

## Events

<http://www-rohan.sdsu.edu/~gawron/semantics>

Jean Mark Gawron

San Diego State University, Department of Linguistics

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# Outline

- 1 NeoDavidsonian representations
- 2 Event predicates
- 3 Events and thematic roles
- 4 Further evidence for events

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Marcia quickly shoved Clive into the cupboard.

[I am REJECTING the text book's distinction between "selected argument" and "unselected argument" (LOCATION in 33c and 33d)]

shoving event

$$\exists e[\text{SHOVE}(e) \ \& \ \text{AGENT}(m, e) \ \& \ \text{PATIENT}(c, e) \ \& \\ \text{INTO}(\text{the cupboard}, e) \ \& \ \text{QUICKLY}(e)]$$

# Neodavidsonian event

Marcia took the book from Clive.

taking event

$$\exists e[\text{TAKE}(e) \ \& \ \text{AGENT}(m, e) \ \& \ \text{PATIENT}(\text{the book}, e) \ \& \ \text{FROM}(c, e)]$$

Clive broke some clods up roughly with a shovel.

breaking-up event

$$\exists e [\text{BREAK UP}(e) \& \text{AGENT}(c, e) \& \\ \text{PATIENT}(c, e) \& \text{WITH}(y, e) \& \text{ROUGHLY}(e)]$$

## Quantified NPs, too

Suppose we translate the last example again, treating *some clods* as a quantified NP the way we did in Chapter 3. Then we'd have:

$$\begin{aligned} &\exists x [\text{CLODS}(x) \& \\ &\quad \exists e [\text{BREAK UP}(e) \& \text{AGENT}(c, e) \& \\ &\quad \quad \text{PATIENT}(x, e) \& \text{WITH}(s, e) \& \text{ROUGHLY}(e)]] \end{aligned}$$

And now ALSO translating *a shovel* as a quantified NP:

$$\begin{aligned} &\exists y [\text{SHOVEL}(y) \& \\ &\quad \exists x [\text{CLODS}(x) \& \\ &\quad \quad \exists e [\text{BREAK UP}(e) \& \text{AGENT}(c, e) \& \\ &\quad \quad \quad \text{PATIENT}(x, e) \& \text{WITH}(y, e) \& \text{ROUGHLY}(e)]] \\ &\quad ] \\ &] \end{aligned}$$

# A sudden fall

The tree will fall suddenly.

Falling event

$$\exists e[\text{FALL}(e) \ \& \ \text{PATIENT}(t, e) \ \& \ \text{SUDDENLY}(e)]$$



# Perception verb: embedded event

Marcia saw<sub>e</sub> [<sub>S</sub> Clive punch<sub>e'</sub> John].

seeing event

$$\exists e, e' [ \text{SEE}(e) \& \text{EXPERIENCER}(m, e) \& \text{STIMULUS}(e', e) \& \\ \text{PUNCH}(e') \& \text{AGENT}(c, e') \& \text{PATIENT}(j, e') ]$$

# Emotion verb: nominalized embedded event

[NP Kennedy's assassination<sub>e'</sub>] shocked<sub>e</sub> America.

past shocking event

$$\exists e, e' [ \text{SHOCK}(e) \& \text{EXPERIENCER}(\text{America}, e) \& \text{STIMULUS}(e', e) \& \text{ASSASSINATION}(e') \& \text{PATIENT}(\text{kennedy}, e') ]$$

The embedded event is **nominalized**. Other sentences and the translation of the assassination event we might use.

- That Kennedy was assassinated shocked America.
- It shocked America that Kennedy was assassinated.
- $\exists e' [ \text{ASSASSINATION}(e') \& \text{PATIENT}(\text{kennedy}, e') ]$

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## stealing silently away

- a. The Bedouin stole silently away.
- b. \* The Bedouin stole.
- c. The Bedouin stole away.

*steal away* a verb-  
particle

### stealing away event

$$\exists e, t[\text{STEAL AWAY}(e) \& \text{AGENT}(\text{the bedouin}, e) \& \text{SILENTLY}(e)]$$

- a. John woke up in a foul mood.
  - b. John was in a foul mood.
- a. entails b.  
*in a foul mood* a predicate on John!

## wakening event

$\exists e[\text{WAKE UP}(e) \ \& \ \text{AGENT}(\text{john}, e) \ \& \ \text{IN-FOUL-MOOD}(\text{john})]$

# leaning heavily

- a. Horace leaned heavily on the counter.
- b. Horace was on the counter.

Does (a) entail (b)?

past leaning event

$$\exists e, t[\text{LEAN}(e) \ \& \ \text{AGENT}(\text{horace}, e) \ \& \ \text{HEAVILY}(e) \ \& \ \text{ON}(\text{the-counter}, e)]$$

# spontaneously combusting

- a. Marcia spontaneously combusted.
- b. Marcia was spontaneous                      Does (a) entail (b)?
- c. Marcia's combustion was spontaneous.    Does (a) entail (c)?

## combusting event

$\exists e [\text{COMBUST}(e) \ \& \ \text{PATIENT}(\text{marcia}, e) \ \& \ \text{SPONTANEOUSLY}(e) ]$

# Willing instruction

- a. Jones willingly instructed Clive.
- b. Jones was willing (to instruct Clive). Does (a) entail (b)?
- c. Clive was willing (to be instructed by Jones). Does (a) entail (c)?

## Instruction event

$\exists e [\text{INSTRUCT}(e) \ \& \ \text{AGENT}(\text{Jones}, e) \ \& \ \text{PATIENT}(\text{clive}, e) \ \& \ \text{WILLING}(\text{jones}, e) ]$



# Willing instruction

- a. Clive was willingly instructed by Jones.
- a'. Clive was instructed willingly by Jones.
- b. Jones was willing (to instruct Clive). Does (a/a') entail (b)?
- c. Clive was willing (to be instructed by Jones). Does (a/a') entail (c)?

## Instruction event

$\exists e [\text{INSTRUCT}(e) \ \& \ \text{PATIENT}(\text{Clive}, e) \ \& \ \text{AGENT}(\text{jones}, e) \ \& \ \text{WILLING}(\text{clive}, e) ]$

# interview over coffee

c. Anita interviewed Barry over coffee

b. Anita was over coffee

Does (a) entail (b)?

c. Barry was over coffee

Does (a) entail (c)?

## past leaning away event

$$\exists e [\text{INTERVIEW}(e) \ \& \ \text{PATIENT}(\text{Barry}, e) \ \& \ \text{AGENT}(\text{Anita}, e) \\ \text{OVER-COFFEE}(e) ]$$

# Outline

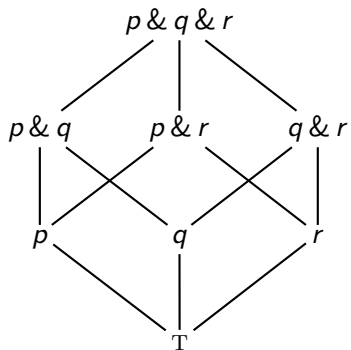
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# Order entailments

Brutus stabbed Caesar violently in the back.

- a.  $\Rightarrow$  Brutus stabbed Caesar in the back violently.
- b.  $\Rightarrow$  Violently Brutus stabbed Caesar in the back.

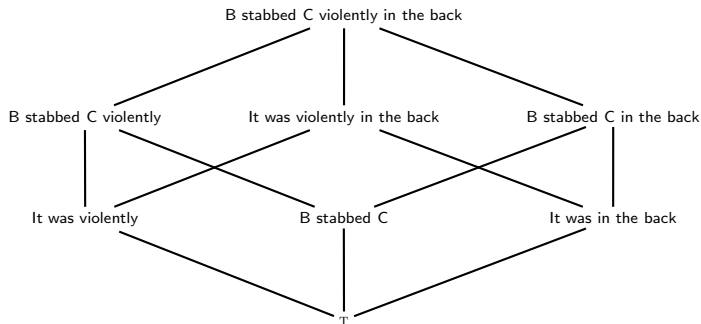
# Diamond entailments I



# Diamond entailments II

- Brutus stabbed Caesar violently in the back
- a.  $\Rightarrow$  Brutus stabbed Caesar violently.
    - i.  $\Rightarrow$  Brutus stabbed Caesar.
  - b.  $\Rightarrow$  Brutus stabbed Caesar in the back.
    - i.  $\Rightarrow$  Brutus stabbed Caesar.

# Diamond entailments



# Explaining the entailment patterns

- a. B. stabbed C. violently in the back.
- b.  $\llbracket B \text{ stabbed } C \rrbracket(\alpha) \ \& \ \llbracket \text{violently} \rrbracket(\alpha) \ \& \ \llbracket \text{in the back} \rrbracket(\alpha)$

Both diamond entailments and order entailments are explained!

Let's call  $\alpha$  an event! The meaning of an untensed clause is a property of an **event**. For example  $\llbracket Brutus \text{ stab } Caesar \rrbracket$  is the property that's true of event  $e$  if and only if

$$\text{STAB}(e) \ \& \ \text{AGENT}(\text{Caesar}, e) \ \& \ \text{PATIENT}(\text{Caesar}, e)$$

At least some adverbials are also properties of events. For example,  $\llbracket \text{violently} \rrbracket$  is that property that an event  $e$  has if and only if

$$\text{VIOLENTLY}(e)$$



# In the marketplace

[[Brutus stabbed Caesar in the marketplace.]]	$\exists e[ \text{STAB}(e) \& \text{AGENT}(b, e) \& \text{PATIENT}(c, e) \& \text{IN}(\text{the marketplace}, e) ]$
[[Brutus did something.]]	$\exists e[ \text{AGENT}(b, e) ]$
[[Brutus did something to Caesar.]]	$\exists e[ \text{AGENT}(b, e) \& \text{PATIENT}(c, e) ]$
[[Something happened to Caesar.]]	$\exists e[ \text{PATIENT}(c, e) ]$
[[There was a stabbing in the marketplace.]]	$\exists e[ \text{STAB}(e) \& \text{IN}(\text{the marketplace}, e) ]$
[[Something happened to Caesar in the marketplace.]]	$\exists e[ \text{PATIENT}(c, e) \& \text{IN}(\text{the marketplace}, e) ]$

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# Event verbs: Perception

- a. Zabruder saw<sub>e</sub> [<sub>S</sub> Oswald shoot<sub>e'</sub> Kennedy.].
- b. Zabruder saw<sub>e</sub> [<sub>S</sub> Kennedy shot<sub>e'</sub> by Oswald.].

## Seeing event

$$\exists e, e' [ \text{SEE}(e) \& \text{EXPERIENCER}(z, e) \& \text{STIMULUS}(e', e) \& \text{SHOOT}(e') \& \text{AGENT}(o, e') \& \text{PATIENT}(k, e') ]$$

# Quantification over events I

- a. Everything John does is crazy.
- b. Most of what happens to Marcia is funny.
- c. Clive isn't going to do anything for Marcia.
- d. Something awful is going to happen.

①  $\llbracket X \text{ does something} \rrbracket = \exists e \text{ AGENT}(X, e)$

②  $\llbracket \text{Something happens to } Y \rrbracket = \exists e \text{ PATIENT}(Y, e)$

③  $\llbracket \text{Something happened} \rrbracket = \exists e \dots$

# Quantification over events II

- a. Everything John does is crazy.
- b. Most of what happens to Marcia is funny.
- c. Clive isn't going to do anything for Marcia.
- d. Something awful is going to happen.
- ①  $\forall e \text{ AGENT}(j, e) \rightarrow \text{CRAZY}(e)$
- ②  $[\text{MOST } e \text{ PATIENT}(m, e)] \text{ FUNNY}(e)$
- ③  $\neg \exists e \text{ AGENT}(c, e) \& \text{ BEN}(m, e)$
- ④  $\exists e \text{ AWFUL}(e)$

# Where downward entailment comes from

Since:  $p \Rightarrow q$   
then  $\neg q \Rightarrow \neg p$

Since: I saw a white dog.  $\Rightarrow$  I saw a dog.  
then: I didn't see a dog  $\Rightarrow$  I didn't see a white dog.

Since: Clive is going to buy flowers for Marcia  
 $\Rightarrow$  Clive is going to do something for Marcia.  
then: Clive isn't going to do anything for Marcia  
 $\Rightarrow$  Clive is not going to buy flowers for Marcia.

# Diamond entailments and negation

Our account of diamond entailments thus brings along for free an account of certain entailments under negation, **provided they follow the following pattern.**

Since  $\exists e P(e) \& Q(e) \& R(e) \Rightarrow \exists e P(e) \& Q(e)$   
then  $\neg \exists e P(e) \& Q(e) \Rightarrow \neg \exists e P(e) \& Q(e) \& R(e)$

Since  $\exists e [ \text{BUY-FLOWERS}(e) \& \text{AGENT}(c, e) \& \text{BEN}(m, e) ]$   
 $\Rightarrow \exists e [ \text{AGENT}(c, e) \& \text{BEN}(m, e) ]$   
then  $\neg \exists e [ \text{AGENT}(c, e) \& \text{BEN}(m, e) ]$   
 $\Rightarrow \neg \exists e [ \text{BUY-FLOWERS}(e) \& \text{AGENT}(c, e) \& \text{BEN}(m, e) ]$

## Exercise 4, p. 254

$\neg \exists e [ \text{AGENT}(c, e) \& \text{BEN}(m, e) ]$

$\Rightarrow \neg \exists e [ \text{BUY-FLOWERS}(e) \& \text{AGENT}(c, e) \& \text{BEN}(m, e) ]$

$\Leftrightarrow \neg \exists e [ \exists x [ \text{FLOWER}(x) \& \text{BUY}(e) \& \text{PATIENT}(x, e) ] \& \text{AGENT}(c, e) \& \text{BEN}(m, e) ]$

$\Rightarrow \neg \exists e \exists x [ \text{PENCIL}(x) \& \text{SHARPEN}(x) \& \text{AGENT}(c, e) \& \text{BEN}(m, e) \& \text{PATIENT}(x, e) ]$

$\Rightarrow \neg \exists e [ \text{SING}(e) \& \text{AGENT}(c, e) \& \text{BEN}(m, e) ]$