

Semantic Theory

week 12 – Current issues in semantic theory

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Semantic Theory

Topics covered in this course:

Predicate logic - Type Theory - Lambda Calculus - Generalised Quantifiers - Event Semantics - Plurals and Mass Nouns - Dynamic Semantics - Discourse Representation Theory - Presuppositions



formal semantics

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Open questions

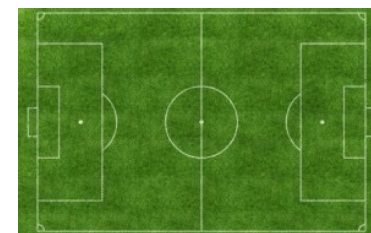
I. What is meaning?

Truth-conditions vs. context-change potential
vs. answering the Question Under Discussion



II. Which phenomena should be captured by a semantic formalism?

Syntax vs. Semantics vs. Pragmatics



III. How to validate predictions from formal semantic theories?

Experimental approaches, Computational Semantics



Communication as question-answering



The Goal of communication: to determine what the world is like.

But: an exhaustive characterisation of the current state of the world – “The Big Question” (Roberts, 1996) – is too big a task

- What makes certain issues more important to us than others has to do with our goals
- Therefore, we establish certain subgoals, which take the form of issues to be resolved or Questions Under Discussion (QUDs)
- Content that addresses the QUD is called *at-issue* content; all other content is *not at-issue*



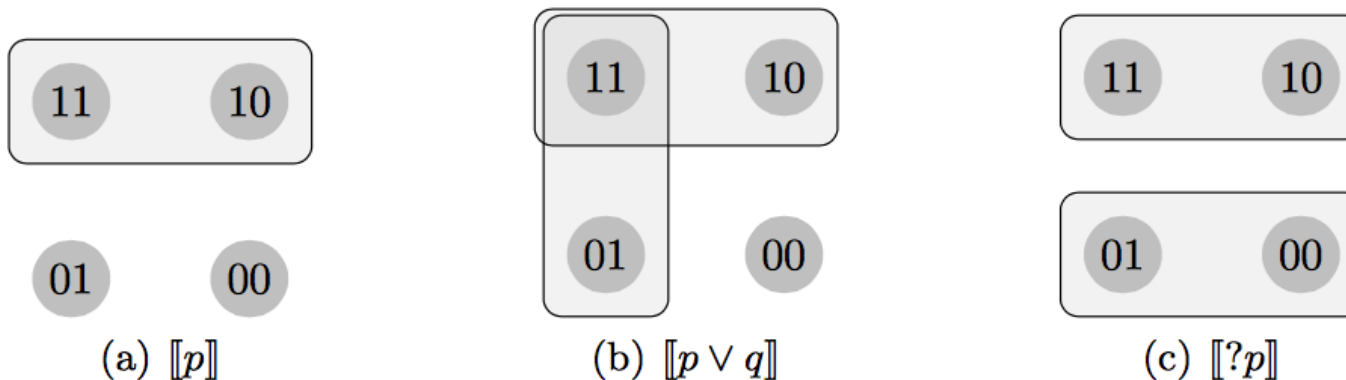
Inquisitive semantics

“Meaning is Information *EX*change Potential”

(1) $\llbracket \text{John plays} \rrbracket^{M,w,g} := \{\lambda v. \text{play}(\text{John})(v)\} :: \langle s, t \rangle$

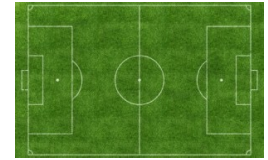
(2) $\llbracket \text{John or Bill plays} \rrbracket^{M,w,g} := \{\lambda v. \text{play}(\text{John})(v), \lambda v. \text{play}(\text{Bill})(v)\}$

(3) $\llbracket \text{Does John play?} \rrbracket^{M,w,g} := \{\lambda v. \text{play}(\text{John})(v), \lambda v. \neg \text{play}(\text{John})(v)\}$



(Groenendijk, 2009; Groenendijk & Roelofsen, 2009)

Defining the playing field of semantic theory



What can/should be captured in a semantic formalism?

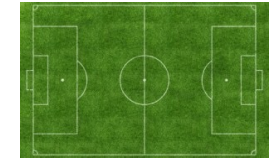
The syntax-semantics interface:

- quantification, anaphora, tense and aspect, thematic roles, ...

The semantics-pragmatics interface:

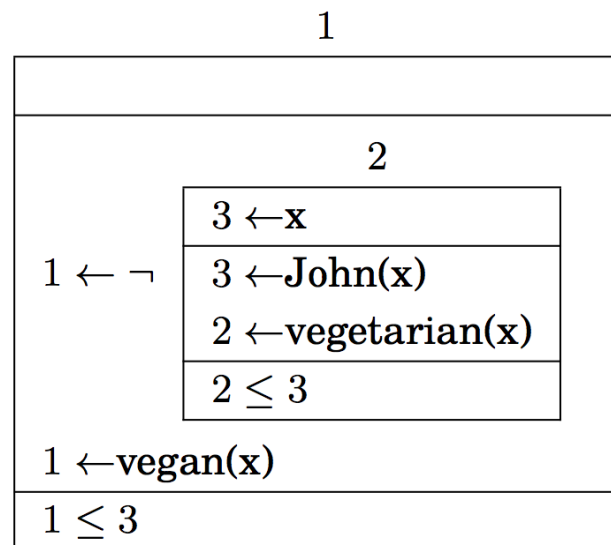
- anaphora (again!), presuppositions, implicatures, rhetorical structure, ...

Beyond truth-conditional meaning: Projection

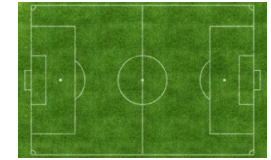


Projective Discourse Representation Theory: DRT with information structure

Toward a unified & unidimensional treatment of projection
(*presuppositions, anaphora, and conventional implicatures*)

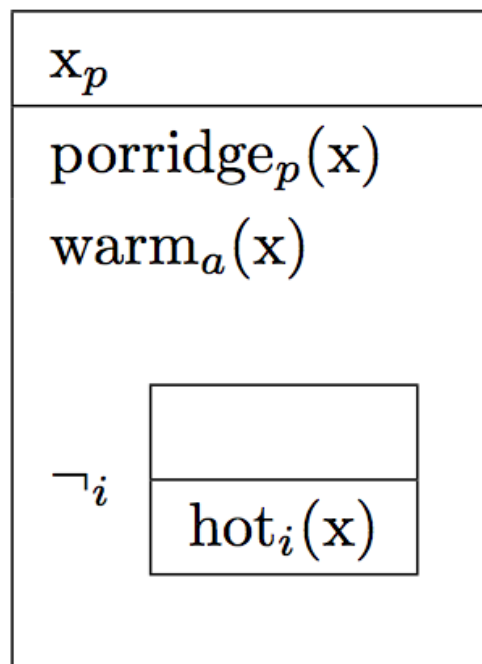


Beyond truth-conditional meaning: Implicature

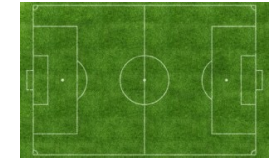


- (1) a. The porridge is warm. As a matter of fact, it is hot.
b. ?The porridge is warm. As a matter of fact, it is cold.

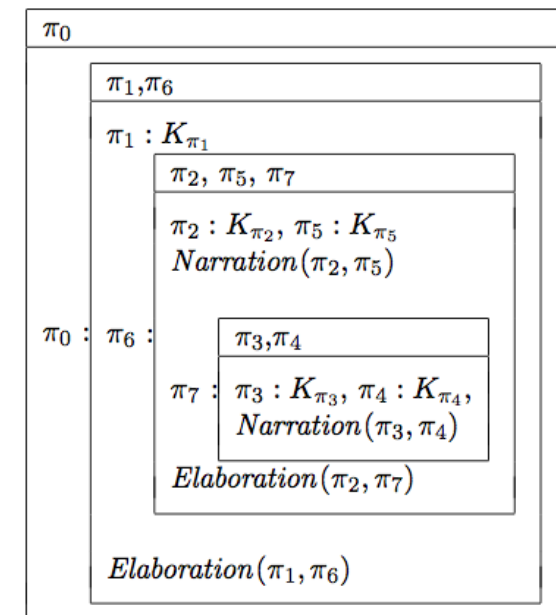
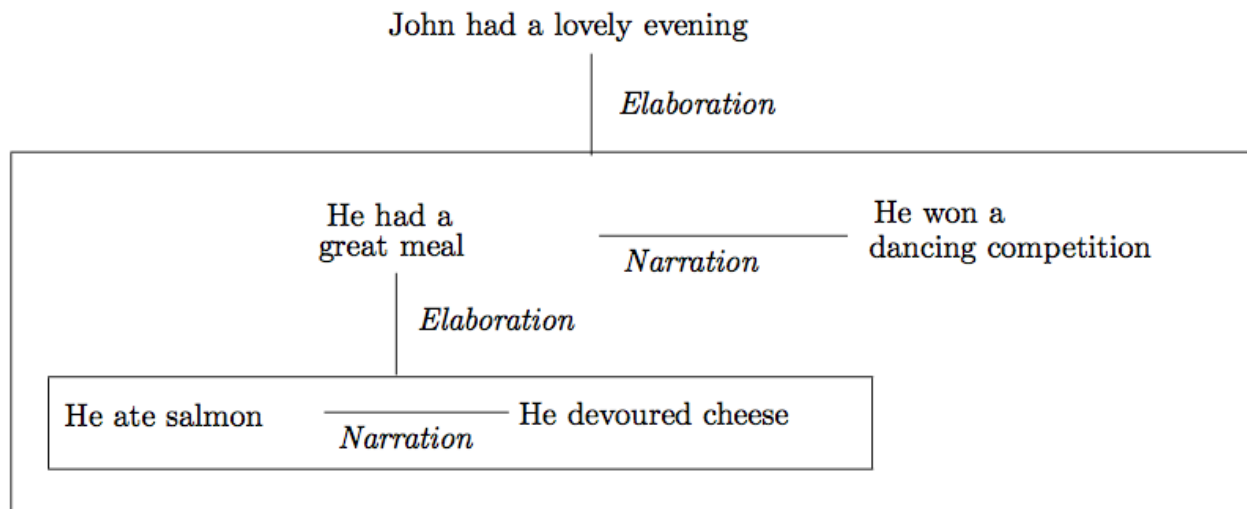
Layered DRT: DRT with multiple layers of meaning



Beyond truth-conditional meaning: Rhetorical Structure



(1) *John had a great evening last night. He had a great meal. He ate salmon. He devoured lots of cheese. He won a dancing competition. ??It was a beautiful pink.*



Segmented DRT: DRT with discourse relations

(Asher, 1992; Asher & Lascarides, 2003)

Formal semantics in the real world

How to apply and evaluate formal linguistic theories?

⇒ Testing predictions from formal semantic theories using psycholinguistic methods (questionnaires, eyetracking, EEG)

- Geurts et al (2010); Chemla et al (2011); Florian Schwarz (ed., 2015), ...

⇐ Using implementations of semantic formalisms to perform large-scale computational semantic analyses

- PDRT-Sandbox (Brouwer & Venhuizen, 2013)
- Boxer (Bos, 2008)
- The Groningen Meaning Bank (Basile et al., 2013; Bos et al., 2015)

Groningen Meaning Bank

Corpus of semantically annotated texts – with (P)DRSs!

k0 : x2 x4 x6 x8 x10 x11 x13 e14 t16 x17 e18 e19 p20

named(x2, u.s., loc)
 ambassador(x2)
 named(x4, vatican, loc)
 to(x2, x4)
 support(x6)
 named(x8, catholic_church, org)
 of(x10, x8)
 push(x10)
 for(x6, x10)
 more(x11)
 religious(x11)
 freedom(x11)
 named(x13, china, loc)
 in(x11, x13)
 for(x6, x11)
 voice(e14)
 Agent(e14, x2)
 Topic(e14, x6)
 now(t16)
 x17 = t16
 e18 > x17
 e14 > e18
 say(e19)
 Cause(e19, x2)
 Topic(e19, p20)
 p20:

□ x23 e25 t16 t26 x28

named(x23, beijing, loc)
 cooperate(e25)
 Agent(e25, x23)
 openly(e25)
 more(e25)
 now(t16)
 e25 < t26
 t16 < t26
 named(x28, holy_see, org)
 with(e25, x28)

k29 : x30 x2 e32 p33 t16 t34

ambassador(x2)
 with(x30, x2)
 named(x30, francis_rooney, per)
 say(e32)
 Cause(e32, x30)
 Topic(e32, p33)
 p33:

x11 x36 x38 e40 t16 x41 t42 p43

male(x11)
 named(x36, church, org)
 of(x38, x36)
 mission(x38)
 support(e40)
 Experiencer(e40, x11)
 Stimulus(e40, x38)
 now(t16)
 x41 = t16
 t42 > x41
 e40 > t42
 p43:

x45 x46 x13 e47

greater(x45)
 liberty(x45)
 catholic(x46)
 named(x13, china, loc)
 in(x46, x13)
 for(x45, x46)
 secure(e47)
 Cause(e47, x11)
 Theme(e47, x45)

now(t16)
 e32 < t34
 t34 < t16

k48 : x50 x52 x53 x55 x13 p57 e58 t16 t59

announcement(x50)
 president(x53)
 with(x52, x53)
 named(x52, bush, per)
 of(x55, x52)
 trip(x55)
 named(x13, china, loc)
 where(x13, p57)
 p57:

x52 x23 p61 e62 t16 t63

male(x52)
 named(x23, beijing, loc)
 p61:

x65 x66 x67 x68 x69 e70

greater(x65)
 x66 < x65
 x67 < x65
 social(x66)
 freedom(x66)
 x68 < x67
 x69 < x67
 political(x68)
 freedom(x68)
 religious(x69)
 freedom(x69)
 allow(e70)
 Agent(e70, x23)
 Theme(e70, x65)

urge(e62)
 Agent(e62)
 Recipient(e62)
 now(t16)
 e62 < t63
 t63 < t59

to(x55, x13)
 follow(e58, x50)
 Agent(e58, x50)
 Theme(e58, x50)
 now(t16)
 e58 < t59
 t59 = t16

k71 : x73 e75 p76 t16 x77 e78

named(x73, pope_benedict, per)
 say(e75)
 Cause(e75, x73)
 Topic(e75, p76)
 p76:

x73 e80 x81 x13 x82 e83 x84 t16 t85 t16 t86

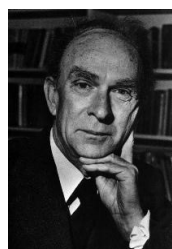
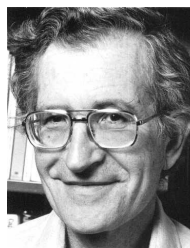
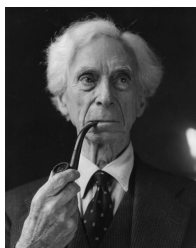
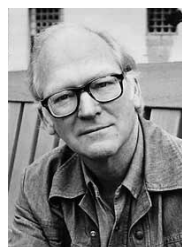
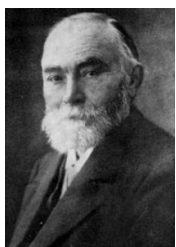
male(x73)
 interested(e80)
 theme(e80, x73)
 diplomatic(x81)
 tie(x81)
 named(x13, china, loc)
 x13 = x82
 sever(e83)
 Theme(e83, x82)
 timex(x84, +1951XXXX)
 in(e83, x84)
 now(t16)
 e83 < t85
 t85 < t16
 with(x81, x13)
 re-establishing(e80, x81)
 now(t16)
 e80 < t86
 t86 = t16

now(t16)
 x77 = t16
 e78 > x77
 e75 > e78

continuation(k0, k29)
 continuation(k29, k48)
 continuation(k48, k71)
 continuation(k71, k87)



Semantic Theory: from past to present (and future?)



But first... the exam!

- The date for the final exam is: July 30, 10am
- You can (have to!) register for the exam: until tomorrow (15.07)
- You can find a practice exam at:
http://noortjejoost.github.io/teaching/ST15/practice_exam.pdf
(NB: you can skip Exercise 3 — not part of this year's materials)
- An example of the exam materials is given at:
http://noortjejoost.github.io/teaching/ST15/exam_materials.pdf
(Again, you can ignore the parts about Cooper Storage)
- Next Thursday: Q&A. Take a look at the practice exam, previous exercises, and the slides — **Prepare questions!**