"Now that you mention it, I wonder..." : Awareness, attention, assumption

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Chapter 7

Conclusions and further work

It is the nature of an hypothesis, when once a man has conceived it, that it assimilates everything to itself, as proper nourishment; and, from the first moment of your begetting it, it generally grows the stronger by everything you see, hear, read, or understand. This is of great use.

Laurence Sterne, *Tristram Shandy*

If your experience of reading this dissertation has been anything like my experience of writing it, having made your way this far through the various notions and notations you may feel you have rather lost track of the big picture. In this final chapter I will sum up the main ideas that I have attempted (with varying degrees of success) to flesh out as formal systems. Then, in the true spirit of awareness, I will end this dissertation by raising some possibilities that I have not had time to address explicitly, in the hopes of making the reader aware of something he or she has not hitherto entertained.

1 · Some explicit beliefs

Awareness is just now making the transition from a new and problematic concept in epistemic logic to a standardised notion that can be applied as a tool in other fields, driven largely by research in the formal economics community. I hope this dissertation contributes to this movement, by showing the potential applicability to problems in formal semantics and pragmatics.

Intuitions about unawareness or attention to possibilities are common in linguistics, but tend to be relegated to the proverbial ‘wastepaper basket’ of pragmatics. (This is not, I hasten to add, an opinion of pragmatics which I share.) In this dissertation I have tried to formalise some of these intuitions, and to suggest where some existing problems can fruitfully be recast in terms of awareness.

In adapting models from the economics literature for formal semantics and pragmatics I have been concerned with a problem that has received little attention in that community: the influence of unawareness on belief. My notion of assumption is the key to representing this influence: assumptions are beliefs which are only held because of unawareness, and we can examine the ‘assumptive component’ of any belief. An interesting feature is that explicit
beliefs, too, typically rely on assumptions (the notion does not reduce to the distinction between implicit and explicit belief).

On a behaviouristic view, assumptions are only distinguishable from ‘ordinary’ explicit beliefs when they get overturned: drawing attention to an assumption allows the agent to question it, while drawing attention to a belief she already holds explicitly doesn’t change her epistemic state. I have adapted update theories from formal semantics to represent this effect, but a lot of work remains to be done here. In particular, all the models I have described are flat single-agent representations; it remains to be seen if these techniques can be easily extended to multi-agent relational systems.¹

Besides the notion of assumption, the most important notion for linguistics that comes ‘for free’ with models of unawareness is the context change that comes with attending to new possibilities. This is not the outcome of reasoning, it is not dependent on assumptions of speaker competence, trustworthiness or cooperation, and it cannot be rejected, cancelled or denied. I have applied this notion to some reasonably simple cases (everyday use of might and counterfactuals); in the rest of this chapter I would like to suggest some more speculative applications.

2 · Some unexamined possibilities

Implicit notions of awareness can be found throughout the formal semantics and pragmatics literature. It is tempting to say that the field has always had assumptions about awareness, and it is only now, with growing awareness of awareness itself as a formal notion, that these are becoming ratified as beliefs (or in some cases overturned).

In particular, I believe that some phenomena currently described as accommodation would be better recategorised as effects of dynamic awareness and assumption. Lewis discusses a number of cases which he unifies under the term ‘accommodation’ in his seminal paper on the subject [Lew79]. His proposed rule of accommodation (the general framework all his examples fall under) is

If at time $t$ something is said that requires component $s_n$ of the conversational score to have a value in the range $r$ if what is said is to be true, or otherwise acceptable; and if $s_n$ does not have a value in the range $r$ just before $t$; and if such-and-such further conditions hold; then at $t$ the score-component $s_n$ takes some value in the range $r$.

This rule is carefully phrased so as not to make any statement about reasoning.

¹Some models of awareness dynamics already exist in the economics literature but they are focused on game-theoretic applications and make no allowance for assumptions. [DF09], which I became aware of only very late in the writing of this dissertation, gives a very promising approach somewhat akin to public announcement logics.
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but the term ‘accommodation’ is nowadays used in a somewhat narrower sense. We expect speakers to ‘follow the rules’; if their behaviour can only be interpreted as following the rules by changing the score, then we change the score.²

Changes in awareness can provide behaviour that matches the technicalities of Lewis’s rule, but for reasons that have nothing to do with pragmatic reasoning. Consider the example Lewis gives of relative modality (we have already seen this example in Chapter 4):

Suppose I am talking with some elected official about the ways he might deal with an embarrassment. So far, we have been ignoring those possibilities that would be political suicide for him. He says: “You see, I must either destroy the evidence or else claim that I did it to stop Communism. What else can I do?” I rudely reply: “There is one other possibility — you can put the public interest first for once!” That would be false if the boundary between relevant and ignored possibilities remained stationary. But it is not false in its context, for hitherto ignored possibilities come into consideration and make it true. And the boundary, once shifted outward, stays shifted. If he protests “I can’t do that”, he is mistaken.

This is an instance of accommodation in the extremely abstract formulation given by Lewis: his utterance (“You can put the public interest first”) is only acceptable if the possibility it mentions is ‘on the table’ at least in the minimal sense of being entertained by both parties, and if it was not entertained before the utterance then it will be afterwards. This last conditional is vacuous, as the possibility will be entertained after the utterance regardless of whether it was before or not; Lewis’s rule does not explicitly come out and say why the score changes. But according to the intuitive (modern) notion of accommodation, it should change because the speaker’s behaviour is only acceptable if it does; this is not the case, on the awareness account, for this update.

We can see a hint of this in the fact that the ‘rule of accommodation’ only works one way in this example. If the possibility had already been entertained and excluded (“I have chosen not to put the public interest first. So you see, I must either. . .”) then the rule of accommodation would suggest that Lewis can still make his protest, which he certainly cannot do. Of course there is the hedge

²If accommodation is pragmatically driven in this way, then we should be reluctant to accommodate for speakers who we know to consistently break the rules. Edward Gorey’s delightful picture-book “The Object-Lesson” begins with the line “It was already Thursday, but his lordship’s artificial limb could not be found.” Neither Lordship nor limb seem to feature in the rest of the story (if “story” it can be called). My favourite line, “It now became apparent (despite the lack of library paste) that something had happened to the vicar”, appears near the end; by that time any reader, no matter how conscientiously cooperative, has long since given up accommodating the various presuppositions that are being invoked with such inventive abandon.
that “such-and-such further conditions” must hold, but we can see where this is going: the correct statement of these conditions for this case will very likely be that the possibility being mentioned may not have been previously entertained. In that case, the rule of accommodation is a completely superfluous (although perfectly correct) description of the phenomena.

There seem to be a number of other examples following the same pattern, so that we can pick out a subclass of Lewis’s accommodation phenomena that owe their existence to (something like) awareness (and that are not accommodation in the modern sense: they are not driven by any kind of pragmatic reasoning). What singles out these particular cases is that they have a preferred direction, and that direction is towards more inclusive sets (of whatever is being quantified over).

There are two cases treated explicitly in these terms in [Lew79]: the section on relative modality already mentioned, and the analysis of vagueness. I have dealt with some of the observations about relative modality already, but I have focused on commonsense uses of might and must; Lewis applies the accommodation account also to sceptical argument. In general schema the problems of scepticism and vagueness both seem to match rather well to unawareness accounts, but there are also indications that the details may prove problematic. I have been able to formulate some of the questions that should be asked, but not to give them any answers.

2.1 · Epistemology and the sceptic
The problem of the sceptic is a clash between two fairly basic intuitions about knowledge: firstly that we have a lot of commonsense knowledge (I know what my name is, where I live, and so on), and secondly that a proposition is not truly known unless all possibility of doubt has been eliminated. The sceptic’s argument puts these two intuitions into conflict by raising possibilities that cannot be eliminated, but that appear to undercut our commonsense knowledge; for example, that I have been recently hypnotised and my beliefs about my name and address are in fact incorrect. The possibility cannot be eliminated because, the sceptic argues, it is conceivable that the hypnotism was so perfectly conducted that I cannot tell the difference between my hypnotically induced memories and my true ones.

We have seen already some approaches to representing knowledge under unawareness; in particular the model of [HMS06] explicitly sets out to represent the limits that unawareness places on potential for knowledge. This approach is vulnerable to sceptical argument, however: if the agent is unaware of the possibility that he is hallucinating, and if under a hallucination nothing he sees is real, then he cannot know anything about what he sees. The problem is avoided by not including sceptical possibilities in the models, which is reasonable enough when they are intended for economic applications but is
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An opposite extreme is to take the agent’s knowledge as generated from within his assumptions; this would acknowledge that we can know mundane facts like where we live, so long as we do not entertain (or wonder about) sceptical possibilities. Taken without reservation, this principle relaxes all normative standards: it leads to non-factive knowledge (since the agent’s assumptions may rule out the actual world), and it implies what Catherine Elgin called the “epistemic efficacy of stupidity”, that “stupid people may be in a better position to know than smart ones” [Elg88].

[Lew96] takes an intermediate road between these two extremes: “S knows that P if S’s evidence eliminates every possibility in which not-P—Psst!—except for those possibilities that we are properly ignoring.” This definition takes our two problems into account in the “sotto voce proviso”: “Ignoring” allows assumptions to influence knowledge, while “properly” maintains a normative standard. Stupidity does not grant knowledge because some possibilities ignored by the stupid will not be properly ignored (and if the actual world is never properly ignored then knowledge is again factive), but sceptical possibilities do not destroy knowledge unless they are attended to (so when ignoring them I can still know what my address is and similar mundane facts).

If Lewis can be trusted to spell out the normative conditions of “properly”, it seems that an unawareness model will be perfect for representing “ignoring”. However there are two complications: the first is the source of normative judgements, and the second (more fundamental) is a problem with shifting the meanings of expressions.

2.1.1 · Multi-agent epistemology

As soon as we start thinking about knowledge attributions the question arises, whose awareness matters? If I am embroiled in a sceptical discussion and, looking out the window, say “Those people out there think they know their own names, but they’re wrong: the possibility that they might be hypnotised victims of a hoax undercuts their knowledge”, am I wrong?

Lewis wrote “that we are properly ignoring”, but it is easy to manufacture cases where attributor and attributee attend to different sets of possibilities, and it is by no means clear that a single rule will always provide a sensible answer here. The multi-agent properties of awareness play their part here also: if I do not imagine the possibility that p then I certainly do not imagine that you imagine the possibility that p, so my own assumptions will have an effect on the knowledge attributions I am willing to assert (quite distinct from the question of how these assumptions influence which of those assertions are true).

I have contributed a very simple model along these lines to a paper giving a range of analyses of “knowing whether” constructions: [AEJ].
While these questions are interesting and difficult, I presume that some kind of answer is in principle possible (even if it be “it depends”). The next problem, however, indicates the very boundary of applicability of the approach that I have followed throughout this dissertation.

2.1.2 · Meaning shift under changes in awareness

All the models I have presented contain a syntactic element, representing some agent’s conceptual vocabulary or language of self-ascription of beliefs.4 The agent comes pre-equipped with a potential vocabulary of concepts, with a logical specification of how those concepts apply across the space of possible worlds. The extreme possibilities introduced by sceptical argument, though, call such a notion into question.

If we are to follow Lewis’s schema for knowledge, we need to be able to say when an agent’s evidence eliminates a possibility. But the very terms that we use to describe the evidence are themselves subject to sceptical attack. If I say (along with Lewis [Lew79, p. 355]), “I know the cat is in the carton — there he is before my eyes,” you can reply that my evidence is nothing but the pattern of light arriving on my retina (which might in fact come from an ultra-high-tech projector system, or a deceiving demon); when I concede this you go further: my evidence is in fact nothing more than my sensations (compatible with light patterns on my retina, but also with artificial stimulation of my neurons), and so on. The sceptic’s game is always to point out how the commonsense concepts involved even in the very notion of evidence itself rely on unstated assumptions for their effectiveness.

Where this causes difficulties in our formal models is in the representation of the agent’s evidence. For instance, if you try to convince me that this is not a hand by raising the possibility that I am hallucinating all my experiences, the atomic formula that I have been interpreting as “My hand hurts” will have to be amended to “I have pain sensations of such-and-such a character”, and so on. (Otherwise we can say, with Moore, “I know I have a hand, therefore objects exist”.) This behaviour is quite different to the paradigm awareness cases, in which the interpretation of utterances may shift over time (as the assumptions giving rise to them become visible) but the interpretation of sentences (against the abstract background ‘model of reality’) remains fixed.

This is not really a new observation, dressed up though it is in the new language of unawareness. Wittgenstein wrestled with the same problem in On Certainty:

That is to say, the questions that we raise and our doubts depend on the fact that some propositions are exempt from doubt, as it were

4The model of [HMS06] is defined without such a language, but these remarks apply equally there once it is equipped with a logical language interpreted at states in the model.
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At first sight it seems like unawareness should apply nicely to the problem, but then the question arises: what should it mean if we draw attention to the hinges?

2.2 · Vagueness

The second application of unawareness that I did not manage to spell out is to vagueness and standards of precision. Again, Lewis describes the data as an accommodation effect, and again the resistance to reversing the direction of change seems to indicate something like a growing awareness of a space of possibility:

One way to change the standards is to say something that would be unacceptable if the standards remained unchanged. If you say “Italy is boot-shaped” and get away with it, low standards are required and the standards fall if need be; thereafter “France is hexagonal” is true enough. But if you deny that Italy is boot-shaped, pointing out the differences, what you have said implies high standards under which “France is hexagonal” is far from true enough.

I take it that the rule of accommodation can go both ways. But for some reason raising of standards goes more smoothly than lowering. If the standards have been high, and something is said that is true enough only under the lowered standards, and nobody objects, then indeed the standards are shifted down. But what is said, although true enough under the lowered standards, may still seem imperfectly acceptable. Raising of standards, on the other hand, manages to seem commendable even when we know that it interferes with our conversational purpose.

He goes on to cite Peter Unger’s argument that hardly anything is flat: since “flat” is an absolute term, if $a$ is flatter than $b$ then $b$ is not flat; but for just about anything we can find something flatter, so pretty much everything must not be flat.

The answer that awareness suggests for this conundrum is by no means novel. It might have the virtue, though, provided by every unifying framework: if there is anything to the comparison then we will find that these aspects of vagueness are ‘like’ other awareness phenomena in more than superficial ways.

2.2.1 · Standards of precision

It seems clear enough to me that two different mechanisms are involved in raising and lowering the standards of precision: lowering may indeed proceed by accommodation, but raising goes by something analogous to an awareness
update. It is no coincidence that in objecting that Italy is not boot-shaped you must point out the differences: in much the same way one cannot overturn knowledge by a ‘lazy sceptic’s argument’ “You don’t know that because you might be wrong” but must draw attention to a particular, specific possibility.

The analogy is however only partial, since whatever it is that these agents should be aware and unaware of, they are not possibilities, concepts, or objects in first-order models, in the sense that I have used these terms. In the case of country borders they might be abstract geometrical figures: a low standard of precision contains a few shapes such as a hexagon, a square, and a boot, while a high standard of precision contains in addition more of the possible finely-varied outlines. In that case becoming aware of new possible shapes raises the standards of precision.

A similar case has been made by Manfred Krifka [Kri07] regarding the inherent vagueness (or implied precision) of numerical terms. Elwood Blues announces “It’s a hundred and six miles to Chicago,” implying an accuracy of one mile; the same distance could as acceptably be described as 100 miles (under lower standards of precision), while 100 miles can never acceptably be described as 106. Here it is different cognitively salient scales of measurement that the agents must be aware of: the scales with intervals of one mile, five miles, ten miles, fifty miles, and so on are all possibilities. Mentioning 100 miles need not call attention to the one-mile scale, while mentioning 106 miles necessarily does (since the value does not lie on any other scale).

I see two important open questions about using awareness for these sorts of problems. The first is whether we can make a sensible semantics using truth by approximation; “Italy is boot-shaped” would be true, for example, if the actual shape of Italy is most similar to the boot out of all the shapes under consideration. Whether this will directly cause problems I’m not sure (I will argue in a moment that the most obvious negative consequence, the sorites paradox, can be ducked using assumptions); it would certainly require reinventing rather a lot of wheels though. The second question is how the combinatorics works. If I argue that France looks more like a star than a hexagon, what effect does that have on the judgement that Italy is boot-shaped? What about if I point out that France’s borders are not straight? Things are easier in the numerical case, since we have natural scales we can talk about (mentioning 106 calls attention to all distances on the one-mile-unit scale) but of course we do not have such clear-cut and well-defined standards for every vague predicate.

### 2.2.2 · The sorites paradox

Besides standards of precision, the second well-known difficulty with vague predicates is of course the sorites paradox. There too awareness models may have something to offer.

If an account something like the above is correct, then using a particular
standard of precision for some vague predicate $P$ amounts to being aware of only a few of the many possible degrees of $P$-ness. What could be more natural, then, but that assumptions rule out the intervening degrees?

That is, if Carrie Fisher’s character in The Blues Brothers attends only to the ten-mile scale, then she assumes that there is no such distance as $10^6$ miles! This is why we need an approximate (similarity-based) semantics: the actual world (or in this case the actual distance) no longer appears at all in Fisher’s set of possibilities.

This certainly stops the sorites argument dead in its tracks. In fact, the very idea of a standard of precision associated with a degree scale may be that the increments on that scale are suitably sized to distinguish whether something is $P$ or not-$P$. (If you are using the one-hair scale then you thereby admit that for some element $n$ on that scale, $n$ hairs is bald while $n + 1$ hairs is not bald.) Of course it raises all sorts of other problems instead...

One has to stop somewhere, however.

For small erections may be finished by their first architects; grand ones, true ones, ever leave the copestone to posterity. God keep me from ever completing anything. This whole book is but a draught—nay, but the draught of a draught. Oh, Time, Strength, Cash, and Patience! Herman Melville, *Moby-Dick*