Worrying about Trivial Questions *

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Abstract

I discuss 'knowledge-which' attributions of the form, "x knows which Fs are Gs" (e.g. 'Billy knows which dice are loaded'). It's tempting to think that knowing which Fs are Gs reduces to knowing the answer to the question 'Which Fs are Gs?', and that this, in turn, amounts to knowing some proposition. Contemporary theories of the semantics of questions developed by Hamblin, Higginbotham, Groenedijk and Stokhof, and others provide a general account of what proposition serves as the answer to the question 'Which Fs are Gs?' and, thus, they form the basis of a reductive account of knowing-which. However, none of these accounts can explain a very basic fact about knowing-which: that mere semantic knowledge can suffice to know which bachelors are men, though not to know which men are bachelors. Knowing which bachelors are men is possible just in virtue of knowing that all bachelors are men, whereas you need to know facts about particular men (or groups of men) to know which men are bachelors. Although this problem has been long recognized, I argue that all extant treatments of it are inadequate. We need either to abandon the project of reducing knowing-which to propositional knowledge, or posit a special link between the syntactic form of questions and the pragmatics of knowledge ascriptions.

1 Knowing Which and Knowing That

There are different ways of attributing knowledge to people. To name three: we can say *that* they know that some proposition is true, we can say that they know *whether* some proposition rather than another is true, and we can say that they know *which* things in some class satisfy some property.

Despite the diversity of linguistic means of attributing knowledge, it's tempting to think that, at bottom, all knowledge is knowledge of propositions. This suggests that *knowledge-that* has some sort of priority over other types of knowledge, since knowledge-that seems like propositional knowledge. One case that challenges this thesis is *knowledge-how*: it is not clear in what sense knowledge-how depends upon propositional knowledge.[1] By contrast, in other cases such as *knowledge-whether* and *knowledge-which* (together often called *knowledge-wh*) it seems that the sorts of knowledge ascribed by these locutions always are constituted by knowledge-that.

I'm not interested here in the question of which kind of knowledge ultimately depends upon which other kinds of knowledge. What I'm interested in is whether, in the general case, attributing knowledge-*wh* to someone is equivalent to attributing propositional knowledge to them. I won't directly discuss knowledge-whether here (which I think is an easier case) but only knowledge-which.[2] For this case, the question I want to ask is whether there is some

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[1] Stanley and Williamson (2001) defend the thesis that knowledge-how is just a species of propositional knowledge.

[2] Jonathan Schaffer (2003) gives arguments that knowledge-whether does not reduce to knowledge that, which

proposition p such that saying that x knows which F is G is attributing the same mental state as you would if you said that x knows that p.

To take a concrete example, consider this knowledge attribution:

(1) John knows which friends of mine went to the Getty.

If I use (1) without myself knowing which friends went to the Getty, then, obviously, I don't know what p is. However, it might still be the case that my assertion of (1) has equivalent truth conditions to the assertion that John knows that p. So, the real question is whether, in a given context, there is always a proposition p such that (1) attributes to John the knowledge that p. I'll call the thesis that there is always such a p *reductionism* about knowing-which.

You might wonder how reductionism could fail to be true. After all, isn't knowing who went to the Getty just a matter of knowing some proposition? Then, doesn't there have to be, in context, a reduction of the ascription in (1) to some ascription of knowledge-that? Not quite: Suppose there are two propositions p' and p'' that are logically independent and that (1) (when uttered in a given context) is true if and only if John knows p' or p''. If this is the case, then there is no p such that (1) is equivalent to John knows that p. So *reductionism* could be false even if all knowledge-which depends on knowledge-that.[3]

2 Which Propositions?

What would be good is to have a general method to get from a question Q, e.g. *which friends went to the Getty*, and a context c to a proposition p such that in c John knows Q, e.g. John knows which friends went to the Getty, if and only if John knows p.

We have some help here from the extensive literature on the *semantics* of questions (Groenendijk and Stokhof, 1984; Hamblin, 1973; Heim, 1994; Karttunen, 1977, and others). This literature is concerned with providing formal objects to represent the meaning of questions as part of the general program of compositional semantics. The particular tact taken in this literature suggests a road-map for giving just the kind of reduction of knowledge-*wh* to propositional knowledge described above. The meaning of questions, in this literature, is defined by reference to its possible or actual answers which are themselves propositions. Thus, we can associate with each question, in a context, its actual answer. It's natural, then, to think that knowing Q (e.g. which Fs are Gs) is just a matter of knowing the proposition which is the actual answer to Q in the context.

Before getting into the details of this literature, let me note an intuitive distinction between *complete* and *partial* answers to which-questions. We can distinguish between answers that merely give *some* information about the answer, and those that entirely answer the question. For example, if I ask which students came to the party and you answer, "Jack and some others came," you have not entirely answered the question. It *might* be that in a context this answer would be pragmatically adequate, but I think there is a clear sense in which it is not a *complete* answer. On the other hand, if you say for every student whether they came or not, you have clearly given a complete answer.

Hamblin (1958) suggests that the set of all possible *complete* answers to a question is a

I'll discuss in passing.

[3] Essentially, knowledge-which might admit of multiple realizations. Note that the state of knowing p' or knowing p'' is not equivalent to the state of knowing p' or p''.

set of exhaustive and mutually exclusive propositions. There is some dispute about whether this is the right way of thinking about answers to questions generally but it is widely accepted as correct for understanding knowledge-*wh*.[4]

A set of mutually exclusive and exhaustive propositions over logical space is equivalent to a partitioning of logical space, and equivalence relations form partitions. There are two prominent proposals for what sort of partition is needed, which are generally thought to capture *de re* and *de dicto* readings of questions. Groenendijk and Stokhof (1984) suggest the equivalence relation in (2) as the relation partitioning logical space associated with the *de dicto* reading of the question "Which friends (Fs) went to the Getty (are Gs)?"

(2) $w \sim w'$ iff $\forall x((F_w x \& G_w x) \leftrightarrow (F_{w'} x \& G_{w'} x))$

This relation partitions logical space into a set of cells, where, in each cell, exactly the same set of individuals are both friends and went to the Getty.[5]

Such a partition of all the possible answers to a question naturally feeds into a reductionist theory. Knowing which friends went to the Getty is just a matter of knowing the answer to the question "Which friends went to the Getty?" The answer to the question is just the proposition expressed by the cell of the partition that the actual world is in. Consider, for instance, the set of possible worlds represented in Table 1. The partition defined by (2) has three cells,

Table 1: Which friends went to the Getty

	F	G
w_1	a, b	a
w_2	b	a
w_3	a	a
w_4	a, b	b
w_5	a	a, b

$\{w_1, w_3, w_5\}$, $\{w_2\}$, and $\{w_4\}$. Knowing which friends went to the Getty in w_1 or w_3 or w_5 is just a matter of knowing the proposition $\{w_1, w_3, w_5\}$, in w_2 it is a matter of knowing the proposition $\{w_2\}$, and in w_4 it is a matter of knowing the proposition $\{w_4\}$. So using the partitions associated with questions from Groenendijk and Stokhof (1984) seems to be a way of implementing a reductionist account of knowing-which.

Let me first suggest that the above account might be too weak in one sense: Suppose you attribute to John the knowledge of which friends went to the Getty in w_1. It seems to follow from this that John knows, for each friend, whether or not he or she went to the Getty. However, if John's knowledge set includes w_5 then John does not know whether or not friend b went to the Getty. Thus, there is someone who actually is a friend and all John can say for sure about him is that if he did go to the Getty, then he's not a friend. In this case, it may seem odd to say that John knows which friends went to the Getty.

The more standard worry is that (2) is too strong: (2) requires that John know not only who the friends who went to the Getty are but also that they are friends. In some situations

4 Karttunen (1977) suggested that the complete answers to questions were *not* mutually exclusive. However, I think it is generally acknowledged that *for the purposes of knowledge ascriptions* it's best to think of the possible answers to a question as being mutually exclusive. See in particular Groenendijk and Stokhof (1984) and Heim (1994).

5 In case the notation is opaque: "$F_w x$" means that x satisfies F in w.

this may be appropriate, but in others it may be too stringent a requirement. It is argued, for instance, that there is a sense in which merely in virtue of knowing exactly who went to the Getty in total, John knows which friends went to the Getty, even if John does not know who the friends are. This reading of knowing-which attributions is usually called the *de re* reading, and it can be captured by this equivalence relation:

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

On this notion we simply require John to know of the actual friends whether or not they went to the Getty. So the partition defined by this is $\{w_1, w_2, w_3\}$, $\{w_4\}$, and $\{w_5\}$. This partition rules out the worry of the previous paragraph: to know which friends went to th e Getty, we need to know of every actual friend whether or not they went to the Getty. We can combine these two notions, (2) and (3), into one stringent notion that might be needed in some cases.[6]

How do things look so far for reductionism? Well, we now have two or three competing senses of what proposition constitutes a complete answer. If these distinct senses really exist, it might be reasonable to think that questions are *ambiguous* between these different readings. It's probably reasonable, after all, to think that we only need two of the three notions I've canvassed above and the distinction between them might correspond simply to a *de re/de dicto* distinction, which is often thought to be the result of a syntactic and/or semantic ambiguity. Relative to one or the other reading, however, each question in each context is used to ascribe a particular piece of propositional knowledge: the proposition determined by the cell of the partition that the actual world is in.

It's worth noting that much of the semantics literature since Karttunen (1977) has been concerned with explaining *embedded* uses of questions, such as in knowledge attributions. Thus, in asking whether the answers provided in this literature can support reductionism, we are also directly asking whether the semantics for questions is adequate.

3 Trivial Questions

Higginbotham (1996) observes that the following two questions differ sharply.

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

While the first seems entirely trivial, and its answer knowable a priori, the second is a legitimate question. This also raises a puzzle for the reductionist view of knowledge-which, since the two knowledge ascriptions associated with (4-a) and (4-b) differ:

(5) a. John knows which bachelors are male.
b. John knows which men are bachelors.

While (5-a) ascribes what seems like entirely trivial knowledge to John, (5-b) ascribes substantive knowledge. Note, first, that according to (2) the possible answers to (4-a) and (4-b) are the same. Thus, the notion of knowing the answer in (2) is, on the face of it, inadequate to capture the distinction between (5-a) and (4-b).

[6] That is, for any two partitions you can define a third one where there is a cell corresponding to any pair of cells, one from each of the other partitions.

Consider, on the other hand, the *de re* notion of knowing the answer in (3). On this notion the two predicates in the knowledge ascription have different roles, so it does not face the immediate symmetry problem. However, note that, on (3), knowing which bachelors are male requires knowing this proposition:

(6) $\{w : \forall x(F_{@}x \to (G@x \leftrightarrow Gwx))\}$

This is a non-trivial requirement: it requires, for the case of (5-a), knowing of a certain set of men that they are men, which you certainly might not know (e.g. because you don't know that Pat, the bachelor, is a man).

One way of putting the puzzle: on many semantics (7) comes out as tautologous:

(7) All balloons are balloons.

This seems like a desirable feature. Likewise, we might hope that the answer to (8) is tautologous:

(8) 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.[7]

Another way of pointing to the problem is to note that it seems that the standard theories without supplementation over-generate readings of questions. The substantive readings predicted by Groenendijk and Stockhof (henceforth, G+S) are often missing from trivial questions.

(9) Which spies are spies?

It does not seem like asking (9) is a way of asking someone to say who the spies are, even though that is exactly the proposition G+S assign to the actual answer to this question in both the *de re* and *de dicto* senses. Of course, we might think this simply has to do with the fact that it's simpler to ask:

(10) Who are the spies?

We can, however, construct more elaborate cases where we eliminate this pragmatic confound. Suppose there are two classes of spies, Russian and Polish. We know that Bob in accounts is Russian and not a spy. We also know that everyone else of Russian origin is a spy, but we are

[7] In fact, in the end, I won't accept that the answer to (8) is tautologous, but rather simply argue that we can explain why in any given context we are always in a position to know the answer. Thus knowing which balloons are balloons might be similar to knowing that "I am here": the knowledge comes for free in any context though the proposition itself is not a logical or necessary truth.

not sure who else is of Russian origin (and hence who the spies are). It seems in this context we cannot easily ask (11) as a way of asking who the Russian spies are.

(11) Which Russians are spies?

But according to G+S's notion of answer, in this context, this should be understood directly as a request for the identity of the Russian spies. Moreover no individual word in (11) is redundant, unlike in (9).

4 Two Inadequate Accounts

Let me briefly mention the two attempts I know of in the literature to handle the problem posed by trivial questions.

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 (though he is not very explicit about how). The *de re* sense can only deal with the problem 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 some clear 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.

5 A Generalization

I think the problem of trivial questions can be reduced to a more general problem about the related notions of possible answers that I outlined in Section 2.

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.

Note that the **No/Which Connection** but not the **All/Which Connection** follows from (2). Neither connection follows from (3). It should be clear that if we can explain the **All/Which Connection** we can explain the issue of trivial questions. After all, we can seem to know a priori that *all* bachelors are male, so given the **All/Which Connection** we can know a priori *which* bachelors are male.

Let me put aside a tempting thought. You might think that *all* quantificational answers give some sort of knowledge of the answer, and that this explains the **All/Which Connection**. However, I think it's intuitively clear that not all quantitative answers constitute complete answers and thus constitute knowing-which. Consider this example:

(12) Which boys came?

(13) a. All of them.
b. None of them.
c. Most of them
d. Three of them.
e. Half of them.

We cannot respond to (13-a) or (13-b) by asking for further specification ("Oh really, which ones?") but we can reply to the others this way. Likewise, knowing (13-a) or (13-b) would amount to knowing the complete answers to (12), but knowing (13-c), (13-d), or (13-e) would not.

It seems to me that on at last a prominent reading of "which Fs are Gs" the **All/Which Connection** and **No/Which Connection** hold. Thus, the attempt at spelling out reductionism in Section 2 seems to be incomplete since it cannot account for this. The rest of the paper will be concerned with what our options are explaining knowledge-which in light of this problem.

6 Semantic Solution?

The first thought you might have is that the particular partitions we chose above were just not the right ones. What we need to do is to refine them to account for the **All/Which Connection**. Since we know already how to capture the **No/Which Connection**, let's only consider the **All/Which Connection**. To capture it directly we need to give a notion of answer-hood according to which knowing that all Fs are Gs entails knowing which Fs are Gs.

The main point I want to make about this is that to make such a solution work we would need to have a notion of knowing the answer that is distinct from all the previous notions we have used. Consider, for instance, the set of possible worlds described in Table 3, which include all possibilities except those where F and G are empty. The proposition you know when you

Table 3: F and G

	F	G
w_1	a, b	a, b
w_2	a, b	a
w_3	a, b	b
w_4	a	a, b
w_5	a	a
w_6	a	b
w_7	b	a, b
w_8	b	a
w_9	b	b

know that all Fs are Gs is $\{w_1, w_4, w_5, w_7, w_9\}$. This proposition overlaps with *every* cell in every partition discussed in Section 2. So, if we are going to allow this to be a possible answer, we need to redefine the partition completely by making a new cell which contains parts of all the previous cells. Thus we could simply take $\{w_1, w_4, w_5, w_7, w_9\}$ to be one cell and keep the other cells as is except where they intersect with the new cell.[8]

[8] We also could abandon the notion that the answers to a question are a partition.

This strategy is 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. Another acceptable response to (12) is:

(14) All of them but Todd.

This has the characteristics of a complete answer and should be analyzed as such. Using it does not seem to require knowledge of who all of the other boys are. But, **Two-Part** does not make this a complete answer. For example, consider the case in Table 4. Here, if your knowledge

Table 4: S and C

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

tells you that you are in w_1 or w_2, then you are in a position to say that all students but Todd came.

We now have two parallel and overlapping partitions. There is, first of all, the so-called *de dicto* reading of G+S, defined by the relation in (2). On this notion your knowledge must fix the intersection of F and G. This allows, for example, these answers (12) to count:

(15) a. Todd but no one else.
b. No one.

In fact, each cell of the partition defined by (2) corresponds to an answer of the form *set X and no one else*. Then, there is the inverse partition which counts the following answers:

(16) a. Everyone.
b. Everyone but Todd.

All the answers in this partition are of the form *everyone but set X*. This is, of course, the G+S *de dicto* partition for the negative question:

(17) Which boys didn't come?

For F and G we can write this partition as follows:

(18) $w \sim w'$ iff $\forall x((F_w x \& \neg G_w x) \leftrightarrow (F_{w'} x \& \neg G_{w'} x))$

The truth is that what G+S call the *de dicto* reading of questions simply corresponds to a reading which allows one direction of ignorance about the extent of the restrictor in a which-question. There is also another, corresponding, direction: the negative direction. These two determine distinct partitions of logical space. In most possible worlds there are two logically independent propositions you can know, either of which allows you to know which Fs are Gs.

What G+S call the *de re* partition, (3), is different in *two* ways from the previous two conceptions. First, it requires knowledge of the extent of *both* the Fs that are in G *and* the Fs that are not in G, but, second, it only requires that knowledge *de re*, that is, one does not need to know of any object whether it satisfies F. As I suggested earlier, however, we can easily strengthen this notion to yield a *de dicto* version of it, which requires either knowing that of each member of F and G that it is in F and G, or requires of knowing of each member of F and $\neg G$ that it is in F and $\neg G$.

I've given empirical motivation for allowing both (2) and (18) to count as notions of answerhood. I'm not clear about the status of the evidence motivating other stronger or weaker notions (such as those discussed in the last paragraph). Regardless, we are in exactly the non-reductionist situation for knowledge-which that I discussed in Section 1. A question in a context does not determine a unique proposition knowledge of which constitutes knowledge of the answer. Rather there are (at least) two options: the usual G+S *de dicto* partition, (2), or the inverse partition I have just outlined, (18). There is no evidence I am aware of that these notions of answer constitute an *ambiguity* in the meaning of questions as the *de re*/*de dicto* distinction might. In this case, the semantics for questions from G+S is inadequate *and*, thus, the route from it to reductionism (in its strong form) fails.

We could, of course, deal with this semantic problem simply by stipulating a particular lexical item for "know" that interacts with questions in the right way. However, if we do this we abandon G+S's hope that "know" is unambiguous and merely embeds propositions in cases of both "know that" and "know which".[9]

7 Non-Reductionism

Instead of defining two or three *propositional* notions of answers to which-questions, we might instead try to define a single *non-reductionist* notion. By non-reductionism I do not mean that knowledge-which is not constituted by propositions in some way, but rather that it is not obvious that for every context there is a single proposition p such that knowing p is equivalent to knowing which Fs are Gs.

This notion is rather intuitive: 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 that were discussed above. If you know 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**.

The notion is not easily expandable to handle the *de-re*/*de-dicto* distinction. It does not entail that knowing which Fs are Gs requires knowing of any Fs that they are Fs. We might think, though, that such requirements are more like a *presupposition* of question-ascriptions rather than part of their actual meaning. The non-propositional account of answer-hood is also weaker than the *de dicto* account of answer-hood captured by equivalence relation (2) in that it does not require knowing of every actual F whether or not it is G. We might be able to explain why this assumption appears by reference to some sort of conversational assumption that someone who knows which Fs are Gs knows who the Fs are rather than having it follow from anything about the semantics of questions.

This strategy thus is not perfect: it requires more elaboration to show that the notion of being able to tell, given the set of Fs, which are Gs can form the core of the notion of knowing the answer. We must postulate some presuppositions and use some pragmatic reasoning to explain all the putative data about *de re* and *de dicto* readings. I do not think the strategy is

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[9] Several people brought to my attention a very distinct semantic approach to questions due to Velissaratou (2000) that would solve some of the problems discussed here. Full discussion of this proposal would take us too far afield, but the basic problem with her approach is it makes knowledge-which far too easy in many cases.

unworkable, but I won't pursue it here. It corresponds to a radically different approach to the meaning of questions and knowledge attributions than that pursued in the semantics literature so far. It has no problems dealing with the various puzzles for G+S I have posited so far but it may have disadvantages compared to their approach. For instance, if we do not treat the semantic value of a question as corresponding to a proposition in knowledge attributions we cannot easily explain why knowledge-which and knowledge-that can be conjoined:

(19) John knows which students came and that they brought their umbrellas.

Generally speaking, conjunctions conjoin to items of the same type. Thus, if we treat that-clauses as picking out propositions in knowledge attributions, then we have some pressure to view which-clauses as doing so also.

7.1 Connection to Schaffer

Schaffer (2003) considers constructions of the form "whether A or B." I assume that he is considering the reading of these questions that does not ask whether the sentence *either A or B* is true but rather whether the sentence A or whether the sentence B is true. Here is an example of the kind of case he uses:

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 knowledge 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. One way of thinking about this is to think that the question "whether A or B" induces a partition that only covers *part* of logical space. There is one cell where A is true and B is false and one cell where A is false and B is true. Knowing whether A or B is just a matter of being able to tell, which of those cells (if any) obtain—in other words, you don't need to know *that* the actual world is in those cells, but just that if it is, which one it is in.[10]

We can expand this view to try also to cover the **All/Which Connection**, as suggested above. In Schaffer-type cases knowing whether is a matter of being able to tell *given the partition* what the answer to a given question is. Suppose x knows that all bachelors are men. If we give x the *de re partition*, the one yielded by (3), and he knows that it is the *de re partition* of the question "which bachelors are men?", then he can tell which cell of the partition the actual world is in.[11] So it seems that we can account for the **All/Which Connection** on the general picture of knowledge-*wh* according to which knowing the answer to a question depends upon being able to tell, *given a partition of logical space*, which cell the actual world is in.

If you want to abandon reductionism this seems like a perfectly good way of doing so. However, I don't think Schaffer's cases themselves give us any reason to abandon reductionism

[10] There's probably also a factivity requirement: the actual world does indeed need to be in one of those cells.

[11] The partition that the actual world is in is the one where the set of individuals who only vary in whether they are men between partitions and not within partitions are all men, x can obviously determine this without knowing (before he is given the partitions) who is a bachelor.

or even to resort to the idea that knowing whether A or B is true is not simply a matter of knowing the truth of A and B. It has often been observed that asking whether A or B is true tends to lead to a presupposition that one and only one of A and B is true. When someone presupposes something, we can often accept that they believe it and thus are given reason ourselves to believe it. Suppose in the **Schaffer-Style Case**, you are asked whether Ted or Napoleon is speaking. Being asked that question can give you *knowledge* by testimony, through the presupposition that either Ted or Napoleon is speaking (and not both). In this case, your old knowledge combined with your new knowledge puts you in a position to know that Ted is speaking. This, of course, does not explain why we are able to say (before we actually ask you whether Ted or Napoleon is speaking) that you know whether Ted or Napoleon is speaking. However, here I want to simply note that the intuitions that support the Schaffer cases are not that strong. Certainly there is a contrast between whether it seems right to say that you know whether Bill or Ted is speaking and whether it seems right to say that you know whether Ted or Napoleon is speaking. The latter sounds much better to me, but it still is not clear to me that we should judge it as being absolutely true. Given that we have both an explanation of the contrast in judgments and an explanation of why it is tempting to attribute knowledge in these cases, I do not think the Schaffer's cases provide a serious motivation for the non-reductionist partition view.

8 *De Re* vs. *De Dicto*

Note that G+S's so-called *de dicto* sense of the answer is *de re* in the sense that it requires knowing of 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. This explanation will require two steps: first, we need to explicate more carefully what allows one to have *de re* knowledge *in a context*, and second, we need to clarify the status of plural entities. I'll argue that both of these moves are independently needed and I'll argue that once we have have made them there is an easy route to explaining the puzzles for G+S's semantics.

9 Guises and Knowing-Which

Before discussing other ways of explaining the **All/Which Connection** I will discuss some well-known puzzles about *de re* knowledge. These puzzles relate to classic philosophical discussions of *de re* beliefs and attitude ascriptions (e.g. Kaplan, 1986). We often answer which-questions by using a description (or descriptions) to identify one or more individuals. However, which description can be appropriately used varies with context. Suppose you know that Schmole Silverstein stole your car battery because he left a business card under the hood. In a sense, you know who stole your car battery. However, if you only glimpsed Schmole in the act, and you are taken to a police lineup and asked to say which of five similar-looking men is the one who stole your car battery, there is a sense in which, in that context, you don't know who stole your car battery.

What lesson should we draw from this? There are really two choices here: one is to alter the *semantics* of questions to account for this relativity, the other is to use the *pragmatics* of knowledge ascriptions to do so.

9.1 Semantic Treatment of Guises

The most detailed attempt, that I know of, to handle these problems semantically can be found in Aloni (2001). She entirely reworks the semantics of question. Each question on her account is associated with what she calls a *conceptual cover*. A conceptual cover, relative to a set of worlds, W, and a domain of objects, D, is a set of individual concepts, I such that *a)* there does not exist any world w in W two individual concepts in D pick out the same individual in w and *b)* the cardinality of I equals the cardinality of D. Aloni defines the *meaning* of a question in terms of the conceptual cover associated with it. In particular the meaning of which Fs are Gs is a partition of logical space according to which individual concepts in the conceptual cover satisfy $F\&G$.[12]

For example, in the lineup situation, if I am asked who stole my car battery relative to a conceptual cover where there is one individual concept for each person standing in front of me, then merely knowing that Schmole stole the car is not enough: I have to be able to pick him out relative to the descriptions picking out the people standing in front of me (e.g. "the man to the far-left", "the one with a beard"). So, I need to know some proposition along the lines of *the man on the far-most left is the battery thief*.

Although this view is attractive I find it easier here not to take a semantic view of guises. Mainly my choice is for convenience but it also is based on some skepticism about Aloni's approach related to the issues I have been discussing. Supposing that a question in a context uniquely determines a set of guises assumes the context can do a lot of work. Suppose I ask you, "Which NRA members that you know support abortion rights?" This seems like it could be a felicitous question when I know that you know some NRA members fairly well. However, it's hard to imagine that this question also always comes with a unique set of guises. This is not a decisive criticism. After all, we could think contexts underdetermine questions, and that underdetermination only matters if it prevents successful transference of information. But, all else being equal, it might be nice to have a leaner semantics of questions and a pragmatic treatment of guises. (I don't think anything I say here hangs on this choice.)

9.2 Pragmatic Treatment of Guises

The notion of knowledge of the answer in Section 2 is very strong. To know which Fs are Gs requires knowing of the actual Fs and Gs that (at the least) they satisfy G. However, how do we determine when we know something of some object o? Some philosophers talk as if there is an *acquaintance* relation: a relation an individual can bear to an object which can put them in a position to have *de re* thoughts about it. Without that acquaintance relation we can only think about objects by virtue of descriptions of one sort or another and our thoughts will only uniquely pick out that object if our descriptions have a unique satisfier. This story seems to me, as it does to many others, just a bit spooky.[13]

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[12] This is a slight expansion of her approach.

[13] See **HawthorneManley**

You might instead think that 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 if he cannot recognize John in those conditions.

One way of treating this relativity is to suppose that in different contexts, different descriptions can serve to *rigidly* pick out an individual. So, for example, in the club context, a name couldn't rigidly pick out an individual, but a description of his location could. Essentially, then, I do not want to build guises into the semantics of questions as Aloni does, but rather I want to build it into the pragmatics of knowledge ascriptions for the purpose of assessing knowledge-which. The conditions of having a *de re* thought about an individual are that one must think of that individual using a description which supports *de re* thoughts in that context. There will probably be considerable looseness here: in many cases it will simply not be determinate whether or not I know which F is G; it will depend on whether the description I know this information under is allowed to count as supporting *de re* reference or not. I take this as a desirable result.

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 the same phenomenon occurs where a question can be answered by identifying a plurality rather than the individuals constituting it. For example:

(20) 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. Moreover, it has all the marks of being a complete answer in the right context. Suppose we try to treat this case using the individual concept theory of Aloni. She does not extend her account to deal with plural questions. One way of extending her account is just to think that instead of answers determining which individuals satisfy certain properties, a la G+S, they determine which individual concepts satisfy certain properties.

To give a concrete example, suppose there are three mushrooms (that you cannot see) and you know that whichever ones are red are poisonous. It is not clear that you can possibly possess individual concepts picking out any of the mushrooms in this case (after all you do not know anything besides that some of them might be red). But you can still know which ones are poisonous. The individual concept theory, further, requires that for you to know which mushrooms are poisonous you must know how many mushrooms are poisonous. But you do not know this. Nonetheless, there is a clear sense in which you know which mushrooms are poisonous. So, oddly enough, a feature that Aloni takes to support the individual concept theory (preservation of cardinality) appears to be a defect in the theory. Knowing-which does not entail knowing how many, a fact which neither Aloni (1999) nor Groenendijk and Stokhof

(1984) provide an easy way to account for *directly*.[14,15]

We might think, then, that what we need is to treat questions as having different semantic values relative to a set of concepts picking out pluralities by description. We could just flat-footedly treat singular and plural questions on a par with the only difference being the assumption that the latter requires unique identification of a plural entity rather than of a singular one. In this case, each question would come with a domain of plural individuals and a set of individual concepts picking them out (a conceptual cover). Knowing the answer would be a matter of knowing that one individual concept for a plurality satisfied the question predicate. If we associate (20-a) with a set of individual concepts for plurals such as *the red ones*, *the black ones*, *the big ones*, etc., then we can say that knowing that the red ones and only the red ones are poisonous constitutes knowing the answer. This strategy might formally work. However, it is rather implausible to suppose that questions in contexts come with sets of individual concepts for all the possible pluralities that could serve as answers. There are, after all, going to be a large number of possible pluralities (for n individuals, 2^n pluralities) and it is hard to think that the context can set individual concepts for each subset of them that form a conceptual cover in Aloni's sense. So, it seems a bit odd to build this into the meaning of questions.

What we can do is to extend to pluralities the pragmatic approach to guises for individuals. This is simply to assume that in certain contexts certain guises (e.g. names or descriptions) for pluralities can support *de re* knowledge of them, and in certain contexts they cannot. So, in contexts where we can see colors, "the red ones" might support *de re* knowledge about the red mushrooms, but in other contexts (e.g. in the dark), it might not.

Again, this approach has some difficulties. It also raises the same worry 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). A related worry is that *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. This is a highly unintuitive consequence.[16]

Clearly, some way is needed to model knowledge of pluralities that handles this problem. In other words, we need the resources to allow for the possibility of having *de re* beliefs about a plurality without having *de re* beliefs about all (or any) of its members. I don't want to defend any particular view of plurals here. I will, though, assume that we have some account which posits plural entities and does not transfer knowledge *de re* of plurals to knowledge *de re* of the

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[14] Aloni (1999, p. 19) writes that it would be "highly counterintuitive" to think "that you know which card is marked without knowing how many cards are marked". I assume she means to apply this to the plural case as well, since it is trivial in the singular case where there is a presupposition that one and only one card is marked.

[15] A more basic worry is that the apparatus of individual concepts seems to attribute much more structure to questions than we find. It is not as if an utterance of question (20-a) is in any way associated with ways of identifying *each* mushroom in the world that satisfy the conditions Aloni associated with a conceptual cover. But the entire purpose of the notion of the conceptual cover is to capture the way in which we actually conceive of the domain. Consider the mushroom case again. On Aloni's account (extended to deal with plurals in this way), knowing which mushrooms are poisonous would require knowing of a set of individual concepts that they are red ones. There are many such propositions that would entail that all and only the red mushrooms are poisonous. So it seems like the notion is too strong to capture the sense in which knowing that all and only the red mushrooms are poisonous can be sufficient for knowing which mushrooms are poisonous.

[16] Cian Dorr pointed this out to me.

members of the plurality.

Moreover, I will posit one critical connection between plurals and questions: knowledge of a plurality alone suffices to know the answer to a question. Probably the most natural way of ensuring this connection is to take the answers to which-questions as *semantic* knowledge of 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 is the largest plurality of Fs that satisfies G.

Plural Answer ("de dicto") the complete answer to "which Fs are Gs" is the set of all worlds w where the plurality of individuals that are the intersection of F and G in the actual world constitute the entire intersection F and G in w.

This is the plural equivalent of G+S's *de dicto* notion, the one given by relation (2). Correspondingly we can also give a *de re* notion of answer-hood based on pluralities:

Plural Answer ("de re") the complete answer to "which Fs are Gs" is the set of all worlds w where the plurality of individuals that are the intersection of F and G in the actual world is the largest plurality satisfying G in w which is entirely contained in the plurality of all those individuals that satisfy G in the actual world.

11 Pragmatic Treatment of Answers

We now have the requisite tools to construct a way of rescuing the reductionist, propositional view of knowledge-which to explain the **All/Which Connection**. Knowing which Fs are Gs 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. Having such *de re* knowledge requires thinking of the group under a guise appropriate in the context for supporting *de re* knowledge. I think it is reasonable to assume that the guise "the Fs" is an appropriate guise in the context of a which-question. Many have noted in the syntax literature that the *wh*-phrase, "Which Fs," tends to take for granted a salient group of Fs; for this reason it was called by Pesetsky a "d-linked" expression (Enç, 1991; Pesetsky, 1987). 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.

Suppose that John knows that all Fs are Gs. Then he will know which Fs are Gs when the guise of the plurality of Fs, "the Fs" can support *de re* knowledge about Fs.[17] 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?")

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

12 Knowledge-Which

I presented a puzzle about the notion of answer-hood used by G+S and others. This worry challenged the project of reducing knowledge-which to propositional knowledge. I proposed three ways of dealing with it. The first involved multiple reduction of knowing-which to two or three different notions of knowing the answer. The second gave a practical view of knowing-which as being able to tell for a given set which members satisfied the predicate in question. The third took G+S's original notion of knowing the answer and showed how it could be augmented by the semantics and pragmatics of guises and plurals to deal with the puzzle I presented. Reductionism, in my view, is a tenable thesis, but to see how requires care.

References

Aloni, Maria (1999). "Questions under Cover". In: *Proceedings of LLCS*. Ed. by D Barker-Plummer et al.

— (2001). "Quantification under Conceptual Covers". PhD thesis. University of Amsterdam.

Aloni, Maria et al. (2007). "The dynamics of topic and focus". In: *Questions in Dynamic Semantics*. Ed. by M. Aloni, A. Butler, and P. Dekker. Elsevier.

Enç, Mürvet (1991). "The Semantics of Specificity". In: *Linguistic Inquiry* 22, pp. 1–25.

Groenendijk, Jeroen and Martin Stokhof (1984). "Studies in the Semantics of questions and the pragmatics of answers". PhD thesis. University of Amsterdam.

Hamblin, Charles (1958). "Questions". In: *Australasian Journal of Philosophy* 36, pp. 159–168.

— (1973). "Questions in Montague English". In: *Foundations of Language* 10, pp. 41–53.

Heim, Irene (1994). "Interrogative semantics and Karttunen's semantics for *know*". In: *IATL1*. Ed. by Rhonna Buchalla and Anita Mittwoch. Hebrew University of Jerusalem.

Higginbotham, James (1996). "The Semantics of Questions". In: *The Handbook of Contemporary Semantic Theory*. Ed. by Shalom Lappin. Blackwell.

Kaplan, David (1986). "Opacity". In: *The Philosophy of W. V. Quine*. Ed. by E. Hahn and P. Schlipp. Open Court.

Karttunen, Lauri (1977). "Syntax and Semantics of Questions". In: *Lignuistics and Philosophy* 1, pp. 3–44.

Pesetsky, David (1987). "*Wh*-in-Situ: Movement and unselective binding". In: *Representation of (In)definiteness*. Ed. by E. J. Reulend and A. G. B. ter Meulen. MIT.

Schaffer, Jonathan (2003). "Knowing the Answer". In: *Philosophy and Phenomenological Research* 75, pp. 383–403.

Stanley, Jason and Timothy Williamson (2001). "Knowing How". In: *Journal of Philosophy* 98, pp. 411–444.

Velissaratou, Sophia (2000). "Conditional questions and which-interrogatives". MA thesis. ILLC, Amsterdam.