Worrying about Trivial Questions

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1 Knowledge of Questions and Propositional Knowledge

(1) a. Heather knows which mushrooms are poisonous.
  b. Heather knows that all and only the black mushrooms are poisonous.

Seems like in some cases (1-b) and (1-a) attribute the same mental state to Heather. Be nice, in the general case, to reduce knowing-*wh* to knowing-that.

Reduction vs. Realization Question is whether there exists a p such that an attribution of knowledge of which Fs are Gs (in a context) is equivalent to an attribution of knowledge that p.

Clarifications Speaker need not be able to identity of p, since attribution knowledge of which Fs are Gs does not require knowing which Fs are Gs. But there cannot be two propositions p and p' such that attribution of knowledge-which to a person is equivalent to saying that the person knows one of them (since knowledge of disjunction is not sufficient in this case). Multiple realization is not reduction in the sense I mean.

2 What You Know When You Know Which Fs are Gs

Reduction of Knowledge-Which to Knowledge-That:

1. Knowing which Fs are Gs is just knowing the *complete answer* to the question "which Fs are Gs"?

2. Knowing the complete answer to the question "Which Fs are Gs", in any given context, is simply a matter of knowing a certain proposition, p.

Luckily, the semantics/philosophy of language literature contains has sophisticated accounts of what constitutes the complete answer to a question (these usually come under the heading of the *semantics of questions*) and, hence, what counts as knowing the answer. Mostly the notions I use are from Groenendijk and Stokhof, but they have earlier antecedents.

Knowledge Which (*standard/de dicto*) Knowing which Fs are Gs is a matter of knowing what the extension of F and G is, knowing exactly which individuals satisfy F and G, which amounts to knowing the proposition that those and only those individuals satisfy F and G). In possible world talk: every world compatible with your knowledge has to have the same intersection of F and G as in the actual world.[1] We can also think of this notion as being defined by the following partition:

(2) $w \sim w'$ iff $\forall x((Fwx \& Gwx) \leftrightarrow (Fw'x \& Gw'x))$

As an example, consider the possible worlds in Table 1. Suppose w_1 is the actual world.

Table 1: F and G

	F	G
w_1	a, b	a
w_2	b	a
w_3	a	a
w_4	a, b	b

Then, the only world that is equivalent to w_1 according this conception of answer-hood is w_3. So your knowledge must rule out at least w_2 and w_4 to count as knowing which Fs are Gs in w_1.

Too Weak: doesn't require you know of every actual F whether or not they are a G, since you can simply know of some actual F that *if* they are an F *then* they are not a G.
Too Strong: Imagine there was school trip yesterday and you know exactly which students went on it and which didn't, but you don't know which students are third-graders and which are fourth graders. There is a sense in which you know which fourth-graders went on the trip, even though you might not know of any student that they are a fourth grader.

Knowledge Which (*de re*) In this sense, what you need to know is for each actual Fs whether or not they are a G (so a conjunction of statements of the form x is a G or x is not a G for each x in the actual extension of F).[2] In possible world talk, any world compatible with your knowledge must be one where all the actual Fs have the same intersection with G whether they are Fs or not. Going back to Table 1: if w_1 is actual then your knowledge must rule out only w_4 to count as knowing which Fs are Gs.[3] We can think of this notion as the partition corresponding to this equivalence relation:

[1] This sense of knowing-which comes from Groenendijk and Stokhof (1984, 1994), see also Heim (1994) for its connections to the analysis of questions in the classic Karttunen (1977).

[2] This is the *de re* sense from Groenendijk and Stokhof (1984, 1994) and the proposal in Higginbotham (1996).

[3] Note that we might need a third, stronger sense that incorporates both these other account, but it's not really relevant to the points here.

(3) $w \sim w'$ iff $\forall x(F_{@}x \to (Gwx \leftrightarrow Gw'x))$

Connection Between Semantics of Questions and Reductionism semantics literature gives *one* route of implementing reductionism. I'll mostly be concerned with how well this literature handles knowledge attributions, and thus supports reductionism. Of course, looking at "know" constructions is a way of evaluating G+S's semantics.

3 Trivial Questions

Two questions:

(4) a. Which bachelors are male?
b. Which men are bachelors?

Note that the **standard** sense does not even distinguish between the answers to these two questions. Thus, it cannot (alone) explain why one is trivial and the other not.

In the **de re** sense above, knowing which bachelors are male requires knowing of the actual bachelors whether they are male or not. This is a non-trivial requirement: it requires knowing of a certain set of men that they are men, which you certainly might not know (e.g. you don't know that Pat, the bachelor, is a man). Thus, although the **de re** sense does distinguish between (4-a) and (4-b) it does not explain why semantic knowledge alone seems to allow us to know the answer to (4-a).

One way of putting the puzzle: on many semantics (5) comes out as tautologous:

(5) All balloons are balloons.

This seems like a desirable feature. Likewise we might hope that the answer to (6) (on at least one reading) is a tautology:

(6) Which balloons are balloons?

However, none of the accounts above managed to capture this. Table 2 gives an example. Even

Table 2: Balloons

	B
w_1	a, b
w_2	a

though both w_1 and w_2 are worlds in which all balloons are balloons (as any world is), to know which balloons are balloons at w_1 on either of the accounts above, means that your knowledge rules out w_2.[4]

Over-generation Without supplementation the *de re* accounts over-generate. The *de re* reading is often missing from trivial questions we only get the trivial reading. Context: we know there are 20 spies in our company:

(7) Which spies are spies?

4 Two Inadequate Accounts

This issue is very little discussed in the literature (to my knowledge). Two accounts try to explain what's going on with trivial questions (or, anyway, with the particular contrast between (4-a) and (4-b)):

Special contexts Higginbotham (1996) discusses the puzzle posed by the pair of sentences in (4). He suggests that his sense of answer (essentially **de re**) can deal with the problem. However, this is only relative to common knowledge of who the Fs are. Consider this scenario: you don't know which of the 20 students are third graders or fourth graders. You still know (in an obvious sense) which third graders are in third grade. So fixing the domain in the common ground does not help, since the phenomenon persists even when the domain is not fixed.

Explaining Deviance Aloni et al. (2007) give an account according to which (4-a) is a pragmatically defective question. It may well be, but accounting for the deviance of (4-a) doesn't itself explain why you can know the answer to it based on semantic knowledge alone. It also fails to explain the generalization that's about to come.

We need a substantive account of how we can know (in at least one sense) which of the seven spies are spies, without appealing to our ability to identify the seven spies.

5 A Generalization

All/Which Connection If you know that all Fs are Gs then you know which Fs are Gs.

No/Which Connection If you know that no Fs are Gs then you know which Fs are Gs.

[4] Actually, as we'll see, we don't need to make the answer to (6) a tautology to explain why we can know the answer a priori.

Note that the **No/Which Connection** but not the **All/Which Connection** follow from the **standard** conception of knowing the answer. And neither follow from the **de re** conception. **All/Which** and trivial questions.[5]

This is not merely a matter of complete vs. incomplete answers to questions/knowledge of answers. All Fs are Gs appears to be a complete answer, unlike various other quantificational answers. For instance, knowing that most of the children went to the zoo does not mean you know *which* children went to the zoo.

6 Semantic Solution

A brute-force solution by replacing definition of complete answer to handle this case:

Knowing-Which Two-Part If all Fs are Gs then knowing which Fs are Gs is just a matter of knowing that all Fs are Gs otherwise it is as in **standard** or **de re**.

A little ugly, but seems to do the trick in that it gives you the **All/Which Connection**. However, problems arise when we consider slightly more complex cases. In addition to the **All/Which Connection** there are a series of related connections which might be called the **All but** X **Connection**. Knowing that all students but Ted went on the school trip seems to be as good for knowing which students went on the school trip as knowing that all students went on the school trip. But, **Two-Part** does not make knowing that all but X went on the school trip constitute knowing which students went on the school trip. For example, consider the case in Table 3. Here, if your knowledge tells you that you are in w_1 or w_2, then you are

Table 3: S and C

	S	C
w_1	a, b, t	a, b
w_2	a, t	a
w_3	a, b, c	a, b

in a position to say that all students but Ted came. The notion we need to capture all of these cases is actually the G+S *de dicto* notion of answer for "Which Fs are *not* Gs":

(8) $w \sim w'$ iff $\forall x((Fwx \& \neg Gwx) \leftrightarrow (Fw'x \& \neg Gw'x))$

[5]Note for my purposes **All/Which** does not need to hold universally: it's holding sometimes is already a problem for G+S's accounts).

These two notions can capture both "set X and no one else" and "everyone but X", but they define two different partitions and in any given context each gives a different proposition corresponding to "the" answer. Unlike the *de re*/*de dicto* distinction, this does not seem to be semantic ambiguity in question-meaning, so poses a problem for G+S theory and reductionism.

7 Non-Propositional Notion

Knowing which Fs are Gs is a matter of being able to tell *given* the set of Fs whether they are Gs. This can account for all the notions of knowing the answer we have discussed above. If you know but that every F except some set X satisfies G then you can tell given the set of Fs which satisfies G. Likewise if you know that some set X satisfies G but no other Fs do. So we can capture both the **All/Which** and the **No/Which** connection.

We need, however, to do more work to explain *de dicto* readings, but this is perhaps not so worrisome (could be a presupposition of some sort).

Also, seems to connect to independent work of Schaffer (2003).

Schaffer-Style Case You are watching *Bill and Ted's Excellent Adventure* and Ted is talking. You are sure that it is Bill or Ted speaking (and not, say, Napoleon, who also figures in the film), but you do not know which one is speaking. According to Schaffer it is true to say you know whether Ted or Napoleon is speaking. You do not, however, know whether Ted or Bill is speaking.

This suggests that knowing whether A or B does not depend upon knowing either A or B but rather on knowing, given that one or the other is true, which one is true. Expansion of this view: questions induce partition of (some or all) of logical space. Knowing the answer amounts to, given a question/answer-partition pair, being able to tell which cell you are in. Suppose that knowing the answer to the question "Which Fs are Gs" is just a matter of being capable, when you are given the **de re** partition of logical space and told that it is the partition of the answers to the question, of telling which cell the actual world is in.

However, Schaffer's cases use weak intuitions which can easily be account for without abandoning the view that knowledge wh- is not reducible to knowledge that. Three-step strategy:

1. While there is a contrast between whether John knows whether Bill or Ted and John knows whether Bill or Napoleon, it is not *clear* that Ted knows either.

2. Whether-questions induce presuppositions that one and only one of the alternative propositions is true and the other not.

3. Being asked the question can give you *knowledge* of the correct answer by a combination of your prior knowledge and taking the presupposition of the question as testimony.

8 *De Re* vs. *De Dicto*

Note that G+S's so-called *de dicto* sense of the answer is in fact *de re* in the sense that it requires knowing of the all the actual Fs and Gs that they are Fs and Gs. The problem we have is that knowing that all Fs are Gs doesn't seem to put you in a position to have this *de re* knowledge. For it's compatible with knowing that all Fs are Gs that any given individual might or might not be an F. I'll now explain how we might bridge this gap.

9 Guises and Knowing-Which

Murder The prince has been murdered. As the chief inspector you know because of certain clues that the man who killed him is named Sergio Vassily. So you know who killed the prince. However, you are not sure who this Sergio Vassily is. When you have gathered all the lead suspects in the room to question them, there is obviously also a sense in which you do *not* know who killed the prince.

Aloni (2001) handles these cases by treating the quantification in question as not being over individuals but rather being directly over a set of individual *concepts*. In other words, we move Fregean-like guises for individuals into the semantics of questions.

A pragmatic approach: No absolute "acquaintance" relation that allows in all contexts *de re* beliefs. Instead features of a context determine when we can appropriately attribute a *de re* belief about an individual to someone. So, for instance, it might often be perfectly legitimate to attribute to David the *de re* thought that his neighbor John is a psychopath. However, in the context of a dark club where everyone is wearing unfamiliar attire and strange wigs, it might be inappropriate to attribute that same *de re* thought to David.

10 Plural Answers

For our purposes we will need to discuss not only questions picking out single individuals but also questions picking out pluralities. Note, first of all that, that the same phenomenon occurs where a question can be answered by identifying a plurality rather than the individuals constituting it. For example:

(9) a. Which mushrooms in this box are poisonous?
b. The red ones.

In some contexts, this answer will suffice, and in others it will not. We can extend the pragmatic approach to guises for individuals to pluralities.

Some problems:

- Worries about cardinality that the semantic approaches do. Being able to pick out rigidly the red mushrooms suggests that one knows how many red mushrooms there are (if we model knowledge in the usual way and assume that pluralities have their members essentially as sets do).
- *de re* beliefs about a plurality would seem to filter down to *de re* beliefs about the individuals comprising it. So, if our knowledge rules out every world in which the actual red mushrooms are not poisonous, then it would follow that we know *de re* of each red mushroom that it is poisonous.

Lesson: good model of plurals and knowledge about plurals needed, but this needed independently of questions literatures (e.g. in normal knowledge attribution. Independent motivation:

(10) a. John knows that this collection of objects is painted.
b. John knows that the toy piano is painted.

Connection questions to pluralities Knowing which Fs are Gs is simply a matter of knowing of the actual largest plurality X from F such that the Xs satisfy G that it it is the largest plurality of Fs that satisfies G. This is the plural equivalent of G+S's *de dicto* notion, the one given by the relation (3).

11 Pragmatic Treatment of Answers

Knowing which Fs are G just requires having *de re* knowledge of the largest plurality of Fs that satisfies G that it satisfies G and that it is the largest group that satisfies G.

Critical assumption: The guise "the Fs" is/can often be an appropriate guise for the plurality of all Fs in the context of a which-Fs-question.[6]

[6]Many have noted in the syntax literature that the wh-phrase, "Which Fs" tends to take for granted a salient group of Fs.[7] So we might think that using the expression "Which Fs" marks a certain discourse status of the plurality of Fs which allows us to use the plurality to support knowledge *de re* of the Fs under that guise. (Similar to how indefinites allow definite reference back to them.). Of course, this similar phenomenon occur with non-d-linked wh-expressions such as "what F".

Suppose than John knows that all Fs are Gs. Then he will know which Fs are Gs on this conception of question meaning if the guise of the plurality of Fs, "the Fs" can support *de re* knowledge about Fs.[8] So we can explain the **No/Which Connection** without deviating from G+S's *de dicto* notion of answer. We can also explain why knowing that every F except a set X satisfies G counts as knowing the answer since we can now assume that if someone can identify the pluralities of all the Fs and X then he can identify the plurality consisting of all those individuals in F that are not in X. Thus, when we allow reference to the plurality of all Fs we can make one notion of answer do double duty. (Of course, we could just as well have started with G+S's notion of answer to "Which Fs are not-Gs.)

12 Reductionism Revisited

G+S's *semantics* for questions might be adequate to account for knowledge-which constructions. However this depends on attributing knowledge of *de re* propositions which we would not normally attribute.

(11) a. John knows which of the the third graders are third graders.
b. John knows that the (actual) third graders are third graders.

From the perspective of just understanding knowledge-which it seems like it might be more natural to see it as a multiple realization situation, not a clean reduction.

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[8]I'm assuming also that John knows of the plurality of Fs that they are all and only the Fs but this is trivial.

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