Do good explanations have to be true?

The prescribed title addresses the underlying subjectivity of truth in determining what makes an explanation “good”. Prior to discussing this prompt, it is essential that the terms “good” and “true” be defined. In general, a “good” explanation requires that a second party understands presented knowledge with high confidence and certainty, regardless of its truthfulness. A “true” explanation, counterintuitively, may not necessarily refer to an explanation which is empirically true, but rather one that is most coherent and often reasoned to be accepted as “true”. The degree to which an explanation can be “good” or “true” is rather relative and dependent on context; there need not be any scientific reasoning when explaining the existence of Santa Claus to an innocent child.

The prompt implies that for an explanation to be “good”, it must be inherently truthful. However, this raises the idea of whether one explanation would be “better” than another if it were to be “truer”; hence, begs the questions: “How do “good” explanations differ in different Areas of Knowledge?” and “To what extent is the degree of truth in an explanation dependent on the Area of Knowledge to which it belongs?”. Therefore, with these knowledge questions in mind, this essay aims to answer the prescribed title by delving into the fields of Mathematics, Natural Sciences and History, due to their distinct approaches to truth and therefore their qualifications of a “good” explanation, and concludes that the varying degrees of truth in different Areas of Knowledge plays a major role in determining how “good” an explanation is.

The degree of truthfulness of an explanation, in general, is dependent on the context of the discussion. In the case of Mathematics, Natural Sciences and History, knowledge can either be (1) empirically true, (2) theoretically true and (3) relatively true, respectively.

In Mathematics, intuition and reason is utilised to examine patterns, derive axioms — propositions which are held to be self-evidently true in the sense that they require no proof (“Theory of Knowledge 3.2.1 Scope and Applications.”) — and ultimately deduce universal knowledge. This application of axioms leaves basic assumptions justified due to their empirical nature. For instance, one of the most fundamental assertions from “The Elements of Euclid” states that things which are equal to the same thing are also equal to one another (DeHaan); i.e. if A = C and B = C, A = B. Knowledge in Mathematics can thus be considered universal, consequently rendering explanations in Mathematics, empirically true.

In the Natural Sciences, faith and reason are employed in the Scientific Method, a process in which conjectures are made based on prior knowledge, then experiments conducted to determine whether the conjectures were correct (Andersen) ー otherwise referred to as falsifiability. For example, the constant change in the conventional perception of the atomic model, from J.J. Thomson's plum pudding model to Niels Bohr’s planetary model to Erwin Schrödinger’s quantum model (“Atomic Structure.”), suggests how it is not possible to determine whether knowledge in the Natural Sciences is true, as such knowledge would merely be approximations asymptotically approaching the truth. Therefore, knowledge in the Natural Sciences can only be viewed as hypothetical approximations, rendering explanations in the Natural Sciences, theoretically true.

In History, historians derive knowledge by means of acquiring evidence through sense perception and faith, ultimately generating knowledge based on evidence from the past. Though the generation of knowledge is fairly straightforward, determining what is “correct” knowledge becomes difficult once emotion comes into play. As historical evidence is not definitive, historians are open to selecting their own sources and making personal interpretations regarding different sources; it is ultimately in the hands of the historians, with different social backgrounds and perspectives, to determine what source is to be investigated. The subjectivity and bias of how knowledge can be interpreted by different individuals effectively renders knowledge, and thus explanations in History, relatively true.

These three different definitions of truth in their respective fields suggest how it would be difficult to judge the quality of an explanation when solely considering truthfulness. Therefore, a new criterion must be defined for determining what makes an explanation, “good”, i.e. the process of explanation.

A “good” explanation in Mathematics would be one which is derived and validated with sufficient references to first principles ー otherwise referred to as lemmas ー and justified with no logical error. According to Bloom’s taxonomy, within the six steps of cognition ー knowledge, comprehension, application, analysis, synthesis and evaluation ー explanation falls in the category of analysis (Shorser), suggesting that the three prior steps ー knowledge, comprehension and application ー must suffice in order for an explanation to be considered “good”. In other words, mathematical knowledge can only be explained once it has been fully derived, been sufficiently understood, and applied in multiple contexts as validation of being true.

For example, when explaining why a second degree polynomial can have two distinct roots, stating that a second degree polynomial can have two distinct roots as it is implied in the name, “second degree polynomial”, would not be considered a “good” explanation as it does not incorporate lemmas nor provide adequate context or justification for why this is true. A good explanation in this context would be that a second degree polynomial is a polynomial with one local maxima or minima, making it possible for the polynomial to intersect with the x-axis at two discrete points; hence, have two distinct roots. Therefore, the criterion for determining whether an explanation is “good” in Mathematics would depend on how coherent and effective it is in delivering knowledge.

As knowledge in the Natural Sciences can only theoretically be true, a “good” explanation in the field would require that the fewest assumptions be made. This observation brings to attention Occam’s Razor, a principle which states that one should not make more assumptions than the minimum needed — also known as the principle of parsimony (Heylighen). In layman terms, an explanation established upon knowledge which requires the least assumptions would be considered more logical, therefore, “better”.

A classic example of Occam’s Razor in action revolves around conspiracy theories regarding NASA’s moon landings (“Byrd”). Many conspiracy explanations as to why the moon landing is said to be a hoax rely upon various contrived theories and suppositions, whilst NASA’s explanation is relatively straightforward and employs the Scientific Method as validation. Therefore, according to Occam’s Razor, NASA’s explanation would be regarded as “truer” and hence, “better”, than conspiracy explanations because it requires fewer assumptions. However, the application of Occam’s razor does not necessarily render the explanations of the conspiracists untrue, as it is always possible to generate new explanations to support the conspiracies; Occam’s Razor is merely a heuristic principle. This ultimately indicates that whilst it may not be possible to definitively conclude that a “good” explanation in the Natural Sciences is intrinsically true, it would be possible to determine whether an explanation is “good” by considering how sensible and coherent it is, by virtue of how few assumptions need to be made.

Though superficially, it may seem as though a “good” explanation in History would be one supported by sufficient historical evidence with little to no bias, the relativistic nature of historical knowledge rather renders a “good” explanation as one which is difficult to falsify. This idea of falsification calls attention to the Correspondence Theory of Truth, the view that truth is correspondence to, or with, a fact (David). If a “false fact” were to be referenced when generating knowledge and there existed no way to effectively falsify it, the “false fact” could ultimately be regarded as being true.

An example that demonstrates historical relativism is the Crewe murders. In June 1970, farmer Arthur Allan Thomas was convicted of the murders of the Crewe couple. During his ninth year in prison, Thomas received a royal pardon after it was revealed that local police had manufactured evidence at the site to make it seem as if Thomas was responsible for the murders (“The Crewe Murders”). The forging of false evidence as apparent truth allows false explanations to ostensibly become “true” explanations, and with sufficient evidence, “good” explanations, as it becomes difficult to falsify. Another idea relevant to the falsifiability of explanations is Last Thursdayism ─ the belief that the universe was created last Thursday, but with the physical appearance of being billions of years old ("Last Thursdayism."). This theory is unfalsifiable in the sense that every argument can be negated by the notion that all evidence or memory dating before Last Thursday may as well have been created to appear as if it had existed before Last Thursday. The Correspondence Theory of Truth must therefore be referenced to provide logical, and ultimately, "good" historical explanations to eliminate unlikely scenarios like that of Last Thursdayism. Thus, an explanation in History may disregard the aspect of truthfulness completely and still qualify as a "good" explanation, as long as the explanation is realistic and made hard to falsify through credible evidence.

The prescribed title oversimplifies the relationship between the quality and truthfulness of an explanation, implying a superficial link between the two aspects. In conclusion, the criterion for determining the quality of an explanation, therefore how "good" it is, does not necessarily depend on its truthfulness, but its context in the respective area of knowledge. When it comes to discerning the truthfulness of an explanation, there exist some fields in which it is absolute, whereas in others it is indeterminable; therefore, as a general principle, how "good" an explanation is would most effectively be determined by considering its purpose in an Area of Knowledge; hence, how it is forged and delivered to the audience.

(Word count: 1600)

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