Quantifiers in Questions

Manfred Krifka
Humboldt University, Berlin
& Zentrum für Allgemeine Sprachwissenschaft (ZAS), Berlin

1. Introduction

This talk is based on Krifka (2001). Its topic is the interpretation of quantifiers in questions. I will use English data for illustration, but the phenomena to be discussed appear to be general enough to be relevant for other languages as well, at least those languages that have nominal quantifiers.

It is generally assumed that quantified NPs in questions lead to three distinct interpretations, which can be identified by their characteristic answers. The **narrow-scope** reading of (1) requires answers like (2.a), the **functional** reading, answers like (2.b), and the **pair-list** reading, answers like (2.c).

(1) Which dish did every boy make?
(2) a. (Every boy made) pasta.
b. (Every boy made) his favorite dish.
c. Al (made) the pasta, Bill the salad, and Carl the pudding.

There are reasons for distinguishing these three readings that relate to grammatical properties of the question itself, and not to their answers. First, in certain syntactic configurations pair-list readings are absent (cf. (3)). Second, many quantifiers do not allow for pair-list readings (cf. (4)).

(3) Which boy_1 [t_1 [made every dish]]?
a. Bill.
b. #The boy that likes it best.
c. #The pasta (were made by) Al, the salad, (by) Bill,
and the pudding, (by) Carl.
(4) Which dish did most/several/a few/no boys make?
a. Pasta.
b. Their favorite dish.
c. #Al the pasta, and Bill the salad.

This article will concentrate on **pair-list readings**, and argue that they are **conjoined speech acts**. While conjunction of speech acts is a natural concept, other Boolean operations aren't, which explains why only universal quantifiers allow for pair-list interpretations. I will develop a type-theoretic system for speech acts and their conjunction, and will argue that expressions that scope out of speech acts are topics. Finally I will turn to embedded questions and explain why they sometimes exhibit a different behavior.

2. Approaches to Pair-List readings

There are three major approaches to pair-list questions (cf. the overviews in Szabolcsi (1997) and Pafel (1999)), which all have their problems, as detailed in Krifka (2001). Here I will sketch them and indicate their main problems.

Karttunen (1977)

Karttunen (1977) proposes that pair-list questions involve a quantification into a question. But in his question theory, which is a variant of the theory of Hamblin (1973), this is not an easy thing to do. According to the theory, the meaning of a question is the set of possible answers, cf. (5).

(5) *Which dish did Bill make?*
{'Bill made pasta', 'Bill made salad', 'Bill made pudding'}

But then it is difficult to see how one shoud make sense out of the paraphrase in (6), as the meaning in the scope of the quantifier 'For every boy x' is not a proposition, but a set of propositions.

(6) Which dish did every boy make?
'For every boy x: Which dish did x make?'
*'For every boy x: {'x made pasta', 'x made salad', 'x made pudding'}'

In view of this problem, Karttunen proposes that root questions are embedded by a silent embedding verb, following the performative analysis of Ross (1970). If the quantifier outscopes that verb, then we get the right representation:

(7) Which dish did every boy make?
'For every boy x, I ask you: Which dish x made.'

While the proposal I will defend below is inspired by this solution, there are problems with this particular implementation — the usual problems of the performative hypothesis, as discussed in Levinson (1983), pp. 247-263. To mention just one: A question like *Which dish did Al make?*, analyzed as *I ask you which dish did Al make*, would necessarily be true, just like other performative sentences.

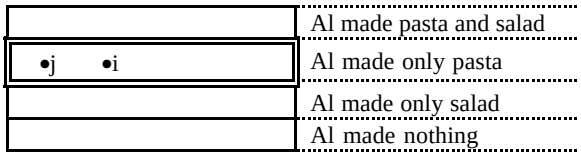
Groenendijk & Stokhof (1984)

The theory of Groenendijk and Stokhof (1984) is similar to Hamblin's or Karttunen's, insofar questions denote sets of possible worlds. But it differs insofar they denote sets of equivalence classes (partitions) of the set of possible worlds. More precisely, a question denotes an equivalence relation between possible worlds that corresponds to a partition. For example, if there are two dishes, pasta and salad, then (8.a) would have the meaning (b), a relation between possible worlds i and j such that the dishes Al made in i are exactly the dishes that Al made in j. This corresponds to a partition of the possible words, as in (c), where I assume that there are exactly two dishes.

(8) a. Which dish did Al make?

b. $\{\langle i, j\rangle \mid \{x \mid x \text{ is a dish that Al made in i}\} = \{x \mid x \text{ is a dish that Al made in j}\}\}$

c.

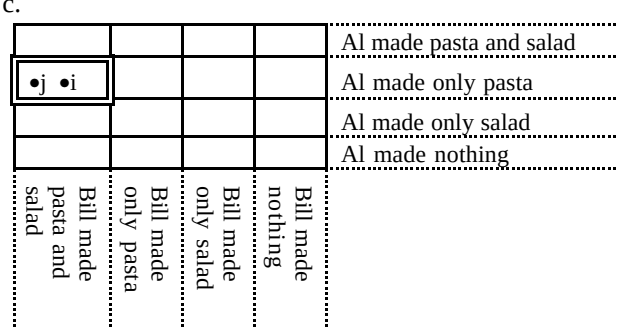


The way how the equivalence relations are construed enables us to represent quantification into questions like in (9.b), which is now well-formed. The result is a partition as well, cf. (c), if the quantifier is a universal quantifier.The two worlds i, j stand in the equivalence relation because for every boy y (that is, for Al and for Bill) it holds that the dishes that y made in i are the same as the dishes that y made in j.

(9) a. Which dish did every boy make?

b. $\{\langle i, j\rangle \mid$ For every boy y:
$\{x \mid x \text{ is a dish that y made in i}\} = \{x \mid x \text{ is a dish that y made in j}\}\}$

c.



One problem of this account is to make sure that the quantifier is interpreted with the right scope: It cannot scope out of the whole question, but then the part that corresponds to the scope in (9.b) does not correspond to any unit of meaning in the compositional construction of the question.

For non-universal quantifiers, the result is a relation that is not an equivalence relation, hence does not correspond to a partition of the set of possible worlds. This may appear to be a welcome consequence. However, Groenendijk & Stokhof argue that questions like (10) are possible, with the indicated reading, which they call **choice reading**.

(10) Which dish did two boys make?
'Pick out two boys, and tell me which dish everyone of them made.'

To accommodate choice readings, Groenendijk & Stokhof change their representation of questions, lifting them from equivalence relations to sets of equivalence relations. For (10) we have for each choice of two boys a separate equivalence relation. I will not go into details here, but would like to point out one problem: Quantifiers have to be interpreted in this account in an unusual way, namely as referring to witness sets.

Engdahl (1985) and Chierchia (1993)

Engdahl (1985) has developed an analysis of pair-list interpretations in which they are not analyzed as involving quantification into questions at all, but rather functional readings that do not ask for a simple individual, but for a function. This analysis has been further explored by Chierchia (1993). It is illustrated in (11).

(11) Which dish did every boy make?
'Which f (a function from persons to dishes) is such that every boy y made f(y)?'

Such questions ask for a function, which can either be given by naming the function, or by giving a set of pairs:

(12) a. His favorite dish.
b. Al the pasta, Bill the salad, and Carl the pudding.

Crucially, quantification over a function f enables us to treat pair-list interpretations as involving a narrow-scope quantifier, thus avoiding the problem of scoping out of questions.

Chierchia argues that this analysis can explain why (13) is bad under both the functional interpretation and the pair-list interpretation. It leads to a Weak Crossover violation, a configuration in which a quantifier over a variable x first binds a function applied to x, and then x itself. This is in general bad, cf. standard cases of weak crossover violations as in (14).

(13) Which boy made every dish?
*'For which f (a function to boys): for every dish x, f(x) made x.'

(14) *Which boy_i does his_i mother love?
'For which boy x: mother(x) loves x?'

But there are problems with this analysis (cf. also Beghelli 1997). First, quantifiers based on the determiner *each* allow for pair-list readings, cf. (15), even though they disallow weak crossover, cf. (16).

(15) Q: Which boy made each dish?
A: The pasta was made by Al, the salad by Bill, and the pudding by Carl.

(16) *His_i mother loves each boy_i.

What is more important is that many quantifiers allow for functional readings but not for pair-list readings (Liu (1990), Chierchia (1993)). Recall that this was a reason why we distinguished between pair-list readings and functional readings in the first place.

(17) Q: Which dish did most boys make?
A: Their favorite dish.

(18) Q: Which dish did no boy make?
A: His least favorite dish.

3. Conjoined Question Acts

In Krifka (2001) I have argued that quantification into questions can be seen as involving **conjoined questions**. That is, a pair-list question like (19) that uses a quantifier, *every boy*, is short for a conjoined question like (20) (if there are three boys, Al, Bill and Carl), just as *Every boy came* is short for *Al came and Bill came and Carl came*.

(19) Which dish did every boy make?
(20) Which dish did Al make, which dish did Bill make, which dish did Carl make?

These questions in their pair-list readings allow for exactly the same answers. Generally, the answer to a conjoined question is a conjunction of the answers to each conjunct:

(21) Al (made) the pasta, Bill the salad, and Carl the pudding.

Conjoined Speech Acts

What are conjoined questions? Questions are **speech acts**, and I assume that speech acts in general can be conjoined. What does this mean? Let us consider speech acts as moves in conversational games, in the spirit of Wittgenstein (1958) or Stenius (1967). I am not in a position to give anything like a formal system for conversational moves, but there are promising first suggestions, as the "algebra of social acts" developed by Merin (1994). Merin suggests that conversational games consist of a set of states, and transitions between those states. If s is the current state in a conversational game, then the performance of an appropriate act A leads to a new state, s′. Of course, not every act will be appropriate for a given state.

(22) A(s) = s′, if A is appropriate for s, else A(s) is undefined.

Some acts require **corresponding** acts; reference to these corresponding acts is part of their definition. Examples are questions and their corresponding answers, and commands and actions that carry out the commands (which need not be speech acts). I will talk of **initiating** acts and **responding** acts, respectively. The conversational states after initiating acts are characterized by the expected response. For example, if s is a neutral state and Q is a question act, then Q(s) = s′ is a state in which a particular reaction, an answer A, is expected to lead back to a neutral state.

(23) A(Q(s)) = A(s′) = s″,
where Q is appropriate for s, and A is appropriate for s′.

Now it appears that speech acts in general can be conjoined. We can conjoin assertions, questions, commands, exclamations, baptisms, curses, and more.

(24) a. My dog loves chicken soup. And my cat likes chopped liver.
b. Which dish did Al make? And which dish did Bill make?
c. Eat the chicken soup! And, drink the hot tea!
d. How beautiful this is! And how peaceful!
e. I hereby baptize you John. And I hereby baptize YOU Mary.
f. You are an idiot! And you are a fool!

The **conjunction** of acts is obviously equivalent to the **consecutive performance** of those acts. What does this mean for initiating acts? In particular, what is the responding act to a conjunction of initiating acts? Obviously, a conjunction of acts that respond to each of the conjuncts of initiating act. Using "&" as the symbol for act conjunction, this can be expressed as follows:

(25) If A(Q(s)) and A′(Q′(s)) are valid conversational moves,
then [A & A′]([Q & Q′](s)) is a valid conversational move;
it is equivalent to A′(Q′(A(Q(s))).

For example, the act sequences in (26.a,b) and (27.a,b) are equivalent:

(26) a. A: Which dish did Al make?
B: The pasta.
A: Which dish did Bill make?
B: The salad.

b. A: Which dish did Al make?
And which dish did Bill make?
B: Al (made) the pasta,
and Bill the salad.

(27) a. A: Pick up the ball!
B: [Picks up ball.]
A: Throw it to me!
B: [Throws ball to A.]

b. A: Pick up the ball!
And, throw it to me!
B: [Picks up the ball
and throws ball to A.]

Disjunction or negation of Speech Acts?

If speech acts can be conjoined, we would expect that they can also be disjoined. (28) is a good candidate for the disjunction of two questions.

(28) Which dish did Al make or which dish did Bill make?

But the status of such sentences is unclear. Szabolcsi (1997) judges them ungrammatical, and sentences like (29) as devices to revoke the first question and replace it by the second (*or rather…*). That is, we don't have a question disjunction; the linguistic device that would have this meaning is interpreted differently.

(29) Which dish did Al make? Or, which dish did Bill make?

Opinions about disjoined questions like (29) vary, though. Belnap and Steel (1976) assume that questions can be disjoined (e.g., *Have you ever been to Sweden, or have you ever been to Germany?*). A direct answer to such a question is one that answers at least one subquestion. Groenendijk and Stokhof (1984) subsume such readings under choice readings. While such readings may indeed exist in natural language, and not only in the mind of trained logicians, they are considerably less natural than conjoined questions, and more readily subject to reinterpretation.

What about commands? The disjoined command (30) can be understood in two ways, as illustrated by the paraphrases (a) and (b):

(30) Pick up the ball or pick up the racket.
a. 'Act to make true: You pick up the ball or you pick up the racket'
b. 'Pick up the ball, or pick up the racket, I don't know which.'

In (30.a), *or* disjoins the underlying proposition and not the commands; hence this is not an example of command disjunction. In (b), the speaker hasn't made up his or her mind, and the result is not a command (cf. Merin (1992) on 'weak' readings of permission sentences). Neither is a true disjunction of commands.

Consider now baptisms and curses. Clearly, (31) is not a proper baptism, and (32) is not a curse, rather a description.

(31) #I hereby baptize you John, or I hereby baptize YOU Mary.
(32) You are an idiot, or you are a fool!

Assertions turn out not to be different. Disjunction is interpreted as a disjunction of the asserted propositions, not of the acts of assertion:

(33) Al made the pasta, or Bill made the salad.
a. 'I assert: Al made the pasta or Bill made the salad.'
b. # 'I assert: Al made the pasta, or I assert: Bill made the salad.'

Disjunction also has to be reinterpreted in cases like the following, which disjoins a command and a threat. Clearly, the sentence has to be paraphrased as in (34.a), and not literally as in (b).

(34) Get out of here or I will call the police.
a. 'If you don't get out of here, I will call the police.'
b. # 'I order you to get out of here, or I threaten you that I will call the police.'

We conclude that, while coordination is well-defined operation for speech acts, disjunction is not. Syntactic forms that look like disjunction of two speech acts typically are interpreted in special ways, e.g., by lowering the disjunction to the propositional level, or by interpreting it as replacement of the first speech act.

Speech acts not only lack disjunction as a general operation; they also lack negation. Searle (1969), p. 32, mentiones a possible case where negation may have wide scope over a speech act, cf. (35.b) in contrast to (a).

(35) a. I promise not to come.
'I make the following promise: I will not come.'
b. I do not promise to come.
'I do not make the following promise: I will come.'

But (35.b) is not so much a negation of a promise but a refusal to promise; Vanderveken (1990): calls this an act of illocutionary denegation. It certainly is not the Boolean operation of complement formation – what could the complement of an act of promise be?

We conclude that speech acts, which may have a fairly general operation of conjunction, lack general operations of disjunction and negation. They certainly do not form a Boolean algebra like the one generally assumed, and very fruitfully so, for truthconditional semantics (cf. Keenan and Faltz (1985)).

Restriction for Quantifiers in Questions Explained

The analysis of pair-list interpretations as conjoined questions, and the analysis of speech act conjunction as involving a semi-lattice and not a full Boolean algrebra, explains why only universal quantifiers can scope out of speech acts. The reason is that **universal quantifiers** are **generalized conjunctions**, whereas other quantifiers cannot be reduced to conjunction (cf. Keenan and Faltz (1985)):

(36) a. Every boy came. ⇔ Al came **and** Bill came **and** Carl came.
b. A boy came. ⇔ Al came **or** Bill came **or** Carl came.
c. No boy came. ⇔ **Not**: Al came **or** Bill came **or** Carl came.
d. Most boys came. ⇔ Al came and Bill came, **or**
Al came and Carl came, **or**
Bill came and Carl came.

This explains why we have robust pair-list interpretations only with universal quantifiers – they are the only ones that can be reduced to conjunction.

(37) Which dish did every boy make?
⇔ For every boy x: Which dish did x make?
⇔ Which dish did Al make, which dish did Bill make, and which dish did Carl make?

(38) #Which dish did most boys make?
⇔ For most boys x: Which dish did x make?
⇔ Which dish did Al make and which dish did Bill make, **or**
which dish did Al make and which dish did Carl make, **or**
which dish did Bill make and which dish did Carl make?

We find the same situation for other speech acts as well. Universal quantifiers (but not others) can scope out of commands, baptisms and curses:

(39) a. Confiscate every book on dinosaurs!
b. #Confiscate most books on dinosaurs!
(40) a. I hereby baptize everyone of you John.
b. #I hereby baptize most of you John.
(41) a. Everyone of you is a crook! (a possible curse)
b. Most of you are crooks! (not a curse, a description).

In addition to quantifiers and conjoined NPs, we find wide-scope interpretations of definite NPs that are interpreted distributively:

(42) Which dish did the boys make?
'For each of the boys x: Which dish did x make?'

This can be analyzed as involving a **distributive** operator, i.e. a universal operator that quantifies over the domain given by *the boys* (cf. Beghelli (1997)). As a universal operator, distributivity can be defined on the basis of speech act conjunction.

Why "Conjunction"?

We call the speech act conjunction "&" **conjunction** because we can express it by *and.* But why is this so? I would like to suggest the following: When we **describe** conjoined speech acts, which yields truth-functional expressions, we use Boolean conjunction:

(43) a. A, to B: Which dish did Al make? And, which dish did Bill make?
b. A asked B which dish Al made, and A asked B which dish Bill made.

The same holds true for the use of universal quantifiers.

(44) a. A: Which dish did every guest make?
b. For every guest x, A asked which dish x made.

We can use *and* and *every* N to conjoin the **execution** of speech acts because we can use *and* and *every* to **describe** the conjoined execution of such speech acts. In general, expressions that relate to the type of speech act or to properties of its execution are the same as expressions that describe such speech acts. Examples are performative speech acts (Bierwisch (1980) and speech act adverbials:

(45) a. A: I baptize you *John.*
b: A baptized him *John*.

(46) a. A, to B: Quite frankly, John is unable to do the job.
b. A told B quite frankly that John is unable to do the job.

An implementation of speech act conjunction

In Krifka (2001) I have proposed a system of semantic types that implements speech act conjunction. This theory follows Stenius (1967) in distinguishing between illocutionary operators and sentence radicals, typically propositions or sets of propositions. We can capture this distinction in a type system by assuming a type a for speech acts and a type p for propositions and pt for sets of propositions.

(47) a. Basic types: *e* entities, *t* truth values, *p* propositions, *a* speech acts.
b. Derived types: If τ, σ are types, then $(\sigma)\tau$ is a type (the type of functions from elements of type σ to elements of type τ). If σ is basic, I write $\sigma\tau$.

Some examples:

(48) a. It is raining.
ASSERT('It is raining')
pa p
a

b. Is it raining?
QUEST ({'It is raining', 'It is not raining'})
(pt)a pt
a

Conjunction of speech acts combines two speech acts to a speech act, hence is of type aaa:

(49) Which dish did Al make? And, which dish did Bill make?
aaa a
a aa
a

The problem with quantifiers within questions is that they may express speech act conjunction within a sentence. If they are to express quantification into speech acts, they should scope out of the speech act, leaving a trace of type *e* (for entities), and resulting in a type *ea*, a function from entities to speech acts. The quantifier then has to be interpreted as being of type *(ea)a*; it combines with a meaning of type *ea* and yields a speech act, tye *a*. I indicate the formation of functions in logical form by a lambda expression, following Heim and Kratzer (1998).

(50) a. Which dish did every boy make?
b. every boy_1 λt_1 QUEST [which dish did t_1 make]
e a
(ea)a ea
a

The quantifier *every boy* can be interpreted as a generalization of the speech act conjunction &. Let BOY be the set of boys and A be a function from entities to speech acts, then we have the following interpretation:

(51) every boy A: $\&_{y \in BOY} A(y)$

That is, we form the conjuction $A(b_1)$ & $A(b_2)$ & … & $A(b_n)$, where b_1, b_2, … b_n are all the boys. Obviously, a quantifier like *most boys* cannot be interpreted as a generalized speech act conjunction.

Wide-Scope Speech Act Quantifiers as Topics

Representations like (50) assume that speech acts are not, in general, islands for movement. But which sub-sentential expressions could scope out of a speech act? I would like to suggest that **topics** can do that. The following examples quite obviously involve topics scoped out of questions, commands and curses.

(52) a. As for Al, Bill and Carl, which dishes did they make?
b. The hamburger, please hand it to me.
c. This guy, he should go to hell!

Perhaps topics even *have to* scope out of speech acts. Topic selection is a speech act itself, an initiating speech act that requires a subsequent speech act, like an assertion, question, command, or curse about the entity that was selected.

There is evidence that the quantifiers that scope out of speech acts are topical. First, observe that we do not find wide scope for quantifiers that are in focus. We do not get the pair-list reading for a question like (53), but only the narrow-scope reading. This is as expected, as the topic cannot be the main focus of a sentence.

(53) Q: Which dish did EVERYONE make?
A: #Al the pasta, Bill the salad, and Carl the pudding.
A: Everyone made salad.

Second, we have seen that quantifiers in subject position facilitate wide-scope readings, in contrast to object quantifiers (cf. (1) vs. (3)). This is not astonishing, as subjects are prototypical topics (cf. e.g. Chafe (1976)). Furthermore, it has been observed by Beghelli (1997) that indirect objects allow for wide-scope intepretation more easily than direct objects, as in (54). Also, Kim and Larson (1989) noticed that objects of psych verbs allow for wide-scope interpretation, cf. (55). The plausible reason is that indirect objects and the object of psych verbs are animate, and animate NPs are more likely topical (cf. Comrie (1981) p. 197ff.).

(54) Q: Which painting did you show to every boy?
A: To Al, the Picasso, to Bill, the Klee, and to Carl, the Mondrian.
(55) Q: Which painting impressed every boy most?
A: Al, the Picasso, Bill, the Klee, and Carl, the Hundertwasser.

Quantifiers headed by *each* in general allow for wide scope, cf. (56). This can be explained by their presuppositional nature; *each boy* means *everyone of the boys*. As topics, in general, presuppose the existence of an entity or a set, this helps explain why these quantifiers can have wide scope. (cf. Lambrecht (1994) p. 155f.).

(56) Which boy made each dish / each of those dishes?

Szabolcsi (1997) observes that sentences like (57.a) are more easily interpreted as a pair-list question than sentences like (57.b). A plausible reason for this is that singular *which*-phrases and *what*-phrases, which involve reference to a given set of entities, are more likely topical than *who* or plural *what*-phrases.

(57) a. Who / which boys did every dog bite?
b. Which boy/what boy did every dog bite?

It appears that the assumption that only topics can scope out of speech acts makes a number of valid predictions and is well justified on theoretical grounds.

The Nature of Choice Readings

Let us return to the subject of choice readings, which, as I have argued, are marginally possible, even though they are not based on a universal quantifier. (58) is an example.

(58) Which dish did two boys make?

One way to interpret (58) is to assume that indefinites can marginally be used as topics, with the interpretation that leaves a choice to the hearer to pick out an instance of a class. The sentence then is interpreted distributively, that is, by a universal quantifier based on speech act conjunction, cf. (59):

(59) Which dish did two boys make?
'For two boys x that you may select: For every y that belongs to x: Which dish did y make?'

The distributive interpretation is a general option that also appears, for example, with definite NPs:

(60) Which dish did the boys make?
'For x = these boys: For every y that belongs to x: Which dis did y make?'

Notice that choice readings require that the indefinite NP is deaccented, which is characteristic for topical expressions. This analysis correctly predicts that these choice readings are considerably worse with quantifiers like *more than two boys* or *less than seven boys*, which are not as easily interpreted as topical, presumably because the involve focus-sensitivity (cf. Krifka (1999)).

4. Embedded Questions

Let us turn now to embedded questions and the behavior of quantifiers in them. One observation is that there are different types of embedded questions. Karttunen (1977) pointed out several types of embedding verbs that show distinct semantic behavior; Groenendijk and Stokhof (1984) identified two broad classes which they call **extensional** (e.g., *know, tell, find out*) and **intensional** (e.g., *ask, wonder, want to find out*). The first type also embeds *that*-clauses, the second one doesn't.

(61) a. Doris found out which dish Bill made.
b. Doris found out that Bill made pasta.

(62) a. Doris wondered which dish Bill made.
b. *Doris wondered that Bill made pasta.

With respect to quantification into questions, Szabolcsi (1993) discovered that wide-scope interpretations of non-universal quantifiers that are not available in root questions and in questions embedded by intensional verbs become available for extensional verbs (judgements are for pair-list readings):

(63) #Which dish did most boys make?

(64) a. #Doris wondered which dish most boys made.
b. #Doris asked which dish most boys made.
c. #Doris wants to find out which dish most boys made.

(65) a. Doris knows which dish most boys made.
[She knows that Al made the pasta and Bill the salad.]
b. Doris found out which dish most boys made.
c. Doris told Elizabeth which dish most boys made.

One way to explain this difference assumes that intensional verbs embed a question act (of semantic type *a*), whereas extensional verbs embed a question radical (type *pt*), as indicated in (66.a,b).

(66) a. Doris wondered [QUEST [which dish Bill made]]
aep *a*
ep

b. Doris knows [which dish Bill made]
(pt)ep *pt*
ep

As there is no pair-list interpretation of the question act (63), there is also no corresponding pair-list interpretation for the embedded question acts in (64.a,b,c). This is illustrated in (67).

(67) Doris wondered every boy/ *most boys λt_1QUEST [which dish t_1 make]
(ea)a *ea*
aep *a*
ep

Wide-scope readings of quanifiers in questions embedded by extensional verbs presumably arise because there is no intervening illocutionary operator. As question-embedding *know*, *find out* etc. are not factive either, like *know*, *find out* etc. when embedding a *that*-clause, wide-scope interpretation of these quantifiers by LF movement should be possible, for regular interpretation of quantifiers.

(68) every boy / most boys λt_1 [Doris knows [which dish t_1 made]]
(ep)p *ep*
p

Moltmann and Szabolcsi (1994) argue against this kind of analysis because of an apparent lack of scope interaction with quantifiers in the upstairs clause; they claim that quantifiers of the downstairs clause must have wide scope over them in the pair-list reading. However, data like (69) show that we do find scope interaction here.

(69) Some officer found out which crime every detainee committed.
a. 'There is an officer x such that for each detainee y, x found out which crime y committed.'
b. 'For each detainee y, there is an officer x such that x found out which crime y committed.'

If illocutionary operators create islands for movement of quantifiers (except for quantifiers that can be interpreted as speech act conjunctions), we should not expect wide-scope readings with respect to quantifiers in the upstairs clause. This prediction is correct:

(70) Some officer wondered which crime every detainee committed.
'There is an officer x, and x wondered for every detainee y, which crime y committed.'
not: 'For every detainee y, there is an officer x, and x wondered which crime y committed.'

The notion of a embedded speech acts, as in (66), may be considered problematic. But there is evidence that speech acts can be embedded. For example, Lee (1975) points out that there exist embedded performative clauses as in the following sentence:

(71) I regret that I have to inform you that [you are hereby dismissed].

As for the interpretation of sentences like (66), there are plausible paraphrases that make use of the notion of speech act, like 'Doris would be interested in the answer that uttering the speech act "Which dish did Bill make?" would produce'.

Independent evidence for a categorial distinction between questions embedded by intensional vs. extensional verbs comes from a number of syntactic differences, which show that the former, but not the latter, can subcategorize for root questions (cf. McCloskey (1999)).

(72) Which dish did Al make, Doris wondered / asked / wanted to find out.
(73) *Which dish did Al make, Doris found out / knew / told Elizabeth.

We find root question syntax in (72). Notice that this is not direct speech; we have, for example, *Which dish did she$_1$ make, Doris$_1$ wondered.*

A root clause phenomenon in German shows up in the fact that the the particle *denn* can occur in root questions and in questions embedded by an intensional verbs.

(74) a. Wann kommt sie denn?
when comes she PART
'When will she come?'

b. Hans fragt sich, wann sie denn kommt.
Hans asks himself when she PART comes
'Hans wonders when she will come.'

c. Hans weiß, wann sie *denn kommt.
Hans knows when she *PART comes.
'Hans knows when she will come.'

There are other known known properties of questions embedded by intensional verbs. For example, Suñer (1991) shows that in Spanish, there is an additional complementizer *que* in these cases:

(75) a. Sue preguntó / se preguntó **que** cuántas charlas planeaban los estudiantes.
'Sue asked / wondered how many talks the students were planning.'
b. Sue sabía / nos dijo / explicó cuántas charlas planeaban los estudiantes.
'Sue knew / told us / explained how many talks the students were planning.'

Verbs of communication like *decir* 'say', *repetir* 'repeat' and manner of speech like *susurrir* 'whisper', *tartamudear* 'stutter' allow for *que* as an option. This complementizer can be seen as an explicit reflex of the illocutionary operator QUEST.

5. Conclusion

In this talk, I have argued that quantification into question acts is possible for universal quantifiers, as these quantifiers are based on conjunction, an operation that is defined for speech acts. This explains the restriction to universal quantifiers, which are generalized conjunctions. I have developed a type system in which quantification into question acts can be described. I have argued that expressions that scope out of speech acts must be topic, which explains a number of additional observations. I have also discussed embedded questions, which, depending on the embedding verb, may allow for quantification into questions.

Needless to say, much still has to be done. In particular, a comprehensive formal theory of speech acts in which they are treated as acts, and not as descriptions of acts with Boolean properties, has to be developed, and a theory that captures the way how such acts can be integrated within recursive, Boolean semantics.

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