PHILOSOPHICAL LOGIC AND ITS HISTORY

Anna Brożek

On the so-called embedded questions

Abstract. The analysis of dependent questions plays an important role in the general theory of questions. Dependent questions are expressions which are parts of compound questions and are isomorphic with some independent questions (scil. questions *sensu stricto*). One may meet the tendency to explicate the sense of independent questions by the sense of dependent ones, e.g. the sense of questions such as "Where is Budapest situated?" is explicated by the sense of sentences such as "*A* knows where Budapest is situated", where the second contains the first as a part. The analysis of dependent questions is often the point of departure for constructing set-theoretical or possible worlds semantics for independent questions. In my opinion, these tendencies are abortive and lead to irrelevant explications of the sense of questions *sensu stricto*. But on the other hand, semiotic functions of the so-called dependent questions as parts of compound expressions require deeper analysis. My paper contains a proposal of such an analysis.

1 SUPPOSITIONS

The following are the points of departure for my paper:

(A) Following Kazimierz Ajdukiewicz (1956/1978), I distinguish stating from expressing; for instance, if a person P utters the sentence 'p' then this sentence *states* the occurrence of a certain state of affairs (namely that p), and *expresses* the conviction of P that p.

(B) I adopt the concept of name introduced by Stanisław Leśniewski: "a name" means an expression that can occur as a subject of a subject-predicate sentence, or as part of a predicate in a subject-predicate sentence of the form "… is …"; this means that both "Imre Ruzsa" and "the inventor of the system of intensional logic with semantic value gaps" are names, since the first is the subject and the second is part of the predicate within the sentence "Imre Ruzsa is the inventor of the system of intensional logic with semantic value gaps. "

(C) I distinguish designating from denoting:
    (a) a name *N* designates an object *A* iff *N* can be truly predicated about *A* or *A* can be indicated by *N*;
    (b) the denotation of *N* is the set of all things designated by *N*—its designata.

2 *SENSU STRICTO* QUESTIONS VS. NOMINALIZED QUESTIONS

The communicative sense of every *sensu stricto* question is composed of three elements: cognitive, incognitive and volitional. For instance, if a person *P* asks seriously:

    (1) Where was Imre Ruzsa born?

then *P* expresses:

    (a) that *P* is convinced that Imre Ruzsa was born somewhere;
    (b) that *P* does not know where Imre Ruzsa was born;
    (c) that *P* wants to know where Imre Ruzsa was born.

These three components of sense distinguish questions as a specific class of expressions.

It is convenient to describe this situation using the metaphor of a picture of a situation. A person seriously uttering a question has a mental picture of a situation with an epistemic gap, and wants to fill that gap.

Questions have the following general form:

    (2) $?x\,(Fx)$

i.e. "For which *x* it is a fact that *Fx*?" This scheme was first proposed by Kazimierz Ajdukiewicz in 1923 (13 years before Rudolf Carnap, who is usually credited with introducing it). Later, Tadeusz Kubiński (1970) used Ajdukiewicz's formulation in the construction of his systems of erotetic logic (*i.e.* his logic of questions), noting the analogy between the role of the questionmark in (2) and the role of quantifiers in declarative sentences.

Example (1) is a completive question; in what follows, I shall use examples of such questions only. However, my remarks may easily be expanded to other kinds of questions (selective and confirmative ones), since all questions—after appropriate preparation—come under the scheme (2). The only difference is in the scope of the unknown and the way of defining it.

3 REDUCTIONS

Logical theories of questions usually simplify the sense of questions: they reduce it to an exclusively cognitive, exclusively incognitive, or exclusively procognitive element. In my opinion, none of these three elements should be omitted when

constructing a materially adequate theory of questions.

One could argue that since I am able to list the elements of the sense of questions, I should agree that questions of the form (1) uttered by me may be reduced to the conjunction of declarative sentences of the form:

(3) (I know that $\exists x\,(Px)) \land \sim\exists x\,$(I know that $Px) \land \forall x\,(Px \rightarrow$ I want to know that $Px)$

where the variable x ranges over (names of) places and P is the property of being-a-place-of-birth-of-Imre-Ruzsa. There are at least two reasons why (3) is not an adequate paraphrase of (1). Firstly, the expression "I want to know that Px", being a component of (3), is semantically defective. We encounter it sometimes in ordinary situations, but only in the sense "I want you to tell me that Px", which is not of course the proper sense of "to know". Secondly, the sense of (3) is essentially different from the sense of (1): one may express this difference by saying that (3) states what (1) expresses. To state that one possesses experiences motivating one to pose a question is not the same as actually to pose that question. One may experience everything that is stated in (3) without asking (1) at all.

Both these reasons for rejecting the paraphrase (3) are important in the case of so-called embedded questions.

4 EMBEDDED QUESTIONS: MISUNDERSTANDINGS

Let us use the term "embedded questions" to denote the set expressions isomorphic to *sensu stricto* questions but being proper parts of declarative sentences (not merely quoted in them).

The first misunderstanding connected with embedded questions is that one may reduce *sensu stricto* questions to declarative sentences containing embedded questions (*scil.* that one may explicate the sense of *sensu stricto* questions through the sense of embedded ones).

Such reductions are proposed, e.g., in the imperative-epistemic tradition in the theory of questions where exclusively embedded questions are used—as a certain step—within paraphrases of questions (see Åquist 1965).

For instance, at the point of departure in one of the versions of this concept, (1) is paraphrased as follows:

(4) Let it be the case that I know where Imre Ruzsa was born.

In the next step, sentences like (4) are paraphrased in such a way that they do not contain embedded questions: they are equal to sentences containing the predicate "know that" which has been well analyzed by logicians, e.g.:

(5) $\forall x$ (Imre Ruzsa was born in $x \rightarrow$ let it be the case that I know that Imre Ruzsa was born in x).

The paraphrase (5) ignores the aforementioned distinction between expressing and stating or describing: (5) describes components of the sense expressed in (1). In addition, paraphrase (5) violates our linguistic intuitions by introducing the expression "I want to know that" which (as was previously observed) seems to be incorrect.

The second misunderstanding connected with the concept of embedded questions is that the point of departure of so-called erotetic semantics should be (or at least could be) the semantics of embedded questions (see Lahiri 2002). Such a view is incorrect simply because embedded questions are not *sensu stricto* questions. In fact, according to such an approach, one constructs nothing over and above a semantics of declarative sentences containing embedded questions.

However, the problem of the sense of embedded questions is intriguing.

5 EMBEDDED QUESTIONS AS NAMES

Let us now analyze the problem of what the function of embedded questions in declarative sentences is. Consider the sentence:

(6) Ferenc knows where Imre Ruzsa was born.

This contains as a component an expression isomorphic to (1), i.e. the expression "Where was Imre Ruzsa born?" (the only and usually ignored difference is inversion). Thus we notice an analogy between (6) and the sentence:

(7) Ferenc knows that Imre Ruzsa was born in Budapest.

since (7) contains the sentence:

(8) Imre Ruzsa was born in Budapest.

as a component. There are many possible analyses of (7); the most popular of these takes the expression "knows that" as the main predicate with two arguments: name-argument and sentence-argument. In another interpretation—a less popular but more accurate one—the predicate "know" takes two name-arguments, the second argument being a name of a suitable situation. In Polish, one may even say:

(9) Ferenc wie to, że Imre Ruzsa urodził się w Budapeszcie.

and see explicitly the «*reificator*» "to, że" (Eng. "that") of the sentence occurring after "wie" (Eng. "knows"). In word-for-word translation, the start of sentence (9) has the form "Ferenc knows this [fact] that…".

Let us analyze sentence (6) analogously. We accept that the predicate "know" in (6) possesses two name-arguments (and not name-argument and question-argument). Again, we may say in Polish:

(10) Ferenc wie to, gdzie urodził się Imre Ruzsa.

The initial phrase of (10)—"Ferenc wie to, gdzie" —has the structure of the type "Ferenc knows this [fact] where…". It is hypothesized that embedded questions are always preceded by an explicit or implicit reificator (or nominalizator). There

are several arguments in favor of such an analysis of (at least some) embedded questions.

Firstly, the following expression, being a paraphrase of (6), possesses explicitly two name-arguments:

(11) Ferenc knows the place of Imre Ruzsa's birth.

Secondly, in Polish (and probably some other languages), embedded questions which occur at the beginning of the sentence possess an obligatory reificator, e.g.

(12) To, gdzie urodził się Imre Ruzsa, ciągle pozostawało dla Ferenca tajemnicą.

Maybe the lack of reificator *inside* the sentence is caused only by the specific connectivity of some verbs. In English, an explicit reificator of the type "this [fact]" does not appear:

(13) Where Imre Ruzsa was born was still a mystery for Ferenc.

But the position of the embedded question at the beginning of the sentence, and its specific word order, make its name-like character more clear.

Thirdly, embedded questions do not perform the communicative function of questions (mentioned in section 1). The person uttering (6) does not reveal the desire to fill a gap in a picture of a situation. The situation is similar with embedded sentences. The communicative function of sentences consists in expressing convictions. But a person uttering (7) does not express the conviction that Imre Ruzsa was born in Budapest—only the conviction that Ferenc knows that Imre Ruzsa was born in Budapest.

In what follows, I assume that at least some embedded questions are nominalized questions. I also assume that a question that has undergone nominalization does not perform the same functions as a *sensu stricto* question (just as a nominalized sentence does not perform the same functions as the *sensu stricto* sentence). Nominalized questions are names and—like every name—they have referential functions, *scil.* they designate something. The problem is to say what the designata of nominalized questions are.

6 THE DESIGNATA OF NOMINALIZED QUESTIONS

Consider the following sentences containing nominalized sentences:

(14) Ferenc knows that Imre Ruzsa was born in Budapest.

(15) Ferenc was convinced that Imre Ruzsa was born in Budapest.

(16) That Imre Ruzsa was born in Budapest influenced his life.

(17) That Imre Ruzsa was born in Budapest encourages Ferenc to take part in the conference *Logic, Language, Mathematics* devoted to the author of *Modal Logic with Descriptions*.

What does the name *N*: "that Imre Ruzsa was born in Budapest" in sentences (14)–(17) refer to? Generally speaking, one usually assumes that nominalized sentences designate states of affairs (i.e. elements of reality or objects abstracted from reality), or judgments (i.e. elements of thoughts or objects abstracted from thoughts). The following are possible approaches to this problem (two uniform and one mixed approach):

(a) every nominalized sentence refers to situations;

(b) every nominalized sentence refers to judgments;

(c) nominalized sentences are ambiguous: in one sense they refer to situations; in the second sense to judgments.

At first glance, it seems that in (14) and (15), the name *N* refers to a state of affairs, whereas in (15) and (17) it refers to a judgment. This implies the mixed solution: it is hard to defend any homogeneous one. I omit this problem since it does not relate to the main theme of my investigations.

Let us stress once again: nominalized sentences perform different semiotic functions than non-nominalized sentences do. *Sensu stricto* sentences describe the occurrence of states of affairs and are used to express convictions. Nominalized sentences designate states of affairs or judgments; they are not used to express convictions.

The situation appears similar to the case of nominalized questions: they perform a different semiotic function than *sensu stricto* questions.

Consider the question:

(18) Who was born in Budapest?

Let us keep in mind that somebody who seriously poses such a question possesses a gapped picture of a situation; this situation involves the relation _ was-born-in_, with the gap in the first argument, the second being known (it is Budapest). Somebody who seriously utters (18) wants to fill this gap.

Let us call a person's particular experiences, composed of these three components (cognitive, incognitive and volitional), "inquiries". An inquiry understood in such a way—as expressed in questions—is a counterpart of the convictions expressed in sentences.

In reality, there are no *gapped* states of affairs. But our pictures of real situations possess gaps. However, questions are correlated with some specific *full* situations—situations which one asks for, pictures of which we aim to possess when we pose questions. Sentences stating the existence of these states of affairs constitute accurate (i.e. true and direct) answers to questions. Let us call states of affairs which are correlates of true answers of a given question "supplementations" of that question. It should be stressed that some questions—in particular, improperly posed questions—do not have supplementations, since they do not possess accurate answers.

A supplementation of a question of the type '?x (Px)' is identical with such a state of affairs whose occurrence is stated by a true substitution of the formula

'*Px*'. For instance, the fact that Imre Ruzsa was born in Budapest is one of the supplementations of the question (18) (this question has of course many other supplementations).

Nominalized sentences are not suitable to express conviction; nominalized questions are likewise not suitable to express inquiries. However they are suitable to indicate inquiries or supplementations.

Three possibilities may be considered:

(a) every nominalized question refers to an inquiry;

(b) every nominalized question refers to supplementation;

(c) nominalized questions are ambiguous: in one sense, they refer to inquiries, in another sense, to supplementations.

7 INQUIRIES AS CORRELATES OF NOMINALIZED QUESTIONS

Consider the set of famous logicians, the nominalized question "[that] who was born in Budapest", and its role in sentences:

(19) Ferenc asked [about] who was born in Budapest.

(20) Ferenc knows who was born in Budapest.

(21) Ferenc wanted to know who was born in Budapest.

(22) Who was born in Budapest was a mystery.

(23) Who was born in Budapest influenced the fate of the city.

(24) Who Budapest's citizens are proud of depends on who was born in Budapest.

What would it mean to say that the nominalized questions in (19)–(24) refer to inquiries? *Sensu stricto* (not nominalized) questions communicate the desire to fill a gap in the picture of a situation. It seems that in the question-state indicated (by a nominalized sentence), the volitional element is not included; the only indicated elements are the cognitive and incognitive ones. In other words, nominalized sentences designate *gapped* pictures of situations.

Such a solution is implied first of all in contexts in which nominalized questions are arguments of predicates such as "ask", "wonder", "inquire", "guess", etc.

8 "FULL" STATES OF AFFAIRS AS CORRELATES OF NOMINALIZED QUESTIONS

In some contexts, it seems that nominalized questions refer to supplementations. In particular, the name "that-*q*" designates the state of affairs designated by "that *p*", where '*p*' is a true answer to '*q*'.

It was observed long ago that in the case of the verb "know", the following dependencies hold:

(25) If Ferenc knows where Imre Ruzsa was born and Imre Ruzsa was born in Budapest, then Ferenc knows that Imre Ruzsa was born in Budapest.

The same applies in the case of such verbs as "say" (as a synonym of "inform", and not "utter"), "be surprised", "it is clear that". But notice that such a solution (i.e. considering nominalized questions as names of supplementations) can also be applied in cases (19)–(24). For instance, it is a certain state of affairs which is unknown (say, it is a mystery) (example (22)); they are certain facts such that a relation of dependency holds between them (example (24)), etc.

9 PRAGMATIC PROPERTIES OF NOMINALIZED SENTENCES AS NAMES OF STATES OF AFFAIRS

Let us agree that the following sentence is true:

(26) Imre Ruzsa was born in Budapest.

Now, consider the name:

(27) [that] Imre Ruzsa was born in Budapest.

Let us agree also that the name (27) designates a certain fact; let us call this fact 'f'. Now, consider the following names:

(28) [that] somebody was born in Budapest

(29) [that] Imre Ruzsa was born somewhere

Both these names designate f; but (28) designates additionally other states of affairs.

Consider, finally, the following names:

(30) [that] who was born in Budapest

(31) [that] where Imre Ruzsa was born

What are their designata?

If we agree that nominalized questions designate supplementations (in my sense), then the designata of (30) and (31) are the same as in the case of (28) and (29). It seems that (30) designates f and other states of affairs, whereas (31) designates only f.

It is not surprising that two names designate the same object. But what is the difference between the two types of names?

Note that we use nominalized questions in specific situations, i.e. when we cannot indicate the supplementation precisely or when we do not want to indicate the filling of a gap. This may be easily seen from the following examples:

(32) Ferenc knows who was born in Budapest (but I do not know).

(33) I know who was born in Budapest (but I shall not say).

Moreover, nominalized questions are used when we want to express general dependencies:

(34) How successful our conference is depends on what the weather is like.

(35) Whether I understand Imre Ruzsa's works depends on what the language in which they were published is.

These sentences have a more general sense than sentences with the functor "if-then":

(36) If the weather is dreadful, then our conference will turn out well.

(37) If the language in which Imre Ruzsa's works were published is Hungarian, then I do not understand them.

Again—in contrast with (34) and (35)—in the case of (36) and (37), we do not know or do not reveal consciously what exactly this relation consists in.

10 SUMMARY

Let me summarize my views.

– Firstly, embedded questions are not *sensu stricto* questions.
– Secondly, questions in embedded contexts are (explicitly or implicitly) no-minalized questions.
– Thirdly, nominalized questions are ambiguous: in one sense, they designate question-states, while in another, they designate supplementations.
– Fourthly, nominalized questions have denotations similar to some nomina-lized sentences, but they perform more sophisticated pragmatic functions.

REFERENCES

Ajdukiewicz, K., 1923, O intencji pytania 'Co to jest *P*?' (On the intention of the question 'What is *P*'). *Ruch Filozoficzny* 8, 152b-153a.

Ajdukiewicz, K., 1956/1978, Conditional statement and material implication (Okres warunkowy a implikacja materialna.) In: K. Ajdukiewicz, *The Scientific World-Perspective and Other Essays*, Dordrecht, Reidel, 222–238.

Åquist, L., 1965, *A New Approach to the Logical Theory of Interrogatives*. Upsala, Almquist & Wilksell.

Kubiński, T., 1970a. *Wstęp do logicznej teorii pytań.* (*Introduction to the Logical Theory of Questions.*) Warszawa, PWN.

Lahiri, U., 2002, *Questions and Answers in Embedded Contexts*. Oxford, Oxford University Press.