Interrogative Semantics in Perspective

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Abstract

Taking as its departure Groenendijk and Stokhof's work on questions in their Ph.D. dissertation and in a 1982 *Linguistics and Philosophy* article, this note reexamines the question of what semantic type to assign to interrogative constructions.

1 Introduction

In this note, I will return to some issues discussed in an early article of Groenendijk and Stokhof's, [GS82] published over 31 years ago.

2 Some Prehistory

Before there was such a thing as the formal semantics of questions, there was a tradition of work in the logic of questions, or "erotetic logic." Examples of this work include [Ham58], [Bel63], [Har69] [Bel72], [Hin74], [NT76], and [Har84]. There is an extensive bibliography in [NT76], containing additional references, and useful annotations.

[Ham73] and [Kar77] begin the literature of published papers on the formal semantics of questions that follow in the tradition of [Mon73]. Karttunen cites many of the earlier logical works, but later work by other formal semanticists tends to forget the logical prehistory.

Nevertheless, this logical work contains many insights that are useful and relevant even today. [NT76], in particular, provides a more extensive and thoughtful discussion of the varieties of questions, and of the question-answer relationship, than you find in subsequent treatments of the topic, which tend to deal with self-selected "fragments" rather than with the general range of phenomena, and which are not so philosophical.

Belnap and Steel's work began, I believe, at the System Development Corporation during the early 1960's, and—unlike later work on the theory of questions—was was meant (optimistically) to be relevant to applications in information retrieval. As far as I know, this hope has never been realized. Practical work in databases and in question answering based on textual corpora is dominated by the problem of efficient information retrieval. The issues have to do with finding anything that might be useful and relevant to the user's interests, without swamping this in too many false positives. In this context, there seems to be no point in reasoning about the fine-grained semantics of natural language questions. Techniques that rely on a highly constrained query language or on crude, simplified representations of natural language queries prevail in this area.

3 Some assumptions and issues

[GS82] was one of several papers to appear in the 1970s and early 1980s dealing with how to incorporate interrogative constructions into Richard Montague's semantic framework. Other contributions devoted to the same topic include [Ham73], [Kar77], [Ben79], and [Bel82b].

These papers share many assumptions, most of these inherited from Montague's work. The most important of these are the following.

1. A semantic interpretation of interrogatives must deliver a model theoretic interpretation, and in particular an interpretation of interrogative clauses must be located somewhere in Montague's type-theoretic framework.

2. All interrogative clauses, including *yes-no*, alternative, and *wh-* interrogatives, have the same logical type.

3. There is no difference between the interpretation of a direct question, in a main clause, and the interpretation of the same question when it is indirect, in a subordinate clause.

4   Theory proliferation

The semantics of interrogatives presents to the theorist a large number of crucial alternatives. As often happens in semantics—but may happen even more in the case of interrogatives—the linguistic evidence concerning which choice to make is less conclusive than one would wish. This is the reason why semantic theories of interrogatives have proliferated in the literature.

These fundamental alternatives include the following.

1. What counts as an answer to a question, and what are the linguistic tests for answerhood?

   2.1 In particular, do false answers count as answers?

   2.2 Also in particular, do elliptical answers count as answers?

2. What semantic type should be assigned to (direct and indirect) questions?

3. Do questions have semantic presuppositions? More generally, where do you draw the line between semantics and pragmatics with interrogatives?

5   The type of questions

Here, I'll consider only the third question: how should we assign a type (in Montague's Intensional Logic) to interrogative constructions? As Groenendijk and Stokhof say in their 1982 article, this is one of the main issues on which the first attempts to incorporate interrogatives into Montague's framework differ. Out of the four authors I mentioned above in Section 3, Hamblin treats interrogatives as sets of propositions, assigning them the type $\langle\langle s, t\rangle, t\rangle$. So does Karttunen, with the difference that he wants to associate with a question the set of its true answers, rather than the set of all its (true or false) answers. Bennett and Belnap follow Hamblin's proposal. (This alternative is strongly adumbrated, by the way, in the pre-Montagovian theory of [NT76].)

Karttunen's and Belnap's theories are closer to each other than you might think. You can easily recover the set of true answers from the set of all answers, and you can come close to recovering the set of all answers from the intension of the set of true answers—take the set of propositions that are true answers in some possible world. The only cases where this doesn't work involve false answers that aren't true in any possible world, and these don't make for convincing examples that can be used in favor of either theory.

Departing from the idea of a set of propositions, Groenendijk and Stokhof recommend interpreting questions simply as propositions. But (crucially) what proposition a question expresses can vary from one world to another. This means that the interpretation of a direct question is the proposition that is its true answer, while (since constructions taking questions as complements are in general intensional) the interpretation of an indirect question is a function from worlds to propositions. As Groendijk and Stokhof point out (and, in fact, this is the main argument for the idea), this theory is simpler: it delivers a very straightforward account of some entailments (such as the one from *She knows whether the bus has left* to *She knows that the bus has left or that the bus has not left*), and it unifies the types assigned to declaratives and interrogatives. All of these are good things.

In holding that the interpretation of a direct question is the proposition that is its true answer, Groenendijk and Stokhof are supposing that questions have a unique answer. Now, examples like *Is 3 less than 1 or less than 2* (construed as an alternative question, not a *Yes-No* question) do cast some doubt on the notion that every question has at least one true answer. But let's set this problem aside—these questions can be concocted but are unusual, and perhaps some *ad hoc* treatment could be worked out for them.

The uniqueness issue is perhaps more troublesome. Perhaps alternative questions provide examples of questions that seem have two or more true answers, such as *Is 1 less than 2 or is 1 less than 3*— but maybe one could say that 1 *less than 2 and 1 is less than 3* is its true answer, so that 1 *is less than 2*, for instance, is at best an incomplete answer.

A question such as this example, of course is peculiar. But, as [NT76] points out, and Belnap mentions in other early publications, there are many naturally occurring cases of questions that seem to be asking for an example of something meeting certain criteria, rather than a complete list: cases like *Where can I find an internet cafe* and *What is good on the dessert menu*.

Most semantic theories ignore cases like this, perhaps because they fit less well into the most natural formal framework. Maybe a pragmatic explanation can deal with them, but I don't know of any successful attempt to do this.

If we grant that every question has a unique true answer (in every possible world), then the interpretation that Groenendijk and Stokhof give to indirect questions is not that different from the approach that uses the set of true or false answers: in fact, the two are the same, if one assumes that the set of true or false answers is identical to the set of propositions that are true answers in some world. This assumption is plausible, except in peculiar cases.

6 Conclusion

The story that has emerged here is one that actually is fairly common in semantic theory: theories that at first look quite different turn out to be discriminated only by linguistic evidence that looks somewhat contrived and about which we don't seem to have robust intuitions. This is one reason why indirect evidence often turns out to be especially important in semantics.

If we do look at such evidence, I think we can find reasons why the approaches that use sets of propositions have been preferred as time has passed. Later work in semantics and pragmatics has found other useful ways to employ sets of propositions—ways that plausibly should be closely related to the semantic interpretation of interrogatives. These include the interpretation of focus ([Roo85]) and the role of alternative sets in governing discourse (e.g., [Rob96]).

On reexamination, the arguments for the propositional representation are not strong enough to offset the pull of these other areas towards the sets-of-alternatives representation. Phenomena such as the relation of intererrogative-taking *know* to declarative-taking *know* can be handled

on any approach by meaning postulates. And there is another way to unify the representations of declaratives and interrogatives, if we wish to do this. We could adopt Montague's tactic of choosing the more abstract representation when there is a choice, and change the interpretation of declaratives rather than that of interrogatives. Interpreting declaratives as sets of propositions (which ordinarily are unit sets) may have certain advantages, even if the independent arguments for this aren't yet conclusive. (See, for instance, [AO08]).

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