# Krifka's Theory of NPIs

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# Overview

- A theory of *semantics* and *pragmatics*
- Building on Kadmon & Landman and Zwarts

# Coverage

Data

- anything, any + N, at all, ever, a drop (minimal entities)
- PPIs: tons of, rather
- Presuppositional: already

Contexts

- sentence negation, negated NPs
- generally, propositions on implicational scales
- interrogatives, double negation

# In a nutshell

- Nothing special to the meaning:
- ⟦ anything ⟧ = ⟦ any thing ⟧ = ⟦ a thing ⟧
- “any” introduces alternatives

# Alternative semantics

The semantic framework captures alternatives.

- The meaning of each node in LF is a triple $< B, F, A >$
- background, foreground, alternatives
- The meaning of a sentence is: B(F)
- Its alternatives are all B(F') with F' $\in$ A
- The rules for functional application abstract over the focus
  - $\alpha(< B, F, A >) =< \lambda X[\alpha(B(X))], F, A >$
  - $< B, F, A > (\beta) =< \lambda X[B(X)(\beta)], F, A >$

# anything

- $\langle B, thing, \{P|P \subset thing\}\rangle$
- exhaustivity: the alternatives make up the foreground
  $\cup\{P|P \in thing\} = thing$
- object “anything”
  $\langle \lambda Q \lambda R \lambda i \lambda x \exists y[Q_i(y) \wedge R_i(x, y)], thing, \{P|P \subset thing\}\rangle$

# A lengthier calculation

- $[\![$ Mary $]\!] = \lambda P \lambda i[P_i(m)]$
- $[\![$ saw $]\!]$ = saw
- .....
- $[\![$ Mary say anything $]\!] = \lambda i \exists y[thing_i(y) \wedge saw_i(m, y)]$
- $[\![$ Mary didn't see anything $]\!] = \lambda i \neg \exists y[thing_i(y) \wedge saw_i(m, y)]$

Both sentences have a well-defined semantics.

# In a nutshell

Why are semantically valid sentences ungrammatical?
$\Rightarrow$ When trying to intersect them with the common ground, the latter is reduced to the empty set due to a conflict between the meaning of a sentence and its implicatures.

# Grice's principles

Pragmatic effects usually don't lead to ungrammaticality. The closest one gets is a violation of a principle. Speakers tell the truth,

- the full truth (quantity)
- and nothing but the truth (quality)
- but only what is relevant[1]
- and they avoid ambiguity

Krifka makes use of all four. The first two receive a formal treatment.

[1] see Hitch Hiker's Guide To The Galaxy

# Assert Operator

- update of the common ground c by asserting a proposition p (= B(F)): $c \cap p$
- informative: $c \cap p \neq c$
- not contradictory: $c \cap p \neq \emptyset$
- There are alternatives: $\exists p' : c \cap p \neq c \cap p'$
- Each such alternative
  - is either wrong
  - or the speaker lacks evidence for it

This still renders “Mary saw anything” valid.

# Scalar Assertion

"There are 3 students in the room."

- Excludes less than 3 students semantically, and more than 3 pragmatically (quantity)
- The number of students forms a scale
- The according propositions are on a implicational scale

# Scalar Assert Operator

- applicable if on a scale
- $\forall F' \in A : [c \cap B(F')] \subseteq [c \cap B(F)] \vee [c \cap B(F)] \subseteq [c \cap B(F')]$
- **scal.assert**$(< B, F, A >)(c) = \{i \in c | i \in B(F)$
  $\wedge \neg \exists F' \in A[[c \cap B(F')] \subset [c \cap B(F)] \wedge i \in B(F')]\}$
- read: the common ground is restricted to those worlds in which
  - the proposition is true
  - and no stronger alternative is true

# Scalar Assertion, applied to anything

"Mary saw anything"

- alternatives imply "thing" → scale
- meaning under **scal.assert**: Mary saw a thing, but no (particular) thing
- contradiction, common ground is empty

"Mary didn't see anything"

- meaning: Mary saw no thing, and no stronger alternative is true
- "no thing" is already strongest

# something — a PPI?

Compare “anything” to “something”, wrt to negation scope:

- “don’t see anyone”
  - $\neg\exists$: correct
  - $\exists\neg$: impossible because of alternatives
- “don’t see someone ”
  - $\exists\neg$: correct
  - $\neg\exists$: anyone preferred (ambiguity avoidance)

# Emphatic ANYthing

"Mary didn't get ANYthing (at ALL)!"

- as opposed to "nothing"
- $\langle B, \mathit{thing}, \{P | P \subset \mathit{thing} \wedge \neg \mathit{min}(P)\}\rangle$
- minimal alternatives excluded
- non-exhaustivity: the union of the alternatives is smaller than the foreground
  (and makes up what would be meant by "nothing")

# Emphatic Assertion

- first version of **emph.assert** in terms of likelihood
- second version on implicational scales
- assertable if strictly strongest:
- $[c \cap B(F)] \subset \cap\{c \cap B(F') | F' \in A\}$
- weak NPIs cannot be asserted emphatically
- on the contrary, strong NPIs are not exploited by **scal.assert**
- thus ruled out by the principle of relevance

# Emphatic Assertion, applied to ANYthing

"Mary got ANYthing"

- $< \lambda Q \lambda i \exists y [Q_i(y) \wedge get_i(m, y)], thing, \{P | P \subset thing \wedge \neg min(P)\} >$
- **emph.assert** now says:
  Mary got a thing $\rightarrow$ Mary got all kinds of stuff (except minimal alternatives).
- Obviously not.

# What determines the grammaticality?

- Ungrammaticality of misplaced NPIs follows from pragmatics
- More precisely, from formalized Gricean principles
- Such sentences implicate, what they deny
- The common ground would get empty