V03-Existential Closure of Events

Course in Semantics · Ling 531 / 731
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1 Existential events

We have seen that verb phrases denote properties of events. But such is not a saturated expression. It's of type $\langle s, t \rangle$. How can we saturate it?

Davidson proposes that the event argument is bound by an existential quantifier. Thus, for (1a) we get the meaning in (2b).

(1) a. *Jen runs*.
b. $\exists e \in D_s$[runs(Jen)(e) = 1]
READ: *There is an event such that e is an event of Jen running*

This gets us the right truth conditions. It's true anytime Jen ran, and it's false if Jen didn't run. It also leads to negation easily: *Jen didn't run* is true if there is no event of Jen running.

(2) a. *Jen didn't run*.
b. $\neg\exists e \in D_s$[runs(Jen)(e) = 1]
READ: *There was no event such that e is an event of Jen running*

2 Motivations

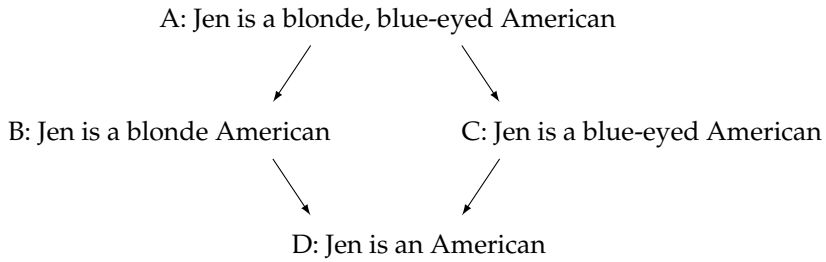
Davidson did not offer much discussion about the motivations for using existential quantifiers. He actually built off Reichenbach (1947), who basically found this idea, but did not feel the need to distinguish events from individuals. Our intuitions tell us it's right.

Parsons (1990) found much stronger motivations for existential quantifiers.[1] He looked at what are called **diamond entailments**. Look at the following entailment patterns for adjectival/nominal predicates. Take this sentence, and the predicates we can break it down to.

(3) *Jen is blonde, blue-eyed American*

Using a diamond shape, we can show the downward entailment patterns.

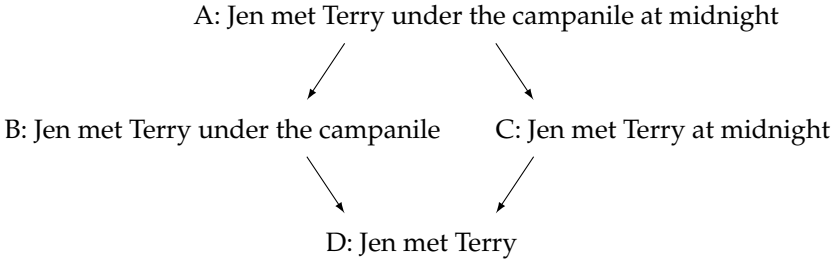
[1] There's a clear discussion of Parsons's argument in Landman (1992).



Notice how "B and C" does entail A. That is, Jen is a blonde American and Jen is a blue-eyed American entails Jen is a blonde, blue-eyed American.

But try this with adverbials and it FAILS. The diamond entailment works:

(4) *Jen met Terry under the campanile at midnight.*



But now, notice how "B and C" does not entail A.

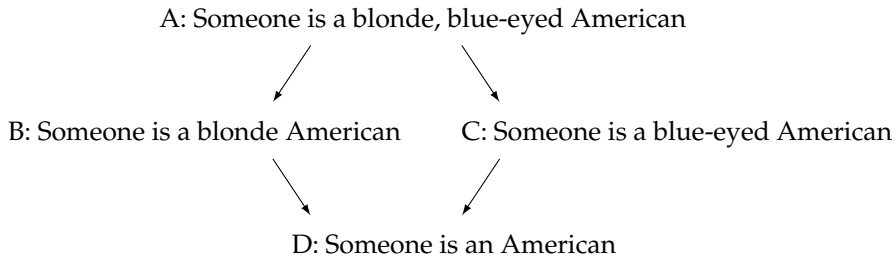
> Jen met Terry under the campanile.
>
> Jen met Terry at midnight.
>
> (FALSE:) Therefore, Jen met Terry under the campanile at midnight.

So how does that show existential quantification? It doesn't. What it shows is that we do not saturate the predicate with a referential event. The diamond entailments with adjectives involved saturating the predicate with a referential subject.

What happens when we use an existentially quantified subject with adjectives? The diamond entailment facts change!

(5) *Someone is a blonde, blue-eyed American.*

Well, the downward entailment facts work. But now, "B and C" don't entail A anymore.



Someone is a blonde American.

Someone is a blue-eyed American.

(FALSE), Therefore, someone is a blonde, blue-eyed American.

That is, if you existentially quantify over the argument that all these predicates share, the conjunction of B and C do not entail A. That applies to individuals, and Parsons's argument now emerges:

1. We don't saturate verbal predicates with referential events.
2. With diamond entailments, verbal predicates behave like nominal predicates do when the latter have an existential quantifier over the shared argument.
3. Therefore, there is an existential quantifier over the shared argument of verbal predicates.

So that's why we must existentially quantify over events in sentences.

3 Composition

Compositionally, where do we add existential quantifiers over events?

One common way, borne of the philsophical/mathematical literature, is to introduce existential quantifiers via the concept of **existential closure**. Essentially, EC 'closes off' the expression by binding certain loose variables with an existential quantifier.

(6) $P(x)$ becomes $\exists x[P(x)]$ by EC

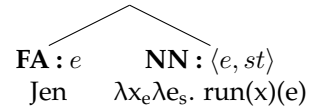
From a compositional standpoint, we can simply throw in EC like magic. That's what we'll do for now.

Of course, for an approach that links the syntax and semantics, that simply won't do. Our compositional rules don't allow so-called **unary operations** for non-terminal nodes. We could add such a rule:

(7) **Existential Closure (EC)**
If ⟦ α ⟧ is a root node of type $\langle s, t\rangle$, let ⟦ α ⟧ = ∃e ∈ D_s[⟦ α ⟧(s) = 1]

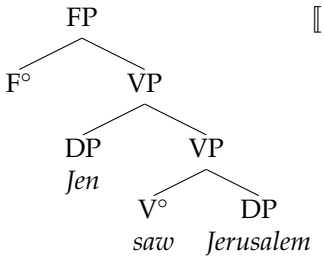
This would do the trick:

(8) **EC :** t : ∃e[run(Jen)(e) = 1]
FA : $\langle s, t\rangle$: λe ∈ D_s. run(Jen)(e)



But unary rules for non-terminal nodes are still difficult to manage or contain. We could instead propose some functional head that introduces EC. Essentially, this head would serve as an existential quantifier over events, taking ⟦ VP ⟧ as its argument for Functional Application.

(9)



⟦ F° ⟧ = λf ∈ D_{st}. ∃e[f(e) = 1] : $\langle\langle s, t\rangle, t\rangle$
λf_{st}. ∃e[f(e)] : $\langle st, t\rangle$

Of course, this will require that we propose something about the syntax; namely that there is such a functional head. (We say "functional" head because it is not introducing a 'lexical' category like noun or verb.)

What head might this be?