

### **Title 3: “Do good explanations have to be true?” – A response with respect to natural science and religion**

Being ‘true’ is defined as being “in accordance with fact or reality” (*Oxford Dictionaries*). A distinction should be drawn between ‘truth’ and ‘reality’ in light of this definition. While reality is an objective actuality, truth is one’s subjective perception of reality based on facts — which are true statements about reality made from different perspectives. The methodical understanding of reality is knowledge, which is otherwise more formally defined as “the theoretical or practical understanding of a subject.” (*Oxford Dictionaries*) One crucial method of understanding reality is through explanations, where to “explain” is defined as either “to make plain or understandable”, or “to show the logical development or relationships of” (*Merriam-Webster*). As the definitions imply that knowledge and understanding are inseparable, the facilitation of understanding through explanations is an integral way of propagating and producing knowledge through logic and reasoning.

Whether good explanations have to be true is largely dependent on the criteria that one uses to determine what a good explanation is, hence the title can be approached by asking the questions: ‘what makes a ‘good’ explanation?’ and ‘is a good explanation universal?’

If one initially assumes that the purpose of explaining is to propagate and produce true factual and conceptual knowledge, it can be easily argued that ‘good explanations’ have to be true. Such an argument would indicate that for an explanation to be considered ‘good’ under this assumption, its logic and reasoning must firstly be true to all established facts in order to achieve the propagation and production of true conceptual and factual knowledge, where being true is an intrinsic property of a ‘good’ explanation. This makes the accordance with facts and reality the

universal criterion for a good explanation under the stated assumption, where the more factual evidence that an explanation logically agrees with, the better the explanation. This argument is largely valid in natural science, with its primary purpose being to propagate and produce true knowledge of the natural world. When two conflicting explanations arise in natural science, the one that is the more logically concordant with experiment results will be considered as the better one, and subsequently the best explanation will be considered true until a better one that is more concordant with experiment results emerge. This can be very clearly illustrated by how most modern physicists agree that quantum-mechanics is a better explanation of the behavior of elementary-particles than Newtonian-mechanics, for that Newtonian-mechanics cannot validly explain the results of quantum experiments such as the electron double-slit experiment, while quantum-mechanics can. Thus, the very fact that quantum-mechanics is more concordant with facts and reality makes it a better explanation than Newtonian-mechanics by the principles of the aforementioned argument in natural science.

On the other hand, the principle of Ockham's razor is another widely accepted criterion for a good explanation. Proposed by William of Ockham in the 14<sup>th</sup>-century, this principle states that: "of two competing theories, the simpler explanation of an entity is to be preferred". (*Duignan, Britannica*) The logic behind the principle of Ockham's razor argues that a simpler explanation will be less susceptible to logical incoherencies that can overturn the explanation. The principle of Ockham's razor also has credence under the assumption that the purpose of explaining is to produce and propagate knowledge, as simpler explanations are also more easily comprehensible, and hence will lead to better understanding of the subject. The principle of Ockham's razor is pervasively used in religion to provide convincing explanations for theists. This is most significantly exemplified by how religion explains the beginning of the universe. As the laws-of-

physics of our universe do not exist before the initial-singularity (*Hawking, The Beginning of Time*), cosmologists have to rely convoluted inductive, and even abductive reasoning to explain what was before the big-bang and why the big-bang happened. This not only makes the simpler explanation that ‘the big-bang happened as a result of some divine power’ as valid as all other explanations, but also makes it better than all other explanations by the principle of Ockham’s razor, which is partly why Albert Einstein (*Hendricks, Big Think*), along with a number of other illustrious scientists, has chosen to reject atheism and instead embrace agnosticism.

However, the first argument that ‘a good explanation is one that is true’ makes it inevitable that better explanations are more logically convoluted, as better explanations have to be logically concordant to greater sets of facts, which directly conflicts with the principle of Ockham’s razor. This conflict between the principle of Ockham’s razor and the first argument is essentially the question of whether validity or comprehensibility is the universal criteria for a good explanation. Under the assumption that the purpose of explaining is to produce and propagate true knowledge, this conflict implies that the existence of a universal criterion for a good explanation is impossible, as comprehension is key to the propagation and production of knowledge, while true knowledge must have logical validity. Thus, this conflict can only be resolved by regarding the criteria of a good explanation as perspective-dependent.

By revisiting the two distinct parts to the definition of ‘explaining’, it can be reasoned that an explanation can either be a conceptual explanation that intends to promote understanding of a concept by answering ‘who, what, when or where’, or a logical explanation that aims to facilitate the production of further knowledge based on established facts or claims through logic and reasoning by answering ‘how or why’. Considering the impossibility of obtaining the ultimate truth, different degrees of truth must exist in different explanations. While valid logic and

concordance with facts stated in the first argument is more important for a good logical explanation, a good conceptual explanation can sacrifice these qualities to a certain extent to become simpler in accordance to the principle of Ockham's razor. Furthermore, whether an explanation is considered 'good' also depends on the perspective of its receiver (the knower). The knower is ultimately the arbiter of whether an explanation is good or not. Different knowers have levels of background-knowledge, and hence they will be at different levels in terms of their ability to understand an explanation. With respect to the two types of explanations distinguished earlier, a conceptual explanation involving familiar analogies would be more suitable for a foundational-level knower who lacks necessary background knowledge to follow a logical explanation of the same subject. Correspondingly, a logical explanation would be more suitable for a more studied knower than a merely conceptual one, as logical validity and accordance with facts now hold a greater significance when background knowledge is assumed to enable basic understanding. This is exemplified by my personal experience of how the explanation for 'what is an electron?' drastically changed across different phases of education. In primary school I was told to imagine electrons as negatively-charged "billiard-balls", which was a better conceptual explanation by the principle of Ockham's razor as it facilitated understanding of the concept of electrons; However, the diploma HL-physics course explains that electrons exist in particle-wave duality, which is a better logical explanation by the principle of the first argument, as it is concordant with the known fact that electrons don't spiral into the nucleus due electrostatic attraction. This strongly implies that a better explanation certainly don't have to be more true, as the logical explanation of electron particle-wave duality would fail to facilitate the same conceptual understanding in me during primary-school, albeit it is more concordant with facts. This also reflects how paradigm shifts

happen, where a certain level of background understanding is necessary before new explanations more concordant with reality can be established.

Although the previous argument apparently offers a definite conclusion to the title, it is entirely based on the unrealistic assumption that a fixed set of facts is always agreed-upon by all perspectives. As truth is the subjective interpretation of a certain set of facts, this leads one to question ‘is the criterion for truth universal?’

Consider the Flat-Earth Society as a group perceiving a different truth to others. Based on religious faith, the Flat-Earth Society uses their interpretation of Bible excerpts such as “[God] spreads out the northern skies over empty space; he suspends the earth over nothing.” (*Job 26:7*) as facts to explain their belief of a flat Earth, while believing what is commonly accepted as facts supporting a spherical Earth, such as satellite-images, are fabricated (*Svarrior*) based on intuition. Bearing in mind the distinction between truth and reality drawn at the start, the Flat Earth Society evidently considers their explanation of a flat Earth to be a good one, hence a flat Earth is the truth from the perspective of the Flat-Earth Society, despite it being perceived untrue from the perspective of all others believing otherwise. This thus implies that neither the definition of a good explanation nor the truth is universal, which all good explanations must be true for a rational knower who deemed the explanation good.

In the end, the lack of universality in both the notion of ‘truth’ and ‘good explanation’ makes a definitive response to the title impossible, as an explanation can be simultaneously ‘true’ and ‘untrue’ as well as both ‘good’ and ‘bad’ when viewed from different perspectives. However, the real value of discussing this title surfaces if one regard the history of human progression. While we can never be quite certain, even less to agree on what a good explanation is and what is true,

our constant and perpetual search for both better logical and conceptual explanations against both the principles in the first argument and the principles of Ockham's razor is what takes our truth infinitely closer to the unreachable ultimate reality, one paradigm-shift at a time, all the way from the Stone Age to the modern age and beyond.

1599 words

## Works Cited

*The Bible*. New International Version (NIV) ed., The International Bible Society.

Duignan, Brian. "Occam's Razor." *Encyclopædia Britannica*, Encyclopædia Britannica, Inc., 19 Dec. 2018, [www.britannica.com/topic/Occams-razor](http://www.britannica.com/topic/Occams-razor).

Hawking, Stephen. "The Beginning of Time." *Stephen Hawking*, [www.hawking.org.uk/the-beginning-of-time.html](http://www.hawking.org.uk/the-beginning-of-time.html).

Hendricks, Scotty. "Did Einstein Pray? What the Great Genius Thought about God." *Big Think*, Big Think, 30 Jan. 2019, [bigthink.com/did-einstein-pray-what-the-great-genius-thought-about-god](http://bigthink.com/did-einstein-pray-what-the-great-genius-thought-about-god).

Merriam-Webster. "Explain." *Merriam-Webster*, Merriam-Webster, [www.merriam-webster.com/dictionary/explain](http://www.merriam-webster.com/dictionary/explain).

Oxford Dictionaries. "Knowledge | Definition of Knowledge in English by Oxford Dictionaries." *Oxford Dictionaries / English*, Oxford Dictionaries, [en.oxforddictionaries.com/definition/knowledge](http://en.oxforddictionaries.com/definition/knowledge).

Oxford Dictionaries. "True | Definition of True in English by Oxford Dictionaries." *Oxford Dictionaries / English*, Oxford Dictionaries, [en.oxforddictionaries.com/definition/true](http://en.oxforddictionaries.com/definition/true).

Svarrior, Pete. "'It's True, I Saw It on the Internet!'" *The Flat Earth Society*, [forum.tfes.org/index.php?topic=8698.0](http://forum.tfes.org/index.php?topic=8698.0).