LING4400: Lecture Notes 12
Eventualities

Contents

12.1 Eventualities [Davidson, 1967, Bach, 1986]

We have reasons to treat **eventualities** (events and states) like entities.

1. First, we constrain them with modifiers like we constrain descriptions of entities:

   (1) a. *Etna erupted in 2021.*
   b. (entailed by 1a:) *Etna erupted.*

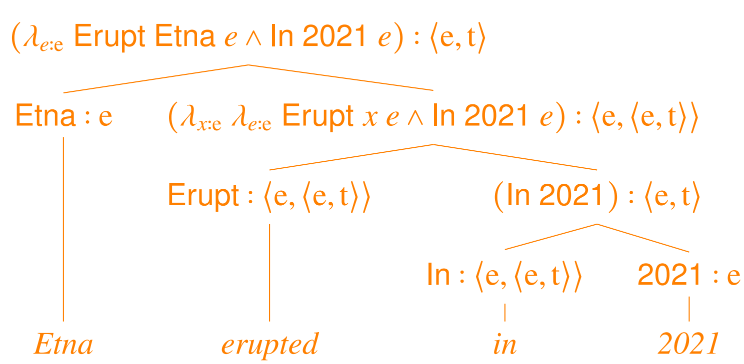
2. Second, we describe them explicitly like entities in **nominalizations**:

   (2) a. *Etna erupted in 2021.*
   b. (entails and entailed by 2a:) *An eruption of Etna was in 2021.*

This similarity is modeled by adding an argument to verbs and other predicates – type $\langle e, \langle e, t \rangle \rangle$:

$$[\![\text{Erupt}]\!]^M = [\![\lambda_{x:e}\ \lambda_{e:e}\ \text{Erupt}\ x\ e]\!]^M$$

Modifiers of these events can be composed using the schematized modifier rules:

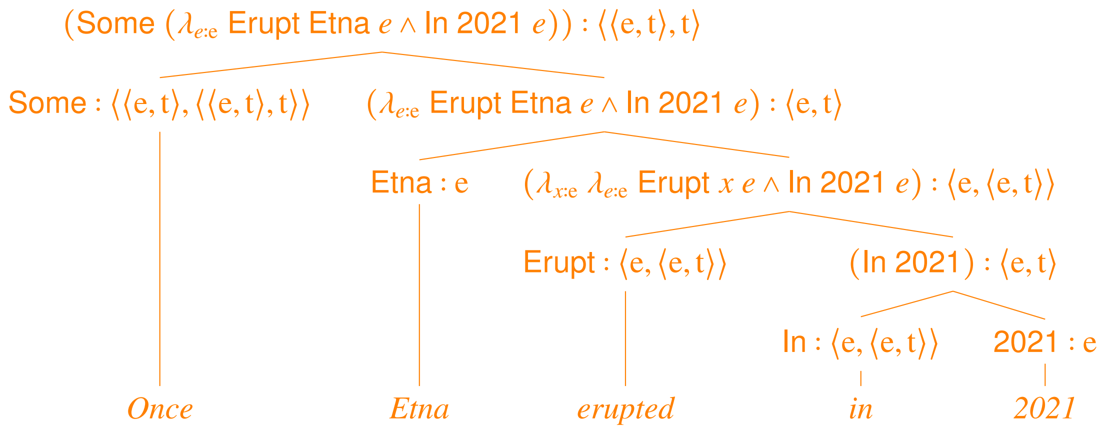


Practice 12.1: trees with rules

Label the tree for *Etna erupted in 2021* with rules.

Note that the variable e above is not quantified.

We can quantify it with an adverb *Once*, translated as Some. For example:



This extends naturally to other cardinal quantifiers: *twice* as Two, *never* as None, etc.

If we don't have an explicit quantifier, we can assume an implicit one:

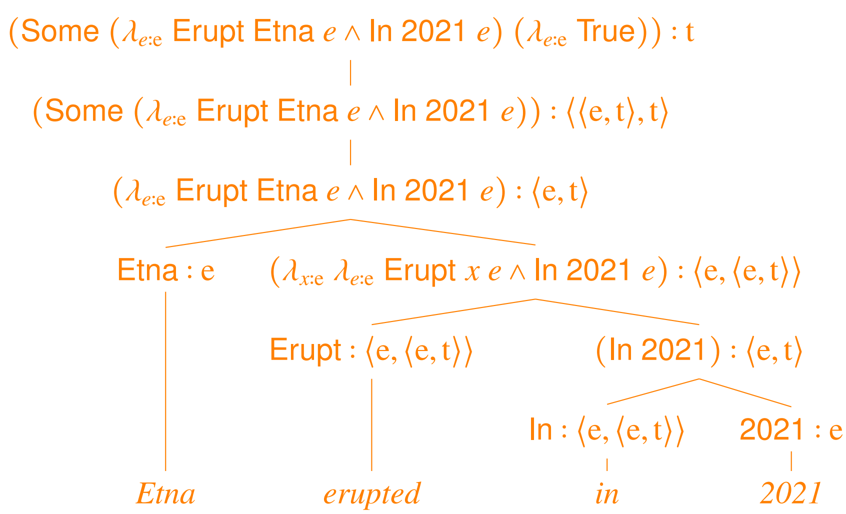
$$f : \langle e, t \rangle \quad \Rightarrow \quad (\mathsf{Some}\ f) : \langle \langle e, \gamma_n \rangle, \gamma_n \rangle \qquad \text{(Existential Closure)}$$

This is sometimes called **existential closure**.

For isolated sentences we need an additional closure operation to get a truth value:

$$g : \langle \langle e, t \rangle, t \rangle \quad \Rightarrow \quad (g\ (\lambda_{e:e}\ \mathsf{True})) : t \qquad \text{(Nuclear Scope Closure)}$$

For example:



This analysis treats quantified sentences like quantified noun phrases, for use as arguments.

Practice 12.2: trees with rules

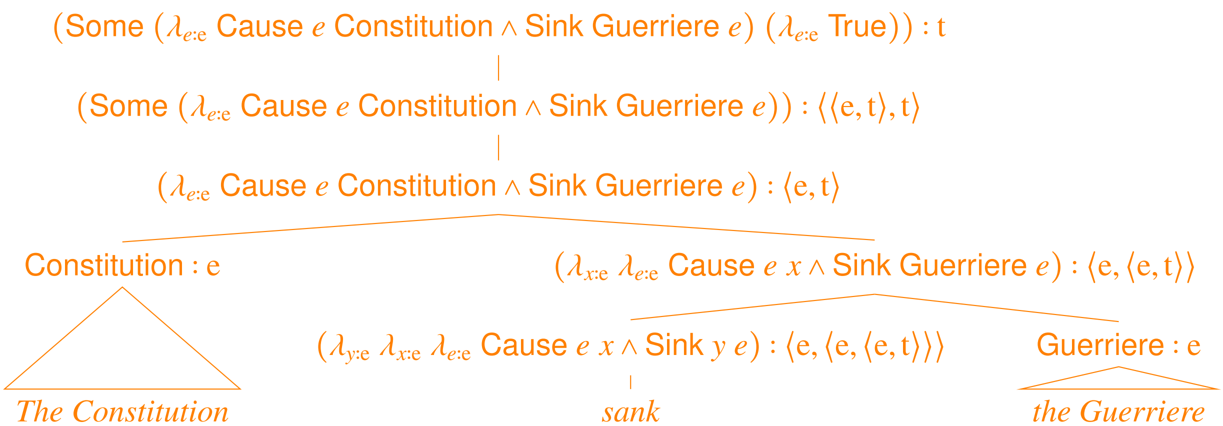
Label the complete tree for *Etna erupted in 2021* with rules.

12.2 Further decomposition (lexical semantics)

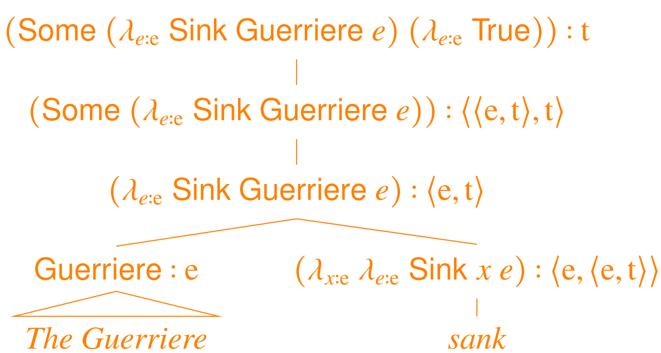
Many transitive predicates can be further decomposed into a cause and an intransitive predicate:

(3) a. *The Constitution sank the Guerriere.*
    b. (entailed by 3a:) *The Guerriere sank.*

Here's the translation:



The intransitive predicate can then occur by itself as an **unaccusative** verb:

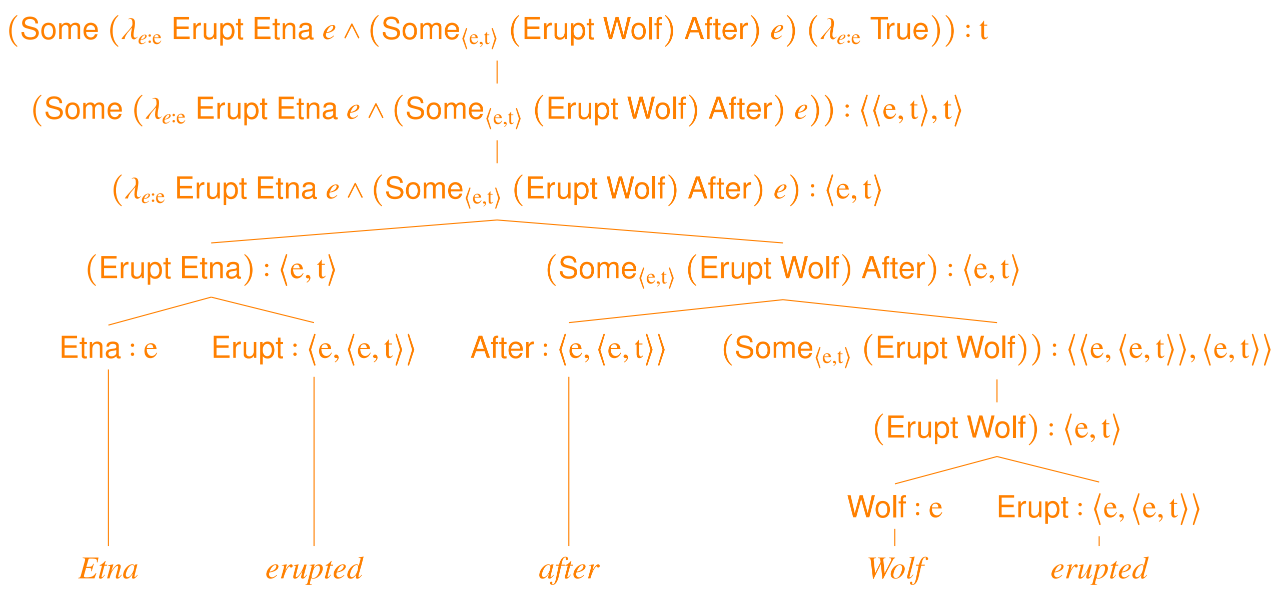


The transitive and intransitive need not be the same verb:

$$kill \Rightarrow (\lambda_{y:\mathrm{e}}\ \lambda_{x:\mathrm{e}}\ \lambda_{e:\mathrm{e}}\ \mathsf{Cause}\ e\ x \wedge \mathsf{Die}\ y\ e) : \langle \mathrm{e}, \langle \mathrm{e}, \langle \mathrm{e}, \mathrm{t}\rangle\rangle\rangle$$
$$give \Rightarrow (\lambda_{z:\mathrm{e}}\ \lambda_{y:\mathrm{e}}\ \lambda_{x:\mathrm{e}}\ \lambda_{e:\mathrm{e}}\ \mathsf{Cause}\ e\ x \wedge \mathsf{Have}\ z\ y\ e) : \langle \mathrm{e}, \langle \mathrm{e}, \langle \mathrm{e}, \langle \mathrm{e}, \mathrm{t}\rangle\rangle\rangle\rangle$$

12.3 Quantified sentences as arguments

This treatment provides a simple analysis for sentential arguments analogous to noun phrases:



Practice 12.3: trees with rules

Label the tree for *Etna erupted after Wolf erupted* with rules.

12.4 Tense

We can use eventualities to carry tense, assuming an entity Now for the beginning of the speech.

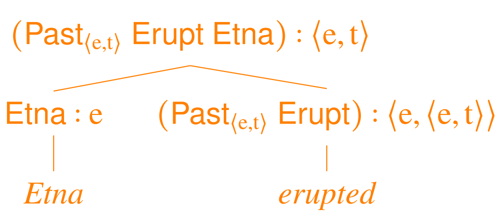
For example, here's a present tense function (schematized for use with an intransitive verb):

$$[\![\mathsf{Present}_{\langle e,t\rangle}]\!]^M = [\![\lambda_{f:\langle e,\langle e,t\rangle\rangle}\ \lambda_{x:e}\ \lambda_{e:e}\ f\ x\ e \wedge \mathsf{In}\ e\ \mathsf{Now}]\!]^M$$

And here's one for past tense, assuming Precede with its usual meaning:

$$[\![\mathsf{Past}_{\langle e,t\rangle}]\!]^M = [\![\lambda_{f:\langle e,\langle e,t\rangle\rangle}\ \lambda_{x:e}\ \lambda_{e:e}\ f\ x\ e \wedge \mathsf{Some}\ (\mathsf{In}\ e)\ (\mathsf{Precede}\ \mathsf{Now})]\!]^M$$

So here's what the translation looks like:



12.5 Non-intersective modifiers

Remember our trouble with *new capital*:

(4) a. *Beijing is a new capital.*
 b. (entailed by 4a:) *Beijing is a capital.*
 c. (**not** entailed by 4a:) *Beijing is new.*

as opposed to *coastal capital*:

(5) a. *Beijing is a coastal capital.*
 b. (entailed by 5a:) *Beijing is a capital.*
 c. (entailed by 5a:) *Beijing is coastal.*

Here's an analysis using eventualities:

$$(\lambda_{x:\mathrm{e}}\ \mathsf{Some}\ (\lambda_{e:\mathrm{e}}\ \mathsf{Capital}\ x\ e \wedge \mathsf{New}\ e)\ (\lambda_{e:\mathrm{e}}\ \mathsf{True})) : \langle \mathrm{e}, \mathrm{t}\rangle$$

$$(\lambda_{f:\langle \mathrm{e},\langle \mathrm{e},\mathrm{t}\rangle\rangle}\ \lambda_{x:\mathrm{e}}\ \mathsf{Some}\ (\lambda_{e:\mathrm{e}}\ f\ x\ e \wedge \mathsf{New}\ e)\ (\lambda_{e:\mathrm{e}}\ \mathsf{True})) : \langle\langle \mathrm{e},\langle \mathrm{e},\mathrm{t}\rangle\rangle,\langle \mathrm{e},\mathrm{t}\rangle\rangle \qquad (\lambda_{x:\mathrm{e}}\ \lambda_{e:\mathrm{e}}\ \mathsf{Capital}\ x\ e) : \langle \mathrm{e},\langle \mathrm{e},\mathrm{t}\rangle\rangle$$

new *capital*

In English, adjectives like *old* are polysemous between intersective and non-intersective:

(6) a. *Kim is an old friend of mine.*
 b. (entailed by 6a:) *Kim is old.*
 c. (entailed by 6a:) *My friendship with Kim is old.*

These meanings are distinguished using pre- or post-modifiers in Spanish and Portuguese:

(7) a. *Kim é um velho amigo.*
 b. (entailed by 7a:) *Kim is old.*
 c. *Kim é um amigo velho.*
 d. (entailed by 7c:) *My friendship with Kim is old.*

References

[Bach, 1986] Bach, E. (1986). The algebra of events. *Linguistics and Philosophy*, 9(1), 5–16.

[Davidson, 1967] Davidson, D. (1967). The logical form of action sentences. In N. Rescher (Ed.), *The logic of decision and action* (pp. 81–94). Pittsburgh: University of Pittsburgh Press.