Theme with Variations:
Focus, Congruence and Exhaustivity

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Source

- Chapters 2, 3, and 4 of Kata Balogh's dissertation

  Theme with variations: a context-based analysis of focus

  defended September 2009 at the University of Amsterdam.
- Chapter 2 of the dissertation draws on earlier work by Jeroen Groenendijk, presented, among other places, in his 2008 lectures at Rutgers.
- Kata's dissertation and Jeroen's lecture notes are available through `www.illc.uva.nl/inquisitive-semantics`
- I largely follow Kata's plot, but slightly adapt the terminology and notation at some points, and also bring up some issues that seem to require further consideration.

Dialogue modeling

Common ground and pending proposals

At any point in a conversation there is:

- A common ground σ
- A stack of pending proposals $\langle \pi_1, \ldots, \pi_n \rangle$

Stages and transitions

- We refer to $\langle \sigma, \pi_1, \ldots, \pi_n \rangle$ as a stage of the conversation
- Utterances induce transitions from one stage to another

Uptake and absorption

- Primary uptake: semantic content
- Secondary uptake: pragmatic inferences
- Absorption: the effect of a response

Uptake and absorption

- Primary uptake: semantic content
  - Add the theme of $\phi \approx$ the questions behind ϕ
  - Add the rheme of $\phi \approx$ the proposition expressed by ϕ itself
- Secondary uptake: pragmatic inferences

- Absorption: the effect of a response

$\langle \sigma, \mathit{Theme} \rangle$

$\langle \sigma, \mathit{Theme}, \mathit{Rheme} \rangle$

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- Primary uptake: semantic content
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  - alternative exclusion
- Absorption: the effect of a response

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Uptake and absorption

- Primary uptake: semantic content
  - Add the theme of $\phi \approx$ the questions behind ϕ
  - Add the rheme of $\phi \approx$ the proposition expressed by ϕ itself
- Secondary uptake: pragmatic inferences
  - alternative exclusion
- Absorption: the effect of a response
  - accept: proposed information percolates down
  - cancel: cancels informative steps and returns to latest issue

$\langle \sigma, \mathit{Theme} \rangle$

$\langle \sigma, \mathit{Theme}, \mathit{Rheme} \rangle$

$\langle \sigma, \mathit{Theme}, \mathit{Rheme}, \mathit{Excl} \rangle$

$\langle \sigma, \mathit{Theme}, \mathit{Rheme}, \mathit{Excl} \rangle[\mathit{absorption}]$

Questions, focus, and thematization

Representation of wh-questions and focus

- 'Who did Amy call?' $\rightsquigarrow$ $?\exists x.C(a,x)$
- 'Amy called BEN.' $\rightsquigarrow$ $C(a,b_F)$

Questions, focus, and thematization

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Thematization without focus

- $TH(\varphi) = ?\varphi$
- $RH(\varphi) = \varphi$

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Thematization with focus

- $TH(\varphi(a_{1,F},...,a_{n,F})) = ?\exists x_1...x_n.\ \varphi\ [a_{1,F}...a_{n,F}/x_1...x_n]$
- $RH(\varphi(a_{1,F},...,a_{n,F})) = \varphi(a_1,...,a_n)$

Focus and thematization exemplified

Thematization without focus

- $TH(\varphi) = ?\varphi$
- $RH(\varphi) = \varphi$

Thematization with focus

- $TH(\varphi(a_{1,F}, ..., a_{n,F})) = ?\exists x_1 ... x_n.\ \varphi\ [a_{1,F} ... a_{n,F} / x_1 ... x_n]$
- $RH(\varphi(a_{1,F}, ..., a_{n,F})) = \varphi(a_1, ..., a_n)$

Examples

- Ben called Amy. $\rightsquigarrow C(b, a)$ $\Rightarrow$ Theme: $?C(b, a)$
- BEN called Amy. $\rightsquigarrow C(b_F, a)$ $\Rightarrow$ Theme: $?\exists x.C(x, a)$
- BEN called AMY. $\rightsquigarrow C(b_F, a_F)$ $\Rightarrow$ Theme: $?\exists x \exists y.C(x, y)$

Application: question–answer congruence

Pattern

Who called Ben?	AMY called Ben.	(ok)
Who called Ben?	#Amy called BEN.	(misplaced focus)
Who called Ben?	#AMY called BEN.	(overfocused)
Who called whom?	#AMY called Ben.	(underfocused)

Generalization (KB)

The theme of an answer must be compliant with the given question.

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Who called whom?	#AMY called Ben.	(underfocused)

Generalization (KB)

The theme of an answer must be compliant with the given question.

Or perhaps simpler? (FR)

The theme of an answer must be identical to the given question.

Example: congruence

- ‘Who called Ben?’ $\rightsquigarrow$ $?\exists x.C(x, b)$
- ‘AMY called Ben.’ $\rightsquigarrow$ $C(a_F, b)$
- Theme: $?\exists x.C(x, b)$
- Identical to the given question (and also compliant)

Example: misplaced focus

- ‘Who called Ben?’ $\rightsquigarrow$ $?\exists x.C(x, b)$
- ‘Amy called BEN.’ $\rightsquigarrow$ $C(a, b_F)$
- Theme: $?\exists x.C(a, x)$
- Not identical to the given question (and also not compliant)

Example: overfocused answer

- ‘Who called Ben?’ $\rightsquigarrow$ $?\exists x.C(x, b)$
- ‘AMY called BEN.’ $\rightsquigarrow$ $C(a_F, b_F)$
- Theme: $?\exists x \exists y.C(x, y)$
- Not identical to the given question (and also not compliant)

Example: underfocused answer

- ‘Who called whom?’ $\rightsquigarrow$ $?\exists x.\exists y.C(x,y)$
- ‘AMY called Ben.’ $\rightsquigarrow$ $C(a_F, b)$
- Theme: $?\exists x.C(x,b)$
- Not identical to the given question
- Also not compliant, BUT

Example: underfocused answer

- 'Who called whom?' $\rightsquigarrow$ $?\exists x.\exists y.C(x,y)$
- 'AMY called Ben.' $\rightsquigarrow$ $C(a_F, b)$
- Theme: $?\exists x.C(x,b)$
- Not identical to the given question
- Also not compliant, BUT
- This indicates that there is a problem with the definititon of compliance, or with the logical representation of wh-questions.
- After all, 'Who called Ben?' should come out as compliant with 'Who called whom?'
- So I don't think that congruence should be characterized in terms of compliance

Exhaustivity

Observation

Focused answers are interpreted exhaustively

For example

Q: Who called yesterday?

A1: AMY did. → and nobody else
A2: AMY and BEN did. → and nobody else
A3: AMY or BEN did. → not both, and nobody else

Account in terms of alternative exclusion

- Automatic mechanism, but separate from primary uptake
- Can therefore also be canceled separately
- Intended effect: disclaim stronger possible answers to the given question

Possible answers

Possible answers

The possible answers to a proposition π are characterized by:

- The possibilities in π, corresponding to answers that establish exactly one of the proposed updates
- But also intersections of the possibilities in π, which correspond ot answers that establish more than one of the proposed updates

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Alternative exclusion

$\langle \sigma, s, t \rangle [excl] = \langle \sigma, s, t, u \rangle$

where u is obtained from t by 'substracting' from every possibility α in t any possible answer to s that is strictly stronger than α

Illustration

Examples

Q: Who called yesterday?

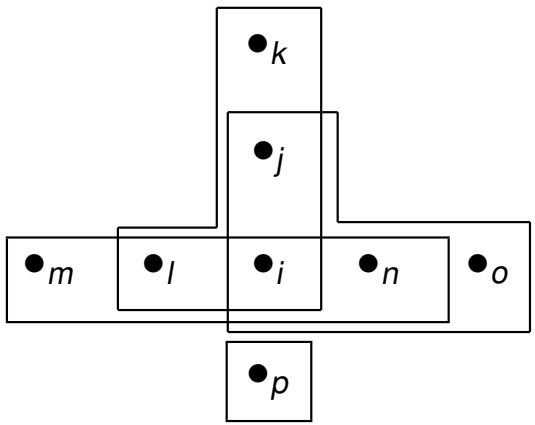
A1: AMY did. → and nobody else

A2: AMY and BEN did. → and nobody else

A3: AMY or BEN did. → not both, and nobody else

Representation of the question

	i	j	k	l	m	n	o	p
$C =$	$\{a,b,c\}$	$\{a,b\}$	$\{a\}$	$\{a,c\}$	$\{c\}$	$\{b,c\}$	$\{b\}$	$\{\}$



$\rho_1 \rightsquigarrow C(a)$

$\rho_2 \rightsquigarrow C(b)$

$\rho_3 \rightsquigarrow C(c)$

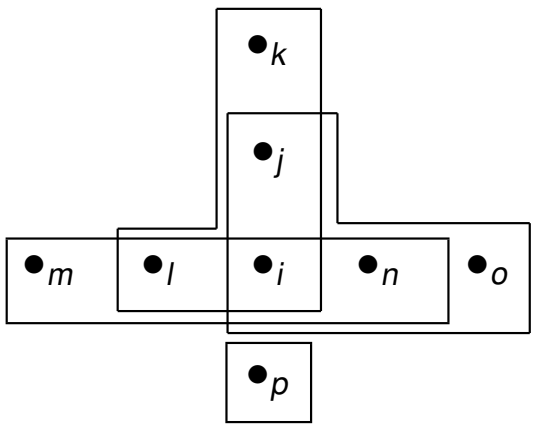
$\rho_4 \rightsquigarrow \neg\exists x.C(x)$

Illustration: atomic answers

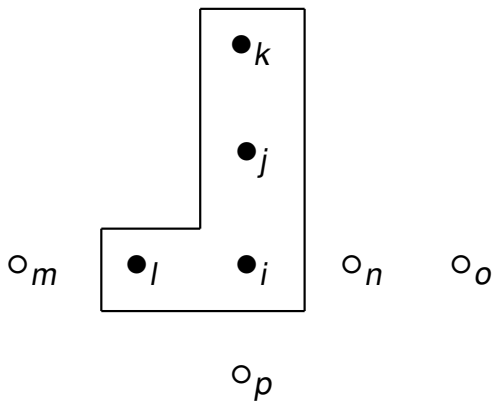
Q: Who called yesterday?

A1: AMY did. → and nobody else

Question:



Answer:



Exhaustification:

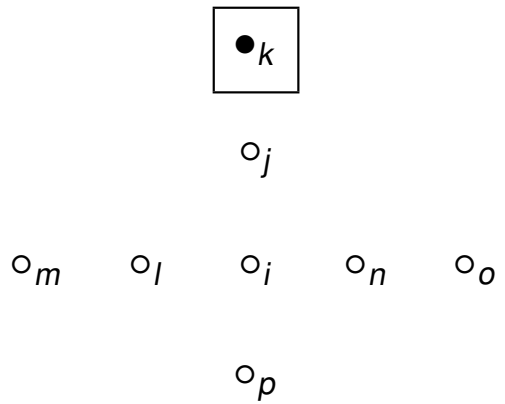
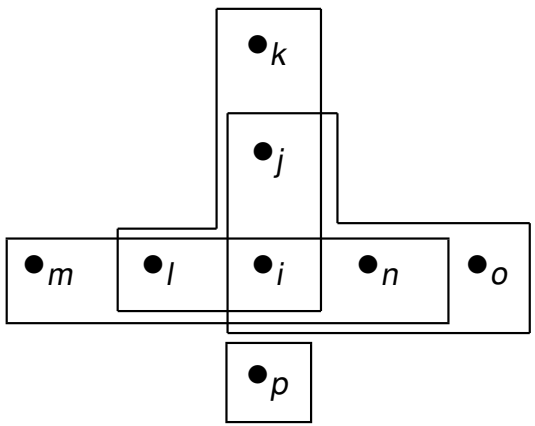


Illustration: conjunctive answers

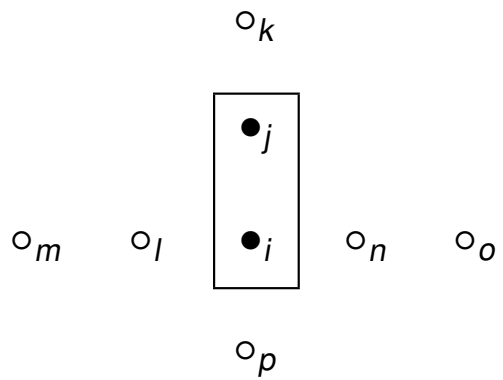
Q: Who called yesterday?

A2: AMY and BEN did. → and nobody else

Question:



Answer:



Exhaustification:

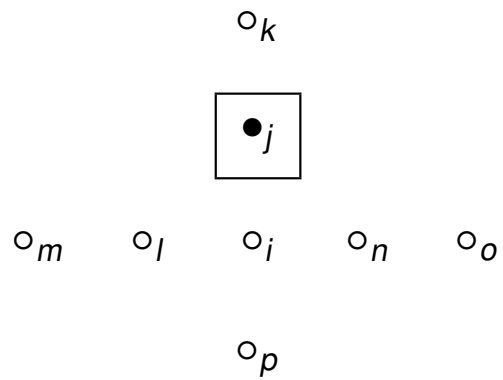
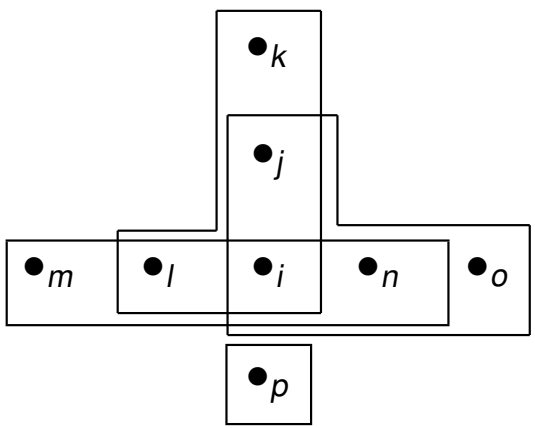


Illustration: disjunctive answers

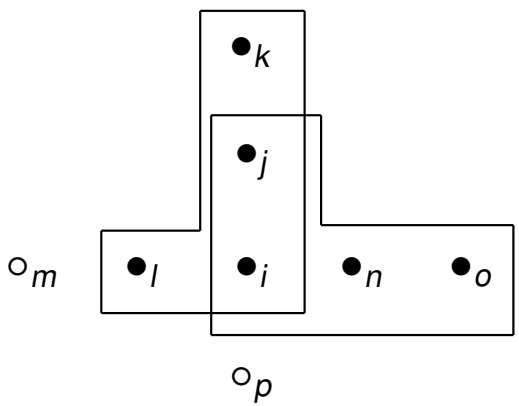
Q: Who called yesterday?

A3: AMY or BEN did. → not both, and nobody else

Question:



Answer:



Exhaustification:

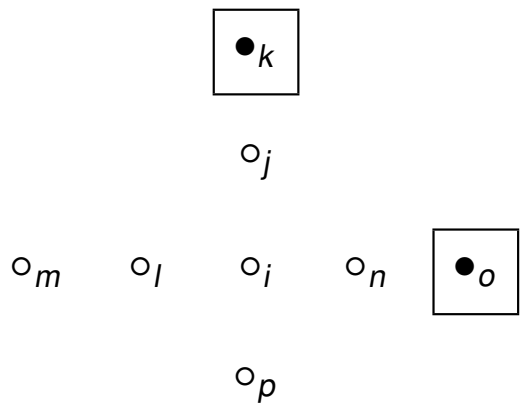
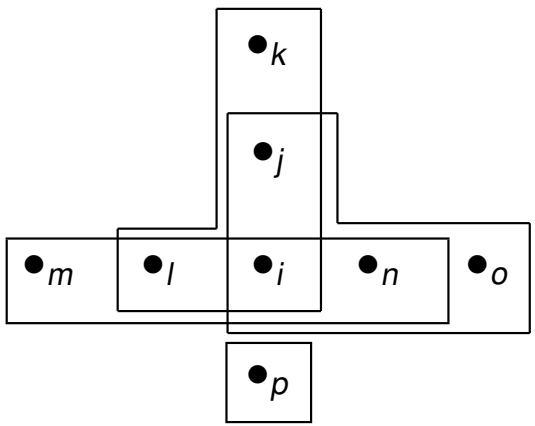


Illustration: disjunctive questions

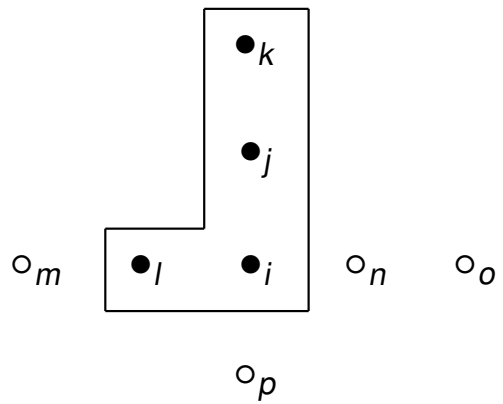
Q: Did Amy or Ben or Chris call yesterday?

A3: AMY did. → Ben and Chris did not

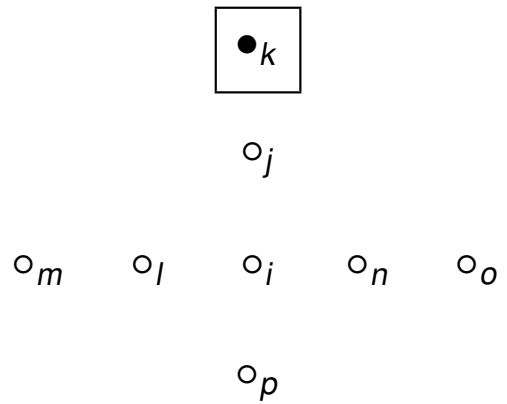
Question:



Answer:



Exhaustification:



Some problems

A or B or both

Who called yesterday?

AMY or BEN or both. $\not\Rightarrow$ not both

Prediction: not both

(because ‘A or B or both’ behaves just like ‘A or B’)

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Conditional questions

If Ben called, did Amy then call as well?

Yes, if Ben called then Amy called as well. $\not\Rightarrow$ both called

Prediction: both called

(by alternative exclusion)

Summary

- Basic architecture of a dialogue modeling system
- Focus analyzed as having a special effect on thematization
- Congruent answers in terms of compliance
- Exhaustivity as automatic, but cancelable inference
- The dissertation also contains chapters on the interpretation of only and of structural focus in Hungarian

Some open problems (to work on)

Question–answer congruence

- Characterization in terms of compliance does not seem to be on the right track;
- Is identity general enough?

Alternative exclusion

- A or B or both
- Conditional questions