Negation and Focus in Polarity Questions

Manfred Krifka
Humboldt-Universität Berlin
Zentrum für Allgemeine Sprachwissenschaft (ZAS) Berlin

CDC Seminar Series Talk at Macquaie University, July 5, 2013

1. Issues of this talk

(1) Negation in polarity questions
   a. *Is there a vegetarian restaurant around here?*
   b. *Is there no vegetarian restaurant around here?* – why different from (a)?
   c. *Isn't there a vegetarian restaurant around here?* – why different from (b)?

(2) Focus in polarity questions
   a. *Did John order soup?* – Yes. / No. / #No, Mary did. / No, he ordered salad.
   b. *Did JOHN order soup?* – Yes. / #No. / No, MARY did. / #No, he ordered salad.

2. Negation in polarity questions

Ladd (1981), inner and outer negation in polarity questions.

(3) Inner, propositional negation:
   a. *Is there no vegetarian restaurant around here?*
   b. *Isn’t there a vegetarian restaurant around here (either)?*
   c. *Isn’t there any vegetarian restaurant around here?*

(4) Outer, extra-propositional negation:
   *Isn’t there a vegetarian restaurant around here (too)?*

(5) Differentiation in German: Combination Negation + indefinite article only in inner reading, no combination in outer reading:
   a. *Gibt es hier *k-ein* vegetarisches Restaurant?*
   b. *Gibt es hier *nicht ein* vegetarisches Restaurant?*


Romero & Han (2004): Negation interacts with verum operator, interpreted as FOR-SURE, where FOR-SURE(φ): The proposition φ is assumed for certain.

---

1 I gratefully acknowledge support by the DFG (Project Syntax/Semantics Mismatches on Externally and Internally Headed Relative Clauses, and by the Bundesministerium für Bildung und Forschung (Projektförderung Zentrum für Allgemeine Sprachwissenschaft, Berlin, Förderkennzeichen 01UG0711).
(6)  a. Is there a veg. restaurant around here? \{φ, ¬φ\}
b. Isn’t there a veg. restaurant around here? \{FOR-SURE(φ), ¬FOR-SURE(φ)\}
c. Is there no veg. restaurant around here? \{FOR-SURE(¬φ), ¬FOR-SURE(¬φ)\}

Designed to express bias towards φ in (6)(b): Speaker assumes φ but wants to be sure.

Problems:

(7)  They say that there is a vegetarian restaurant around here.
   a. Is it for sure / Is it certain that there is one around here?
   b. #Isn’t there a vegetarian restaurant around here?

(8)  A: Isn’t there a vegetarian restaurant around here?
    B: I think so. / Probably. – unexpected, similar to #Probably for sure.
    B: Yes. – does not express greater certainty than answer to (6)(a).

Here: Proposal that outer negation scopes over speech act of a requested assertion; Krifka (t.a.).

3. Basic framework for speech acts


(9)  Common Ground / Commitment State c:
   Set of commitments accrued in a conversation;
   commitments are propositions, here rendered in a formal language.

(10)  Example, assertive commitment:
   a. S₁ ⊨ φ: S₁ has assertive commitments w.r.t. the proposition φ
   b. S₁[S₂] ⊨ φ: S₁ has assertive commitments to S₂ w.r.t. the proposition φ

   We sometimes neglect the addressee variable.

(11)  Assertive commitments towards a proposition φ (cf. Alston 2000):
   Provide evidence for φ if asked so,
   face social consequences if φ turns out to be false.

(12)  Update of c with speech act A_{S₁,S₂}, where S₁: Speaker, S₂: Addressee:
   c + A_{S₁,S₂} = c U \text{com}_c(A_{S₁,S₂}),
   where com_c(A_{S₁,S₂}): The commitments originating from A at c.

(13)  For certain phenomena, commitment states are not sufficient,
   as a speech act might not only change the commitment state,
   but the possible continuation of commitment states;
   Example: denegation of speech acts: I don’t promise to come.

(14)  C is a Commitment Space (CS) iff
   a. C is a set of commitment states;
   b. \exists c \in C \forall c' \in C [c \neq \emptyset \land c \subseteq c']

   We call the commitment state \( \cap C \) the “root” of C, and write \( \sqrt{C} \).
Update of a commitment space with a speech act $A$, defined for commitment states:
\[ C + A = \{ c \in C \mid \sqrt{C + A} \subseteq c \} \]

Update of a commitment space with the denegation of $A$:
\[ C + \neg A = C - \{ c \in C \mid \exists c' \in C[c' + A \subseteq c] \} \]
i.e. exclude from $C$ all $c$ for which the commitments of $A$ hold.

Notice: Denegation does not change the root of the input CS, but prunes the possible future developments; it is a meta speech act (Cohen & Krifka 2011).

Update with denegation of $A$, lifted to commitment spaces:
\[ C + \neg A = C - \bigcap \{ C'' \subseteq C \mid \exists C' \subseteq C[C' + A = C'' \} \]

**Commitment Space Developments CSD:**
Sometimes a conversational move is rejected; captured by **stack** of commitment spaces, modeled by a sequence.

Update of a CSD with a speech act:
\[ \langle ..., C \rangle + A = \{ ..., C, C+A \} \]

**4. Assertions and reactions to assertions**

**4.1 Assertions**

Assertions have two purposes:

a. Express commitments for a proposition by the speaker
b. Attempt to make the asserted proposition part of the common ground

These two purposes can be dissociated; in particular, (b) is not essential for assertions, against e.g. Bach & Harnish 1982: 
*Believe it or not, I didn’t steal the cookie.*

Adding of a proposition to a commitment state (similar, to commitment space):

\[ c + \phi = c \cup \{ \phi \} \]

Interpretation of Assertion:
\[ \langle ..., C \rangle + \text{assert}_{S1,S2}(\phi) \]
\[ = \{ ..., C + S1[S2] \models \phi, \]
\[ C + S1[S2] \models \phi + \phi \} \]
adding assertive commitment
adding proposition itself
A proposal for the syntactic and prosodic realization:

a. ⊢ operator, introduction of $S_1 \vdash \varphi$ (derived from Rizzi 1997; cf. also performative hypothesis of Ross 1970, Sadock 1974):

$$[	ext{ForceP} \; \text{John} \; \text{Force} \; \varphi \; \text{TP} \; \text{t} \; \text{arrived} \; \text{t} \; \text{John} \; \text{t} \; \text{arrived} \; \text{t} \; \text{ed} \; \text{t} \; \text{John} \; \text{t} \; \text{arrived} \; \text{t} \; \text{ed}]$$


$$(H^*) \; L^\%$$

With $+\varphi$, $S_1$ proposes to make $\varphi$ common ground (cf. “projected set” i in Bruce & Farkas 2011).

4.2 Reactions to assertions

(26) Answer okay, mhm, or no reaction:

- $S_2$ accepts the proposed commitment space,
- in particular: accepts $\varphi$ as part of the common ground,
- but does not express a public commitment for the proposition $\varphi$

$$\{..., \; C + S_1[S_2] \vdash \varphi, \; \text{Assertion of } \varphi \text{ by } S_1, \; C + S_1[S_2] \vdash \varphi + \varphi \} \; \text{proposal to make } \varphi \text{ common ground}$$

(27) Answer yes: $S_2$ asserts the same proposition:

$$\{..., \; C + S_1[S_2] \vdash \varphi, \; \text{Assertion of } \varphi \text{ by } S_1, \; C + S_1[S_2] \vdash \varphi + \varphi \} \; \text{agreeing assertion of } \varphi \text{ by } S_2$$

where yes picks up a propositional discourse referent introduced by the TP of the antecedent clause (Krifka i.prep.), here $[\text{TP} \; \text{John arrived}]$.

(28) Answer no: $S_2$ negates the same proposition;

for consistency, this requires a previous rejection,

- as a common ground $c$ cannot contain both $\varphi$ and $S_2 \vdash \neg \varphi$

$$\{..., \; C + S_1[S_2] \vdash \varphi, \; \text{Assertion of } \varphi \text{ by } S_1, \; C + S_1[S_2] \vdash \varphi + \varphi \} \; \text{proposal to make } \varphi \text{ common ground}$$

$$\{..., \; C + S_1[S_2] \vdash \neg \varphi, \; \text{REJECT}_{S_2}: \text{Return to last step} \}$$

The resulting common ground contains conflicting commitments, but is not contradictory.

(29) $\{..., \; C, \; C + A_{S_1,S_2} \} \; \text{REJECT}_{S_2} = \{..., \; C, \; C + A_{S_1,S_2}, \; C\}$

Cf. Krifka (t.a. b) for a more detailed view involving propositional discourse referents.

5. Polarity questions

(30) Question radicals vs. questions speech acts:

a. Mary knows $[\text{CP whether } [\text{TP} \; \text{John arrived}]]$

b. Did John arrive?
(31) Question radicals: A set of propositions (cf. Hamblin 1973)
\[ [\text{CP} \ \text{whether} \ [\text{TP} \ \text{John \ arrived}]], \]
interpreted as \{‘John arrived’, ‘John arrived’\}, = \{φ, ¬φ\}

(32) Use in embedded questions (weak reading):
Mary knows whether John arrived.
λi∀p∈Φ[p(i → Mary knows in i that p)]

(33) Syntax of polar question speech act, illocutionary operator: ?
complementizer not realized
\[ [\text{Force}_P \ [-\text{did} \ [\text{CP} \ \text{whether} \ [\text{TP} \ \text{John \ did \ arrive}]]]] \]

(34) Interpretation as a meta speech act:
\{ ..., C \} + S_1, to S_2: [\text{Force}_P \ [-\text{did} \ [\text{CP} \ \text{whether} \ [\text{TP} \ \text{John \ arrive}]]] = \{ ..., C, \{√C\} ∪ \{C + S_2[S_1] ⊢ p | p ⊆ \{φ, ¬φ\} \}

(35) Congruent answer picks out one of the options:
 a. Yes: Picks up discourse referent for TP, φ = ‘John arrived’,
S_2 asserts this discourse referent, φ.
b. No: Picks up discourse referent for TP, φ = ‘John arrived’,
S_2 asserts negation of this discourse referent, ¬φ

(36) Incongruent answers, e.g. I don’t know:
Require first a REJECT operation,
followed by assertion S_2[S_1] ⊢ ‘S_2 does not know whether φ’

Figure 7: Answer REJECT + I don’t know.

Evidence for this modeling of questions:

(37) Interrogative flip with reportatives, evidentials (Speas & Tenny 2003, Faller 2006).
What has John reportedly done?
Expected answer: She (reportedly) called the boss an idiot.
Interpretation of discourse particles (Zimmermann 2004, German *wohl*):

(a) *Es wird wohl regnen.*
   - ‘Presumably, it will rain.’

(b) *Wird es wohl regnen?*
   - ‘Will it rain, presumably?’

Egophoricity (cf. Creissels 2008, conjunct/disjunct systems):

(44) (Northern Ahkvahk, NE Caucasian, Creissels 2008)

(a) *de-de kaʁa qwar-ada*
   - 1s-ERG paper write-EGO
   - ‘I wrote a letter’

(b) *me-de ču ṅa kaʁa qwar-ada*
   - 2s-ERG when paper write-EGO
   - ‘When did you write a letter?’

(c) *me-de kaʁa qwar-ari*
   - 2s-ERG paper write-N.EGO
   - ‘You wrote a letter.’

(d) *de-de ču ṅa kaʁa qwar-ari*
   - 1s-ERG paper write-N.EGO
   - ‘When did I write a letter?’

6. Requests and negation in questions

6.1 Requests to form monopolar questions

   *There is a vegetarian restaurant around here?*

(41) Assume meta speech act operator REQU, applied to speech acts A:
   \[ C + \text{REQU}_{S_1,S_2}(A) = C + A_{S_2,S_1} \]
   i.e. \(S_1\) requests from \(S_2\) to perform the speech act \(A\).

(42) In declarative questions, REQU is expressed solely by prosody:
   H\% boundary tone: Authority shift to addressee,
   L* nuclear tone: No commitment to proposition.

(43) \[ C + \text{REQU}_{S_1,S_2}([\text{ForceP} \vdash [\text{TP} \text{John arrived}]]) \]
   \[ = \{ \Box C \} \cup C + S_2[S_1] \vdash \varphi; \]
   notice that this is a question that proposes only one continuation
   (monopolar question vs. bipolar question).

(44) Assume that REQU can, like ?, also be head of a ForceP
   triggering head movement of auxiliary do.
   \[ [\text{ForceP} \vdash [\text{REQU}-\text{did} [\text{ForceP} \text{John} \vdash [\text{TP} \text{John t did arrive}]]]]; \]
   notice: there is no question radical, but an embedded assertion.

(45) Prosodic signature of this reading: nuclear tone L*, boundary tone H%,
   in contrast to regular bipolar questions, which allow for H* L%

(46) **Congruent** answer yes picks out the only proposed continuation:
   Yes: Picks up discourse referent for \([\text{TP} \text{John arrived}]\), \(\varphi = \text{‘John arrived’},
   S_2\) asserts this discourse referent; this is the expected answer (bias).

(47) Answer no is an **incongruent** answer,
   requires first a REJECT operation,
   hence more complex than yes – captures the bias of this type of question.
(48) Question based on negated proposition: Did John not arrive?
   \[
   [\text{ForceP} \ [\text{REQU}-\text{did} \ [\text{ForceP} \ John \ [\vdash \ [\text{TP} \ t_{\text{John}} \ t_{\text{did} \ not \ arrive}]]]]],
   \]
   results in \{\neg C \cup C + S_1[S_1] \vdash \neg \varphi\;\}
   now \textit{no} is a congruent answer, hence question is biased towards \neg \varphi
   \textit{yes, he did!} is an incongruent answer requiring prior REJECT

(49) English root questions are ambiguous w.r.t. bipolar and monopolar reading, but...
   – Chinese has distinct forms, \textit{shi-bu-shi} questions and \textit{ma}-questions;
   – Questions based on negated propositions pragmatically restricted to monopolar questions,
     as negation would not make a difference with bipolar questions.

6.2 High negation in questions

(50) \textit{Didn’t John arrive?} (on high negation reading).
Here we assume denegation, cf. (13) above.
   \[
   [\text{ForceP} \ [\text{REQU}-\text{did} \ [\text{NegP} \ n’t \ [\text{ForceP} \ John \ [\vdash \ [\text{TP} \ t_{\text{John}} \ t_{\text{did} \ arrive}]]]]]]
   \]

(51) \[
   C + \text{REQU}_{S_1,S_2} (\sim (\neg \varphi))
   = \{\neg C \cup C + S_2[S_1] \vdash \neg \varphi\}
   = \{\neg C \cup C \vdash \exists c' \in C (\exists c' \in C (c' + S_2[S_1] \vdash \neg \varphi \subseteq c))\},
   \]
i.e. S_1 requests that S_2 rules out asserts that \varphi by S_2.

Explanation of bias (cases: Büring & Gunlogson 2002):

(52) Positive bias: High negation inappropriate.
   S_2: \textit{There are all kinds of restaurants here, you can choose.}
   S_1: \textit{Isn’t there a vegetarian restaurant here?}
   No reason for S_1 to check whether S_2 would exclude assertion of \varphi, as it seems that S_2 endorses \varphi.

(53) Neutral bias: High negation possible.
   S_1: \textit{Remember, we have been to Mooswood’s, and we liked it.}
   Isn’t there a vegetarian restaurant around here (too)?
   S_1 checks whether an option of interest has to be excluded; preferable over \textit{Is there a vegetarian restaurant around here (too)?},
   as this bipolar question treats both options as being of equal interest and relevance.

(54) Negative bias: High negation possible, especially with prosodic incredulity contour:
   S_2: \textit{We can’t go out here, because John doesn’t eat meat.}
   S_1: \textit{Isn’t there a vegetarian restaurant around here?!}
   Here S_1 double-checks whether \varphi indeed has to be excluded; preferable over \textit{Is there a vegetarian restaurant around here?},
   as this treats both options as equal, but \varphi less likely to be true in the context given.

(55) Under negative bias we also can have requests based on negated propositions:
   S_1: \textit{Is there no vegetarian restaurant around here?}
   Request for asserting that there is no veg. restaurant makes it easier for addressee to assert
   the probable answer.
And under positive bias, cf. (52), we can have requests based on positive propositions:

\[ S_1: \text{Is there a vegetarian restaurant around here?} \]

7. Constituent questions and focus in answers

7.1 Constituent questions

(57) Constituent question radical (Hamblin 1973):
A set of propositions
as a result of the interpretation of the wh expression:
\[ [\text{CP who } t_{\text{who}} \text{ arrived}] \]
\[ = \{ 'x \text{ arrived}' | x \in \text{PERSON} \}, = \Phi \]
e.g. \{ ‘John arrived’, ‘Mary arrived’, ‘Sue arrived’ \}

(58) Constituent question radical in embedded questions:
\[ \text{Bill knows who arrived.} \]
proposition: \( \lambda i[\forall p \in \Phi [p(i) \rightarrow \text{Bill knows in } i \text{ that } p]] \)

(59) Constituent questions:
\[ \left[ \text{forcep who } [\text{?}-\text{did } [\text{CP t}_{\text{who}} \text{ who_t did arrive}]] \right] \]
\[ \langle ..., C \rangle + S_1, \text{ to } S_2: \text{Who did arrive?} \]
\[ = \{ ..., C, \{ \neg C \} \cup \{ C + S_2[S_1] \vdash \neg p | p \in \Phi \} \}, \]
proposed continuations restricted to assertions
by the addressee (S_2) of questions in the question radical

(60) Fully congruent answer to a question:
Takes up one of the proposed continuations.
\[ \langle ..., C, \}
\[ \{ \neg C \} \cup \{ C + S_2[S_1] \vdash \neg p | p \in \Phi \} \}
\[ + S_2[S_1] \vdash \text{‘John arrived’} \}
\[ = \{ ..., C, \}
\[ \{ \neg C \} \cup \{ C + S_2[S_1] \vdash \neg p | p \in \Phi \}, \]
\[ C + S_2[S_1] \vdash \text{‘John arrived’} \}
\[ = \{ ..., C, C’ \} \]

(61) Reaction \textit{I don’t know}:
Requires prior rejection,
then assertion: \( S_2[S_1] \vdash ‘S_2 \text{ does not know’} \)

(62) Partially congruent answers, e.g. \textit{Not John}.
Modeling by rejection of current CS
and performing an assertion that rules out certain proposed continuations.
Alternatively, allow that constituent questions allow for more continuations,
e.g. wh words may vary over quantifier meanings
like \textit{not John, several people, nearly everyone} etc.
7.2 Focus in assertions

(63) Focus to mark congruence of answer to question:
\[ S_1: \text{Who did arrive?} \]
\[ S_2: \text{JOHN} \, \text{arrived.} \]

(64) Focus indicates propositional alternatives (Rooth 1992):
Pair of proposition and alternatives \( \langle \varphi, \Phi \rangle \):
\[ \{ \text{‘John arrived’, ‘x arrived’ | x \in \text{THING} \} \}, \]
\[ = \{ \text{‘John arrived’, } \Phi \}, \]
notice that \( \Phi \subseteq \Phi' \),
congruent to question radical \textit{who arrived}, cf. (57)

(65) Focus indicating assertional alternatives:
Focus projects to the illocutionary level.
\[ \{ S_2[S_1]\} \vdash \text{‘John arrived’}, \]
\[ \{ S_2[S_1]\} \vdash \text{‘x arrived’ | x \in \text{THING} \} \}, \]
\[ = \{ A, A \} \]

(66) Update of commitment space development with focused assertion: \( \{ ..., C \} + \{ A, A \} : \)
\[ \text{– presupposes that } \forall A'[\forall C + A' \text{ is a move in } C \rightarrow \exists A'' \in A[A' = A'']] \]
\[ \text{– if presupposition is satisfied: } \{ ..., C \} + \{ A, A \} = \{ ..., C \} + A \]

(67) This presupposition is satisfied for the assertion of \text{JOHN} \, \text{arrived}
if the question \textit{Who did arrive?} was asked first:
The input commitment space must be such that each continuation from the root
is of the form of an assertion ‘x arrived’, asserted by \( S_2 \) to \( S_1 \).

(68) The alternatives indicate the proposed continuations,
given the current state in conversation (cf. e.g. von Stechow 1992, Rooth 1992);
if not present, this can trigger accommodation of the input commitment space.

8. Focus in polarity questions

(69) Example: \textit{Did John} \, \text{arrived?}
Congruent answers: \textit{Yes.} / \textit{No, BILL} \, \text{arrived.}

(70) Dedicated focus marker for polarity questions in Slavic languages: \textit{li},
e.g. Dukova-Zheleva (2010) for Bulgarian:
a. \textit{Risuva li Ivan vseki den?}  
\text{draws LI Ivan every day}
\text{‘Does Ivan draw/DRAW every day?’}
b. \textit{Ivan li risuva vseki den?}  
\text{Ivan LI draws every day}
\text{‘Does IVAN draw every day?’}

(71) Observations with regard to focus in polarity questions:
a. This kind of focus in polarity questions requires the monopolar reading:
\text{it is a biased towards the proposition ‘John arrived’}.  
b. Possible also in declarative questions: \text{JOHN} \, \text{arrived? – No, Mary.}
c. Equivalent to specified constituent question: \textit{Who arrived? John?}
Proposed analysis:
A monopolar question with focus indicates a commitment space $C$ in which the alternative monopolar questions are asked; this corresponds to the general rule (66).

$S_1$, to $S_2$: $\{\text{REQU-did} \ [\text{Force} \ John_F \ [\vdash \ [TP \ t_{John} \ \text{did} \ \text{arrive}]]]\}
\langle S_2[S_1]|'John \ arrived', \ S_2[S_1]|'x \ arrived' \ | \ x\in\text{THING} \rangle$

Update of commitment space development with focused polarity question just as with focused assertions, cf. (66).

\{..., $C$\} + (73)
- presupposed: $\forall A'[[\sqrt{C + A'} \ is \ a \ move \ in \ C \ \rightarrow \ \exists x \in \text{THING}[A' = S_2[S_1]|'x \ arrived']$
- if satisfied: = \{..., $C$, $C + S_2[S_1]|'John \ arrived'\}$
Recall that this is a move by $S_1$, i.e. $S_1$ presupposes that the proposed moves are assertions by $S_2$ of propositions 'x arrived' and $S_1$ asks the monopolar question $\text{Did John arrive}$?

Figure 17:
Alternatives of question $\text{Did JOHN arrive}$?, with $p_1 = 'Mary \ arrived'$, $p_2 = 'John \ arrived'$, $p_3 = 'Bill \ arrived'$

Figure 16:
Meaning of question $\text{Did JOHN arrive}$?

That is: $\text{Did JOHN arrive}$? presupposes the effects of a question $\text{Who did arrive}$?
This captures the naturalness of the sequence: $\text{Who did arrive? John}$?

Answer Yes: $S_2$ in fact makes the assertion $\text{John arrived}$, by asserting the propositional discourse referent introduced by $[TP \ John \ arrived]$ – Figure 18

Answer No: $S_2$ makes an assertion that negates this discourse referent; this requires a prior REJECT operation, returning to the original alternatives – Figure 19 i.e. the only legal moves there are assertions of propositions of the type ‘x arrived’ by $S_2$. 

Manfred Krifka, July 5, 2013
(79) Not represented in Figure 19: Assertion $S_2 \vdash \neg p_2$
Assume that presupposed questions are carried over.

(80) It is essential for this analysis of focus in polarity questions
that the questions are monopolar;
this captures the asymmetry between answers yes (simple) and no (requires REJECT).

(81) This is distinct from focus in constituent questions:
*When will JOHN arrive?*
Alternative constituent questions:
*When will Mary arrive? When will John arrive? When will Bill arrive?*
Answering one question returns to the remaining questions in any case.
This requires an implementation of discourse trees with the help of stacks

9. References


Büring, Daniel & Christine Gunlogson. 2000. Aren’t positive and negative polar questions the same? LSA Annual meeting.


