LOT Winter school 2008

Questions and beyond: day 1

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7-11 January 2008

Day-to-day program

Day 1 Introduction to question semantics;

Day 2 The pragmatics of questions and answers: relevance and exhaustification (Katrin Schulz):

(1) a. Who called?
b. John and Mary. ($\Rightarrow$ and nobody else)

(2) a. Where can I buy an Italian newspaper?
b. At the station. ($\not\Rightarrow$ and nowhere else)

Day 3 The dynamics of questions and focus:

(3) Who is wise?
a. SOCRATES is wise.
b. #SOCRATES swims.
c. #Socrates is WISE.

Day-to-day program

Day 4 Identity and concealed questions:

(4) a. John knows *the price of milk*.
b. John knows what the price of milk is.

Day 5 Indefinites, free choice and questions:

(5) Variety of indefinites: *a*, *some*, *any*, ...

(6) Free choice:
a. Any woman may fall.
b. Any woman who tried to jump fell.
c. #Any women fell.

Day 1: Introduction to question semantics

- Three traditions:
  - Proposition set theory; (Hamblin/Karttunen)
  - Partition semantics (e.g. Groenendijk & Stokhof);
  - Structured meaning account (e.g. Ajdukiewicz, vStechow, Krifka, Ginzburg).
- Comparison:
  - Proposition sets *vs* partitions;
  - Structured meanings *vs* proposition sets/partitions.

Literature

Jeroen Groenendijk and Martin Stokhof (1997): Questions. In J. van Benthem and A. ter Meulen (eds.), *The Handbook of Logic and Language*, Elsevier. Sections 4 and 6.

Additional readings

- On proposition sets *vs* partitions:

  Irene Heim (1994). Interrogative semantics and Karttunen semantics for *know*. In R. Buchalla and A. Mittwoch (eds) 'Proceedings of IATL 1':128–144.

- Structured meanings *vs* proposition sets:

  Manfred Krifka (2001). For a structured meaning account of questions and answers (revised version), in C. Fery & W. Sternefeld (eds.), Audiatur Vox Sapientia. A Festschrift for Arnim von Stechow, Akademie Verlag (= studia grammatica 52), Berlin 2001, 287-319.

Additional readings

- A recent overview:

  Paul Hagstrom (2003). *What questions mean*. Glot International 7(7/8):188-201.

- A recent volume:

  M. Aloni, P. Dekker and A. Butler (eds). (2007) *Questions in Dynamic Semantics*. Crispi Publications.

What is a question?

- **Syntax**: sentence with distinctive features: word order, *wh*-pronouns, ... $\mapsto$ *interrogative sentence*

(7)
a. Is it raining? [polar (*yes-no*) interrogative]
b. Who called? [constituent (*wh*-) interrogative]
c. Who ate what? [multiconstituent interrogative]

- **Pragmatics**: act in a dialogue or discourse, request to provide information; $\mapsto$ *interrogative act*

(8)
a. Please, tell me why there is something rather than nothing. [interrogative act]
b. Who lifted a finger to help you? [no interrogative act]

- **Semantics**: abstract object denoted by an interrogative sentence, content of an interrogative act.

What do interrogatives mean?

- Classical view on meaning (Wittgenstein 1922):
  - Semantic content of a sentence $\mapsto$ its *truth conditions*;
  - To know the meaning of a sentence is to know the conditions under which the sentence is true.
- But non-declarative sentences lack truth conditions:

(9) a. Who closed that door?
b. Kill Bill!

Meaning of non-declarative sentences: standard solution

- **Interrogatives** (Hamblin 1958):
  - Semantic content of interrogatives $\mapsto$ *answerhood conditions*;
  - To know the meaning of an interrogative is to know what counts as an answer to the expressed question.
- **Imperatives** (Hamblin 1987):
  - Semantic content of imperatives $\mapsto$ *compliance conditions*;
  - To know the meaning of an imperative is to know what has to be true for the command expressed by the imperative to be complied with.

Defining questions in terms of their answers

- Some answer types:

(10) Who called?

a. **Positive**: John called/Sue called/...
b. **Exhaustive**: Only John called/Only Sue called/...
c. **Constituent**: John/Sue/...
d. #The sun is shining today

- Different traditions take different answer types as central:
  - **Proposition set theories** $\mapsto$ possible/true *positive* answers
  - **Partition theories** $\mapsto$ *exhaustive* answers
  - **Structured meaning theories** $\mapsto$ *constituent* answers

Plan of today

Review these three traditions focusing on two debates:

- Proposition sets *versus* partitions: strong and weak exhaustivity, quantificational variability, mention some readings;
- Proposition sets/partitions *versus* structured meanings: term answers, embedded questions and focus.

Proposition set theory: Hamblin (1973)

- Hamblin's question denotation: set of its **possible** positive answers;
- Examples:

(11) Constituent question:

a. Who called?

b. {that John called, that Bill called, that Mary called, that Sue called, ...}

(12) Polar question:

a. Did Mary call?

b. {that Mary called, that Mary didn't call}

- Karttunen narrows down the set of propositions picked out by the question to just the true ones.

Proposition set theory: Karttunen (1977)

- Karttunen's question denotation: set of its **true** positive answers in w
- Examples: suppose only Mary and Sue called in w.

(13) a. Who called?
b. {that Mary called, that Sue called}

(14) a. Did Mary call?
b. {that Mary called}

- Motivation: embedded uses of question where true answers are involved rather than possible ones.

(15) Who is elected depends on who is running.

(16) John knows who called.

Karttunen on *know*

- You stand in the *know* relation to a question iff you believe all the true positive answers to the question:

(17) Know$(x)(Q)(w)$ iff x believes $\cap Q_K(w)$ in w

a. $Q_K(w)$: set of all true answers to Q in w;

b. $\cap Q_K(w)$: conjunction of all true answers to Q in w. ($answer_1$)

- Suppose only Mary and Sue called:

(18) a. John knows who called $\Leftrightarrow$

b. John believes that Mary called and that Sue called

Karttunen: problems

- Karttunen captures **weak exhaustivity**:

(19) a. John knows who called & Mary called. ⇒
b. John knows that Mary called.

- But, serious problems if $Q_K(w)$ is empty;
- And **strong exhaustivity** not accounted for:

(20) a. John knows who called & Mary didn't call. ⇒
b. John knows that Mary didn't call.

- K instead wrongly predicts the validity of:

(21) Only Sue called. And John believes that Sue and Mary called. Thus John knows who called.

The partition theory (G&S 84)

- Question denotation in w (*extension*):

  its true **exhaustive** answer in w, i.e. a single proposition

  (22) Who called? (suppose only Mary and Sue called in w)
  a. $Q_K(w)$: {that Mary called, that Sue called}
  b. $Q_{G\&S}(w)$: That only Mary and Sue called

- Question meaning (*intension*):

  set of its possible exhaustive answers, i.e. a **partition** of the logical space

G&S on *know*

- Under Karttunen to know who called meant to believe all the true answers to the question, under G&S it means to believe its unique true exhaustive answer.

(23) Know$(x)(Q)(w)$ iff x believes $Q_{G\&S}(w)$ in w

- Suppose only Mary and Sue called:

(24) a. John knows who called $\Leftrightarrow$
b. John believes that only Mary and Sue called

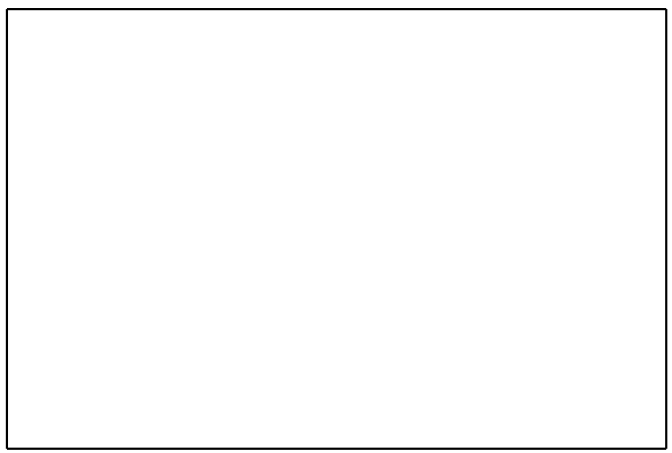
- G&S predict the following to be equivalent:

(25) a. John knows who called $\Leftrightarrow$
b. John knows who didn't call

- And therefore capture **weak and strong exhaustivity**.

Questions partition the logical space

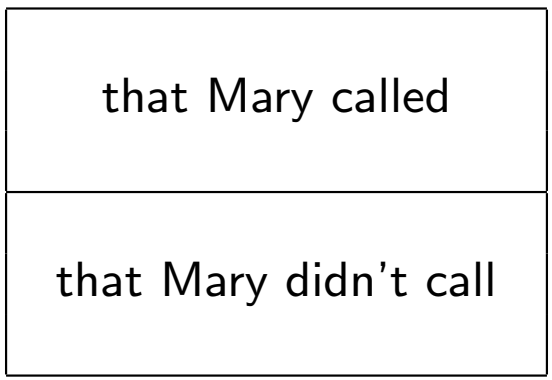
Partitions $\mapsto$ set of mutually exclusive and jointly exhaustive propositions



the logical space

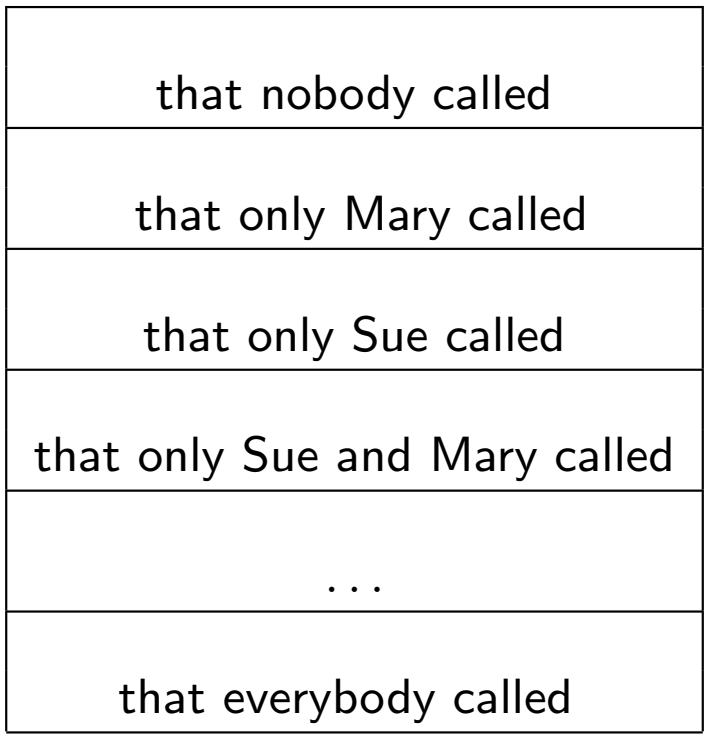
The partition determined by a polar question

(26) Did Mary call?



The partition determined by a constituent question

(27) Who called?



Exhaustive and partial answers

- Questions partitions the logical space;
- *Exhaustive answers* are cell in these partitions;

(28) a. Who called?
b. Nobody called/Only Mary called/Only Sue called/ . . . /Everybody called

- *Partial answers* rule out at least one of these cells.

(29) a. Who called?
b. Mary called/Sue called/ . . .
c. Mary didn't call/Sue didn't call/ . . .

Equivalence and entailment

- Two questions are *equivalent* iff they determine the same partition of logical space:

(30) a. Is it raining? $\equiv$ Isn't it raining?
b. Who called? $\equiv$ Who didn't call?

- Q_1 *entails* Q_2 iff every exhaustive answer to Q_1 entails an exhaustive answer to Q_2:

(31) Who called? $\models$ Did anyone call?, Did Mary call?

(32) a. Will Bea come to the workshop and to the party?
b. Will Bea come to the workshop?

(33) a. $?p \wedge ?q \models ?p$
b. $?(p \wedge q) \not\models ?p$

G&S: too strong?

- Partitions: logically appealing;
- But G&S's predictions have been criticized as being too strong;
- We will focus on three arguments:
  1. Embedding verbs other than *know*;
  2. Quantificational variability;
  3. *Mention some* readings.

Question embedding verbs

- *Know* seems to require G&S exhaustive answers:

(34) a. John knows who called. $\Leftrightarrow$
b. John knows who didn't call.

- Others verbs seems to require Karttunen answers (Heim 94):

(35) a. It surprised me who called. $\not\Leftrightarrow$
b. It surprised me who didn't call.

- Puzzling variety of attitude verbs (Égré 2007):

(36) a. J knows that/whether M called.
b. J believes that/# whether M called.
c. J wonders whether/#that M called.

(37) a. J knows who called/whether M called.
b. It surprised me who called/# whether M called.

Quantificational variability effect (QVE)

- Quantificational adverbs seem to be able to quantify over some part of an embedded question (Berman 1991):

(38) a. Sue rarely remembers what she got for her birthday.
b. For few things that Sue got for her birthday, Sue remembers that she got them for her birthday.

(39) a. Mary mostly knows who cheated.
b. For most people who cheated, Mary knows that they cheated.

(40) a. Mary mostly wonders who cheated.
b. #For most people who cheated, Mary wonders that they cheated.

- Cf. quantificational variability of indefinites (Kamp, Heim):

(41) a. A student usually/rarely watches TV.
b. Most/few students watch TV.

Quantificational variability effect (QVE)

- Two standard analyses:

(42) Mary mostly knows who cheated.

a. Most(x) : [x cheated][Mary knows that x cheated]
[Berman 91]

b. Most(p) : [p is a true answer to 'who cheated?']
[Mary knows that p] [Lahiri 02]

- QVE hard to account if questions denote exhaustive answers.

Last challenge: Mention-some readings

- The following examples have been taken to show that questions are not even weakly exhaustive:

  (43) a. John knows where to buy an Italian newspaper.
  b. Mary told me how to get to the train station.

  True even if J/M not able to provide a complete list.
- More on this tomorrow.

Two reactions to these challenges

- A flexible approach (Heim 1994, Beck & Rullman 1999):
  - Start with Hamblin/Karttunen question denotation;
  - In terms of K/H define exhaustive answers (ANS_2) as a derived notion.

(44) a. $ANS_1(Q, w) = \cap Q_K(w)$ (from Heim)

b. $ANS_2(Q, w) = \lambda w'[ANS_1(Q, w) = ANS_1(Q, w')]$

(But things go wrong if Q_K is empty, and with *which* interrogatives)

- A different strategy (G&S 1993, Kratzer 2005)
  - Start with G&S question denotations;
  - but implemented within a dynamic semantics or a situation/event semantics.

The structured meaning approach

- Questions denotation: functions that when applied to the meaning of the answer yield a proposition.
- Examples:

(45) Q: Who smokes? A: Mary.

a. Q: $\lambda x[\mathbf{smoke}(x)]$

b. A: m

c. Q(A): $\lambda x[\mathbf{smoke}(x)](m) = \mathbf{smoke}(m)$

(46) Q: Does Mary smoke? A: Yes/No.

a. Q: $\lambda f[f(\mathbf{smoke}(m))]$

b. A: $\lambda p[p]/\lambda p[\neg p]$

c. Q(A): $\lambda f[f(\mathbf{smoke}(m))](\lambda p[p]) = \mathbf{smoke}(m)$
$\lambda f[f(\mathbf{smoke}(m))](\lambda p[\neg p]) = \neg\mathbf{smoke}(m)$

Comparison structured meanings *vs* propositions

- One argument in favor of the structured meaning account:

  term (constituent) answers;

- And one problem:

  No uniform category for questions, therefore difficulties with **embedding and coordination**:

  (47) John knows whether there will be a party, who has been invited and who will dance with whom.

- Related debate in focus semantics: structured meaning accounts *vs* Rooth's alternative semantics (Rooth 1996).

Term answers: constituent questions

- The structured meaning account provides a ready account of the following facts:

(48) Who called? a. Mary. $\Rightarrow$ a′. Mary called.

(49) Who didn't call? a. Mary. $\Rightarrow$ a′. Mary didn't call.

- Partition theory would need syntactic reconstructions (semantically (48) and (49) are equivalent)
- But syntactic processes normally respect constituency, and elided strings in term answers are not always constituents:

(50) Who went out to buy what? Bill ice-cream, and Vivek fried chicken.

- Conclusion (also in G&S 84): we need structured meanings (or *abstracts*).

Term answers: alternative/polar questions

- Structured meanings needed also to express contrast between polar and alternative questions (Krifka 2001):

(51) a. Does Mary smoke? (polar)
b. Yes/No

(52) a. Does Mary smoke or doesn't she? (alternative)
b. #Yes/No b′. She does/she doesn't.

- Krifka's analysis:

(53) a. Does Mary smoke?
b. $(\lambda f[f(S(m))], \{\lambda p[p], \lambda p[\neg p]\})$

(54) a. Does Mary smoke or doesn't she?
b. $(\lambda p[p], \{S(m), \neg S(m)\})$

- But we need also partitions (for the embedded case):

(55) John knows whether Mary smokes ≡ John knows whether Mary smokes or she doesn't.

Conclusion

- Structured meanings needed for term answers;
- Partitions/proposition sets needed for embedded questions;
- Partitions/proposition sets derivable from structured meanings (and not viceversa).
- This suggests the following strategy:
  - Start with structured meanings (for term answers)
  - derive partitions (or sets of propositions) (for embedded uses)
- In Aloni et al (2007) this implemented in a dynamic semantics, e.g. to account for impact of questions on subsequent discourse:

(56) a. Who is wise? Only Socrates is wise.
b. Which Athenians are wise? Only Socrates is wise.

Overview on focus

- Phenomena: pragmatic and semantic functions of focus;
- Two competing analysis: structured meaning and alternative semantics;
- Association with focus: semantics or pragmatics?

Literature

Mats Rooth (1996): Focus. In S. Lappin (ed) *Handbook of Contemporary Semantic Theory*. Oxford: Blackwell.

Introduction

The category of focus is notoriously obscure. Roughly, theoretical notion introduced by linguists to describe/explain:

- Systematic correlation between accent and discourse context:

(57) Who did you introduce to Sue? FREE FOCUS

a. I introduced BILL to Sue.
b. #I introduced Bill to SUE.

(58) Who did you introduce Bill to?

a. #I introduced BILL to Sue.
b. I introduced Bill to SUE.

- Impact of accent on truth conditions in sentences with particles like *only*, *even*, *too*, ...

(59) a. I only introduced BILL to Sue. ASSOCIATION WITH FOCUS
b. I only introduced Bill to SUE.

Common assumptions

Relation between intonation and meaning is commonly assumed to be mediated by syntax:

- Prosodic prominence (here indicated by small capitals) is standardly described as marking focus;
- Focus is a syntactic constituent which is marked in surface structure with the feature F (Jackendoff 1972);
- F has beyond phonological/phonetic interpretation also semantic/pragmatic effects.

Examples

(60) a. GEORGE broke the vase.
b. [George]$_{\mathrm{F}}$ broke the vase.

(61) George only broke the VASE.

a. George only broke [the vase]$_{\mathrm{F}}$. (narrow focus)
'George didn't break anything else'

b. George only [broke the vase]$_{\mathrm{F}}$. (broad focus)
'George didn't do anything else'

Challenges for a theory of focus

To account for pragmatic and semantic effects of focus we need:

1. representation of focus: different focus locations $\Rightarrow$ different semantic representations
2. statement of semantic and pragmatic rules in terms of these focus-induced semantic values
   (i) for focus sensitive constructions (e.g. *only*)
   (ii) for discourse configurations (e.g. question-anwser pairs)

Two competing theories

- Structured meaning accounts (Jacobs, von Stechow, Krifka)
- Alternative semantics (Rooth 1985)

Structured meanings: focus representation

- Intonation has the effect of dividing a sentence into a background part B and a focus part F: $\langle B, F \rangle$

(62) John introduced Bill to $[\text{Sue}]_{\text{F}}$

a. focus-background structure:
$\langle \lambda y[\textbf{introduce}(j, b, y)], s \rangle$

b. background applied to focus:
$\lambda y[\textbf{introduce}(j, b, y)](s) = \textbf{introduce}(j, b, s)$

(63) John introduced $[\text{Bill}]_{\text{F}}$ to Sue

a. focus-background structure:
$\langle \lambda x[\textbf{introduce}(j, x, s)], b \rangle$

b. background applied to focus:
$\lambda x[\textbf{introduce}(j, x, s)](b) = \textbf{introduce}(j, b, s)$

Structured meanings: association with focus

- Focus sensitive operators take background-focus structures and convert them into standard meanings (Horn):

(64) ONLY $(\langle B, F \rangle)$

a. assertion: $\forall x[B(x) \rightarrow x = F]$

b. (presupposition/implicature: $B(F)$)

- Applications:

(65) John only introduced Bill to $[\text{Sue}]_{\text{F}}$

a. assertion: $\forall x[\textbf{introduce}(j, b, x) \rightarrow x = s]$

b. (presupposition/implicature: $\textbf{introduce}(j, b, s)$)

(66) John introduced $[\text{Bill}]_{\text{F}}$ to Sue

a. assertion: $\forall x[\textbf{introduce}(j, x, s) \rightarrow x = b]$

b. (presupposition/implicature: $\textbf{introduce}(j, b, s)$)

Structured meanings: discourse congruence

- Assume a structured meaning analysis of questions. Then, simplifying, discourse congruence can be defined as follows:

  (67) A question-answer pair Q-A with meanings [Q] and [A]=⟨B,F⟩ is congruent iff [Q]= B

- Examples:

  (68) Who did John introduce to Sue?
  $\lambda x[\textbf{introduce}(j, x, s)]$

  a. John introduced $[\text{Bill}]_{\text{F}}$ to Sue
  $\langle \lambda x[\textbf{introduce}(j, x, s)], b \rangle$

  b. #John introduced Bill to $[\text{Sue}]_{\text{F}}$
  $\langle \lambda y[\textbf{introduce}(j, b, y)], s \rangle$

Structured meanings: syntactic movement

- Challenge: a structured semantic object should be available at the S level to interact with the semantics of *too*

  (69) $[_S$ John introduced Bill to $[\text{Sue}]_{\text{F}}]$, too

- Prominent answer (Chomsky): covert movement on logical form:

  (70)
  a. SS: $[_S$ John introduced Bill to $[\text{Sue}]_{\text{F}}]$, too
  b. LF: [[Sue[λe. John introduced Bill to e]] too]
  c. interpretation: $\text{TOO}(\langle \lambda y[\textbf{introduce}(j, b, y)], s\rangle)$

- Focused phrases are assigned scope as if they were quantifiers.

Structured meanings: problem of island insensitivity

- Focused phrases are assigned scope as if they were quantifiers.
- But while quantifier movement is sensitive to scope island, focus movement isn't.

(71) a. Sam only saw [a man who was kissing [Mary]$_{\mathrm{F}}$]
b. #Which woman$_i$ Sam only saw [a man who was kissing t_i]?

Structured meanings: problem of restrictiveness

- The structured meaning approach gives access to too much information: info about focus + info about rest of the sentence.
- This makes possible to define quite implausible operators:

(72) x tolfed ϕ iff x told the focus of ϕ that ϕ

a. I tolfed that $[\text{he}]_{\text{F}}$ resembles her. $\equiv$ I told him that he resembles her.

b. I tolfed that he resembles $[\text{her}]_{\text{F}}$. $\equiv$ I told her that he resembles her.

- We expect more from a theory of focus: it should characterize the notion of *possible* focus-sensitive operators (ruling out implausible ones)
- Methodological guidelines: avoid overly expressive frameworks.

Alternative semantics: focus representation

Every expression α is associated with two semantic objects:

- Its ordinary semantic value: $[\![.]\!]^o$ (a proposition)
- Its focus semantic value: $[\![.]\!]^f$ (a set of alternatives)

(73) a. $[\![\text{John introduced Bill to [Sue]}_{\text{F}}]\!]^o$ = the proposition that John introduced Bill to Sue

b. $[\![\text{John introduced Bill to [Sue]}_{\text{F}}]\!]^f$ = the set of propositions of the form 'John introduced Bill to x'

(74) a. $[\![\text{John introduced [Bill]}_{\text{F}} \text{ to Sue}]\!]^o$ = the proposition that John introduced Bill to Sue

b. $[\![\text{John introduced [Bill]}_{\text{F}} \text{ to Sue}]\!]^f$ = the set of propositions of the form 'John introduced y to Sue'

Alternative semantics: recursive definition of focus

- No syntactic movement, but in situ theory. Focus semantic values are derived compositionally as follows:
- The f-semantic value of a focused phrase of type τ is the set of possible denotation of type τ:

(75) $[\![[\text{John}]_{\text{F}}]\!]^f = \text{E, the set of individuals}$

- The f-semantic value of a non-focused lexical item is the unit set of its ordinary semantic value:

(76) $[\![\text{called}]\!]^f = \{\lambda x \text{called}(x)\} \quad = \{[\![\text{called}]\!]^o\}$

- $[\![\alpha]\!]^o = f(\alpha_1, \alpha_2) \quad \Rightarrow$
  $[\![\alpha]\!]^f = \{f(x_1, x_2) \mid x_1 \in [\![\alpha_1]\!]^f, x_2 \in [\![\alpha_2]\!]^f\}$

(77) $[\![[\text{John}]_{\text{F}} \textit{called}]\!]^f = \{\text{John called, Mary called,...}\}$

Alternative semantics: association with focus

- The o-semantic value of a focus sensitive expression like *only* refers to the f-semantic value of its arguments:

(78) only(ϕ)

a. assertion: $\forall p[p \in [\![\phi]\!]^f \wedge^\vee p \rightarrow p = [\![\phi]\!]^o]$

b. (presupposition/implicature: ϕ)

- Applications:

(79) 'only(John introduced Bill to $[\text{Sue}]_{\text{F}}$)' is true iff no proposition of the form 'John introduced Bill to x' is true except for 'John introduced Bill to Sue'

(80) 'only(John introduced $[\text{Bill}]_{\text{F}}$ to Sue)' is true iff no proposition of the form 'John introduced y to Sue' is true except for 'John introduced Bill to Sue'

Alternative semantics: discourse congruence

- Assume Hamblin's question semantics, then simplifying discourse congruence can be defined as follows:

(81) A question-answer pair Q-A is congruent iff $[\![Q]\!]_H = [\![A]\!]^f$

- Examples:

(82) Who did John introduce to Sue?
(the set of propositions of the form 'John introduced y to Sue') (Hamblin denotation)

a. John introduced $[\text{Bill}]_{\text{F}}$ to Sue
(the set of propositions of the form 'John introduced y to Sue') (f-value)

b. #John introduced Bill to $[\text{Sue}]_{\text{F}}$
(the set of propositions of the form 'John introduced Bill to x') (f-value)

Alternative semantics: advantages

- No reference to focus, so *tolfed* cannot be expressed;
- No syntactic movement, so no scope island problem.

Alternative semantics: problem of multiple focus

- AS cannot express variable binding, the variation introduced by focus cannot be accessed distinctively.
- This creates problems with multiple focus constructions:

(83) John only introduced $[\text{Bill}]_{\text{F}}$ to Mary. He also$_1$ only$_2$ introduced $[\text{Bill}]_{F2}$ to $[\text{ Sue}]_{F1}$.

a. also f_1, only $f_2 : \phi(f_1, f_2)$ (what you need)

b. also $*$, only $* : \phi(*, *)$ (what you get)

- In AS, *only* associate with both Bill and Sue.

Alternative semantics: problem of multiple focus

- Possible solution: LF movement of 'Sue' in these cases:

  (84) also [Sue]$_F$ [only he introduced [Bill]$_{\mathrm{F}}$ to t$_i$]

- But focus is not interpreted in situ any longer: problem of island insensitivity of association with focus.

  (85) a. We only$_i$ recover [the diary entries [that Marylyn$_{Fi}$ made about John]]

  b. We also$_1$ only$_2$ recover [the diary entries [that Marylyn$_{F2}$ made about Bobby$_{F1}$]]

Comparison

- Alternative semantics (AS) representations are derivable from structured meanings (SM):

(86) a. $\langle B, F \rangle$ (structured meaning)
b. B(F) (corresponding o-semantic value)
c. $\{B(x) \mid x \in D_F\}$ (corresponding f-sem value)

- But not vice versa.

Comparison

- Structured meanings genuinely richer than alternative semantics representations:

(87) a. $[4]_{\mathrm{F}}$ is the square of 2.
b. 4 is the square of $[2]_{\mathrm{F}}$.

- Same o/f-semantic value for both:

(88) a. o-semantic value: T (tautology)
b. f-semantic value: $\{T, F\}$

- But different focus-background structures:

(89) a. $\langle \lambda x[2^2 = x], 4 \rangle$
b. $\langle \lambda y[y^2 = 4], 2 \rangle$

Conclusion

- The simplicity and parsimony of alternative semantics makes it the null hypothesis (see *tolfed*),
- However there are certain phenomena that indicate that the additional features of structured meanings is needed (e.g. multiple focus)
- On the other hand, the lack of island restriction with association with focus argues against SM and for AS.

Only problems

- Problems arise for both frameworks, when only associate with complex NPs. (G&S, Bonomi and Casalegno):

(90) a. John only introduced [Bill and Mary]$_F$ to Sue.
b. John only introduced [Bill or Mary]$_F$ to Sue.

Focus sensitivity: semantics or pragmatics?

Two different views on focus sensitivity:

- Weak structural accounts: (Rooth 85, von Stechow, Krifka,..)
  relation between intonation and meaning mediated by syntax;
  focus sensitivity derived by grammatical mechanisms;
- Strong pragmatic accounts: (Rooth 92, Roberts, Schwarzshild,...)
  relation between focus and grammar function in a more lax manner; focus sensitivity derived by pragmatic means.

Advantage of a pragmatic account: more explanatory

Second occurrence focus

- Standard argument in favor of pragmatic accounts: second occurrence focus

(91) a. Everyone already knew that Mary only eats $[\text{vegetables}]_{\text{F}}$.

b. If even $[\text{Paul}]_{\text{F}}$ knew that Mary only eats vegetables_{SOF}, then he should have suggested a different restaurant. [Barbara Partee]

- Note however that this evidence has been challenged (Rooth, Bartels Beaver et al)

An example of a strong theory?

- In the following definition no direct reference to focus (cf. Rooth 92):

  (92) only(ϕ) iff $\forall p[p \in C \wedge^{\vee} p \leftrightarrow p = [\![\phi]\!]^o]$

- C set of propositions contextually determined.
- Focus interpretation simply requires C to be some subset of the f-semantic value of the sentence $[\![\phi]\!]^f$.

A different hypothesis (Beaver et al)

- Focus sensitive operators do not constitute a uniform class:
  - (i) focus sensitivity of some derived by a grammatical mechanism, e.g. *only*;
  - (ii) focus sensitivity of others derived by a pragmatic mechanism, e.g. *always*.
- Two arguments in favor of this hypothesis:
  - (i) weak pronouns
  - (ii) extraction

Weak pronouns

Context: You had many discussions with Sandy, but what I want to know is the extend to which you talked about Fred. Of all the times you talked with Sandy, how often was Fred the person you talked about?

(93) I ALWAYS discussed'im with Sandy.
"Whenever I discussed someone with Sandy, I discussed Fred."

(94) I ONLY discussed'im with Sandy.
#"I only discussed Fred (and none else) with Sandy.'

While *always* is able to associate with a weak pronoun, *only* is not.

Extraction

Context: I have two roommates, Kim and Sandy. I always stock my roommates' fishtanks. I stock Sandy's fishtank with goldfish and nothing else. I stock Kim's fishtank with goldfish and clownfish.

(95) KIM's is the tank I said I always stock with clownfish.

a. "I said I always stock KIM's tank with clownfish." [T]
b. "I said I always stock Kim's tank with CLOWNFISH." [F]

(96) KIM's is the tank I said I only stock with clownfish.

a. #"I said I only stock KIM's tank with clownfish." [T]
b. "I said I only stock Kim's tank with CLOWNFISH." [F]

The extraction of the focus of *only* is impossible, but the extraction of the focus of *always* is possible.