

Knowing wh

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Abstract

Recently there has been a flux of interest in ‘knowledge-wh’ reports ([2], [15]) as found in: ‘John knows where to buy newspapers’ and ‘Jane knows who stole the silverware.’ In this paper I assess some of these recent proposals, and note an ambiguity in knowledge-wh ascriptions, akin to the relational/notional ambiguity in intensional transitive verbs, which these proposals do not account for. In light of this, I offer my own analysis of knowing wh, in which the interrogative complement, ‘wh-F’, denotes a generalised quantifier and ‘knows’ a relation between an individual and such a quantifier. In particular, S knows wh-F at w iff S’s knowledge fixes who the F is at w, i.e. (wh-F at w = wh-F at w’) for all w’ epistemically accessible to S from w (for simplicity, we give ‘wh’ the semantics of ‘the’.)

This analysis is then applied to a number of problems in philosophy including: the connection between objectual and propositional knowledge and other factive verbs, know how, concealed questions and Jackson’s knowledge argument.

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1 Introduction

The verb ‘knows’ in English is usually taken to be ambiguous between two meanings, ascriptions of which I shall dub *objectual knowledge*, and *propositional knowledge*. Observe (respectively) ‘Jane knows John’ and ‘Jane knows that John stole the silverware’¹. In contrast, the subject of this paper is *knowledge-wh* reports as seen in ‘Jane knows who stole the silverware’ or ‘Jane knows who John is’ - that is ‘knows’ with an interrogative complement. Thus knowing-wh includes knowing whether, which, what, whose, where, when, how, why, whom and even the outmoded forms: whence, whither and wherefore. The account offered here aims at a unified analysis of all these forms.

Typically epistemologists have concentrated on propositional ‘knowledge that’ ascriptions, and have had less to say about objectual knowledge and even less to say about knowledge-wh, assimilating the latter into their preferred theory of propositional knowledge. Nonetheless knowledge-wh ascriptions are pervasive - Jonathan Schaffer reports that Google returns ‘four times as many hits for the knowledge-wh forms as for knowledge-that (58.6 million to 14.5 million).’

Suppose, for an example, that John stole the silverware and consider:

Jane knows who stole the silverware. (1)

Jane knows John. (2)

Jane knows that John stole the silverware. (3)

In this paper I shall argue that the kind of knowledge asserted in (1) is closer in kind to that asserted in (2) than contemporary wisdom might have it. Be this as it may, (1) is also connected to (3) in important ways which suggests that knowledge-wh provides an insight into the true relation between propositional and objectual knowledge. More concretely, I propose that NPs like ‘what John stole’ denote generalised quantifiers, and that knowledge-wh reports are subject to what has been called the relational/notional ambiguity in the literature on intensional transitive verbs. For example, the relational reading of (1) means something in the same region as (2), whereas the notional reading means, very roughly, something like (3)².

2 Alternative views

Before we move on we shall take a brief survey of the preceding analyses of knowledge-wh.

2.1 Reducing knowledge-wh to propositional knowledge

As we noted, many philosophers and linguists have sought to reduce knowledge-wh to knowledge-that (e.g. [5], [8]). One reason to find such a view implausible

¹Roughly, the complement in the first case stands for an object, and in the second case a proposition.

²What they actually mean will be spelled out in more detail later.

is that intuitively the interrogative complement seems to stand for an individual. For example:

Jane knows what Mary is reading. (4)

In this case Mary is reading a magazine. Thus ‘what Mary is reading is a magazine’ is true, and ‘what Mary is reading’ stands for the particular magazine Mary is reading³. In particular the precopular component of the pseudocleft does not seem to be truth evaluable thus cannot possibly denote a proposition. Unintuitive as it may be, the propositional analysis in question goes as follows:

S knows wh iff S knows p, and p is the/a true answer to the indirect question provided by the interrogative complement. (5)

This analysis has come under attack from both Schaffer and Brogaard recently ([15], [2].) For example Schaffer presents us with the following sentences:

I know whether Bush or Janet Jackson is on TV. (6)

I know whether Bush or Will Ferrell is on TV. (7)

If Bush is in fact on TV, then the propositional analysis predicts that (6) and (7) are equivalent. Yet intuitively, knowing whether Bush or Ferrell is on TV is much harder to achieve than knowing whether Bush or Janet Jackson is on TV!

2.2 Knowledge-wh as irreducible

Schaffer [15] offers an anti-reductionist account of knowledge-wh:

a knows-wh iff a knows pQ where Q is the indirect question of the wh clause and p its true answer. (8)

Here pQ is supposed to mean p *as* the answer to Q. This account seems to be poorly motivated⁴, a detailed criticism can be found in Brogaard [2].

2.3 Knowledge-wh as de re knowledge

Brogaard [2] argues that the interrogative complements function as open predicates which grammatically require existential closure. She uses this to explain why only wide scope readings of sentences like ‘John remembered what Mary did at 3.00pm’ are available. She then applies this to knowledge-wh to come up with the following results

John knows what Mary did at 3 p.m. = for some e, John knows that e is what Mary did at 3 p.m. S knows wh-*F* iff $\exists x$ S knows *F*x. (9)

³I use the loose term ‘stands for’ as I shall be arguing that, strictly speaking, these phrases denote generalised quantifiers rather than individuals.

⁴It is motivated purely on considerations of knowledge-whether.

So in this sense Brogaard reduces knowledge-wh to a form of de re propositional knowledge. However this analysis falls short when it comes to more complicated examples, for example:

Jane knows who everyone is. (10)

Using Brogaard's theory and quantifier raising we get:

$\forall x \exists y$ Jane knows $x = y$ (11)

But this translation predicts that (11) is true in a situation in which Jane knows of each person that they are self identical, even though she doesn't know who they all are! We run into further problems with the following sentence due to Hintikka [4]

Jane knows whom each man admires the most. (12)

$\forall x \exists y$ Jane knows x admires y the most (13)

However, this sentence is supposed to be true in virtue of Jane knowing that each man admires his mother the most, but not Jane knowing for particular instances of this relation that they hold between a man and his mother.

3 An ambiguity

An aspect, which I don't believe any of the theories in §2 capture, is an ambiguity abundant in knowledge-wh ascriptions. The ambiguity is akin to one often associated with intensional transitive verbs, such as the following:

John seeks a doctor. (14)

On one reading (15) is made true by the fact that John has a pain in his leg and seeks medical advice. He seeks a doctor, but any old one would do. On the other reading, John is looking for Tim, who happens to be a doctor, and (15) is true in virtue of this fact. John is looking for a particular person who happens to be a doctor. Montague [9] uses the de re/de dicto idiom however this can be misleading as it is usually associated with clausal embeddings. Since I am defending the view that knowledge-wh reports (and ITV's for that matter) are inherently non-propositional, I have adopted Quines [14] notional/relational terminology.

The point relevant to our present discussion is that in the second reading John needn't even know that Tim is a doctor for (15) to be true. A similar phenomenon can be found in the knowledge-wh case - let's take our example from before:

John knows what Mary did at 3.00pm. (15)

All of the theories we've considered so far predict that (16) entails that John knows that Mary did something at 3.00pm. However there seems to be a way

of reading (16) which doesn't license this entailment. Suppose Mary dug a hole at 3.00pm and John observed this unaware of the time. The pragmatics of this sentence indicate that John shouldn't say that he knew what Mary did at 3.00pm, and similarly in most contexts it would be dishonest for us to say that 'John knows what Mary did at 3.00pm' since it implicates that for some e John knows *that* Mary did e at 3.00pm. Nonetheless, (16) has a true reading. Bearing in mind the scenario, we can use Grice's method of cancelling implicature to see this:

John knows what Mary did at 3.00pm even though he didn't
know she did it at 3.00pm. (16)

Similarly we might have

John knew why Mary was upset, even though he didn't realise
it was the reason for her distress at the time. (17)

Certainly, these readings are sometimes hard to find. One might even object that I have found particularly easy examples to test this hypothesis. For example it seems much less plausible that there is this kind of ambiguity in:

Fred knows when supper is. (18)

However, I claim that even in these harder cases we can find relational readings. In this case, suppose Fred is a baby and has no concept of the twelve hour clock or what supper really is⁵. Nonetheless, we can say that Fred knows when supper is because we always feed him at 6pm. And, indeed, every day at 6pm he expects to be fed: he knows when supper is. Similarly, we might say that Fred knows when 6pm is.

4 Wh-clauses and (in)definite descriptions

Formal semanticists ([1], [7], [12], [16]) have taken the line that expressions like 'what Mary did at 3.00pm' denote special kinds of indefinite descriptions. This is essentially the approach we adopt here, although we remain neutral over whether 'wh-F' behaves like the definite determiner 'the-F', or the indefinite 'an-F'⁶. For the sake of exposition we shall work with the former option, but in most cases it should be clear how to generalise what I say to to an indefinite treatment of wh-clauses.

$$\llbracket \text{wh-F} \rrbracket = \lambda P : \langle et \rangle . (\llbracket F \rrbracket \cap P \neq \emptyset) \quad (19)$$

$$\llbracket \text{wh-F} \rrbracket = \lambda P : \langle et \rangle . (\llbracket F \rrbracket \subseteq P \wedge |\llbracket F \rrbracket| = 1) \quad (20)$$

Since we wish $\llbracket \text{knows} \rrbracket$ to combine with elements of the same type as those above we know that $\llbracket \text{knows} \rrbracket$ must be of type $\langle e, \langle e, t \rangle \rangle$ or $\langle e, \langle \langle et \rangle, t \rangle, t \rangle$. To

⁵Fred sleeps whenever he chooses, so I take it Fred doesn't have a good concept of the evening either.

⁶There are powerful arguments in favour of both which I cannot go into here.

properly capture the ambiguity discussed in §3 we need to take the latter option. Following Montague’s [9] treatment of intensional transitives, the contrast between the notional and relational readings is, more or less, the contrast between holding a relation to a quantifier ((20), (21)), or to the value of a variable under assignment⁷.

Of course, this account is still severely underspecified - we still don’t know under what circumstances someone is under this ‘knowing’ relation to a quantifier. We will return to this in §6. However, for now we may still assess what impact the claims we have made so far have on our understanding of knowledge-wh. So far we have assumed that our interrogative word acts like a determiner applied to some predicate, F. How F is actually extracted from the surface form depends on which wh-word we are dealing with, for example

How to get to Rome = wh x : x is a way to get to Rome (21)

Where to buy newspapers = wh x : x is a place to buy newspapers (22)

When the shop closes = wh x : the shop closes at x (23)

What Mary did at 3.00pm = wh x : Mary did x at 3.00pm (24)

Thus our theory yields the following approximate equivalences:

John knows how to get to Rome. (25)

≈ John knows the way to Rome. (26)

John knows where to buy newspapers. (27)

≈ John knows a place to buy newspapers. (28)

John knows when the shop closes. (29)

≈ John knows the time the shop closes. (30)

John know what the answer to Harry’s question is. (31)

≈ John know the answer to Harry’s question. (32)

John knows which man stole the silverware. (33)

≈ John knows the man that stole the silverware. (34)

Our treatment of ‘knowledge whether’ is not quite so clean. Brogaard [2] notes a similar oddity for ‘knowledge whether’ in her theory, but it is by no means at variance with our previous examples:

John knows whether p or q. (35)

≈ John knows the true alternative out of p and q. (36)

As we can see, the translations of these sentences also appear to exhibit the relational/notional ambiguity. Consider for example⁸:

Jane knows the governor of California. (37)

⁷The full details can be found in Montague 1973.

⁸This example is due to Lance Nathan [10].

On the notional reading this means the same as ‘Jane knows who governs California’ on its notional reading. On the relational reading (38) is true just in case Jane knows Arnold Schwarzenegger.

5 The data

We have already mentioned one reason to prefer the analysis of knowledge-wh offered here - it neatly explains the ambiguities we observed in §3. There are in fact other clues that this analysis is the correct one.

5.1 Belief

Propositional knowledge and belief seem to be intimately related, with belief often appearing among the proposed conditions necessary for knowledge to occur. If knowing wh really is propositional, then one might expect belief to exhibit similar properties. However, belief wh does not exist in English unless the interrogative phrase denotes a proposition. See

Jane believes what Tim said. (38)

while

Jane believes who stole the silverware. (39)

is clearly deviant⁹. If one adopts the account propounded here an explanation naturally presents itself. Belief-wh is not grammatical unless the wh-clause denotes a proposition because belief is a purely propositional verb (there is no such thing as objectual belief as there is with knowledge.) If, on the other hand, knowledge wh is propositional it is somewhat odd that there is no corresponding form of belief-wh.

5.2 Conjunctions

More evidence in support of the claim that wh-phrases denote quantifiers and knowledge wh a predicate of quantifiers, can be seen from the fact that they can be conjoined with other NP’s and embedded under the knowledge operator.

Jane knows the way to Rome, but not how far away it is. (40)

Mary knows the time the shop closes, but not whether you can buy cereal there. (41)

John knows the answer to the question, but not how many points it is worth. (42)

Tim knows the man that stole the silverware and where he hid them. (43)

⁹Note that there are some complex issues to do with negative polarity here, consider for example the seemingly kosher sentence ‘you won’t believe who stole the silverware!’. I shall leave these puzzling issues aside for now.

Jim knows the waitress and what she likes to do in her spare time. (44)

Jack knows most of the best recipes and what makes a good curry. (45)

The professor knew every student and what he was capable of. (46)

In each case we are applying the verb ‘knows’ (forcing it to have the same reading in each case) to a conjunction of a wh-phrase with an NP denoting a generalised quantifier. Generalised conjunctions [13], always take two items of the same type as argument, suggesting the wh-phrase has the same type as the NP, and moreover, that ‘knows’ distributes uniformly in these cases.

5.3 Equivalences

Finally there seem to be plenty of equivalences between knowledge-wh and objectual knowledge ascriptions¹⁰. One marginal example is

John knows Kung Fu iff John knows how to do Kung Fu (47)

However, and more seriously, the following seem to be genuine equivalences of the kind we are looking for

John knows the time iff John knows what time it is. (48)

John knows the way to Rome iff John knows how to get to Rome. (49)

John knows the bent spy iff John knows who the bent spy is. (50)

as well as the stock of equivalences provided by (26)-(37) in §4.

6 Knowing wh

So far we have gotten by without a concrete account of the truth conditions of knowledge-wh ascriptions. We have concerned ourselves only with the logical type and the various readings of sentences containing intensional transitives/doxastic verbs. With this well and good, it is desirable to have a philosophically pleasing analysis of knowing-wh. Accordingly, the content of this section is theoretically separable from the conclusions we have drawn so far.

But first let us deviate for a moment. Up until now we have assumed the following thesis: the objectual form of ‘knows’ is an intensional verb with respect to its right argument. The analysis we give here is intended to extend to the objectual forms of knowledge - indeed perhaps we should think of knowledge-wh as a special kind of objectual knowledge. But before we do that, we should address the puzzlement this thesis has no doubt brought about: surely the

¹⁰Many of these involve what are sometimes called ‘concealed questions’.

objectual form of ‘knows’ is an extensional verb, examples abound

John knows the inventor of bifocals. (51)

Benjamin Franklin is the inventor of bifocals. (52)

Therefore John knows Benjamin Franklin. (53)

seems to be valid. In response, we should draw attention to the notional/relational ambiguity that can also be found in the objectual forms of knowledge (see §4.) The reading of (52) which means roughly ‘John knows who invented bifocals’ clearly does not license this entailment. Whether this kind of response works for all examples like (52)-(54) is an open question, and too far afield to take up here. What is important for our purposes is that *knowledge-wh* ascriptions exhibit this kind of intensionality.

So here’s the proposal - it’s nice and piffy¹¹

S knows wh-F at w iff S is able to identify the-F at w (54)

We can expand this analysis more precisely if we adopt some possible worlds talk

S knows wh-F at w iff at every w' compatible with S’s knowledge at w, the-F at $w' =$ the-F at w. (55)

To get an intuitive handle on this, let’s consider an example. According to (56), John knows who the prime minister is iff, in all the worlds epistemically indistinguishable to John, the prime minister is Gordon Brown, the actual prime minister at the time of writing. That is, the prime minister remains constant throughout the worlds compatible with John’s knowledge: John’s knowledge fixes who the prime minister is. Integrating this into our formal framework unfortunately requires us to add a bit of intensional apparatus (so far in our discussion of types we have treated everything extensionally.) For simplicities sake we give our definite descriptions the type $\langle\langle set \rangle, t \rangle$, resulting with¹²

$$\llbracket knows \rrbracket^w := \lambda a_e. \lambda Q_{\langle\langle set \rangle, t \rangle}. (\forall w' \in Dox_a(w) (\bigcap Q(w) = \bigcap Q(w'))) \quad (56)$$

7 Applications

What makes a satisfactory account of knowledge-wh ascriptions important, is the potential impact it may have on other problems in philosophy. Much philosophy has been done on the assumption that knowledge-wh reduces to propositional knowledge in some form or another. This assumption has had a large influence on many topics in philosophy, most notably Jackson’s knowledge argument, which we shall discuss below, along with some other topics of interest.

¹¹This proposal is closely related to an account of concealed questions mentioned, but not endorsed, in Heim [3].

¹²Here $\bigcap Q$ denotes the infimum of Q under the natural ordering, and $Dox_a(w)$ the set of worlds epistemically accessible to a from w.

7.1 Knowledge how

Jonathan Schaffer [15] suggests that the reason so little attention has been paid to knowledge-wh might be traced back to Ryle's division between knowledge that and knowledge how, leaving no place for the other forms of knowing-wh. Knowledge-how is but a special case of the theory discussed so far, but it has received much attention so it might be worth a separate review here. Ryle famously argued that knowledge how cannot be reduced to knowledge that. More recently Stanley and Williamson [17] have challenged these arguments and offered a reductionist account. On this issue we are sympathetic with Ryle, for example on our theory

John knows how to make a rogan josh at w iff for all worlds w' epistemically accessible to John from w , the way to make a rogan josh at $w' =$ the way to make a rogan josh at w . (57)

Johns' knowledge determines the way to make a rogan josh¹³. Strange worlds in which adding the onions in last will produce a tasty curry are excluded from Johns' epistemic alternatives. He knows adding the onions in last will mess the meal up. Accordingly when John learns how to make a rogan josh, the set of Johns' epistemic alternatives is restricted. Thus knowing how to do something will *entail* that John has various propositional knowledge at his disposal - the set of worlds compatible with his (propositional) knowledge shrinks when he comes to know how to do something. However, none of this suggests a stronger reductionist position.

7.2 The knowledge argument

In [6], Jackson argues against physicalism by claiming that Mary, a neuroscientist who already knows all the physical facts, but who has never seen colour before, acquires further propositional knowledge when she comes to 'know what it is like to see red'. On our view this kind of inference is not licensed unless we are taking the notional reading. That it is not the notional reading that expresses what is relevant to Mary's new knowledge can be seen by considering the Nida-Rümelin room [11], where Mary can see arbitrarily coloured objects including red objects, so Mary knows what red looks like, yet she does not know which colour experience is red.

This provides the seeds of a response to the knowledge argument - a full account of what Mary learns could not be given here¹⁴.

¹³We are considering only notional readings here.

¹⁴Plausibly, Mary gains several types of knowledge on her release. For example, the propositional, but essentially indexical knowledge '*this* is what it is like to see red'. I am, however, inclined to regard this knowledge as harmless as far as physicalism is concerned: it expresses the necessary proposition.

7.3 The connection between propositional and objectual knowledge

To end on a more controversial note, we will have a quick look at the relationship between propositional and objectual knowledge. Many people believe there simply is no connection, while others believe that knowing an individual reduces to knowing a series of facts about them. The key, I believe, to understanding the true relationship between propositional and objectual knowledge, is knowledge-wh.

But first a quick response to those who think there is no connection between the two. Why *should* there be a connection between propositional and objectual knowledge? We first note that postulating ambiguities should be kept as a last resort - this principle has played an important role in debates relating to conditionals, definite descriptions and pronouns to name a few. But what is worse, it seems that there are many other factive verbs that display this objectual/propositional ambiguity.

Jane remembers Tim. (58)

Jane remembered that it was Tim's birthday on Friday. (59)

Jane forgot Tim. (60)

Jane forgot that it was Tim's birthday on Friday. (61)

Tom heard Sam. (62)

Tom heard Sam playing the trumpet. (63)

Jim saw Mary. (64)

Jim saw Mary leave. (65)

It seems much less likely that all these verbs are so systematically divided into objectual and propositional forms, and yet these forms have no relationship whatsoever. We are not just positing an ambiguity in knows here, but one across a whole class of verbs.

As I have said already, the missing piece in this puzzle is knowledge-wh. The relationship between propositional and objectual knowledge can be stated as follows

S knows S' iff S knows who S' is. (66)

S knows p iff S knows whether p, and p is true. (67)

(67) might strike one as quite odd. This has to do with the peculiar pragmatics of each side of the biconditional. However for some readings we should be able to get a situation in which they mean the same. For the notional reading, suppose I am about to tell an anecdote involving John, and it is clearly not important how well you know John for this story to be appreciated. I ask you whether you know John and you reply 'Yes, I know John'. Presumably what is meant here is that you know *who John is*, that is - you can identify John (for

the purposes of the anecdote at least¹⁵.) If my theory is correct there is also a relational reading of both these sentences - in ‘Jane knows John’ it is very much the natural reading, in ‘Jane knows who John is’ it is much harder to find. However if knowledge-wh reports are to have a uniform treatment the relational reading should at least *exist*, even if it is rarely ever used to communicate this reading. What initially strikes you as odd in the equivalence (67) is that the pragmatics of the two clauses differ greatly¹⁶.

Indeed, as I suggested this account also generalises to some of the other factive verbs in (59)-(66). For example

S remembers S' iff S remembers who S' is. (68)

S remembers p iff S remembers whether p, and p is true. (69)

8 Conclusion

In short, an analysis of knowledge-wh ascriptions is not only of intrinsic interest, but also central to a wide range of issues in epistemology, the philosophy of language and the philosophy of mind. Even if the reader does not grant me all the claims made here, I hope to have brought the issue to more central attention.

¹⁵These readings of objectual knowledge ascriptions occur much more frequently in discussions of musicians, authors, actors and so on. Most people rarely ever know these celebrities at a personal level.

¹⁶Another difference in the pragmatics of both sentences is the standards of precision for each ascription differ. I take it without argument that ‘knows’ is contextually sensitive - if John is introducing me to a group of people, and I had met Jane once before, he might say ‘well, you know Jane already’. If on the other hand, Jane asked me to marry her I would be entitled to say ‘but I don’t even know you!’. In contrast, to ‘know who Jane is’ tends only to require very low standards of acquaintance.

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