

# **The problem of interpreting questions or a preliminary to the logic of questions**

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## **I Introduction**

From two different ways we came across the need of a logic of questions. The first one was related to a discussion of Robinson in his article 'Plato's consciousness of Fallacy'<sup>1</sup> (Mind, Vol. L1, No 202, april 1942), where he discussed besides other things the appearance of fallacious questions in Plato's work. So it is natural to ask: What is a question?

Our attempt to solve the problem of context by using a simulation of semantics or world models lead us for a second time to the need of a question logic. For a communication register was there necessary. This is a subsystem which must tell us what to do and how to react on certain information stimuli, which can be external or internal. One type of these stimuli of possible reactions is 'the question'. Therefore let us start by asking ourselves: 'What is a question? What are its functions (a) in a semantic model, and (b) in the communicationregister?'

## **II The interpretation of a question**

Robinson relates a question to 'wondering'. Taking into account characteristics of the process of wondering, he obtained some peculiarities of the question. And he states<sup>3</sup>: 'Every question implies a proposition. This is because a question expresses wonder and wonder must be about something. It is impossible to wonder about nothing at all. In wondering we are therefore assuming the existence of some state of affairs, or the truth of some propositions'.

F. Loeser relates on his turn the question to the process of seeking: 'Die Frage ist ein gedankliches Gebilde, das nach den Merkmalen eines Erkenntnisobjekts sucht'.<sup>4</sup>

L. Apostel in his interesting article 'A Proposal in the Analysis of Questions'<sup>5</sup> defined a question as a specific combination of belief-, deontic-, assertoric-, epistemic-, and alethic modalities.

To us a question is an expression. However, an expression of what? An expression of a wish to get information about something from somebody?

In any case, it is more than a wondering. For if we only wonder about something, then it does not imply that we shall ask something. The same is true about seeking. If we are seeking by memory or by dictionary the name of the authors of the Principia Mathematica, then we do not question for their names. And if we do question for it, do we then necessarily seek their names?

If we ask someone Y 'Is John ill?', then we wish to get some information from Y about my question, i.e. an affirmation or a negation. But the expression itself is not an activity of seeking. It expresses an invitation to a person to give information (eventually a certain type of information) about something. This is illustrated in natural language by the arguments of the explicit questioning verbs, i.e.

(1) I ask somebody something.

(2) I question somebody about something.

Also we think that, if one neglects the social status of a question, one neglects the essential characteristics of the question phenomena and so one loses the cue for the understanding of the role of questions in the communicationsystem and in the communication interaction.

And if a question is a wish or an invitation to a person to give information about something, it must be clear why the assertion of the wish for informations is vital for the question itself. A wish to somebody for information, which is not asserted, is not a question.

As a consequence of these considerations, we propose the following analysis of the question.

$$?P = Ass(S, A, Y)$$

where  $S = W(f(x, A, Y), A)$

where  $x = R \vee L$

R is relation

L is a constant

Ass = assertion

A = the person who questions

Y = the person questioned

W = the process of wishing

f = function of giving information

In other words a question is the assertion by A to Y of a wish S. Of course A and Y can accidentally be identical. However, this does not change the *essential* social quality of the question X. Also Y can be a set of persons, of beings. Eventually Y can be undermined in the question and eventually only be determined by context. A is in general only determined by context. This is at least true in direct questions, but not

entirely true in indirect questions. For in this case, A and Y are much more explicitly determined. It is also rather easy to construct a context where A and Y are undetermined. As in the case where someone finds a piece of paper on which is written 'Is John ill?'. If he does not know who has written it and to whom it has been written, then he knows neither A nor Y.

'S' is a wish. A wishes that Y gives information to A about X. Later on we will specify restrictions on the interpretation of 'f' dependent on some linguistic manners to express '?P'.

Now what is x and what can x be? x can be a relation or a constant. An instance of x as a relation is seen - according to us - in the question 'Is John ill?' What is questioned here? Well, we think that the existence of a modifying relation between 'John' and 'ill' is questioned. When x is a constant L, it is possible that L itself is complex. An instance of L, having a complex structure, seems to us illustrated in 'Why is John ill?'. Here L = T (a), where T = why and a = John is ill.

That 'f' can get different interpretations dependent on the linguistic formulation of '?P', will be clear when looking at the several types of question (these types being differentiated on the basis of the characteristics of the appropriate answers).

<i>question</i>	<i>answer</i>
(1) Is John ill?	Yes
	No
(2) Is John a laywer?	Yes
	No
(3) Does John eat?	Yes
	No
(4) Why does he go home?	Because he is ill
(5) Who is John?	A laywer

If we interpret 'f' as 'giving information' and if we follow our interpretation of the question, then sentence (1) would signify 'The speaker asserts to Y that he wishes that Y gives information about the illness of John, or more correctly the information about the relation between 'ill' and 'John'. It is clear that on such a request, it is impossible to answer 'Yes' or 'No'. Such an interpretation, however, seems allright for the 4th or the 5th kind of question.

*In other words, an interpretation of 'f' as 'giving information' on an 'x' is too general for a 'No - Yes' type of a question.* The kind of information asked in this type of question is specified, viz. an affirmation or a negation of the x. From linguistic point of view, in many languages (per-

haps in all?) the Yes-No questions are clearly differentiated from the other ones. The Yes-No question is mostly (?) structurally expressed (viz. by a specific word-order), while the other questions are expressed by the introduction of special words).

So one could propose in dependence on the structure of the question to give a special interpretation to 'f'.

This is one possible approach to differentiate both classes of questions. However, another approach could be by keeping 'f' constant, but in the interpretation of sentence (1), viz. not to define 'x' as 'R' bus as 'TR', where 'T' means here the truth or falsity. Then also the interpretation of (1) would be the assertion to Y of a wish S (that Y gives information about the truth or falsity of 'x'). In this case too, it is possible to answer this wish with 'yes' or 'no', viz. to affirm or to deny the relation.

It seems to us worthwhile to mention that in both approaches a lot of intermediate answers are possible between the answers 'yes' and 'no', viz. between a complete affirmation and a complete denial. And in fact in natural languages too, it seems that such intermediate answers frequently occur. So, it is possible to answer the question 'Is John ill?' with 'Yes.', or 'In any case the doctor has come to his home', or 'John is never ill', or still 'It depends on your understanding of' 'being ill'. The last answer makes relative the truth or the falsity of the proposition about which information on the truthness is asked. Perhaps one could say that the last possible type of answer slightly favors the last type of analysis, because the answer 'It depends on your understanding of being ill' (a natural answer) seems somewhat difficult as a reaction on a wish to get an affirmation or a denial about something, while it seems more natural as a reaction on a wish to get information on the truth or falsity of a certain 'x'. All these types of answers are possible by treating a question as a wish to get information on a certain 'x'. This seems to indicate the rightness of our lines of approach.

In the last approach, all questions would have the same structure, viz. 'x' could only be a complex structure 'T(a)'; 'T' could be 'why', 'who', or 'truth', etc. The interpretation of 'T' then would depend on the linguistic structure and the special introduced question rules.

The last approach (II) has the advantage that one general normal form for the question is got. A drawback of it, however, is perhaps that we get a somewhat less elegant (because of intentional and not formal differentiation) formulation of the implications of the question.

But, before treating this topic, we shall now look at the secondary functions of a question. (The primary function is the assertion of a specific kind of wish: see earlier).

### **III The secondary function of a question**

Susan M. Ervin-Tripp illustrated in her article 'An Analysis of the Interaction of Language, Topic and Listener', how in a certain context a certain declarative sentence or an imperative can function as a question<sup>8</sup>. Clearly enough the inverse is also true. We know the kind of questions possibly used for instance in an examination situation with intention to bring the examinandus on the good track. The question in case then is in a certain sense declarative. Also a question which is practically an imperative is very easy to imagine. Take the situation where somebody very kindly asks you 'Will you open the door?' holding a revolver in the hand, etc.

These kinds of functions of a question are strongly dependent on the context and are in our views consequences rather or 'fx.T' than of the question itself, where 'f x' is the primary function of the question and 'T' the context.

In other words, for the communication register an input (or an output) A can have a primary function f o, but taking into account T, f o.T can imply a function f<sub>1</sub> where f<sub>1</sub> can fundamentally differ from f o. So for instance, f o can be a declarative, where f<sub>1</sub> is a question, or vice versa, etc. These secondary functions are also very important to simulate. Otherwise an efficient response to the inputs is not possible.

It will also be clear that by experience we will know much about the situations where people use questions. So, we know that if we meet a person and he questions us, then (1) there is a certain probability (rather big in most cases) that he himself does not know for sure the answer on the question. Also we believe that it is rather probable that (2) he really desires to know the answer. A third characteristic is (3) that the questioner thinks or hopes that the questioned person knows the answer, or that he at least can give some indications how to find the answer (indications of prominent people or of books on the question). Also (4) the questioner very probably believes or hopes that the questioned person will answer effectively. Another characteristic: expressing a question makes in certain contexts the probability higher that the questioned person does believe that the questioner does not know the answer. Therefore the questioner will probably only make a question if he believes or hopes (5) that the questioned person will not abuse his knowledge about the ignorance of the questioner, etc.

But, all these characteristics are not generally true. Exceptions on some of these characteristics are f.i. an examination situation and the rhetorical question. But the exceptions are much more general. One can put a question only in order to interrupt the speaker (knowing for instance that the speaker is nervous and easily get disturbed by interruptions, this in

case one wants to play him a dirty trick or if one wants to loose time, etc. . . . One can also put forward questions in order to display his own intelligence, or to annoy people or to create confusion, etc. . . .

Therefore we are not in favour of introducing the characteristics of the type mentioned above in the definition of the question. Here like in the process of determining the significatum of a word in general, we prefer to use the minimal hypothesis, viz. that the significatum of a word or of a structure only encloses the smallest set of characteristics, which are generally present and which are sufficient to explain the uses of the words taking into account the context informations.

Certainly we agree that one can try to give an explanation for the several exceptions in the general situation. So Apostel's argument seems interesting that in the examination situation the question f.i. 'When was Cesar killed?' (1) in fact intends to ask 'Do you know when Cesar was killed?' (2). Therefore (1) would be an ambiguous sentence. Certainly (2) itself will in many situations imply that the questioner does not know the answer on (2). In other words property (1) is fulfilled in many cases. But here again this is not necessarily true. Take as an illustration a fraudulent examination, where the examiner gives the answers to the examinandus and tested before if the examinandus knew the answers or still worse, if before the examiner tested the knowledge of the examinandus and subsequently officially asks just the things the examinandus knows.

In other words, we have the impression that by introducing the general inductive characteristics of a question as fundamental characteristics, so many exceptions on it arise, that only a great bunch of adhoc hypotheses can justify this approach. Therefore we think that all these characteristics — about which we agree that they are very important — also must be introduced as contextual parameters of an utterance in the communicationregister. Certainly their value will also fundamentally determine the communication strategy and the action in general.

#### **IV The implications of a question**

Have the sentences (1) to (4) implications?

- (1) Why is John ill
- (2) Is it true that John is ill.
- (3) Is a book white or black?
- (4) Is John ill?
- (4a) Who is John?

In sentence (2) no proposition is implied as true while in sentence 1, it is implied that 'John is ill'.

In (4) no proposition is implied as true. Sentence (3) however is ambiguous. The ambiguity can easily be seen if we consider possible answers

on (3). Let these answers be (5) and (6).

(5) Yes, a book is or white or black.

(6) A book is black.

In other words, (3) can be interpreted as (3a) if the disjunction is questioned, or as (3b) if the disjunction is presupposed as true and one wants to know which member of the disjunction is true. Thus it is clear that also (3) in one possible interpretation implies a proposition as true.

Knowing this, let us now formalize the question (1, 2, 3a, 3b, 4, 4a), using both earlier proposed analyses of a question.

### *Analysis I*

Ass (S, A Y)

$$S = W ((f(x) A, y), A$$

x =

- |  |                  |
|--|------------------|
| 1. T R (John, ill)                         | T = why          |
| 2. R (true, P)                             | P = John is ill  |
| 3a. v (R <sub>1</sub> , R <sub>2</sub> )   |                  |
| 3b. T v (R <sub>1</sub> , R <sub>2</sub> ) | T = which member |
| 4. R (John, ill)                           |                  |
| 4a. T (John)                               |                  |

### *Analysis II*

Ass (S, A Y)

$$S = W (f(x) A y), A$$

x =

- |  |                  |
|--|------------------|
| 1. T R                                     | T = why          |
| 2. T R (true, P)                           | T = true         |
| 3a. T v (R <sub>1</sub> , R <sub>2</sub> ) | T = true         |
| 3b. T v (R <sub>1</sub> , R <sub>2</sub> ) | T = which member |
| 4. T R (John, ill)                         | T = true         |
| 4a. T (John)                               | T = who          |

We see that following the analysis I a question implies another proposition as true, if the element questioned is a relation or an operator and is a real subpart of the x. In the other cases however the question does not imply another proposition as true. So we see that 1. and 3b. imply a proposition. This is the desired result. According to analysis II a question implies another proposition as true, if the T gets a different interpretation from 'true' and the element questioned is also a relation or an operator. This is only the case in 1. and 3b. And this is also the desired result. It is worthwhile to note the difference between sentences (2) and (4) in our analysis. In (2) we are asking information about the truth of the

relation between  $w(P)$  and  $x$ , while in (4) information is asked about the truth of the relation between 'John' and 'ill'. Are these sequences both equivalent? Is  $W(P) = W(W(P))$ ?<sup>9</sup>

Now arises the problem, what about a question, if it implies a proposition as true and if this proposition is in fact false. Does this mean that the question is fallacious? Before answering this question, let us look at what happens in the natural language then.

Is it possible to answer a question as (7)?

(7) When did one shoot dead Julius Cesar?

It seems that answers as (8), (9) and (10) are rather natural.

(8) But Cesar was not shoted.

(9) But Cesar was killed by a knife.

(10) Cesar was killed the  $x$ -th, but in fact he was knived instead of shoted.

In other words, can a person answer a question (like 7), when he knows that the question implies a false proposition? He can amongst others react by (a) denying the implied proposition (8); or (b) by correcting this proposition (9), or even (c) by answering the  $x$ , at the same time correcting the implied 'false' proposition.

Taking this into account, is the wish of the person who made the question fulfilled? What was in fact his wish? The questioner wished to get information about  $x$  ( $x$  = the date on which Cesar was shoted dead). The three answers (8, 9, 10) give information about  $x$ , however, the one more completely perhaps than the other. But that is already another problem. In other words a wish like (7) can be fulfilled. Thus an adequate response is possible on this question.

Does it seem correct to condemn a wish as fallacious, when it can be fulfilled. Of course, to answer this a logic of optatives is necessary. For, our approach of questions is strongly dependent on wishes. But anyhow, it seems to us very strange that any logic of wishes would determine wishes which can be fulfilled fallacious. Therefore it seems to us not correct to call questions with false implications, fallacious. What happens in case they are considered as fallacious? If a question implies a proposition as true and if this proposition was synthetical, then it would be dependent on concrete material accidentes, if this question was fallacious or not. In general is something not called fallacious when it has formal failures?

Does all this mean that we believe that no fallacious questions exist?

Not at all, in the same way as there can be fallacious propositions, we believe that there are fallacious questions, viz. questions which are not constructed according to the formal construction rules of questions (f.i. 'Is ill John?'). But as one cannot call a proposition fallacious because it

entails a false proposition, so also one cannot call a question fallacious because it entails a false proposition.

## V The embedding of questions in questions

Loeser argues that it is impossible to question about a question. This seems to me incorrect. Their existence is easy to illustrate (see sentence 1).

(1) Did I ask if John is ill?

or Did I ask: 'Is John ill?'

The formalization of this situation is rather easy. We have here two questions. The first one is 'Did I ask x?' and here x is also a question, viz. 'Is John ill?'. Therefore in the first question structure x must be substituted by the structure of the second question.

1st structure:

Ass (W (f (R (I, x) A y) A), A Y = ? P<sub>1</sub>

2nd structure:

Ass (W (f (R (John, ill), A y) A) A Y = ? P<sub>2</sub>

The structure of question (1) is:

3rd structure:

Ass (W(f(R(x As(W(f(R(John, ill) (A Y) A), A Y)A, Y)A) A Y = ? (P<sub>1</sub>?P<sub>2</sub>))

Of course, this structure seems rather complex, but it is easy to simplify this structure by the following convention: if the relations between the person questioning and the person questioned are constant, then these relations must only be stated once and this for the whole context where these conversation relations are valid.

In this case, the third structure could be reduced to the fourth structure.

4th structure:

As(W(f(R(x, As(W(f(R(John, ill)))))) = ?(P<sub>1</sub> ? P<sub>2</sub>) )

An analogy with the logic of optatives is perhaps interesting here (this analogy struck us in a discussion with Apostel and Windross). We can ask ourselves if wishing a wish or questioning a question implies stating this wish or question?

W (W x) → W x

W = wish

?(1 ? (P<sub>2</sub>) → P<sub>2</sub><sup>10</sup>

In both cases the answer seems to be negative. Perhaps this result can be interpreted as an affirmation of our hypothesis for reducing questions to optatives. It seems also to be affirmed by (a) the easiness to get the right answers on the several types of questions and most of all by (b) the natural consequences got when treating questions with false implications as valid questions. (Also wishes which can be fulfilled are valid wishes — valid of course not in the deontic sense.

From a linguistic point of view it is also interesting to attract attention

on the fact that in order to make a question of a question, we cannot use more than once the direct procedure.

We must have resort to the indirect question.

## VI Some remarks about answering questions

A sequence  $q$  is an answer on  $?P$ , if  $q$  gives information about  $x$  ( $x \in ?P$ ). Another problem is how to determine the truth of  $q$ . For, as a matter of fact wrong answers do exist. And a wrong answer is nevertheless an answer. A third problem is the determination under which conditions the questioner will believe this answer. But also this belief is irrelevant for the status of  $q$  as an answer.

Perhaps an excursion might be necessary here. Some people will perhaps ask why we always refer to the natural language when treating an introduction to a logic of questions and answers. First of all, it will be clear that the reason why we are treating the problem of questions and answers, is in order to introduce them in the communication register. Therefore we must have an analysis which is affirmed in the use of the language. Another argument to justify us is Apostel's opinion that logic is an empirical science. This, he argues, can be proved by its history.<sup>11</sup> If this is the case why not explicitly use facts for the justification of logic instead of letting them only implicitly and intuitively influence the development of logic.

Now let us return to the analysis of an answer. We argued that every utterance which gives information about  $x$  ( $x \in ?P$ ) is an answer for  $?P$ . However it is clear that an utterance  $q$  can give more information about  $x$  than an utterance  $z$ . In this sense  $q$  is more complete than  $z$ . However the completeness of an answer is not only dependent on the information processed by this answer, but also on the expectations of the questioner. So it seems to be a very relative notion. Let us illustrate what we mean: a person  $A$  asks 'Is John ill?' and a person  $Y$  answers 'Yes'. Did  $Y$  give a complete answer?

One could propose as a criterium for completeness of an answer  $q$  the fact that no other question about  $q$  or ' $?P$ ' is necessary for the person  $A$ . In our example it will be clear that if we doubt the authority of  $Y$  to affirm  $q$ , we can ask  $Y$  'Are you a doctor?'. In other words the completeness of an answer in this interpretation will be dependent on the questioner on the fourth kind of implications of the answer. In other words the completeness of an answer depends on the context.

Another example which is perhaps even more clear is the following one:  $A$  asks  $Y$  'How did John die?' and  $Y$  answers 'John took antibiotica'. This is a complete answer in case  $A$  knows that John was allergic to antibiotica. However, if this is not the case, he may easily ask more in-

formation about the answer and its relation to the question.

One thing is clear — it seems to us — that no answer is absolutely complete. For in principle, a new question can always be made about the answer q.

Also a person answering can, given a context, anticipate the questions about his answers and therefore motivate his 'Yes'-answer. So he may answer 'Yes, John is ill. The doctor told me. Etc.'

Using our proposed criterium for measuring the completeness of a question, it will be difficult to define a pseudoproblem<sup>12</sup> as a set of related questions for which it is not even possible to have a partial answer. For, it is not clear that not on any question an answer can be given which some people will consider as complete in a certain context (f.i. also in religious problems, some people can get a complete answer, according to our definition of completeness).

## VII The linguistic relevancy of our analysis of the question

An important problem is certainly the question about the linguistic relevancy of our analysis of 'questions'. Does the analysis imply that a question is on the level of its significatum, a special type of wish, or only that there is an equivalence regarding to its use?

Accepting the first hypothesis, then how to explain the existence of the question in all languages as having a special formal status (Is this true?)? Perhaps as a conventional economization on the surface level of a complex significatum structure? This seems not at all an ad hoc hypothesis. For this seems to be supposed in many descriptions of natural language,<sup>13</sup> f.i. in the transformational grammars.

## Notes

<sup>1</sup> Robinson Richard, Plato's Consciousness of Fallacy, *Mind*, Vol. LI, No. 202, April 1942.

<sup>2</sup> More about this context problem and a tough sketch for an approach to solve it, see the workpapers of 'Communicatie en Cognitie, subgroep Negatie'.

<sup>3</sup> Robinson, R., o.c., p. 97.

<sup>4</sup> Loeser, F., *Interrogativ Logik*, V.E.B. Deutscher Verlag der Wissenschaften, Berlin, 1968, p. 23.

<sup>5</sup> Apostel, L., A Proposal in the Analysis of Questions, *Logique et Analyse*, No. 48, 1969.

<sup>6</sup> About interrelations between significata of words, see our book *Simulation of Natural Language — First Approach*, Janua Linguarum Series Maior 50, Mouton & Co., The Hague, to appear.

<sup>7</sup> In Joshua A. Fishman (ed.), *Readings in the Sociology of Language*, Mouton, 1968, p. 198.

<sup>8</sup> We discussed this already in *Werkdocument No. 10, Com. & Cogn.*, Subgroup Negation, part VI.

<sup>9</sup> Carnap in his appendix: 'Terminological Remarks' in his *Introduction to semantics*, Harvard University Press, 1969, under the heading 'True', distinguishes three possible domains of applications of the term 'true'; it may be applied (I) to propositions (in traditional terminology judgments 'or' content of judgments'), (II) to sentences in traditional terminology 'propositions', (III\*) to both .... Further Carnap remarks 'We may construe phrases like 'true statement', 'true report', 'true examination', as instances of II, and formulations of the form' it is true that .... 'as instances of I'.

This last interpretation of 'it is true that...' correspond with our hypotheses about the communication function of the 'that clauses' (see F. Vandamme *Simulation of language*, o.c.).

Taking this differentiation into account in the analyses II, TR (true\*, P) must be substituted for 2, were true\* true. In this case the problem about the iterations of truth doesn't arise here.

<sup>10</sup> It must be remarked that generally there is some structural difference between the wish of a wish: '(W(WP))' and questioning a question. In general ?(?P) is not used with exception of the expression, 'I question your question'. Mostly one specifies his question, so we get '?P(?P)'.

<sup>11</sup> Apostel, L., Introduction to an Intentional Logic on a praxiological Basis (to be published), p. 14 .

<sup>12</sup> This approach was suggested to us in Apostel's article: A Proposal in the Analysis of Questions, o.c., p. 381.

<sup>13</sup> A discussion about this last problem is found in Vandamme, F., Simulation of Natural Language -A first Approach, o.c.