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The Falsification Principle as a Method of Knowledge Growth

SAMUEL OTU ISHAYA
University of Uyo, Nigeria

Abstract. Karl Popper was not a member of the logical positivist, but he had contacts with them in Vienna in the 1920s. He was critical of their scientific philosophy and condemned their outright rejection of metaphysics as meaningless. His sustained criticism of the logical positivists' verification principles played a pivotal role in the birth of philosophy of science as a second-order studies in philosophy. His philosophy of science pursued two main concerns – the criteria for the demarcation of science from pseudo-science and a prescription for the methodology of knowledge growth. Although he shared similar concerns with the positivists on the methods of the sciences, they never agreed on a particular method; while the positivists were persuaded that verificationism was the best method for the sciences, Karl Popper was of the opinion that falsificationism was better. For him, falsificationism as a method would not only serve as a method for the sciences but would create room for the growth scientific growth of knowledge generally. The objective of this paper was to evaluate Popper's notion of falsificationism and its implications for the growth of knowledge and the discovery of truth, not only in the sciences, but in all facets of human endeavour. The analytic method was used for the research. The paper agrees with Popper that the application of the falsification principle will eliminate unverifiable postulations and unfounded doctrines/traditions that tend to encourage ignorance and obfuscate the growth of scientific knowledge. The paper recommends subjecting key legislative, political, religious and scientific assumptions/doctrines to falsification to determine their verisimilitude to truth.

Keywords: Falsificationism, Logical Positivism, Dogmatism, Verisimilitude, Logical curiosity.

1. Introduction

One of the major factors that occasioned the dawn of modern science was the deliberate utilization of specific method for carrying out scientific research by Francis Bacon in the 16th Century. According to Stumpf (221), Bacon considered the human mind as being like a mirror which had been made rough and uneven by both natural tendencies of passions as well as by the errors of traditional learning. In such a condition, the mind cannot reflect truth accurately; Bacon's hope was to make the minds surface clean and smooth and to supply it with new and adequate instruments so that it could observe and understand the universe accurately. But to achieve this, there was need to separate scientific truth from revealed truths of theology and fashion a new philosophy based upon a new method of observation and a new interpretation of nature. Bacon introduced a new method of acquiring knowledge because according to him as cited in Stumpf:

In order to penetrate into the inner and further recesses of nature, it is necessary that our notion be derived from things in a more sure and guarded way. This way would include ridding oneself of his prejudices and looking at things the way they are. We must lead men to the particulars themselves and their series and order. To guide and help observation, it is necessary to supply rectifications to correct errors; and I endeavour to accomplish not so much by instruments as by experiment. For the subtlety of experiments is far greater than that of sense itself.

The point from Bacon above is that there is need for observation and experimentation rather than relying on the senses. For Lawhead (215), Francis Bacon offers us insight into the tremendous excitement and optimism that reverberated throughout the Renaissance and accompanied the rise of modern science. For Stumpf (224) Bacon also succeeded in dislodging the grips of scholastic thought and provided the impetus for making philosophy scientific.

The scientification of philosophy was taken a notch higher by the logical positivists who rejected every

form of metaphysics in scientific enterprise. According to Ishaya:
The logical positivists rejected the whole enterprise of metaphysics because of their scientific orientations and rigorous empirical approach to issues. Their aim was the unification of all sciences and consequently to have a unified system of meaningful and valid knowledge (37).

Although, the verification principle upon which the logical positivists based their empirical approach collapsed because of the internal defect of the principle namely, the impossibility of verifying general statements and their blanket rejection of metaphysics; they however provided the fodder by which philosophers once again began to consider discovering the best method to pursue the scientific enterprise in its quest to discover certainty or near certainty of truth. Karl Popper for instance distanced himself from the logical positivist's rejection of metaphysic as a meaningless enterprise; for him, 'metaphysical concepts and ideas may have helped greatly in its early forms to bring order into man's picture of the world' (Ishaya, 38). He however, went a step further to postulate a method by which near-certainty or what he called "verisimilitude" of scientific knowledge could be achieved. He believes that falsification as a principle will provide an alternative method where by the verisimilitude of truth could be achieved.
In this paper, Popper's notion of the falsification principle shall be evaluated to excavate its basic tenets; especially as a method in the scientific enterprise. The study will also examine its applicability in the human sciences especially in religion where truth as a concept is gradually becoming an illusion to many including adherents.

2. Popper's Notion of Falsificationism

The idea of falsificationism is an off-shoot of Karl Popper's notion of critical rationalism. The intention here was to project the need for a critical assessment of every knowledge claim; whether it is a scientific claim or a social or religious claim using the principle of refutation or falsification. Popper believes that no knowledge claim is above criticism because criticism consists largely in pointing out contradictions in knowledge. He holds the view that knowledge cannot start from a *tabula rasa* nor from observation alone; rather the advance of knowledge consists mainly in the modification of earlier knowledge claims (conjectures, 34). Falsification is Popper's method for demarcating science from non-science and truth from falsity (Logic, 57). Falsificationism refers to the whole system of philosophy developed by Karl Popper in which falsification of knowledge claims is involved. Falsification is the process or act of falsifying a theory or knowledge claim while falsificationism is the philosophy of falsification. For Popper, every genuine test of a theory is an attempt to falsify it or to refute it. "we say that a theory is falsifiable only if we have accepted basic statements which contradict it" (Logic, 66). According to Essien (59), falsification involves the ability to identify an anomaly in a scientific finding or theory. It is the process of testing to ascertain the validity of scientific theories and conjectures. With the falsification method, scientific theories are tested in order to bring out anomalies; and theories that are found to contain anomalies are rejected. If an anomaly is found or detected, the theory is thus falsified and rejected but if no anomaly is found, the theory is thus corroborated and accepted. The law for this method of investigation is that all rules of empirical method must be designed in such a way that they do not protect any statement of claim against falsification. Applying this procedure for Essien (60), is connected with testing a hypothesis or theory against basic statements through observation and experimentation. Basic statements are statements that asserts that an observable event is taking place at a particular time. They are therefore potential falsifiers of a theory or knowledge claim.

The point here, is that falsificationism as a method is hinged on Popper's principle of conjecture and reputations. For him, scientific knowledge progresses by conjectures. These conjectures are on the other hand controlled by criticism or attempted refutations. The refutation will include severe critical test that are performed on the conjectures. Popper believes that all knowledge is human and therefore mixed with human errors, prejudices, dreams and hopes. All we can do is to grope for truth even though it is beyond our reach. For him, "the quest for objective truth can only be achieved through critical appraisal and tests of present and past knowledge claims using falsification as a method. (conjectures, 39).

It is however imperative to note that the falsification method is not applicable to the natural sciences only; but that every discipline that pursues the discovery of truth in whatever form can apply the virtues of falsificationism. This is because every theory embodies some characteristics and a falsificationist should be able to analyse the theory based on the tenets of falsificationism. For example, Kevin Harris (37) articulated four characteristics by which a falsificationist should base his/her analysis of a good theory. These characteristics include:

- The theory should be able to explain all the acceptable observable phenomena that its predecessor could not explain.
- The theory should be able to explain the observable phenomena or anomalies that refuted the old theory.
- The theory should be able to predict some new phenomena not previously known or not covered by the previous theory.
- The theory should not be falsified by any accepted observable phenomena.

From Kevin's characterization, it can be deduced that any theory that passes these tests should be considered good and may not need further analysis or falsification but this cannot be the case in reality. This because there is no certain or absolute truth in science or any human endeavor; what may be true today may turn out to be false tomorrow based on new and emerging information about the phenomena. Thus, falsification is simply the ability to keep looking deeper into extant theories, beliefs and norms with the intent to find anomalies that can become the pedestal upon which new data is discovered.

Popper in his book – Conjectures & Reputations' (314) outlined some cases in which a previous theory or truth claim can be said to have been superseded by a new claim. According to him: I shall give here… list of six types of cases in which we should be inclined to say of a theory t_1, that it is superseded by t_2 in the sense that t_2 seems to correspond better to the facts than t_1. The six list include:
t_2 makes more precise assertion than t_1
t_2 takes account of, and explains more fact than t_1
t_2 describes or explains, the facts in more detail than t_1
t_2 has passed tests which t_1 has failed to pass
t_2 has suggested new experimental tests, not considered before t_2 was designed; and t_2 has passed these tests
t_2 has unified or connected various hitherto related problems – (315).

When a proper diagnosis is done on these lists, one can see according to Popper that the contents of the theories t_1 and t_2 plays an important role. This because, in the list of six cases, the empirical content of theory t_2 exceeds that of theory t_1. This for Popper suggests that we combine the ideas of truth and of content into one – the idea of a degree of better correspondence to truth or of greater likeness or similarity to truth. The degree of correspondence to truth or similarity to truth is what Popper calls verisimilitude.

3. The Notion of Verisimilitude

Verisimilitude is a word derived from two Latin words "veritas" and "similis", veritas means truth while similis means similarity or likeness. So, literally, verisimilitude means "truth-likeness". Popper believes that a good scientific theory has a higher level of verisimilitude than its rivals. The idea behind the notion of verisimilitude according to Essien "is that the assertions or hypothesis of scientific theories can be objectively measured with respect to the amount of truth and falsity that they imply and in this way, one theory can be evaluated as more or less true as another on a quantitative basis (61).

Popper believes that 'a theory which is not refutable by any conceivable event is non-scientific; irrefutability for him is not a virtue of a theory but a vice. Every genuine test of a theory is an attempt to falsify it or to refute it. Testability for Popper, is falsifiability, but there are degrees of testability; some theories are more testable, more exposed to refutation than others; they take as it were, greater risks (conjectures, 48).

4. Operation of the Falsificationist

Anyone that employs the method of falsificationism is a falsificationist. While falsification is the process or act of falsifying a theory or knowledge claim, falsificationism refers to the whole system of philosophy in which falsification of a theory is involved. Or it can be said to be a scientific philosophy based on the requirement that a hypothesis must be falsifiable in order to be scientific. In other words, falsificationism is the idea that only propositions that can be proven false is meaningful. It is based on the notion that scientific theories should be able to be tested and potentially disproven. Falsificationists are those that believe that they have discovered a way to distinguish rational science from various forms of superstition. Falsificationist according to Popper holds that the ideal of separating science from superstition can be realized very simply by recognizing that the rationality of science lies not in the habit of appealing to empirical evidence in support of its dogmas, but solely in the critical approach, in an attitude which involves the critical use of empirical evidence among other programs.

The falsificationist is not interested in establishing scientific theories as secure or probable, rather, he/she is interested only in criticizing them and testing them, hoping to find out where there are mistakes and learning from the mistakes and with some luck, proceed to better theories (conjectures, 310).

5. Falsification of Beliefs and Doctrines

Falsificaition as a method of scientific enquiry is not exclusive to the natural or social sciences alone. The humanities can and have in many instances applied the falsficatiionist principle in overthrowing knowledge claims that had held sway for centuries but were dislodged when they came face-to-face with the hammer of falsification. For instance, in the Renaissance - that spanned between 15th and 16th centuries, most scientific and religious theories were falsified (Stumpf, 204).

According to Stumpf (206), "The renaissance was a time when many individuals from many lands exhibited many new modes of freedom and expression, causing at points, some discontinuity with the past while changing the emphasis in arears in which continuity with the past was preserved".

During this period, the geocentric theory of the earth was falsified with the Heliocentric theory as postulated by Copernicus and put to test by the use of the telescope to test out the veracity of Copernicus' theory. The new data completely falsified the earlier held claim that the earth was the centre of the universe.

In another example of same period, Martin Luther led a protest against some teachings of the church that became known as the Reformation. The reformation was a religious reform movement that began in 1517 when Martin Luther – a German Monk and university Professor, posted his Ninety-five Thesis on the door of a castle church in Wittenberg. Luther's theses was a confrontation to the Catholic Church's teachings. In the theses, he rejected the church's teachings that emphasized salvation through works rather than faith. He argued that the church needed reform because people could only be saved through personal faith in Jesus Christ and God's grace and not by the purchase of exorbitant indulgences. For him, the just shall live by faith and not by works.

According to Lawhead, Luther, originally had no desire to confront the authority of the church, much less cause it to split. The immediate focus of his concern was the church's sale of papal indulgences by a Dominican friar named Tetzel. Tetzel claimed that for a fee, a person could buy relief from both the guilt and penalties for one's sins. The controversies from his Ninety-five, theses reached Rome, but by this time the issue of indulgences had broadened out to encompass fundamental issues on theology and church authority. By 1520, Pope Leo X ex-communicated Luther from the Catholic Church. The excommunication of Luther started "Protest Reformation" and wide-spread religious, intellectual, cultural and political changes" that was felt across Europe. (204).

The reformation for Lawhead was not simply the replacement of one set of religious doctrines with another set; it brought with it a whole new outlook which had wide-spread implications among which is the fact that believers were now made to know that each person has a direct access to God and does not need to go through a priest or church or purchase of indulgences. He taught that people could follow their own interpretation of the scriptures. According to Lawhead:

In undermining the religious authority of the Catholic Church, down-playing subservience to tradition, and giving the individual a new importance, the Reformation had the side effect of eliciting a general reaction against all intellectual authorities and traditions. This fed into the new spirit of freedom and individualism that was sweeping through literature and philosophy. Hence Luther's Pastoral advice to believers became translated into a new philosophical creed: Listen to your own spirit, follow your own personal reflections. (205).

Europe listened to Luther, and Protestantism was born but after almost five hundred and seven (507) years of Luther's admonition for believers to follow their spirit and personal reflections, a Nigerian tele-evangelist pastor - Abel Damina, Pastor of Power City International Ministry has inflamed another controversy over teachings of the Pentecostal Church in regard to tithing. Whereas, Pentecostal Churches depends mostly on the tithe paid by members for the running of their churches, Pastor Abel Damina refutes the payment of tithe – describing it as a scam against vulnerable Christians. Damina, like Luther, base his refutation of tithing from the scriptures where he argued that the New Testament never asked anyone to pay tithe but rather to give. Damina's teachings like that of Luther has also attracted a backlash. For example, in a report entitled 'Why Pastor Damina Must Withdraw Misleading Messages" the Nigerian Supreme Council for Ecclesiastical Affairs, described the teachings of Damina as 'heretic and fallacious" and sent him a letter of warning to desist from going on with such teachings. According to the secretary of the Nigerian Supreme of Ecclesiastical Affairs Damina's 'teachings, deviate from Orthodox Christian doctrines'. According to her, 'Pastor Damina has preached that there is no heaven, that one does not need God to succeed, that the Holy Communion is unnecessary, and that tithing is not required". The NSCEA, voiced strong opposition to Domina,

deeming his messages heretical and not representative of the faith (Punch, Nov. 2, 2024, online).

The point to note from the examples of Galilco, Luther and Damina is that most theories, laws, beliefs and traditions held over long periods of time are shielded from attempts at refutation or falsification by those that society has given authority to protect these beliefs and traditions against research and new knowledge that may refute or falsify these already held views. But this attitude is condemned by Popper who sees all "knowledge as human-created and therefore mixed with human errors, prejudices, dreams and hopes". At least, to ascertain the nearness to truth of any knowledge claim, such a claim should be subjected to criticism, falsification and tests. Following such a process will get researchers closer to truth or verisimilitude.

6. Objections to Falsificationism

Popper's notion of falsificationism was opposed by some philosophers and scientists alike. While Popper anticipated criticism, those who took exception to his theory were contemporaries whose works were also geared toward inventing procedures by which the sciences can evolve to overcome the mysteries of nature. For example, Carl Hempel argues that Pooper's falsificationism was not acceptable on logical ground. He wondered how Popper will deal with statements such as "for every metal, there is a temperature at which it will melt" for Hemple such statement can neither be confirmed nor falsified by any possible observation, yet which seems to be a valid scientific hypothesis (Hempel cited in Essien, 64). But for any falsificationist, this kind of argument is welcome. This is because ascertaining the verisimilitude of a theory or claim can be achieved by working hard to refute it by conducting test that should falsify or affirm it.

For Paul Feyerabend, progress in science will not come by adopting any particular method and definitely not falsificationism. Science according to him achieve progress when practitioners violates sets rules. This is because history is always richer than any reconstructed methodology. This history is chaotic and multifaceted in nature. He therefore recommends the principle of anything goes as a better alternative to falsificationism. (1993:18). The principle of anything goes is hinged on the premise that scientists can and should adopt any method that can aid them to achieve a desired result even if it means applying witch-craft or other diabolical and occult ways. But this paper rejects the "principle of anything goes in its entirety. This is because as stated elsewhere that "Science… cannot make any meaningful progress under a lawless system." "the anarchist theory is rejected on the basis that instead of guaranteeing the progress of knowledge, it will diminish same by the individuality and chaos inherent in the principle of "anything goes" (Ishaya, Niu, 172).

7. Conclusion

Theories, laws, beliefs, traditions and cultures are being falsified, refuted or jettisoned as new information are discovered. Science is at the forefront in the discovery of new knowledge claims that retires the old. History has proven that those who hold on to old data rarely allow it go without a fight. Sometimes the falsifiers of the old knowledge face opposition that sometimes can be fatal as in the case of Galileo. But such experiences have not deterred the growth of science. Popper's notion of falsificationism is meant to encourage researchers to boldly confront any theory, belief, law or tradition that presents doubtful data. Information, tradition, or theory according to this principle should be subjected to severe criticism, refutation and falsification in order to get closer to true reality as much as practicable. A falsificationist does not accept traditional or any background knowledge as neither established nor as fairly certain, nor yet as probable. He knows that even its tentative acceptance is risky, and thus, stresses that, every bit of it is open to criticism. (conjectures, 323).

Following from the examples espoused in the paper, the study recommends that falsificationism be made a deliberate principle of study in every academic discipline especially in tertiary institutions. This will form the basis upon which they will build confidence in querying and attempting to falsify or refute existing theories, laws, beliefs, traditions or cultures. This, according to Ishaya (2020) will help to create the culture of logical curiosity. The culture of logical curiosity is the deliberate habit of a people to critically scrutinize issues and concepts with the intention to falsify beliefs and doctrines that do not fit the principles of logicality.

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