A20713 - 6AANA026

by Amun Lie

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Module Title:	Philosophy of Science
Module Code: (e.g. 5AABC123)	6AANA026

Assignment: (may be abbreviated)	8(a) Is trust important in sciene?
Assignment tutor/group:	Tutor: Nicholas Emmerson, Lecturer: Professor Alexander Bird
Deadline:	30/04/2020
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8. (a) Is Trust Important in Science?

Thomas Young is often cited as "The Last Man Who Knew Everything". He died in 1829. 200 years later, science has progressed immensely, and it is no longer possible for one person to understand all it contains. While laypersons for a long time have had to trust scientists' conclusions without understanding them themselves, increasingly scientists too must, in order to do their own research, rely on other scientists' work without understanding it themselves. This has led philosophers to point to the important role of trust in science and to emphasize the personal character of this trust. Many maintain that modern science simply cannot be done without such a trust between scientists.

In this essay, I argue that this view is exaggerated. In the first section I argue that the practice of confirming and replicating scientific results minimizes the role of trust between scientists – even when confirmation and/or replication is difficult to achieve. In the second section, I clarify what reduced role trust nevertheless can and does play in science. I show that a personal trust between scientists can lead to a more prolific scientific community, but that it does not affect the reliability of the scientific results produced. I concede that there inevitably is some amount of trust attached to our belief in scientific results, but that this trust is impersonal in character.

1. Why Trust is Not Important in Science

In John Hardwig's 1991 paper "The Role of Trust in Knowledge", he describes the way in which Louis de Branges proved the famous Bieberbach conjecture, as recounted by J. Korevaar. The point of the story is that de Branges had to enlist the help of Walter Gautschi and Richard Askey to complete his proof. Gautschi and Askey were specialists in their own fields of mathematics, and separately completed a different step in the proof that de Branges could not do by himself. They were left with a complete proof where each of the mathematicians involved understood their part of the proof, but not the proof in its entirety.

While this example is particularly telling, the situation is not uncommon at all. In fact, according to Nature Index's database of articles from 68 different science journals, the average number of authors on a physical sciences paper was 39 in 2016. It is reasonable to believe that these teams of authors consist of several highly specialized scientists, many of whom do not fully understand their colleagues' work. Consider two scientists involved in some paper - scientist A and scientist B. A and B do not understand each other's work. Therefore, for A to have confidence in the paper, he must rely on his

trust in B. Hardwig argues that this trust is based on two things. Firstly, it is based on A's impression of B's moral character – in other words, how confident A is that B is not lying. Secondly, it is based on A's impression of B's epistemic character – this involves A's confidence in B being a competent scientist who works thoroughly and does not overestimate his or her knowledge. It seems then, that the reliability of some paper must be judged on the character traits of the scientists involved – on whether the scientists can be personally trusted.

However, this forgets the important roles that confirmation, replication and falsification plays in science. It is not enough that one scientist makes a claim about the result of some experiment she performed, without any evidence – no matter how trustworthy she is. For the scientific community to develop a belief in her claim, scientific evidence must be provided, and the experiment must be replicated. The more an experiment is replicated, and the claim is found to be true, the higher the degree of belief the scientific community will have in the claim. When this is done, belief is no longer grounded in the trust of the epistemic and moral character of the original scientist – at least not primarily.

Confirmation and replication therefore minimize the role of trust in science. But what about the cases where confirmation and replication cannot be obtained? Hardwig argues that this is becoming increasingly common. Confirmation is becoming hard to obtain because scientific fields today are so specialized that it can be challenging to find a group of scientists that are sufficiently competent to evaluate the theoretic merit of some scientific claim. Replication, on the other hand, is becoming harder to perform because many experiments today are so costly that obtaining funding to repeat them can be virtually impossible. What does one do in these cases?

It is tempting to appeal to trust. It would be a shame if some scientist performed a costly experiment that produced a potentially important result, and the scientific community could not believe the result simply because the experiment was too costly to replicate. However, I argue that this is exactly the approach that must be taken. Such an approach endorses a form of epistemic humility and minimizes the risk of holding false beliefs. A worry about this approach is that it makes science less efficient. If trust cannot be relied on, then one must presumably wait until a result has received an appropriate amount of confirmation before using it in further research. This could make research a very slow process.

I would argue the mistake made here is the assumption that a scientist must believe a result before using it in further research. This is not necessarily true. Scientists are completely free to use results that have not been comprehensively tested as long as they acknowledge that this is the case, and that any theory involving such results carries some risk to it. In practice then, using an approach grounded in trust is not much different than using an approach grounded in confirmation/replication. The only difference is that theories in the latter case are presented with a footnote where any particularly uncertain assumptions are stated. This stresses the fact that science must often use assumptions, but that this is not the same as having an element of blind faith in scientists' works because the scientists are deemed personally trustworthy.

2. Why Trust is Slightly Important in Science

So far, I have argued that confirmation and replication of scientific results minimizes the role of trust in science and that this also applies when results cannot be confirmed/replicated. However, I have not said that the role of trust disappears. Why is this? Compare the case where A believes proposition P because A trusts B and B says that P, to the case where A believes P because P has been confirmed by C, D and E. In some ways, a trust in B has simply been transformed into a trust in B, C, D and E. I do not dispute this. Nevertheless, I argue that the second type of trust is of a different form. Importantly, it is significantly less personal in character. In the first case, A believes P because A knows B and trusts B's personal character. In the second case, A's belief in P is less based on personal character, and more based on the belief that it is unlikely that B, C, D and E would all have made the same mistakes. In fact, it might be misleading to characterize this sort of evaluation as trust at all. However, if one does want to call it trust, it should be realized that it is better grounded and of a less personal form than the trust A has to B due to his moral and epistemic character.

There is also an entirely different way trust can be important to science. Recall the way in which de Branges enlisted help to prove the Bieberbach conjecture. First Gautschi was contacted to complete a missing part of the proof. Then Askey was contacted to finish it. I have argued that de Branges did not have to trust Gautschi's result before contacting Askey. Theories can be pursued on uncertain premises as long as these are acknowledged. The scientific community would simply have to await confirmation before having a high degree of belief in the proof. However, it is reasonable to think that de Branges would not have contacted Gautschi or Askey in the first place if he did not have some trust in their moral and epistemic characters. In this way, trust between scientists can lead to a more

prolific scientific community since scientists are less hesitant to involve each other in their work. However, importantly, this trust should not affect how reliable the scientific community deems its results to be. This should still be based on scientific evidence. I therefore conclude that the role of trust in science is minimal and primarily impersonal when it comes to the reliability of scientific results, but that personal trust between scientists can have some effect on the volume of theories they are able to produce.

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FINAL GRADE

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GENERAL COMMENTS

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