

Semantic Theory

week 13 – 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 - Dynamic
Semantics - Discourse Representation Theory -
Presuppositions - Distributed Situation-State Space



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

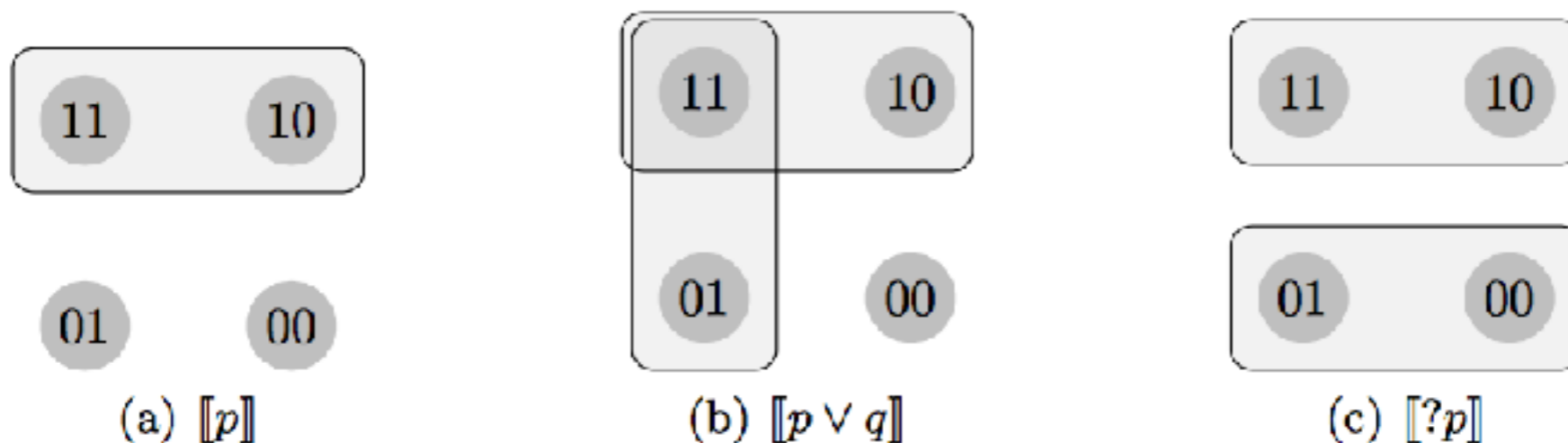


“Meaning is Information EXchange Potential”

(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, ...

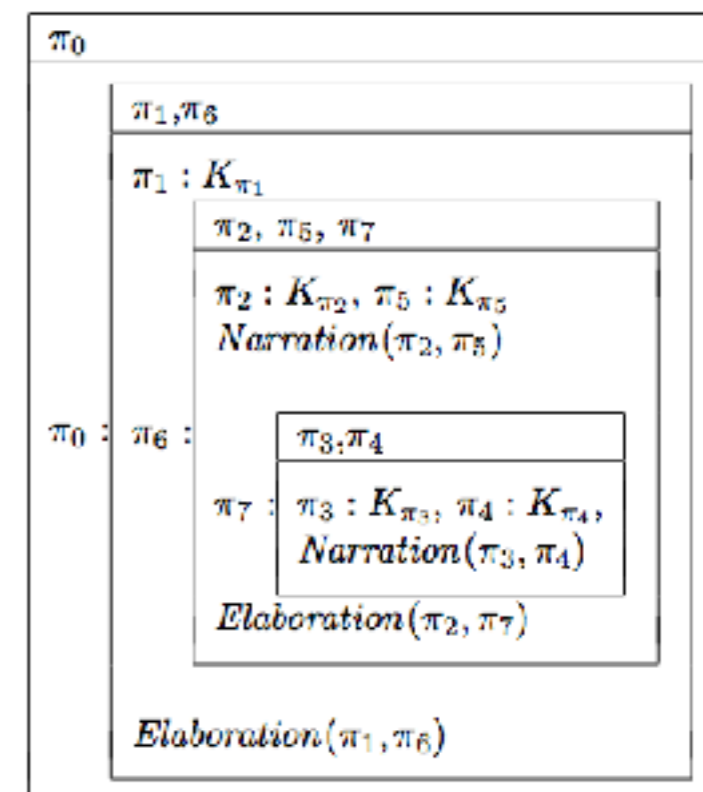
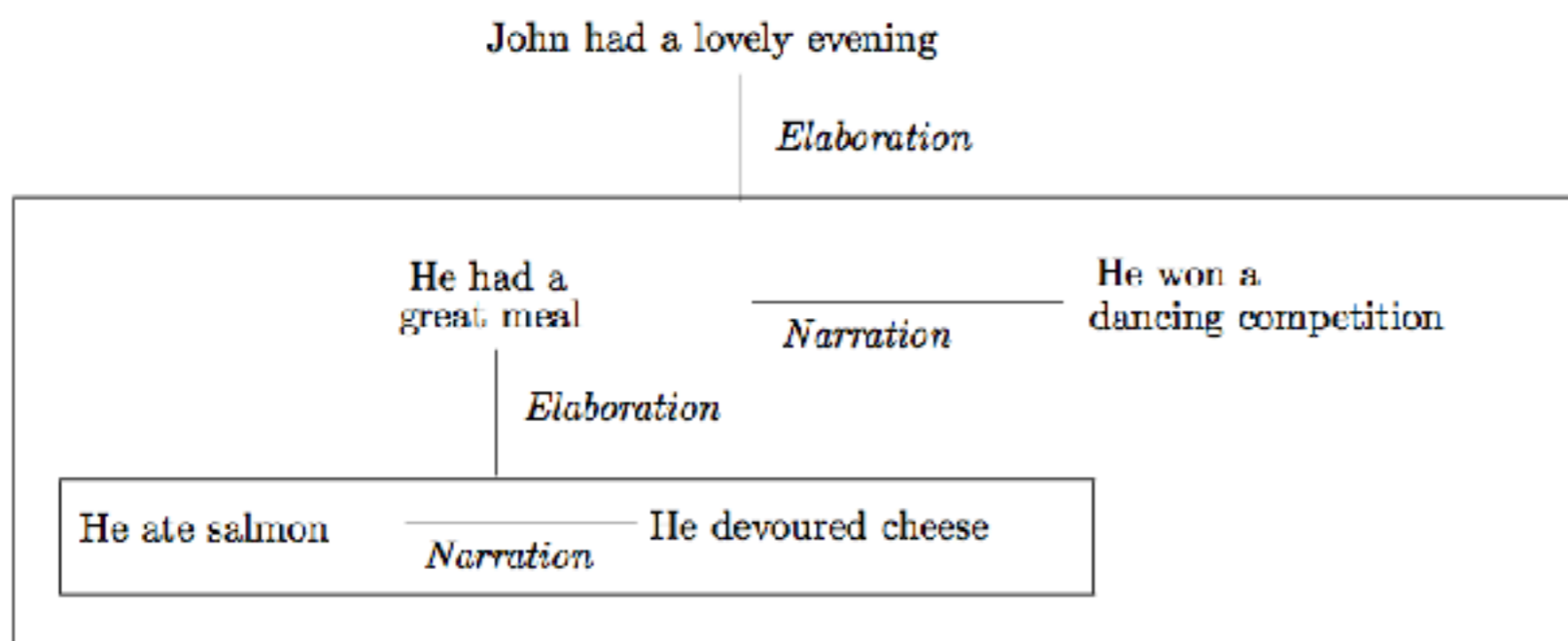
The semantics-pragmatics interface:

- rhetorical structure, implicature, presuppositions, information structure, ...

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

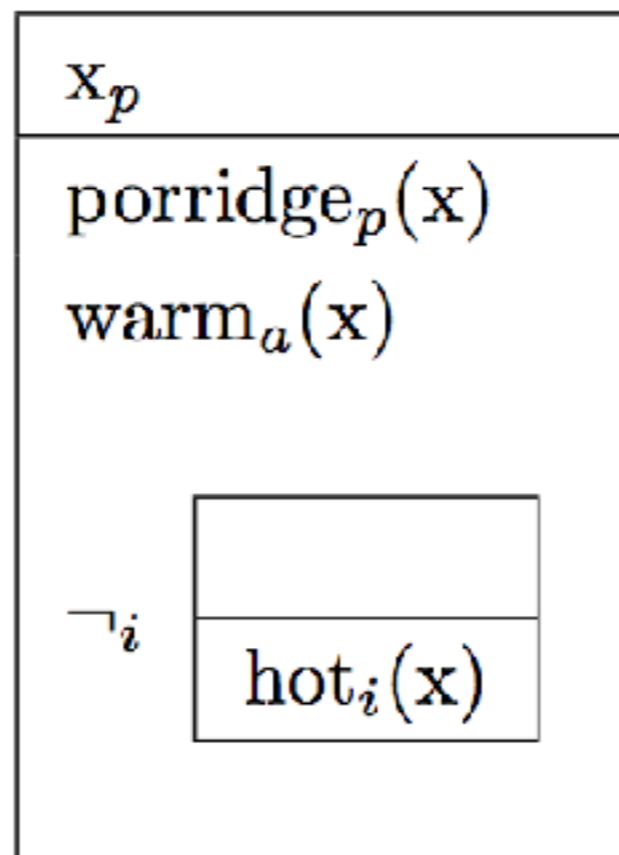
(Asher, 1992; Asher & Lascarides, 2003)

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: Information structure



- (1) John has a sister. He visits her every week. → **assertion**
- (2) John visits his sister every week. → **presupposition**
- (3) John, who has a sister, visits her every week → **conventional implicature**

Projective Discourse Representation Theory (PDRT): DRT with information structure



PDRT provides a unified, unidimensional treatment of asserted and projected content (including: presuppositions, anaphora, and *conventional implicatures*)

Formal semantics in the real world

How to apply and evaluate formal linguistic theories?

⇒ Testing predictions from formal semantic theories using psycholinguistic methods (questionnaires, eye-tracking, 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

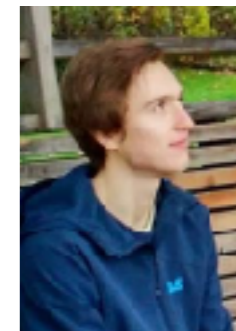


Corpus of semantically annotated texts – with (P)DRSs!

<p>k0: x2 x4 x6 x8 x10 x11 x13 e14 t1E x17 e1E e19 p20</p> <p>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) freenom(x11) named(x13, china, loc) in(x11, x13) for(x6, x11) voice(x14) Agent(x14, x?) Topic(x14, xE) now(t1E) x17 = t1E e18 > x17 e14 < e1E eay(e1E) Cause(e19, x2) Topic(e19, p20) p20: x23 e25 t1E t2E x2E named(x23, bc(hg, loc) cooperate(x25) Agent(x2?, x23) open(x25) more(e25) now(t1E) e25 < t2E t1E < t2E named(x28, holy_see, org) with(x2?, x28)</p>	<p>k29: x30 x2 e32 p33 t1E t34</p> <p>ambassador(x2) with(x30, x2) named(x30, frank_money, per) eay(e32) Cause(e32, x30) Topic(e32, p33) p33: x11 x35 x38 e40 t1E x41 t42 p43</p> <p>male(x11) named(x35, church, org) of(x35, x38) mission(x38) support(e40) Experiences(e40, x11) Stimulus(e40, x38) now(t1E) x41 = t1E t42 > x41 e40 = t42 p43: x45 x45 x13 t47</p> <p>greater(x45) liberty(x45) catholic(x46) named(x13, china, loc) in(x46, x13) for(x45, x46) secure(e47) Cause(e47, x11) Theme(e47, x45)</p> <p>now(t1E) e32 < t34 t34 < t1E</p>	<p>k48: x50 x52 x53 x55 x13 p57 e58 t1E t59</p> <p>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 p51 e52 t1E t59</p> <p>place(x52) named(x23, bc(hg, loc) p51: x55 x55 x67 x68 x69 u70</p> <p>greater(x55) x66 < x55 x67 < x55 x68 < x55 x69 < x55 politics(x68) freedom(x68) religion(x69) freedom(x69) allow(e70) Agent(e70, x23) Theme(e70, x55)</p> <p>like(e52) Agent(e52) Recipient(e52) now(t1E) e52 < t59 t59</p> <p>to(x55, x) follow(x55) Agent(e55) Theme(e55) now(t1E) e58 < t59 t59 = t1E</p>	<p>k71: x73 e75 p76 t1E x77 e78</p> <p>named(x73, pope_benedict, per) say(e75) Cause(e75, x73) Topic(e75, p76) p76: x73 e80 x81 x13 xE2 eE3 xE4 t1E t35 t1E t3E</p> <p>male(x73) interest(e80) theme(e80, x73) diplomatic(xE1) to(xE1) named(x13, china, loc) x13 = x82 seven(e83) Theme(e83, x82) time(xE4, t1E to tXXX) in(e83, xE4) now(t1E) eE3 < t85 t85 < t1E with(x81, x13) re-establishing(e80, x81) now(t1E) e78 < t85 t85 = t1E</p> <p>now(t1E) x77 = t1E e78 > x77 e75 < t78</p>
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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: **Thursday July 27, 10am (sharp!)**
- You can (have to!) register for the exam: until tomorrow (12.07)
- You can find a practice exam at:
http://noortjejoost.github.io/teaching/ST17/practice_exam.pdf
- An example of the supplementary materials is given at:
http://noortjejoost.github.io/teaching/ST17/exam_materials.pdf
- Next Thursday: Q&A. Take a look at the practice exam, previous exercises, and the slides — **Prepare questions!**

Links

- Groningen Meaning Bank:
<http://gmb.let.rug.nl>
- Groningen Meaning Bank Web Demo:
<http://gmb.let.rug.nl/webdemo/demo.php>