Questions and Question Acts

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1. Introduction

Semantic models for questions

The study of questions in semantics has proposed different semantic representations, ultimatel based on the semantic types of entities, truth values, possible worlds:

(1) *Who did John meet?*

- Functional model (e.g., Belnap & Steele 1976, Hausser 1983):
  λx∈PERSON[‘John met x’]
- Proposition set model (e.g., Hamblin 1973):
  {‘John met x’ | x ∈ PERSON}
- Partitional model (Groenendijk & Stokhof 1982):
  {p | ∀i,j∈p ∀x[‘John met x in i’ ↔ ‘John met x in j’]}, type ⟨p, t⟩
- Inquisitive semantics (Groenendijk & Roelofsen 2009):
  Relational model, or a variety of the proposition set model.

Explananda:

- Meaning contribution of embedded questions, as in *Mary knows who John met.* -- o.k.
- What triggers the use of root questions, as in *Who did John meet?* -- implicit in theory.

In semantic models, the use of root questions remained implicit, e.g. statements like

- “Sentences are taken to express proposals to update the common ground”,
- “if a sentence is inquisitive, it requests a response that provides enough information to establish at least one of the proposed updates”

Theories propose no word, or operator, that would trigger such uses.

Pragmatic models for questions

The study of questions in pragmatics, especially speech-act theory, has focused on the use of questions in communication.

- Searle (1975): Questions as a type of speech act
  (subtype of directives, requests the addressee to give information of a specified kind).
- Stenius (1967): Questions as a language game that follows conversational rules.
  Illocutionary operator takes propositional content and turns it into a speech act.

Explananda:

- Use of root questions: this is the target of the theory.
- Embedded questions: Not of concern.

Goal of the present talk:

- Argue that a semantics of questions should incorporate questions as speech acts, as semantic operators can operate on such speech acts.
- Argue that the pragmatic uses of speech acts are encoded in the syntax.
- Sketch how this can be done.

Phenomena to be discussed:

- Quantification into questions

(2) How many cookies did every child steal?

- Particles operating over questions

(3) What’s your name again?

- Bias in questions

(4) a. *John stole the cookies?*
    b. *Didn’t John steal the cookies?*

2. Speech acts, commitments, and commitment changes

Cf. for the following: Cohen & Krifka, to appear.

2.1 Speech acts as commitment changers

Speech acts change commitment of interlocutors

Cf. e.g. Alston 2000, Harnish 2005, Gunlogson 2002.

- Assertion of φ by S1 to S2:
  S1 has to provide evidence for the truth of φ on request by S2.

(5) S1, to S2: *John stole the cookies.*
    S2: *How do you know that?* -- A legitimate question.

- Command of φ[S2] by S1 to S2: S1 has to act in such a way to make φ[S2] true.

(6) S1, to S2: *Eat some cookies!*
    Obliges S2 to act in such a way that ‘S2 eats some cookies’ becomes true.

- Question of a proposition set Φ by S1 to S2:
  S2 has to assert those φ ∈ Φ that can be asserted to S1 (given Assertion rule a).

(7) S1, to S2: *Who stole the cookies?*
    S1 obliges S2 to assert the true propositions of the content ‘x stole the cookies’

Distinction between proposal of a speech act by one participant and its acceptance by the other – not formally incorporated here (cf. e.g. Gunlogson 2002, Farkas & Bruce 2009).

2.2 Modelling of commitment state changes

Basic assumptions:

- Commitments resulting from an (accepted) speech act at a particular point in discourse can be specified in a representation language (not detailed here).

- A discourse consists in a successive development of commitments.
- Any point in discourse is characterized by a **commitment development** leading up to it.

Commitment developments, and changes of commitment developments:

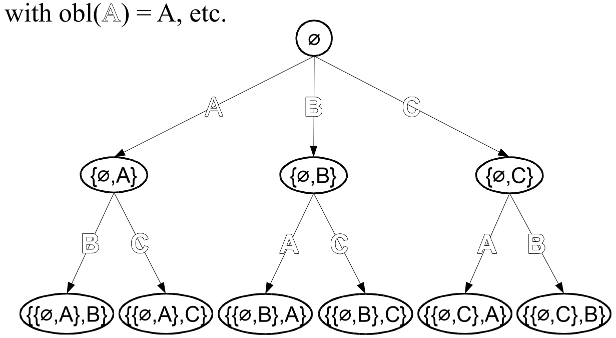
(8) Let c be a commitment development, the current point of discourse, let $A_{S1,S2}$ be a speech act with S1 as actor and S2 as addressee, then $c + A_{S1,S2} = \{c, obl(A_{S1,S2})\}$ is a commitment development, where $obl(A_{S1,S2})$: the obligations (commitments) that originate from S1's performing the speech act A to S2 (at the current point of discourse).

There are restrictions on performing this operation; e.g., assertive consistency: ¬φ cannot be asserted when φ has been accepted in c.

Update of c by speech act A, followed by speech act B:

(9) c + A + B = [c + A] + B = {{c, obl(A)}, obl(B)}

(10) Game tree, update of empty commitment state, three speech acts 𝔸, 𝔹, ℂ, with obl(𝔸) = A, etc.



Continuation of commitment development:

(11) a. c < {c, commitments}
b. if c < c′ and c′ < c″, then c < c″
c. c ≤ c′ iff c = c′ or c < c′

From commitment developments to commitment sets:

(12) Definition of recursive union:
a. ⩀{∅, commitments} = {commitments}
b. ⩀{c, commitments} = {⩀c, commitments}

(13) Example:
⩀{{∅, obl(A)}, obl(B)} = {obl(A), obl(B)}

Rules of discourse, e.g. assertive consistency:

(14) $c + ASS_{S1,S2}(\varphi)$ requires that φ is consistent with the conjunction of all the assertive commitments in ⩀c.

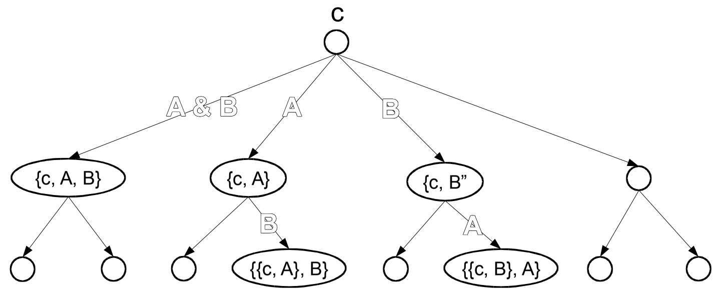
2.3 Modelling conjunction of speech acts

Dynamic conjunction of speech acts ";"

(15) c + [A ; B] = [c + A] + B = {{c, obl(A)}, obl(B)}

Static conjunction of speech acts, "&":

(16) c + [A & B] = [c + A] ∪ [c + B] = {c, obl(A), obl(B)}



Notice: While the commitment developments are different, the resulting commitments are the same: ⩀{c, A, B} = ⩀{{c, A}, B} = ⩀{{c, B}, A} = {⩀c, A, B}

3. Quantification into questions

Cf. Krifka (2001a).

3.1 Universal quantification into questions as generalized conjunction.

(17) a. *How many cookies did every child steal?*
b. ∀x∈CHILD['How many chookies did x steal?']
c. With universal quantification as generalized conjunction:
$\bigwedge_{x \in CHILD}$ ['How many cookies did x steal?']
d. 'How many cookies did John steal' ∧
'How many cookies did Mary steal' ∧
'How many cookies did Bill steal'

But: Boolean conjunction not definied for questions.

With static speech act conjunction:

(18) a. c + $\&_{x \in CHILD}$ [QU('how many cookies x steal')]

b. c + [QU('how many cookies John steal') &
QU('how many cookies Mary steal') &
QU('how many cookies Bill steal')]

c. {c, obl(QU('how many cookies John steal'),
obl(QU('how many cookies Mary steal'),
obl(QU('how many cookies Bill steal')}

Condition: *every* and conjunction can be interpreted as speech act conjunction, &.

Justification: Equivalent effect of boolean and speech act conjunction for assertions:

(19) c + ASS('John danced and Mary sang')
= {c, obl(ASS('John danced and Mary sang'))}

(20) c + [ASS('John danced') & ASS('Mary sang')]
= {c, obl(ASS('John danced')), obl(ASS('Mary sang'))}

Under the assumption that obl(ASS($\varphi \wedge \psi$)) = obl(ASS(φ)), obl(ASS(ψ)), the resulting obligations are equivalent.

3.2 Restriction to universal quantification

(21) *How many cookies did most children steal?*
Does not have reading: 'For most children x, how many cookies did x steal?'

Observe: *most* cannot be defined by conjunction $\wedge$ alone, also requires disjunction:

(22) *Most children danced.*
[J danced $\wedge$ M danced] $\vee$ [J danced $\wedge$ B danced] $\vee$ [M danced $\wedge$ B danced]

But there is no corresponding speech act disjunction. Why not? Because speech act disjunction would lead to ambiguous commitments.

Cf. Assertion, hypothetical disjunction:

(23) c + [A or B] = {{c + obl(A)}, {c + obl(B)}}

Result: disjunctive commitment state, definition of continuation <, recovery of commitments ⋓ not possible.

3.3 Embedded questions

Embedded question radicals:

(24) *John knows how many cookies Mary stole.*
KNOW('how many cookies Mary stole')(John)

With functional reconstruction of question radical:

(25) KNOW(λn: NUMBER['Mary stole n cookies'])(John)

Interpretation of question-embedding vs. proposition-embedding KNOW:

(26) KNOW(Q)(x) $\Leftrightarrow$ $\forall$y[Q(y) is true $\rightarrow$ KNOW(Q(y))(x)]]

(27) KNOW(λn: NUMBER['Mary stole n cookies'])(John)
$\Leftrightarrow$ $\forall$n['Mary stole n cookies' is true $\rightarrow$ KNOW('Mary stole n cookies')(John)]

Embedded question acts:

(28) John wonders how many cookies Mary stole.

Root clause word order (Irish English), root clause question particles (German *denn*):

(29) a. *John wonders, how many cookies did Mary steal.* (cf. McCloskey 2005).
b. *John fragt sich, wie viele Plätzchen Mary <u>denn</u> gestohlen hat.*

In the theory developed here, speech acts have a semantic type (changes of commitment developments), and hence can, in principle, be embedded under semantic operators.

(30) WONDER(QU('how many cookies Mary steal'))(John)

Interpretation of question-embedding WONDER:

(31) WONDER(Q)(x) $\Leftrightarrow$ x is in an inquisitive state that would be (partially) satisfied by answers to the question speech act Q.

Differences in quantification into questions:

(32) *The teacher knows how many cookies most children stole.*
Wide scope reading possible, as speech acts are not involved:
MOST(CHILD, λx['teacher knows how many cookies x stole'])

(33) *The teacher wonders how many cookies most children stole.*
Wide scope reading not possible, as speech acts are islands for quantifiers:
WONDER(<u>MOST(CHILD, λx[QU('how many cookies x stole')</u>(the teacher)
not interpretable

(34) *The teacher wonders how many cookies every child stole.*
WONDER($\underset{x \in \text{CHILD}}{\&}$ QU('how many cookies x stole'))(the teacher)

Minimal variant:

(35) a. *The teacher wants to find out how many cookies every child stole.*
b. **The teacher wants to find out how many cookies most children stole.*
c. *The teacher wants to find out <u>for most children</u> how many cookies they stole.*
Quantifier not embedded, no island violation.

3.4 Syntactic representation

Sentence radicals are IPs; Speech acts are Force-Phrases (FrP):

(36) [$_{\text{IP}}$ *John stole three cookies*],
proposition: 'John stole three cookies'

(37) [$_{\text{FrP}}$ *ASS* [$_{\text{IP}}$ *John stole three cookies*]], or:
[$_{\text{FrP}}$ *John* [$_{\text{ForceP'}}$ [$_{\text{Force0 [ASS]}}$ *stole* [$_{\text{IP}}$ __ __ *three cookies*]]]]
Speech act: ASS('John stole three cookies').

With questions: IP undergoes wh-movement.

(38) $[_{IPQ}$ *what* $[_{IP}$ *John stole* __]],
e.g., functional interpretation: λx∈THING[‘John stole x’]

(39) $[_{FrP}$ *what* $[_{FrP'}$ $[_{FrP\,[QUEST]}$ *did* $[_{IPQ}$ __ $[_{IP}$ *John steal* __]]]]]
Speech act: QU(λx∈THING[‘John stole x’])

4. Particles scoping over speech acts

Speech acts can be modulated by discourse particles like *well* and *now* (in discourse uses).

Sometimes a “semantic” particle appears to scope over a speech act.
Here: *again,* based on an observation by Uli Sauerland.

Cf. event-related vs. speech-act related use of *again*:

(40) *John stole a cookie again.*
‘John stole a cookie; presupposed: He stole a cookie before.’

(41) *What’s your name again?*
Again, what’s your name?
a. ‘What’s your name; presupposed: You had this name before.’ (improbable)
b. ‘I ask you to tell me your name; I have asked it before, or I have known it before.’

(42) $[_{FrP}$ $[_{FrP}$ *what is your name*] *again*]

(43) c + AGAIN(QU(‘what your name is’))
= c + QU(‘what your name is’);
presupposed: ∃c′[c′ + QU(‘what your name is’) < c]

Notice: The question doesn’t have to be put literally before; what matters is that its conversational effects have been introduced before.

5. Denegation of speech acts and Commitment spaces

5.1 A problem posed by denegations of speech acts

Inner vs. outer negation in promises, cf. Searle (1969):

(44) a. *I promise not to come.*
b. *I don’t promise to come.*

Hare (1970): speaker is explicitly refraining from making the speech act in question, i.e. from making the promise to come. -- **denegation** of a promise, here written as “~”

Denegation is not compatible with *hereby* as marker of explicit performatives:

(45) a. *I hereby promise to come.*
b. **I hereby don’t promise to come.*

Explicit performatives: Fine verb transfers speech act feature to FrP:

(46) a. $[_{FrP}$ *I* $[_{FrP'}$ $[_{FrP\,[PROMISE]}$ *promise* $[_{IP}$ _ $[_{VP}$ _ $[_{VP[to]}$ *not to come*]]]]]]
b. c + $PROMISE_{S1,S2}$ (¬ ‘S1 comes’)

Negation can scope over FrP:

(47) a. $[_{NegP}$ *I* [*don’t* $[_{FrP}$ _ $[_{FrP'}$ $[_{FrP\,[PROMISE]}$ *promise*] $[_{IP}$ _ $[_{VP}$ _ $[_{VP[to]}$ *to come*]]]]]]
b. c + ~ $PROMISE_{S1,S2}$ (‘S1 comes’)

But what should this mean? Cannot be modelled by update of a commitment development!

Basic idea:

- Denegations restrict future developments of conversational states.
- Commitment developments, as modelled so far, capture past developments only.
- Needed: general notion of conversational games that includes possible future moves.

5.2 Commitment spaces

Commitment spaces as rooted sets of commitment developments:

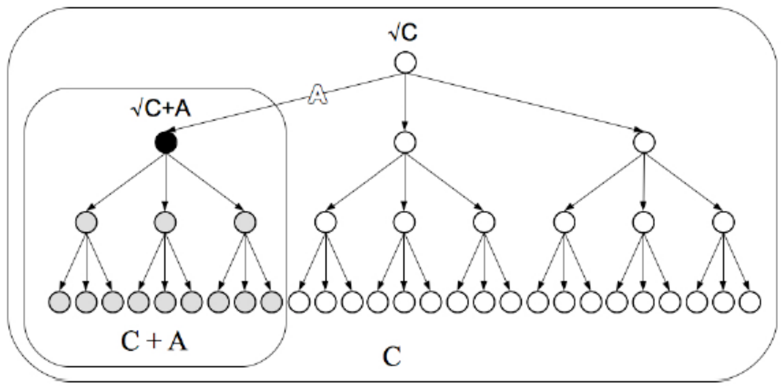
(48) C is a **commitment space** iff
a. C is a set of commitment developments;
b. ∃c∈C ∀c′∈C [c ≤ c′]

We call c the **root** of C, writing √C:

(49) If C is a commitment space, then √C = ιc∈C ∀c′∈C[c ≤ c′]

Update of commitment spaces by speech acts:

(50) C + A = {c∈C | [√C + A] ≤ c}

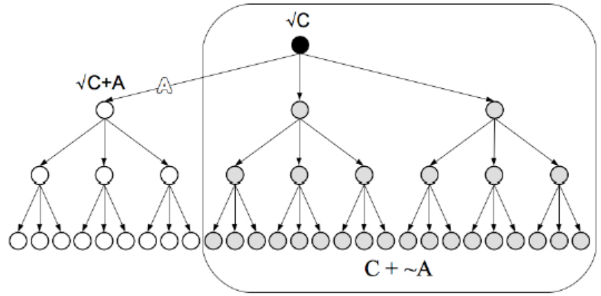


Denegation ~A of a speech act A consists of explicitly refraining from performing A.
Two possible versions:

- Refraining for the moment. (Cohen & Krifka, to appear; also, here.)
- Refraining forever.

(51) $C + {\sim}A = \overline{C + A}$

This is a commit space (a rooted set of commitment developments).



- The root does not change.
- The possible future developments of the commitments are restricted.

Meta speech acts change the rules of the conversational game.

(52) (In chess):
O.k., I see you are a much weaker player than I am. So, I won't use my queen.

Complement rule, double negation:

(53) $C + {\sim}{\sim}A = C + A$

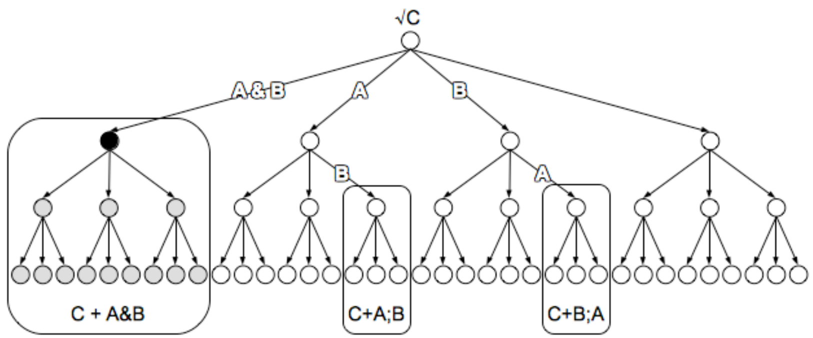
Dynamic and static conjunction in the new setting:

(54) $C + [A ; B] = \{c \in C \mid \surd C + [A ; B] \leq c\}$

(55) $C + [A \& B] = \{c \in C \mid \surd C + [A \& B] \leq c\}$

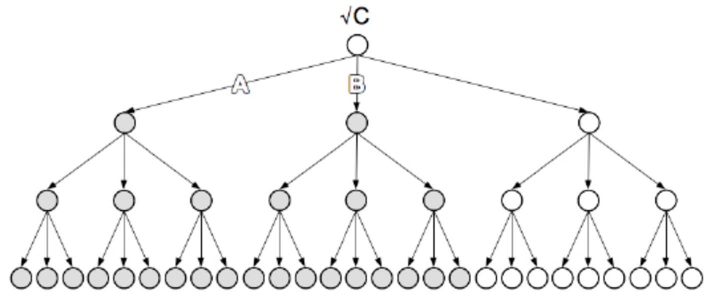
Illustration; the resulting commitments are identical.

(56)



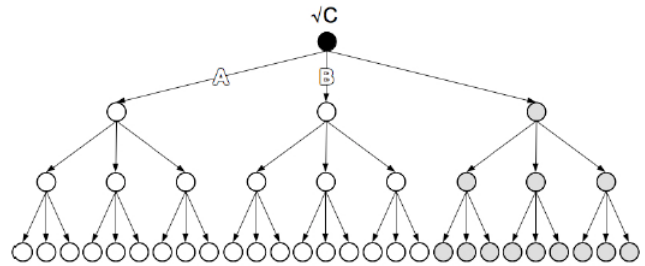
Disjunction does not lead to a commitment space, as it results in a non-rooted set:

(57) $C + [A \vee B] = [C + A] \cup [C + B]$



But interestingly, denegation of a disjunction results in a commitment space:

(58) $C + {\sim}[A \vee B] = \overline{C + [A \vee B]} = \overline{[C + A] \cup [C + B]}$



(59) *I don't promise to marry you or swear to stay with you.*
⇔ *I don't promise to marry you and I don't swear to stay with you.*

Here *and* in the second case expresses Boolean conjunction on commitment spaces:

(60) $C + {\sim}[A \vee B] = \overline{[C + A] \cup [C + B]} = \overline{[C + A]} \cap \overline{[C + B]} = C + [{\sim}A \wedge {\sim}B]$

Boolean conjunction of regular speech acts would lead to empty commitment spaces:

(61) $C + [A \wedge B] = [C + A] \cap [C + B] = \varnothing$, if A, B are regular speech acts.

6. Questioning speech acts

6.1 Classical treatment: Questions based on question radicals.

Classical treatment of questions as speech acts (e.g., Stenius 1967):

(62) S1, to S2: *How many cookies did John eat?*

a. Sentence radical: $\lambda n \in \mathbb{N}$[‘John ate n cookies]

b. Question: $QU_{S1,S2}(\lambda n \in \mathbb{N}$[‘John ate n cookies’])

c. $obl(QU_{S1,S2}(\lambda n{\in}\mathbb{N}$[‘John ate n cookies’])):
S1 adds commitment to S2 to assert for which argument n′
$\lambda n{\in}\mathbb{N}$[‘John ate n cookies’](n′) yields a true proposition.

d. Example satisfaction of commitment: S2 asserts *Three*, or *John ate three cookies.*

(63) S1, to S2: *Did John eat cookies, or not?*

a. Sentence radical: λp∈{‘John ate cookies’, ¬‘John ate cookies’}[p]

b. Question: $QU_{S1,S2}$(λp∈{‘John ate cookies’, ¬’John ate cookies’}[p])

c. obl($QU_{S1,S2}$(λp∈{‘John ate cookies’, ¬‘John ate cookies’}[p])):
S1 adds commitment to S2 to assert for which arguments p′
the sentence radical yields a true proposition.

d. Example satisfaction of commitment: S2 asserts *John didn't eat cookies.*

The same treatment has been proposed for classical polarity questions:

(64) S1, to S2: *Did John eat cookies?*

a. Sentence radical: λO∈{λp[p], λp[¬p]}[O(‘John ate cookies’)]

b. Question: $QU_{S1,S2}$ (λO∈{λp[p], λp[¬p]}[O(‘John ate cookies’)])

c. obl($QU_{S1,S2}$ (λO∈{λp[p], λp[¬p]}[O(‘John ate cookies’)]))
S1 adds commitmentments to S2 to assert for which argments O′,
where *yes*: λp[p], *no*: λp[¬p], this yields a true proposition.

d. Example satisfaction of commitment: S2 asserts *yes.*

See Krifka (2001b) for this use of the functional representation for *yes* and *no*.

6.2 Questioning speech acts: Declarative Questions and Incredulity

Declarative questions

In addition to standard questions, there are question-like moves in conversation that express a certain bias towards one answer.

One case in point: **declarative questions** (Gunlogson 2002):

(65) John ate cookies?

Gunlogson's proposal:

- Rising intonation commits the addressee to the proposition expressed (cf. Merin & Bartels 1997, Steedman 2000).

Questioning speech acts

Proposal here:

- Assume an illocutionary operator QUEST that applies to speech acts.

(66) C + $QUEST_{S1,S2}(A_{S2,S1})$:
S1 adds the obligation to S2 to indicate whether the speech act $A_{S2,S1}$
is to be performed.

(67) [$_{FrP}$ QUEST [$_{FrP}$ *John* [$_{FoceP'}$ *ate* [$_{IP}$ _ _ *cookies*]]]],
where QUEST is expressed by prosodic means.

When are such acts performed?

- S1 is uncertain whether the effects of $A_{S2,S1}$ hold or should hold in C.
- S1 thinks that S2 can decide this, as S1 would be the actor of $A_{S2,S1}$
- As the common ground is supposed to be commonly known,
S1 is likely to believe that the effects of $A_{S2,S1}$ do not hold,
otherweise S1 would not question that (negative bias).

This bias is a conversational implicature that does not always hold:

(68) [Border control, looking at passport:]
You were born in Costa Rica?

Expressing incredulity

Specialized contour for expressing incredulity (H* L+H* LH% vs. H L* HH% for normal questions, optionally accompanied by facial expression, cf. Crespo-Sendra e.a. 2011).
This contour expresses the bias by a **conventional** implicature.
Declarative questions often come with this rise:

(69) *You were born in Antarctica??*

Contribution of incredulous question contour:

(70) C + $QUEST.INCR_{S1,S2}(A_{S2,S1})$
S1 expresses doubt that C contains the obligations
that a prior performance of $A_{S2,S1}$ would have had;
S1 adds obligation to indicate whether $A_{S2,S1}$ should indeed be performed.

Questioning speech acts can affect other speech acts than assertions, like commands, addressing persons (vocatives), questions. The following examples are echoes of speech acts uttered before (cf. Bolinger 1987, “Echos reechoed”).

(71) S1: *Open the window!*
S2: *Open the window?? But it's cold in here!*
S2 questions the justification of S1 to utter the command,
e.g. because it is not reasonable.

(72) S1: *Tom, have a look!*
S2: *Tom?? I'm Mr. Miller, for you!*

(73) S1: *Is Lithuania in Asia?*
S2: *Is Lithuania in Asia?? What a stupid question!*

We find echoing “declarative questions” as well:

(74) S1: *Lithuania is in Asia.*
S2: *Lithuania is in Asia??*

6.3 Questions with negative bias

Questions with standard question syntax can have a negative bias too, especially with incredulity intonation:

(75) Did John steal the cookies??

Proposal: QUEST, or QUEST.INCR, can be expressed by regular question formation:

(76) $[_{FrP}[_{FrP'}[_{FrP0\ [QUEST(.INCR)}$ *Did*] $[_{FrP}$ *John* $[_{FrP'}[_{FrP0\ [ASS]}$ *steal*] $[_{IP}$ _ _ *the cookies*]]]]]]

(77) C + QUEST(.INCR)$_{S1,S2}$ (ASS$_{S2,S1}$ ('John stole the cookies'))
S1 expresses doubt that C contains the obligations
that a prior performance of ASS$_{S2,S1}$('John stole the cookies') would yield;
S1 adds obligation to S2 to indicate whether ASS$_{S2,S1}$('John stole the cookies')
should indeed be performed.

This move is reasonable if the speaker has a bias towards accepting 'John didn't steal the cookies'.

6.4 Questions with positive bias

It has been observed that questions with a syntactically high negation have a positive bias (Ladd 1981, van Rooy & Šafářová 2003, Romero & Han 2004, Reese 2007, Venhuizen 2011, Repp to appear).

(78) Didn't John steal the cookies?

Proposed analysis: Denegation of embedded assertion.

(79) $[_{FrP}\ [_{FrP'}\ [_{FrP0\ [QUEST.(INCR)]}$ *Did*] $[_{NegP}$ *n't* $[_{FrP}$ *John* $[_{FrP'}\ [_{FrP0\ [ASS]}$ *steal*] $[_{IP}$ _ _ *the cookies*]]]]]]

(80) C + QUEST(.INCR)$_{S1,S2}$ ~ ASS$_{S2,S1}$ ('John steal the cookies')
S1 expresses doubt that C contains the obligations
that a prior performance of ~ ASS$_{S2,S1}$('John stole the cookies') would yield;
S1 adds obligation to S2 to indicate whether ~ ASS$_{S2,S1}$('John stole the cookies')
should indeed be performed,
i.e. whether S2 is indeed not willing to assert the proposition 'John stole the cookies'

This move is reasonable if the speaker has a bias towards accepting 'John stole the cookies'.
Different from inner negation:

(81) Did John not steal the cookies?

(82) $[_{FrP}\ [_{FrP'}\ [_{FrP0\ [QUEST(.INCR)}$ *Did*] $[_{FrP}$ *John* $[_{FrP'}$ *not* $[_{FrP0\ [ASS]}$ *steal*] $[_{IP}$ _ _ *the cookies*]]]]]

(83) C + QUEST(.INCR)$_{S1,S2}$ ASS$_{S2,S1}$ (¬'John stole the cookies')
S1 expresses doubt that C contains the obligations
that a prior performance of ASS$_{S2,S1}$(¬'John stole the cookies') would yield;
S1 adds obligations to S2 to indicate whether ASS$_{S2,S1}$(¬'John stole the cookies')
should indeed be performed.

High and low negation in German:

(84) a. *Hat John <u>nicht</u> Plätzchen geklaut?*
b. *Hat John <u>k</u>eine Plätzchen geklaut?*

6.5 Explaining question tags

(85) John stole the cookies, didn't he?

Bias towards 'John stole the cookies', just as in *Didn't John steal the cookies?*

Proposal:

- First clause proposes update:
C + ASS$_{S1,S2}$ ('John stole the cookies'),
- Second clause (question tag) checks attitude of S2:
C + QU$_{S1,S2}$ (~ ASS$_{S2,S1}$('John stole the cookies'))

(86) John didn't steal the cookies, did he?

Bias towards 'John didn't steal the cookies'.

Proposal:

- First clause propsoes update:
C + ASS$_{S1,S2}$ ('John didn't steal the cookies')
- Second clause (question tag) checks attitude of S2:
C + QU$_{S1,S2}$ (ASS$_{S2,S1}$('John stole the cookies'))

7. Summary

General points:

- Semantic theories of questions have dealt with the question sentence radical (sets of propositions, or functions to propositions).
- In addition, we need a pragmatic theory of how such question sentence radicals are used.
- But this pragmatic theory has to be part of semantics, in a broader sense, as operators like conjunction, negation, *again*, question formation operator on the pragmatic use potential of questions as arguments.

Specific points:

- Quantification into questions as generalized conjunction.
- Denegation of illocutionary acts as speech act negation.
- Particle *again* as operating over speech acts.
- Bias in declarative questions as questioning an assertion.
- Bias in questions as questioning (negated) assertions.

7.1 Adverbials

7.2 Existing Approaches

7.2.1 Romero & Han 2004, Romero 2006: VERUM operator

VERUM operator (Höhle 1992): semantic operator that is focused if the finite verb is stressed (German), in English: *do* support.

(87) Karl HAT gelogen.
Karl HAS lied
'Karl DID lie.'

Interpretation of VERUM as a common ground operator:

(88) $[\![\text{VERUM}]\!]^{g[x/i]} = \lambda p \lambda w.\ \forall w' \in Epi_x(w)[\forall w'' \in Conv_x(w')[p \in CG_{w''}]]$,
where p: proposition,
CG: common ground
$Conv_x(w')$: set of worlds where conversational goals of x in w′ are fulfilled
$Epi_x(w)$: set of epistemic alternatives of x at w

(89) *I really am tired.*
$[\![\text{VERUM}]\!]$('I am tired')(w_0)
'For all epistemic alternatives of the speaker at w_0,
when the conversational goals of the speaker are fulfilled,
the common ground contains the information that the speaker is tired.'

(90) Abbr.: SURE-CG_x('I am tired')
'We am sure we should add to CG that I am tired.' — 'we': participants

Application to biased questions:

(91) $[\![Q]\!] = \lambda p \lambda w \lambda q[q = p \vee q = \neg p]$ — Question operator

(92) *Did John bring a present?* — regular balanced question
[$_{CP}$ *Q* [*John brought a present*]]
λq[q = 'John brought a present' ∨ q = ¬ 'John brought a present']
{'John bought a present', 'John didn't buy a present'}

(93) *Did John really bring a present?* — bias: John didn't.
[$_{CP}$ *Q* [*VERUM* [*John brought a present*]]]
λq. [q = SURE-CG ('John brought a present'),
q = ¬ SURE-CG('John brought a present')
{'We are sure that we should add to CG that John bought a present',
'We are not sure that we should add to CG that John bought a present'}

Origin of bias:

- The proposition p in SURE-CG(p) is double-checked, here: 'John brought a present', as the speaker doubts that p is true – bias to ¬p, here: 'John didn't bring a present'.
- Unclear how to derive this bias precisely.

Interaction with negation: Two readings due to scopal ambiguity.

(94) *Isn't Jane coming (too)?* — bias: Jane is coming.
[$_{CP}$ *Q* [*not* [*VERUM* [$_{IP}$ *Jane is coming (too)*]]]]
λq.[q = ¬ SURE-CG('Jane is coming (too)') ∨
q = SURE-CG('Jane is coming (too)')]

(95) *Isn't Jane coming (either)?* — bias: Jane is coming.
[$_{CP}$ *Q VERUM* [*not* [$_{IP}$ *Jane is coming (either)*]]]
λq.[q = SURE-CG('Jane isn't coming (either)') ∨
q = ¬ SURE-CG('Jane isn't coming (either)')]

Problems:

- In (94), double-checking of 'Jane is coming', predicts bias: 'Jane isn't coming'
- In (95), double-checking of 'Jane isn't coming', predicts bias: 'Jane is coming'

(96) Karl DID lie.

8. Own Proposal

There is an incredulity reaction to speech acts in general.

(97) A: *Open the window!* — Command
B: *Open the window??*

(98) Student, to Professor: *Peter!* — Vocative
Professor, to Student: *Peter?? I'm Prof. Dr. Schmidt for you!*

Function: B expresses incredulity about the execution of A's speech act. For example, B challenges the right or justification of A to express that speech act.

Let CG be common ground, let CG + A[a, b] be an update of CG by a to b with the speech act A. This update can also be just inferred / presupposed.

b can react to this as follows: QU[b, a] [CG + SA[a,b]]
That is, b questions the update of CG by A[a, b].
This reaction entails a certain resistance, unwillingness by b to accept CG + SA[a, b].

(99) A: *John eats meat??*
CG + QU(A) [ASS(B)(‘John eats meat.’)
‘A questions the attempt of B to assert at CG the proposition ‘John eats meat.’

(100) A: *John doesn’t eat meat??*
CG + QU(A) [ASS(B)(‘John doesn’t eat meat.’)
‘A questions the attempt of B to assert at CG the proposition ‘John doesn’t eat meat.’

Possible reaction: B actually does assert this, perhaps by giving evidence, or B retracts.

In the previous example, meta-questions were expressed by intonation (“incredulity intonation”). In the following exampe, question syntax satisfies this function:

(101) A: *Does John eat meat??*
CG + QU(A) [ASS(B)(‘John eats meat.’)]

The same strategy holds in the folling case, but now there is a negation that is interpreted high – as negation of the assertive speech act.

(102) A: *Doesn’t John eat meat?*
CG + QU(A) [¬ASS(B)(‘John eats meat.’)
‘A questions the attemt of B **not** to assert at CG the proposition ‘John eats meat.’

This is to be contrasted with narrow-scope negation:

(103) A: *Does John not eat meat??*
CG + QU(A) [ASS(B)(‘John doesn’t eat meat.’)]
‘A questions the attempt of B to assert at CG the proposition ‘John doesn’t eat meat.’

To be explained: What does ¬ASS... mean?

We assume that *yes/no* questions are not interpreted as a set of propositions (this is the case with alternative questions, like *Will John come, or not?*, which cannot be answered with *yes* or *no*). Possible sentence radicals: set of one proposition, {‘John will come’}, or in structured meaning view, λO [O(p)], where O: negation or confirmation.

Question tags:

(104) *John eats meat, doesn’t he?*.
Same bias as: *Doesn’t John eat meat?*
First clause attempts to: CG + ASS(A)(‘John eats meat.’)
Question tag checks: CG + QU(A)[¬ASS(B)(‘John eats meat’)],
A questions the attempt (any attempt) to denegate the assertion that John eats meat.
Paraphrase: ‘John eats meat – or do you object to that?’

Funktionale Äquivalenz:

(105) *Ist das nicht die Merkel?*
Das ist doch die Merkel!

(106)