Questions and connectives

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The 4th Tsinghua Interdisciplinary Workshop on Logic, Language, and Meaning

30/03/2024, Tsinghua University, Beijing

Connectives

- The three basic connectives **and**, **or**, **if** map two propositions to one

(1) a. it's (both) raining and snowing
b. it's (either) raining or snowing
c. if it's raining (then) it's snowing

(2) a. $[\![\text{and}]\!](p)(q) = p \wedge q$
b. $[\![\text{or}]\!](p)(q) = p \vee q$
c. $[\![\text{if}]\!](p)(q) = p \boxdot\!\!\rightarrow q$

Stalnaker (1968); Lewis (1973); Kratzer (1986)

The if-puzzle

- **if** can connect a proposition with a question, while **and** and **or** cannot

(3) a. if it's raining (then) will John come?
b. #it's (both) raining and will John come?
c. #it's (either) raining or will John come?

Goal

- We will proposal an analysis which
  - resolves the if-puzzle
  - maintains that **if** is propositional in both arguments

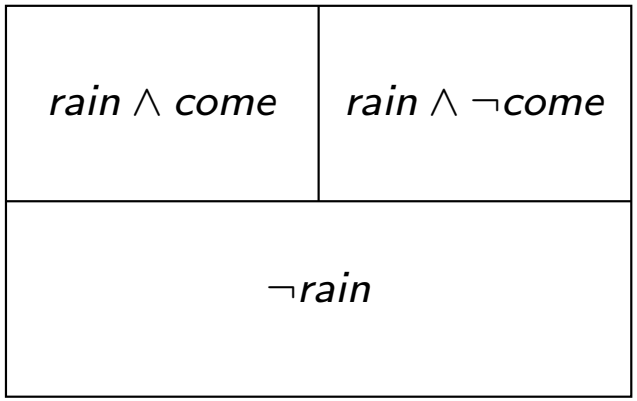
Note

We will discuss polar questions but the account generalizes to constituent questions, as you will see

The cells

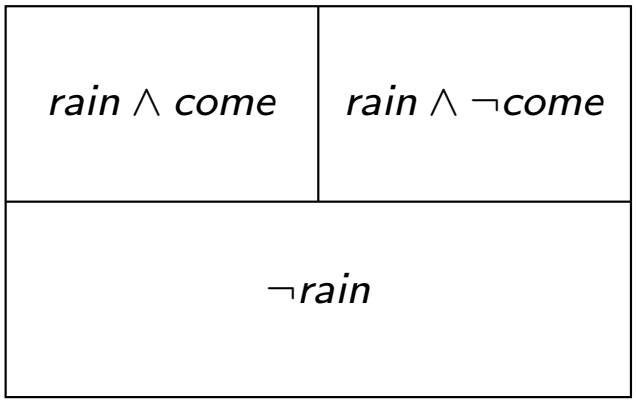
- CQs partition the context set into three cells

(4) if it's raining will John come?



Groenendijk and Stokhof (1997)

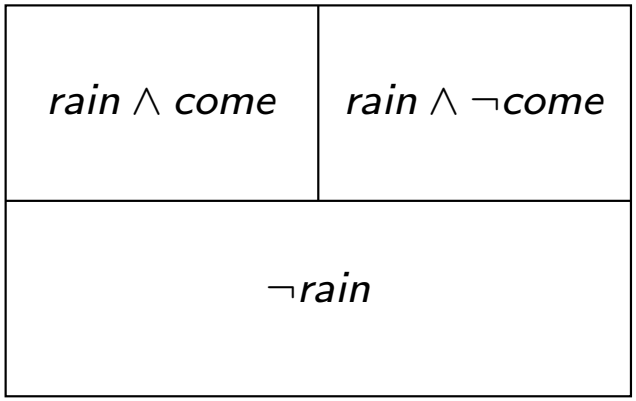
Advantages



- The denial of the antecedent is predicted to be an answer

(5) A: If it's raining, will John come?
B: It's not going to rain.

Disadvantages



- The account over- and undergenerates

(6) If it's raining, will John come?

a. #It's raining and John will come. → predicted ✓
b. If it's raining, John will not come. → predicted ✗
c. No. → predicted ✗

- It's not clear what makes **if** different from **and**/**or**

Velissaratou (2000)

Two-step interpretation

- Asking a conditional question is asking a question in a updated local context

(7) $c+$ if $[_p$ it's raining$]$ $[_q$ will John come$]$

(i) update c with p
$\rightarrow$ resulting in $c' = c \cap \{w \mid \text{it's raining in } w\}$

(ii) update the output of (i) with q
$\rightarrow$ resulting in a partition of c'

Isaacs and Rawlins (2008); Krifka (2019); Bledin and Rawlins (2019)

Advantages

- Denying the antecedent feels similar in both cases: stating that the first update is unrealistic

(8) A: If it's raining, John will not come.
B: It's not going to rain.

(9) A: If it's raining, will John come?
B: It's not going to rain.

- Facts about presupposition projection seem to confirm that p is the local context of q

(10) a. Is the king of France bald? $\rightsquigarrow$ France has a king
b. If France is a monarchy, is the king of France bald? $\rightsquigarrow \top$

Disadvantages

- It's not clear why **and** and **or** cannot embed questions

(11) a. France is (both) a monarchy and the KoF is bald $\rightsquigarrow \top$
b. #It's (both) raining and will John come?

(12) a. France is (either) not a monarchy or the KoF is bald $\rightsquigarrow \top$
b. #it's (either) not raining or will John come?

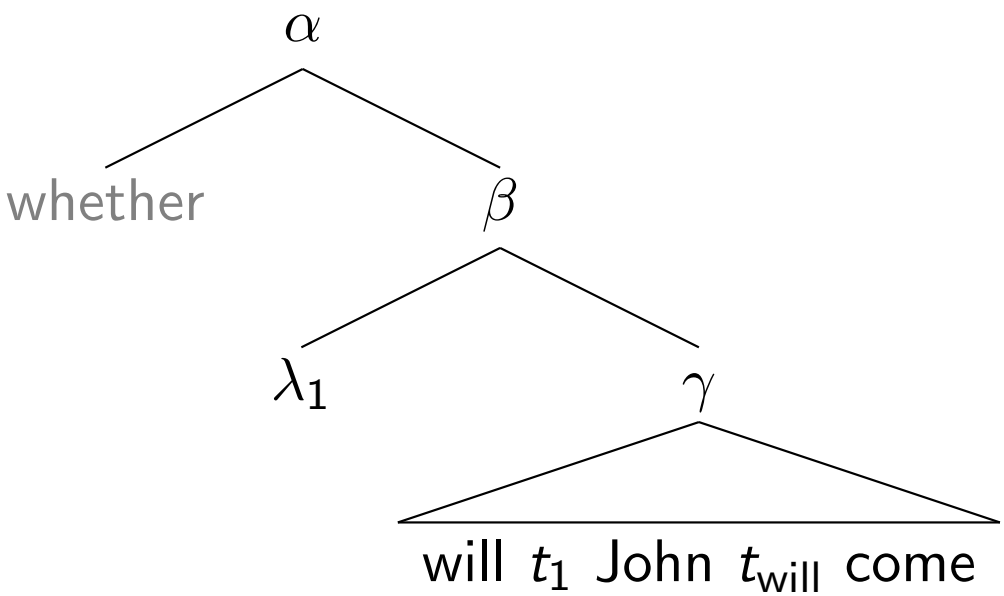
Karttunen (1973); Heim (1990)

Polar questions: syntax

- Matrix polar questions contain a covert **whether** which moves to [Spec,C], leaving a trace and creating a λ-abstract

(13) a. will John come?

b.

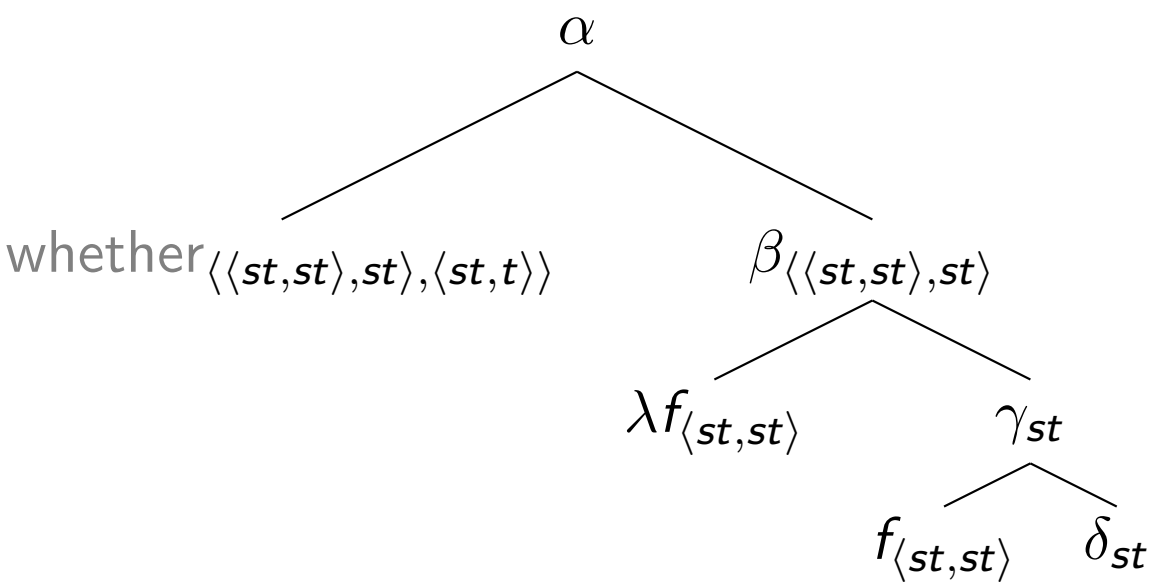


Bennett (1977); Higginbotham (1993); Krifka (2001); Guerzoni (2004)

Polar questions: semantics

- Definition: $pol(f)$ iff f is *yes* ($\lambda p.p$) or *no* ($\lambda p.\neg p$)

(14)



a. $[\![\text{whether}]\!] = \lambda Q_{\langle\langle st,st\rangle,st\rangle}.\ \lambda p_{st}.\ \exists f_{\langle st,st\rangle}.\ pol(f) \wedge p = Q(f)$

b. $[\![\beta]\!] = \lambda f.\ f([\![\delta]\!])$

c. $[\![\alpha]\!] = \lambda p.\ \exists f.\ pol(f) \wedge p = [\![\beta]\!](f) = \{[\![\delta]\!], \neg[\![\delta]\!]\}$

Conditional questions

- CQs are just polar questions whose prejacent is a conditional

(15) a. if it's raining, will John come
b. [$_{\alpha}$ whether λ_1 [[if it's raining] [will t_1 John t_{will} come]]]]

c. $[\![\alpha]\!] = \{\text{rain} \boxdot\!\!\rightarrow \text{John comes}, \text{rain} \boxdot\!\!\rightarrow \neg\text{John comes}\}$

- Movement of **whether** violates no locality constraints because the if-clause is a subordinate clause

(16) that's the movie which [[if it's raining] I would watch t]

The CSC

- Wh-movement out of a co-ordinate clause is not possible

(17) a. *that's the movie which [[it was raining] and [I watched t]]

b. *that's the movie which [[I read the book] or [I watched t]]

Ross (1967)

Resolution of the if-puzzle

- **and**/**or** cannot embed questions because either type mismatch would result or a violation of CSC is incurred

(18) it's raining and will John come?

a. *$[_{st}$ it's raining] and $[_{st,t}$ whether will t John t_{will} come]

b. *[whether $[_{st}$ it's raining] and $[_{st}$ will t John t_{will} come]]

$\rightarrow$ similarly for **or**

Prediction: answers

- We predict the correct pattern of answers

(19) If it's raining, will John come?

a. Yes.
b. No.
c. If it's raining John will not come.
d. #It's raining and John will not come (= irrelevant)
e. It's not going to rain. (= deflecting)

Prediction: presuppositional effects

- Movement out of α gives rise to deviance if α is presupposed

(20) a. what do you think [$_\alpha$ John saw t]

b. #what do you know [$_\alpha$ John saw t]

(21) a. whether [if it's raining [$_\alpha$ will t_1 John t_{will} come]]

b. #whether [because it's raining [$_\alpha$ will t_1 John t_{will} come]]

Prediction: constituent questions

- The account we proposes should generalize to constituent questions

(22) a. if it's raining who will come?
b. #it's (both) raining and who will come?
c. #it's (either) raining or who will come?

(23) a. $[\![\text{whether}]\!] = \lambda Q_{\langle\langle st,st\rangle,st\rangle}.\ \lambda p_{st}.\ \exists f_{\langle st,st\rangle}.\ pol(f) \wedge p = Q(f)$
b. $[\![\text{who}]\!] = \lambda P_{\langle e,st\rangle}.\ \lambda p_{st}.\ \exists x_e.\ person(x) \wedge p = P(x)$

(24) a. who λx [if it's raining [t_x will come]]

b. {rain $\Box\!\!\rightarrow$ John comes, rain $\Box\!\!\rightarrow$ Mary comes,...}

(25) a. *who λx [[it's raining] and [t_x will come]]

b. {rain $\wedge$ John comes, rain $\wedge$ Mary comes,...}

Prediction: ordering

- Ordering of the clauses should not matter

(26) a. will John come if it's raining?
b. #will John come and it's raining?
c. #will John come or it's raining?

(27) a. who will come if it's raining?
b. #who will come and it's raining?
c. #who will come or it's raining?

Prediction: ATB movement (and)

- It is possible for **whether** to move out of both co-ordinate clauses

(28) is it raining and will John come?

a. whether [[is t_1 it t_{is} raining] and [$_\alpha$ will t_1 John t_{will} come]]

b. $\{\text{rain} \wedge \text{John comes}, \neg\text{rain} \wedge \neg\text{John comes}\}$

- The readings of 'yes' and 'no' seem to confirm the analysis

(29) Is it raining and will John come?

a. Yes. $\rightarrow$ it's raining and John will come

b. No. $\rightarrow$ it's not raining and John won't come

Problem: ATB movement (or)

- We incorrectly predict (30a) to be possible and thus (30b) to be available

(30) is it raining or will John come?

a. whether [[is t_1 it t_{is} raining] or [$_\alpha$ will t_1 John t_{will} come]]

b. {rain $\vee$ John comes, $\neg$rain $\vee$ $\neg$John comes}

- the reading seems to be (31) instead

(31) {rain, John comes}

Conclusion

- All three connectives **and**, **or**, **if** are propositional
- Matrix polar questions contain a silent **whether** which undergoes regular $\overline{\text{A}}$-movement
- If-clauses are subordinate while conjuncts and disjuncts are co-ordinate

We thank Anton Benz, Luka Crnič, Dan Goodhue, Roland Hinterhölzl and Manfred Krifka for valuable input and discussion. This work is supported by the ERC Advanced Grant "Speech Acts in Grammar and Discourse" (SPAGAD), ERC-2007-ADG 787929. All errors are our own.

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