

Todmok1 explain why  
it also requires  
disagreement,



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ToDMOK1 answer this question, we must first define some terms which it addresses. For example, the term “robust knowledge” can be interpreted in different ways. Personally, I would see robust knowledge to be knowledge which is widely agreed upon, and has, in the realm of the sciences, been backed up by evidence to some degree. In other words, my definition would imply that robust knowledge requires consensusDMOK2 .

However, if we take the more literal definition of “robust”, which is an adjective that implies longevity and resistance, then it could be argued that robust knowledge is knowledge that is able to withstand continued criticism. DMOK3 Unlike my definition, this one would suggest that robust knowledge requires criticism and disagreement. But what are consensus and disagreement in the realm of knowledge? I believe that consensus is when individuals, when presented with the same data, come to the same conclusions, and thus agree with one another’s observations and reasoning. Likewise, I think disagreement is when individuals presented with the same data come to different conclusions, and refuse to accept each other’s theories. This may be due to a variety of ways of knowing, which I will not delve into too much, since it is irrelevant to the question.

DMOK4 In this essay I will first argue that the aforementioned “robust” knowledge requires consensus, then I will explain why it also requires disagreement, and finally I will bring both of those together and argue that consensus and disagreement are both required in the formation of robust knowledge. I will mainly look at two areas of knowledge: the natural sciences and religious knowledge systems. DMOK5 Firstly, I will argue that consensus plays a key role in the creation of robust knowledge. Let’s take the natural

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sciences, and more specifically Sir Isaac Newton's theory of gravity as an example. It is undeniable that most of the world's population believes this theory to be true. Regardless of the accuracy of the theory, it is a falsifiable theory, meaning that a particular observation could disprove it.

If we look back at my definition of robust knowledge, we can see that the theory of gravity DMOK6 is both widely agreed upon and has indeed been backed up by a lot of evidence (mostly in the form of basing our lives around it), and therefore would imply that Newton's theory is robust. This example provides evidence to back up my argument that consensus plays a critical role in the creation of robust knowledge, at least in the natural sciences. If the theory of gravity was not widely agreed upon, our society would not revolve around it, and thus the theory would not suit my definition of robust.

On the other hand, too much consensus in the natural sciences may lead knowledge astray due to some biases. If a theory was widely agreed upon, scientists may not test it as much to prove its accuracy or try to disprove it. A good example of this was the theory of the aether (the medium through which light was thought to propagate in the early 1800s). It was not until 1887, 8 decades later, that an experiment was carried out to attempt to disprove it. The Michelson-Morley experiment<sup>1</sup>, DMOK7 which did eventually eliminate the idea of the existence of an aether. One cannot help but wonder whether, if the aether theory had not been accepted as easily, scientists could have disproved it sooner. Overall, consensus is definitely required for the creation of robust knowledge as I see it, but I do not think consensus alone can lead to robust knowledge, since there exists the risk of the “argumentum ad verecundiam” fallacy.

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This is when the public supports an idea or a theory purely because it originated from an expert in that field. For example, Neil deGrasse Tyson (one of the world's leading astrophysicists) argues that dark matter exists because science cannot explain the expansion of the universe in any other way yet. DMOK8 However, there is currently no evidence to support the theory of dark matter, and yet lots of people in the world know about and believe in this theory, which seems to originate purely from the imagination of scientists trying to explain something they did not understand.

DMOK9 Having looked at the role of consensus in the creation of robust knowledge, I must now address the role of disagreement. The obvious argument here is once again in the realm of the natural sciences, where disagreement pushes scientists to look more in depth at the topic in question. An excellent example of this was back in the 1600s when Galileo Galilei proposed the heliocentric view of the universe to the Church<sup>2</sup>.

DMOK10 In other words, he was one of the first people to observe and theorise that the Earth revolved around the Sun, and not the other way around. Despite the evidence he provided, the Church refused to give in. He was placed on trial for his theory, and very few people believed in the theory (those who did did not want to go against the Church).

But this proposal sparked interest amongst scientists, who began to question the geocentric model proposed by the Church. Finally, after a century of disagreement, the Church gave in to heliocentrism in 18223, due to the overwhelming evidence scientists had accumulated. In this way the initial disagreement over heliocentrism led to an increase in research in that particular topic, which eventually produced another good example of robust

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knowledge. On the other hand, that example links nicely to disagreement in religious systems, and how that does not always produce robust knowledge. My definition of robust knowledge was “ knowledge which is widely agreed upon”, which would imply that disagreements can only hinder the creation of robust knowledge. In the realm of religious systems, people are free to choose their religion, and believe in whatever they feel is right.

DMOK11 However, it is impossible for everyone to believe in the same religion, which is why there is a segregation between different religions such as Christianity, Buddhism, Islam, DMOK12 etc.

And this raises the question: if not everyone can agree on one religion, is religious knowledge robust? Referring back once again to my original definition of robust, I stated that it needed to be “ backed up by evidence to some degree”. This would imply that a lot of religious knowledge is not robust, as it is a belief rather than a proven science. DMOK13 Finally, I will look at the simultaneous use of consensus and disagreement and evaluate both of their uses in the creation of robust knowledge. At first, the two may seem to counteract each other, because how can we have consensus and disagreement over a topic, and refer to the findings as “ robust knowledge”? A fitting example here in the natural sciences is the gradual improvements of the model of the atom over time DMOK14 . The atom went from being a “ billiard ball” according to Dalton to a “ plum pudding”, and later Rutherford and Bohr also chipped in. This is a perfect example because each model received some consensus and some disagreement. For example, let’s take Thomson’s “ plum pudding” model of the atom.

In the late 19th century Thomson suggested that negatively charged particles floated around inside the atom<sup>4</sup>. Thanks to the consensus this model received, science was able to advance with the idea of negatively charged particles onto things such as electrolysis<sup>5</sup>, even though we know today that the model was not completely accurate. It simply needed to be accurate enough for the time. However, due to the disagreement it received, scientists kept pushing to improve the model, and in 1909 Rutherford directed the Geiger-Marsden experiment to prove the existence of electrons around the nucleus, not inside. DMOK15 On the other hand, there is a clear counterargument here. Can this knowledge really be called robust if it keeps changing? It would seem that consensus and disagreement used together lead to confused knowledge, as scientists keep changing their opinions. DMOK16 Looking at the realm of religious systems, it is undeniable that consensus and disagreement both play a major role in religion.

The consensus has created groups of people with similar beliefs, but the disagreement has driven these groups apart. While religious knowledge may seem robust to a certain group, there will inevitably be lots of other groups who will disagree, and if the former or the latter attempt to impose their beliefs, the disagreement may turn violent, like in the Crusades between 1096 and 1291<sup>6</sup>. DMOK17 Overall, I have argued that both consensus and disagreement play a role in the creation of robust knowledge in the natural sciences, but it would seem that, for religious systems, disagreement only hinders its creation. DMOK18 Looking back at my original definition of robust knowledge, I said that it needed to be widely agreed upon and backed up by some evidence. Once again, this does not fit the knowledge in religious

systems, since people constantly disagree, and nothing has been proven – religion is more of a personal belief than robust knowledge, which is why disagreement only hinders its creationDMOK19 . However, Sibbald said that robust knowledge is knowledge that can survive “ sustained criticism”.

This would imply that religious knowledge is indeed robust, since it has survived criticism for centuries, if not millennia. Thus, the original question is purely based upon one’s definition of “ robust”. My conclusion implies that, in the realm of the natural sciences, we should never simply “ agree” with what an expert says, but rather formulate our own opinions, so that, when opinions do not match, science will keep researching to better our knowledge. When opinions do match, however, then this newly-found knowledge may be used in other fields, to advance our society.