose meanings can be characterized conjunctively:

$$\lambda N_{\langle e, t \rangle}[A(x) \wedge N(x)]$$

- Turning now to VP adverbs, we see that a large class of them behave exactly like the (intersective) adjectives:

- (18) a. Brutus stabbed Caesar violently with a knife.  
 b. i.  $\Rightarrow$  Brutus stabbed Caesar violently.  
     ii.  $\Rightarrow$  Brutus stabbed Caesar with a knife.  
 c.  $\Rightarrow$  Brutus stabbed Caesar.

- (19) a. Brutus stabbed Caesar.  
 b. i.  $\nRightarrow$  Brutus stabbed Caesar violently.  
     ii.  $\nRightarrow$  Brutus stabbed Caesar with a knife.  
 c.  $\nRightarrow$  Brutus stabbed Caesar violently with a knife.

- (20) a. Brutus stabbed Caesar violently in the back.  
 b.  $\Leftrightarrow$  Brutus stabbed Caesar in the back violently.

- (21) a. i. Brutus stabbed Caesar violently.  
     ii. Brutus stabbed Caesar in the back.  
 b.  $\nRightarrow$  Brutus stabbed Caesar violently in the back.

And so again, we can explain these relations easily if the modifiers and the VPs are:

1. Conjoined predicates of the same variable.
2. And that variable is existentially quantified.

$$(22) \quad \exists\alpha[[\text{Brutus stabbed Caesar}](\alpha) \wedge [[\text{violently}]](\alpha) \wedge [[\text{in the back}]](\alpha) \dots]$$

- The question then is what sort of things this variable,  $\alpha$ , ranges over.

The answer that accords best both with our naive intuitions, and with further metaphysical speculations, it seems, is “events.”

- (23) a. There was an **event** of Brutus stabbing Caesar.  
 b. There was an **event** of Brutus stabbing Caesar, and it was violent.  
 c. ?? There was an **event** of Brutus stabbing Caesar, and it was in the back.

There is much discussion, of a philosophical sort, about whether this is the right answer. But of course the force of the argument from adverbs does not require that this dispute be settled.

- As with adjectives, it would be difficult to capture the observed entailment relations in some other way.

- (24)
- a.  $A(B(C(X)))$
  - b.  $\Rightarrow C(B(A(X))),$  etc.
  - c.
    - i.  $\Rightarrow A(C(X))$
    - ii.  $\Rightarrow A(B(X))$
  - d.  $\Rightarrow A(X)$

As Landman observes, we would need an unbounded scheme of meaning postulates, not over individual predicates, but over an entire class of predicates. This would seem a perverse alternative to the more elegant Davidsonian solution.

- Landman discusses one workable alternative, developed by Adam Wyner:
  1. Modifiers are added to a ‘modifier set’ in the logical form, indexed with their thematic relation; e.g.:

$$stab\langle b, c, \{\text{MANNER} : \textit{violent}, \text{INSTRUMENT} : \textit{knife}, \dots\} \rangle$$

2. We can stipulate that supersets of modifiers entail subsets:

$$(V\langle \dots, M \rangle) \wedge (N \subseteq M) \rightarrow V\langle \dots, N \rangle$$

But Landman responds that this model is inferior because it does not interact productively with parts of the grammar:

1. It fails to capture the similarity between adverbs and adjectives.
2. It predicts nothing about reference, anaphora, and quantification involving events.
3. It fails to be helpful in the theory of plurality—see Landman 2000 and Schein 1993.

### 3 Naked infinitival perception-verb complements

- A second argument for Davidsonian events is that they allow an illuminating semantics for a certain type of perceptual idiom.
- Some verbs of perception take a tenseless, and yet seemingly clausal, complement:

- (25) a. Al saw Bill smack Carl.  
b. Al felt Carl fall to the ground.  
c. Al heard Bill scream.

- The semantics of these constructions is very different from those that involve a tensed complement clause.

- (26) Al saw Bill smack Carl.  
(27)  $\neq$  Al saw that Bill smacked Carl.

– The tensed-complement case does not entail the tenseless-complement case.

- (28) a. Al saw that Bill smacked Carl.  
b.  $\not\Rightarrow$  Al saw Bill smack Carl.

– The tenseless-complement case entails ‘eyewitness’ perception.

- (29) a.  $\#$  Al saw Bill smack Carl, but he didn’t see the smacking itself.  
b. Al saw that Bill smacked Carl, but he didn’t see the smacking itself.

– The tenseless complements are referentially transparent (i.e. they allow substitution of coextensional noun phrases).

- (30) a. i. Al saw Bill smack Carl.  
ii. Bill is the president of our university.  
b.  $\Rightarrow$  Al saw the president of our university smack Carl.

- (31) a. i. Al saw that Bill smacked Carl.  
 ii. Bill is the president of our university.  
 b.  $\not\Rightarrow$  Al saw the president of our university smack Carl.

– The tenseless-complement case requires matrix scope for a quantifier in the embedded subject.

- (32) a. Al saw nobody smack Carl.  
 b.  $=$  There is no  $x$  such that Al saw  $x$  smack Carl.  
 c.  $\not\Rightarrow$  Nobody smacked Carl.

- (33) a. Al saw that nobody smacked Carl.  
 b.  $=$  Al saw that there is no  $x$  such that  $x$  smacked Carl.  
 c.  $\Rightarrow$  Nobody smacked Carl.

- So ‘naked infinitival perceptual reports’ do not express a relation to a **proposition**. They seem rather to express a relation to something more ‘concrete.’
- The referential and quantificational properties of the construction are explained if the perceptual relation is to some individual thing,  $\alpha$ , that is described by the tenseless clause.

- (34) a. Al saw Bill smack Carl.  
 b.  $\exists\alpha[saw(al, \alpha) \wedge \text{‘Al smacked Carl’ describes } \alpha]$

N.B. The perceptual relation is not a relation to the proposition that *there was* some thing described by S, but rather to some thing described by S.

- Clearly  $\alpha$  is *not* simply the individual denoted by the referent of the embedded subject:

- (35) a. Al saw Bill, and at that moment Bill smacked Carl.  
 b.  $\not\Rightarrow$  Al saw Bill smack Carl.

- Barwise and Perry argue that  $\alpha$  is a “situation,” which is a small part of a world.

- Higginbotham<sup>2</sup> argues that  $\alpha$  is rather a Davidsonian **event**.

(36)  $\exists e \exists e' [seeing(e, a, e') \wedge smacking(e', b, c)]$   
 'There is an event  $e$  of Al seeing  $e'$ , which is an event of Bill smacking Carl.'

Favoring this over the situation hypothesis is the fact that events, but not situations, are necessarily individuated by time of occurrence. We can have the same situation at two different times, but not the same event. And the perceptual reports reflect this:

(37) # On Monday Al saw Bill smack Carl, and Dan saw it on Tuesday.

- So, perceptual idioms with tenseless complements demonstrate the semantic utility of Davidsonian representations.
- Landman points to a possible problem.

(38) a. i. Al saw Bill leave.  
       ii. When Bill left, he had the documents in his briefcase.  
 b.  $\nrightarrow$  Al saw Bill leave with the documents in his briefcase.

If this judgment is correct, it is difficult to explain.

For the Davidsonian logic of adverbial modification to work, it must be that the event of Bill leaving with the documents is the same as the event of his leaving. Otherwise the following entailment could not be treated as a purely *logical* one:<sup>3</sup>

(39) a. Bill left with the documents in his briefcase.  
 b.  $\Rightarrow$  Bill left.

But if Bill's leaving is identical with Bill's leaving with the documents, how could Al see one without seeing the other?

Notice, we cannot easily appeal to intensionality, since perceptual reports otherwise appear to be referentially transparent.

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<sup>2</sup>1983. The logic of perceptual reports. *Journal of Philosophy*.

<sup>3</sup>Compare:

(1) a. There is a dog that is brown.  
 b. There is a dog.

The first sentence entails the other only because the two sentences can be verified by the *same* dog.

- Perhaps the crucial judgment is not so clear:

- (40) a. i. Did you see Al smack Carl with a ruler?  
 ii. Well, I saw him smack Carl. Did he have a ruler in his hand?  
 b. i. Yes.  
 ii. \_\_\_ Well then I saw him smack Carl with a ruler, but I didn't notice the ruler.

## 4 Reference and quantification

- The most obvious intuitive attraction of the Davidsonian theory is that we often seem to refer, with noun phrases, to the events which our verbs putatively describe:

### 1. Pronominal anaphora to events

- (41) a. Brutus stabbed Caesar.  
 b. It was violent.

### 2. Gerunds:

- (42) a. After the singing of the *Marseillaise*, they saluted the flag.  
 b.  $\iff$  After the *Marseillaise* was sung, they saluted the flag.

### 3. Control of an implicit subject.

- (43) Two cars collided, killing both drivers.

And if event-nominals actually do denote in the same domain of events that is sorted by verbs, inferences like the following would go through **on logical grounds** alone:

- (44) a. i. In every burning, oxygen is consumed.  
 $\forall e[\textit{burning}(e) \rightarrow \exists e'[\textit{consuming}(e') \wedge \textit{Theme}(e') = o]]$   
 ii. John burned wood yesterday.  
 $\exists e[\textit{burning}(e) \wedge \textit{Agent}(e) = j \wedge \textit{Theme}(e) = w]$   
 b. Hence, oxygen was consumed.  
 $\exists e'[\textit{consuming}(e') \wedge \textit{Theme}(e') = o]$

- Landman is not persuaded by the existence of nominal reference to events.

Perhaps we simply know that, if “X burned,” then there was a burning, without it being the case that “X burned” is a predicate of burnings.

$$\forall x.burned(x) \rightarrow \exists y.burning(y)$$

- On the other hand, you can be skeptical about Landman’s caution, in light of contrasts like these:

- (45) a. Two cars collided, killing both drivers.  
       ‘The collision killed both drivers.’  
 b. # I sliced the cheese, weighing 2 grams.  
       ‘The slice(s) weighed 2 grams.’

- (46) a. Brutus stabbed Caesar, and it was violent.  
 b. # I sliced the bread, and they were thin.

- Landman says that there is a “better argument” from quantification over events:

- (47) Brutus stabbed Caesar once.

This has a reading where there is one *stabbing*, not just one occasion of stabbing (or one stab-wound). The ‘one occasion’ reading is what one expect if “once” simply counted how many times the sentence was true.

- We’ll see a similar argument in Rothstein 1995:

- (48) Every time the bell rings I salivate.

- And finally, as we know, many people have productively explored the idea that adverbial quantifiers quantify over events (de Swart 1991, Herburger 2000, Nakanishi and Romero 2004, among many others), or over other event-like things (Berman 1987, von Stechow 1994):

- (49) a. Tai usually eats with CHOPsticks.  
 b. Most events of Tai eating are events of Tai eating with chopsticks.