

Lockhart's problem

ADAM MORTON ASKS, IF WE HAD GREATER THINKING POWER, WOULD THE WORLD BE MORE OR LESS PUZZLING?

The idea of thinking power is very vague and loose, and the technical idea of intelligence, as in IQ, is full of assumptions and dangers. (I have argued this in the last chapter of my book *Bounded Thinking* and I will not repeat my arguments now.) So we should be wary of the following appealing question. But, still, it is a very appealing question.

“If we had greater thinking powers would we be less puzzled by the world?”

The argument for yes is: we could think more effectively so we could *answer* more questions.

The arguments for no is: we could think more effectively so we could *ask* more questions.

I call this Lockhart's problem, because it was first suggested to me in conversation by Michael

Lockhart. I want to discuss Lockhart's problem in a very general setting, more general than the human-centred one that I used when I introduced it in *Bounded Thinking*. In that book, I argued in a not very detailed way that the question has no a priori answer. It all depends on what the world is like: it may be that most of the problems that could be formulated with just a little more mental capacity than we actually have could be solved with just that small amount of extra intellectual oomph. The world, on this picture, would be not a lot more complicated than it seems to be. Or the opposite could be the case: if we could think more powerfully we would see layers and levels of complication that we do not see now, without a hope of explaining or dealing

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with them. My line was that we could argue until we were blue in the face and not know which of these was more nearly right. I concluded that it was a factual matter, about how the complexity of the world compares to the potentialities of our brains, that cannot be settled by abstract thinking. I did not say, though, how it could be settled *not* by abstract thinking: what kinds of evidence would be relevant and how it might be evaluated. And I'm not going to tackle this now, either.

What I want to do now is discuss the analogue of Lockhart's problem for non-human creatures – problem-solving creatures (beings, entities) in general – and look for relations between thinking or problem-solving power and problem-posing (question-asking) power. I am not going to solve this problem either. In fact, I don't think it has a solution, at any rate not one that we humans could understand. My aim is just to state the question in a halfway intelligible form.

Ants have no idea that we exist, at any rate they do not recognise us as social intelligent creatures. Dogs do recognise us as social intelligent creatures, like them. But they do not ascribe to us very many of the thoughts that we think. How could they, since to do so they would have to be able to think something like these thoughts themselves? Five-year-old children can think thoughts that dogs cannot, to a large part because they possess language which gives them some access to the thoughts that grown-ups think. But they also cannot think many things that are routine

for adult humans. They cannot think about death, at least not in the same terms as us adults; they cannot think about time in our terms; they have no idea of the immensity of space. So we adult humans might seem to be at the top of the heap.

Surely this is hubris. We do not know what other intelligent creatures there may be in the universe. And a disturbing thought is whether we would recognise them if we met them. If other intelligences were to us as we are to five-year-olds then we would recognise what they have as intelligence and acknowledge them as more intelligent than us. But if they were to us as we are to ants then we might simply not know that they were there, or that they were intelligences.

There is a region in between the two possibilities, where we might recognise that creatures were impressive thinkers, but not be able to describe the thoughts that they think. Then we would know that they think but not know what they think. This is *my* attitude to some mathematicians and economists: I know that they think things that I cannot, but I know that many of these things, although I cannot describe them in more than hand-waving terms, are real thoughts, really either true or false. And that raises an interesting problem of transitivity: suppose that a five-year-old child knows that I understand things that she cannot, and I know that some human genius understands things that I cannot, and that genius knows that some person who I would regard as totally insane is actually making sense. Then,

since it is easier to understand that someone is ascribing a thought to someone else than it is to understand what that thought is, the five-year-old can recognise – via this chain of ascriptions – that the apparently insane person is actually making sense. (This is an argument against some things that Donald Davidson once wrote, to the effect that if we cannot tell what something is thinking we cannot tell that they are thinking.)

We do have good reason to expect there to be creatures somewhere in space-time with greater problem-solving capacity than ours. Arguments that conditions on our planet are unlikely to be unique are familiar. But consider an alternative line. There is at least one thinking species on our planet, *Homo sapiens* (*pan destructor* would be a better name, but it's too late for that). If that species does not go extinct in the next century or two, as is most likely although far from certain, then it will have descendants, which will evolve within roughly the same niche as it now occupies. They are likely to develop resources to handle problems that present-day humans are intellectually too limited to tackle. After all, the hominin line diverged from the chimpanzee line only five or six million years ago, not really very long in biological terms. So – according to this admittedly rough argument that does not aim at more than establishing a probability – they will be more intelligent than us, and will be capable of thinking things we cannot even understand. We will have smarter descendants, given thousands or millions of years, and they will be to us as we are to five-year-olds. If we think in terms of space-time rather than simply space, the most likely option is that there are other intelligent species, and it is almost as likely that they exceed our intellectual capacity.

“They can or will think things we cannot even understand”. There's an obvious problem giving examples of the thoughts we do not have. But we can give examples of possible *topics* for them. How the activity of a brain can result in a particular experience with a particular sensory feel, how time can both flow and be a dimension of reality, how we can know non-trivial mathematical facts that are then essential to explaining how physical things happen. These topic descriptions are just

We will have smarter descendants

hand-waving: I won't even claim that the words make sense. But any of them can set off a chain of thoughts that come to no satisfactory conclusion, about things which, as Noam Chomsky and others have argued, human beings may just not be equipped to think successfully about. On any of these we can imagine differently brained creatures somewhere out there sighing and saying “Poor dears, the answer is right in front of them but they keep going round and round”.

I have been describing hypothetical problem-solvers both as if they were generally like us but with important differences, and as if they could have mental lives that are unimaginably alien in unimaginable fundamental ways. In an exercise like this we don't want to rule out either, but the choice between them does face us with a very basic problem. The simple formulation of Lockhart's problem is expressed in terms that humans use to describe humans. “Folk psychology”, as philosophers call it: the lore of beliefs, desires, questions, explanations, intentions, and so on. It is pretty uncontroversial that this gives us a fragmentary and unreliable hold

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on what we do and why we do it. It is almost as uncontroversial that it is the best hold we have for on-the-spot use given the evidence available to us in everyday life. Assuming that all this is right, it would seem a great and implausible leap to take folk-psychological terms to apply to other intelligent creatures, such as our descendants in five million years' time. But without this vocabulary we may not even be able to formulate the questions that we started with. "Think", "ask", "explain", "understand" are all terms we contemporary humans have devised to explain the actions and experiences, and facilitate the interactions, of members of our particular species.

The problem is not that these are concepts made by human beings so we should be wary of applying them beyond human experience. "Species", "space-time" and "human" are human concepts, and we should not hesitate to apply them wherever we can. The problem is that these are concepts designed specifically to account for human behaviour and experience, and to mediate in human dealings with other humans, so we should be more than cautious in assuming that they have any hold on other creatures, particularly more capable ones. The worry intensifies if we take a functionalist approach to the meaning of these terms and do not think of them



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as describing, one by one, features of what we feel and how we act. Instead, on a functionalist account, they do their descriptive and explanatory work as a whole, via the folk-psychological theories that bring them together and help them apply to data.

The problem is insuperable, I believe, if we focus on the not very profound terms that we humans use to describe other humans' internal mental states and the ways we represent the environment. But it is more manageable if we shift our attention to the environmental factors that are thus represented and influenced. A fact or event, such as the impending death of the individual or a change in its probability of having offspring, can be represented to various degrees of accuracy by ants, dogs, children, us, or our eventual descendants. And two facts or events can be represented differently or not by this range of creatures, as measured most simply by the possibility of a differential reaction to them. Two possible situations are indistinguishable for a creature if the creature is incapable of reacting to one in a way that it does not react to the other. And some situations, which the individual may or may not be capable of distinguishing from others, pose objective problems for individuals and species, problems of survival and flourishing.

So put it this way. One creature has more *answering* power than another when it can find ways out of many problems that the other cannot. (So humans may be incapable of finding a way out the problem of reconciling material advancement with the survival of the planet. Other creatures – equipped with greater intellects or lesser ambition – may handle this problem better than we do.) This characteristic obviously applies to a species' overall capacities, rather than

making sense for single accomplishments: stones do better than people at surviving long periods of time without damaging their environment, but stones are not very good problem-solvers.

The other side of the issue, *problem-asking* capacity, needs a less direct response. The idea is to generalise the power to ask questions and identify problems so that it is not tied to the use of language. That is a tough one: these capacities seem so conceptual. The solution I shall adopt

Asking questions is something specific to humans

is to look past the conceptual means to a central function that we use these means for. That function is, as hinted, that of discriminating one possibility from another.

Some examples. An orphan puppy is fed cow's milk from a bottle by a male veterinarian. Wrong substance, wrong administration, wrong gender, wrong species. But the puppy does not think "What's going on here?", although in a few weeks' time it will show signs of puzzlement when it sees and smells a thrown ball land at a particular spot and then does not recover it there. It will search persistently in the grass with its senses on high alert, and on returning to the area the next day will have another attempt. "Ball there/ball not there" are possibilities the six-month-old can distinguish, while "fed from a bottle/fed from a teat" are possibilities the one-week-old cannot tell apart. The same possibilities face adult humans, although since it is a matter of the limits of *our* discrimination the examples have to be much more conjectural and

schematic. But suppose that in the next generation our best physicists come up with a solution to the dark matter mystery by proposing that the missing mass is tied up with physical processes we had not been previously aware of. And suppose that the missing mass *is* tied up with novel physical processes – just not the ones our physicists propose. They suggest tests of their proposal, the tests are passed, and the existence of the processes they have postulated becomes a

Capable creatures face more problems

scientific truism, like conservation of energy or the laws of thermodynamics. But it's false. The true explanation is fundamentally different but understanding the difference and detecting it would require a grasp of detail and a use of logic that we cannot imagine. As a result we are as content as well-fed puppies, unaware that something rather puzzling is going on.

Literally asking questions is something specific to humans, or at any rate to language-using creatures that operate much like us. Puzzlement may be more general, and at the heart of it we can find a generalisation of the thought “Why this rather than that?” That requires us to distinguish between the this and the that, so we can see the ability to distinguish between possibilities as the core capacity that puzzlement and questioning presuppose. And it is a capacity that we can describe without invoking language, meaning, or propositional thought. This leads me to my reformulation of Lockhart's problem in its full trans-human glory.

We have already prescriptively defined one creature as having more *answering* power than

another when it can find ways out of many problems that the other cannot. Now define *asking* power as I have been suggesting. One creature has more asking power when it can distinguish possibilities that the other cannot. Now we can generalise Lockhart's problem: does a uniform increase in answering power tend to bring a uniform increase in asking power?

I conjecture that the answer is yes. If more problems can be solved then one means to doing so is to discriminate more possibilities. (As in the progress of science we distinguished force, momentum and kinetic energy, not originally clearly separated, so that later we were able to distinguish heat from temperature. Or as in the history of philosophy we distinguish fatalism from determinism.) As a result, more capable creatures are likely to face more problems as well as more solutions. If we could extend the human emotion of puzzlement to them we might guess that they would be as puzzled as we are, but about puzzles that pass right by us. Of course that is just a conjecture, though, however likely it feels. And it leaves untouched a finer-grained question: can we make any informed guesses about how the small-scale increases in either power that are likely to result from cultural or biological progress might affect the balance between problems we are able to solve and problems we have come to appreciate?

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