



Thought and Experience

Four "Lovelace" questions

Mike Beaney

Can we then turn to the issue of your Lovelace questions, which are quite central in your book, because I guess a main claim of your book is that computational psychology does have a role to play in understanding and explaining creativity? But you distinguish there what you call four Lovelace questions. Perhaps you could say something first about why you called them "Lovelace questions" and then we can look at what the four questions are and your answers to them?

Margaret Boden

Well Lady Lovelace, who of course was Babbage's great friend and co-operator, Lady Lovelace is very famous for saying at one point that to put it in modern terminology that you can't get a program to do anything that you haven't ordered it to perform. And so people quite often quote her, or if they don't quote her they use basically the same argument. They say "a program only does what the programmer tells it to do and therefore it can't come up with anything new and therefore it can't be creative." And what I say is well there are at least four different questions here that we need to distinguish. One is can you use the notion of a computer program or more generally the notion of computational psychology, can you use that sort of approach to understand better how it is possible for human minds to come up with creative ideas. And I say that the answer to that is a very, very loud, strong yes and I try and give lots of examples in the book. Second question is could a computer, either today or in five hundred years time, could a computer, at least sometimes, come up with something, which at least appears to be creative. And again the answer to that is yes and there are already many, many cases, well perhaps that's not quite fair. There aren't many, many cases but there are several extremely interesting cases and very widely varying domains, where the computer comes up with something which at least appears to be creative and indeed in some cases fools experts, human experts, into thinking that another human expert did it. So that's the second question.

Mike Beaney

Can we have some examples?

Margaret Boden

One example would be there is a very interesting program called EMI by a man called David Cope and David Cope himself actually is a musician and a composer and he is a Professor of Composition at the University of California Santa Cruz. And he has written a very interesting computer program which, to put it incredibly crudely, you feed into it a number of works of a given composer or a given style and it extracts if you like the statistical patterns out of this, and then uses those statistical patterns to compose new music in that style. And there are some very interesting things about that because very often it comes up with music which is not only recognisable as apparently Mozart, apparently Bach, apparently Scot Joplin, but more than acceptable as such and it's got to the stage where he can hold concerts where human musicians play the score and sometimes they are playing little known pieces by a very famous composer called "Bloggs" and sometimes they are playing EMI's compositions and it just is an empirical fact that very often the people, even the people who know their musical onions, can't tell the difference. Second thing is for example he fed in the opening bars of a number of Bach oratorios into this thing and then asked it to compose some oratorios and it actually came up with on at least one occasion a phrase which Bach himself had used but which was not in the set of oratorio samples that Cope had given it. OK? So part of Bach's signature, his individual signature, was being captured and being spewed out by this thing but it hadn't been in the sample.

Mike Beaney

Right. OK.

Margaret Boden

And the third Lovelace question is whether a computer could ever recognise creativity either in its own ideas or in a human beings ideas. And of course what that means is, what that comes down to, is could it recognise not just the novelty but the value? And the answer to that isn't such an unqualified "yes" as the two yeses we have had so far. But it is a yes. If the question is can you feed not only values but valuation, valuing, into a computer such that it will be able to some extent to distinguish between more and less valuable ideas, the answer is yes in principle; to a small extent it's already happened. The reason that it hasn't happened much yet and the reason why it is a very difficult thing to do is that even where we agree on certain values, we find it very difficult to state them; even more difficult to define them and even more difficult to define them in the sort of clarity that you need to put into a computer program. That's the third Lovelace question. Now, and that's an empirical question. All of those three questions we have just discussed are empirical, scientific questions.

The last Lovelace question is a very, very different sort of question. It's a philosophical question. And that question is suppose for the sake of argument that you had a computer which could compose music as good as Beethoven's and come up with a wonderful new cure for cancer and all the rest of it. Imagine what you like that the computer could do. Now the fourth Lovelace question is yes, but would it really be creative? Wouldn't it be the human being who wrote the program? Now that is a philosophical question because it isn't asking a factual question. It's taken for granted for the purposes of argument that whatever you want to say this computer can do it does it. The question is what are you to say about its doing it.

Mike Beaney

This point, it raises the point about the definition of creativity because in a way if you take your definition of creativity earlier, that something is creative if it's new, surprising, and valuable, then we could agree that something a computer produces, particularly musical composition, could be new, surprising and valuable. So by your definition it would be creative wouldn't it?

Margaret Boden

Well yes but I mean definitions they don't start from nowhere. I mean when I defined creativity or creative idea was one that was new surprising and valuable I was talking about human creativity because that is what interests me. I am not interested in computers. I am interested in human beings and we just take for granted that human beings are as they are and they are among other things they are conscious, at least sometimes. Among other things they speak and act meaningfully, at least sometimes. And if someone were to decide for example, and even this itself, this is another philosophical question, supposing somebody wanted to argue that valuation requires some aspect of self-reflective consciousness? OK? It certainly sounds plausible to me. Then if you decide, for philosophical reasons, that no computer could be conscious, then it would follow that no computer could be creative because no computer could value because consciousness is necessary for valuation. But all of that, there is a huge mare's nest of philosophical questions in there. Similarly with intentionality. If you say that ideas, thinking, action, never mind valuing, are all intentional concepts, then again it would follow that you wouldn't be prepared to say that any computer was conscious.

Mike Beaney

So if we go back to your definition of creative as involving something that's new, surprising, and valuable, then one way for someone to go, preserving your definition, if they wanted to resist the idea that computers could ever really be creative, would be to say that the value condition must involve some specification of the intentionality of the act.

Margaret Boden

That's right.

Mike Beaney

So you could say that even if a computer does produce this marvellous musical composition that we might think is valuable, when we discover that it's produced by a computer we say, "Ah it isn't valuable after all." Is that the way one would go here?

Margaret Boden

Well I think that's the way you would have to go, yes. I think the philosophical bite is in the value part of it because certainly they can do things that are new and certainly they can do things that are surprising and I mean it's already happened.

Mike Beaney

But another response presumably would be to say what is creative here is not just the computer of a computer program but the whole complex of programmer and program. In other words it's the computer in the context of being developed; being used to perform certain kinds of creative activities and that is what we are judging. So it's a product, not just of a computer but also of certain human intentions.

Margaret Boden

Yes. Well - that – yes...

Mike Beaney

...So we can call it valuable because of that human element.

Margaret Boden

That's right. Yes. And actually that would deal with an objection that Anthony Hear makes in one of his articles, interesting article actually, where he says that by definition a work of art is intended to be a communication of human experience from one human being to another, even if it's done by Robinson Crusoe who knows he is going to die tomorrow. That is basically what a work of art is. And therefore he says, anything which is produced by a computer program is not and cannot be a work of art, not matter what it looks like because it isn't even attempting to you know communicate an experience of human – and the way that you put it, actually I like the way you put it very much Mike, because if the way that you put it, it's the human being at the other end who in some sense is communicating something to us even though he is doing it with the aid and with the essential aid you know of the computer.

Mike Beaney

There was an intention to create a work of art. It just so happened that in this case was done through a computer rather than through your hands. I mean in that sense there is – there might be very little difference and it could count as creative in that respect.

Margaret Boden

Yes. That's right.

Mike Beaney

Margaret Boden, thank you very much indeed for your time and for discussing this issue with us.