

# Charting The Skeptopathy - Skepticism Continuum: A Constructive Aid in the Interests of Consistent and Reliable Scientific Activity

Sujay Rao Mandavilli

**Abstract :- We begin this paper by attempting to define what skepticism is. We also attempt to define other related and allied concepts such as skeptopathy, pathological skepticism, and pseudo-skepticism, and compare and contrast all these different concepts. We also present the various thoughts and opinions of different thinkers on all these issues, and also attempt to explain how thoughts related to these issues evolved through the ages. We therefore begin right from the Ancient Greeks, on to Ancient Rome, the medieval period, the renaissance period, the enlightenment period, and then proceed to the modern period. We propose how an ideal sweet spot can be accomplished and attained based on the quantum and the quality of scientific output, the opportunity loss, the quantum of pseudo-science or bad science generated in the process of scientific study. Last but not the least, we make a valiant attempt to reconcile the different concepts in this paper with the concepts proposed in our earlier papers as applicable so that meaningful extensions and additions can be made, and further takeaways added. We also emphasize the need for generating a wider awareness on this issue, all in the interests of good science, and make it central to scientific methodology and debate. Needless, to say, it will need to be taught in schools, colleges and universities at the appropriate level so that students appreciate and understand all dimensions of the issue.**

## I. INTRODUCTION

- Skepticism, like chastity, should not be relinquished too readily - George Santayana
- The virtues of science are skepticism and independence of thought - Walter Gilbert.

### A. An Overview of Skepticism

Skepticism, is a questioning attitude or an attitude entailing a reasonable and a justified deal of doubt (usually also epistemologically well founded doubt) towards knowledge claims that usually have a logical epistemological basis or validity. The term skepticism probably originated from the Greek word skeptikoi, and skepsis, even though this term may not have been widely used in ancient times. The term is then believed to have been transmitted into Latin, and later, modern European languages. In such cases, skeptics may, and rightly so, refuse to entertain thoughts or ideas regarding empirically unproven phenomena – this approach may most often be seen as somewhat unreasonable – however, in most cases, there is a suspension

of judgment, or a suspension of beliefs pending further evidence or a resolution of unresolved issues, which is much more reasonable. Therefore, a neutral or a dispassionate attitude is highly recommended, and maintained in all such cases. This neutral attitude is propelled by the philosophical assumption that the available or the presented evidence is wholly insufficient and inadequate to support or disprove the claim. However, additional supporting or even additional contradictory evidence (we wholeheartedly recommend that the latter be pursued in a vast majority of cases) is actively sought out and enthusiastically pursued. Good skepticism gravitates towards collection of additional evidence and a speedy resolution of issues, while bad or unhealthy skeptics may choose to suspend judgment indefinitely, and display or exhibit no desire to resolve issues. Good or healthy skepticism postulates that "knowledge or rational belief is possible", and then proceeds to investigate unresolved issues with due diligence. Therefore, skepticism may be said to constitute both a formal attitude, and a way of life, and one that must be diligently followed and pursued at all times. It is widely used in science, and also in a study of religion and different kinds of philosophical matters.

Other reasonable and via media positions may hold that not everything is knowable; therefore, and that we must therefore resist the temptation of arriving at hasty conclusions. Formally, skepticism is a topic of interest in various branches and fields of the sciences, apart from its more mundane, daily and practical uses, in both natural and non-natural, physical and non-physical, material and non-material, fields (such as philosophy and the social sciences) and is one of the foundational components of epistemology, which studies knowledge and truth propositions. Skepticism has been the foundational and fundamental philosophy, and driving and guiding force behind much of scientific endeavour, and has also been directly responsible for many important developments in many different fields of science. Religious and philosophical skepticism calls for healthy doubt pertaining to basic religious principles, such as the existence of God and the occurrence of miracles. It also adopts a critical approach towards study of religious texts using hermeneutical methods. Also, at the heart of skepticism lies rigorous testing, and systematic investigation – using valid and bonafide scientific method- regarding both natural and non-natural phenomena. This implies a systematic search and a systematic hunt for supporting and contradictory evidence. Healthy skepticism does not also accept any statement or truth claims and truth propositions at face value, but instead chooses to probe them more deeply –by face

value, we mean the apparent and superficial worth or implication of something. Skepticism helps us differentiate between certain and uncertain or contingent knowledge, truth claims, and truth propositions. It also helps differentiate between inferential claims, and certain claims. Skeptopathy or pathological skepticism, on the other hand, represents another contrary and a contradictory position that borders on dogma. For example, skeptopaths may even go as far as to argue or claim that objective knowledge does not exist, or that all knowledge is subjective, and is relative, being situated in the eyes of the perceiver.

We also therefore have many different intermediary concepts between healthy and moderate skepticism – one that is beneficial to the progress of science, and pathological skeptopathy or pseudoskeptopathy – the two are different from each other- that are both dangerously inimical to the healthy progress of science. Radical skepticism is the philosophical position that new forms of knowledge are most likely impossible, that severe and serious doubt exists as to the veracity or trueness of every possible kind belief under the sun, and therefore that absolute certainty of any kind is practically or virtually impossible. Radical skepticism may also be inimical to good epistemology which is the study of knowledge in all its myriad forms. The term skeptopathy is used to refer to the irrational and the highly irregular belief that something is not true, highly improbable or is even non-existent because it is highly unusual, controversial, orthodox, or does to appeal to the senses. The term was coined by Michael Fullerton in 1994 during a discussion of the idea of “cold fusion”. Much Earlier, David Hume, an Enlightenment thinker and philosopher, had also briefly presented and described the concept. The terms were also used by Marcello Truzzi who was a sociology professor at the Eastern Michigan University in the early 1990s.

This term is also related to the concept of pathological skepticism, extreme skepticism, or absolute skepticism. The term pseudo-skeptic refers to those people or individuals who claim to be skeptical of a concept when in reality they would not be convinced by any existing evidence, or evidence that may present itself in future in support of that claim. In all such cases, the mind does not believe, or is not ready to believe. These three concepts have a highly negative connotation, and at times may also be highly subjective and relative. For example, a highly religious man, or a man tending towards blind faith, may find the intellectual or the scientist highly irrational, dubious, or overly skeptical. This is because highly religious men are prone to accepting new ideas without significant evidence. For example, most scientists today accept the reality of global warming; however, we have climate change deniers or global warming deniers who remain highly skeptical despite overwhelming evidence to the contrary. We then also have supporters of the

continuing usage of coal and fossil fuel. These groups remain unconvinced that these are threats to the environment. Other groups remain unconvinced of new technologies such as solar and wind power (or for a change or a breath of fresh air, even vegetarianism), and go after them hammer and tongs on flimsy or untenable grounds.

Pathological skepticism also borders on faith and insanity, as it is, as the very name suggests skepticism to the point of pathology. For example, Marxist historians in India like to proclaim that nothing existed between the decline or collapse of the Indus valley civilization and the birth of the Buddha. However, and strangely and bizarrely enough, whenever they want to criticize, critique, mock, or otherwise attack Indian religious traditions, they proceed to reconstruct it with a vengeance. Therefore, such adherents sometimes falsely assume their criticisms require no burden of proof. They may also resort to logical fallacies, and apply double standards (or selective obfuscation or amnesia) in the application of criticism, immediately debunking in the process any scientific data and evidence that contradict their cherished and dearly-held paradigms. They may also likewise be dismissive of any fresh and new data or evidence that contradicts tradition or orthodoxy. They may also reject to block new theories, ideas and concepts by presenting irrelevant arguments including ad hominem attacks. This can often be compounded and magnified with careerism, or other vested interests. Some of them may naively assume that the scientific establishment is objective and unbiased, and free of any form of politics, dogma, corruption, ideology, dictatorship, control, censorship and suppression or data and information simply because they believe blindly in authority. An example here is some Indian Marxist historians believing colonial Indology to be unbiased.<sup>1 2 3</sup>

## II. HISTORY OF SKEPTICISM

The idea of skepticism can be traced all the way back to the ancient Greeks. As a matter of fact, and as previously discussed, the modern English term skepticism is thought to have originated from Ancient Greek, but was later transmuted into Latin, and then other modern European languages. Among the oldest school of thought in this regard, is the school of Pyrrhonian skepticism. This ancient school of philosophical skepticism rejects all forms of dogma and rigidity of thought, and advocates the suspension of judgment over the truth of all beliefs, until matters and disputes can be resolved and settled. These are also sometimes known as ephectic approaches, though the usage of the term is somewhat rare. It also argues that it is impossible to know whether or not we can know anything with an absolute degree of certainty. This school of thought was founded by the Greek philosopher Aenesidemus of Knossos in the first century before Christ, and was in turn inspired by the earlier teachings of the philosopher Pyrrho of

1 Butchvarov, Panayot (1998). *Skepticism About the External World*. Oxford University Press.

2 Keeton, Morris T. (1962). "skepticism". In Runes, Dagobert D. (ed.). *Dictionary of Philosophy*. Totowa, N.J.: Littlefield, Adams, and Company. pp. 277–278

3 Wilson, Richard (2009). *Don't Get Fooled Again: A Sceptic's Handbook*. Icon. ISBN 978-1848310520.

Elis – who is rightly known as the father of skepticism -, and Timon of Phlius – a student of Pyrrho - which date back to the fourth century before Christ. The tenets and ideas of this school of thought are now lost in their original form, and are attested only indirectly through the works of Sextus Empiricus, who lived two centuries after Christ, and was a Greek philosopher and physician with a Roman citizenship. The publication of Sextus' works in the Renaissance rekindled a new wave of interest in the field, and contributed in no small measure to reformation thought and the renaissance. In ancient Greece, Xenophanes and Democritus were also skeptics. Many sophists in ancient Greece were also skeptics. In Hinduism, Ajnana was an ancient school of radical skepticism. A famous Ajnana philosopher was Sanjaya Belatthiputta. A strong strand of skepticism can also be found in Early Buddhism, most particularly in the Atthakavagga sutra.

The period of academic skepticism refers to a period beginning from the third century before Christ, when Arcesilaus became an important scholar, until around one hundred years before Christ, when Antiochus of Ascalon rejected the doctrine of skepticism, even though other philosophers, such as Favorinus and his teacher Plutarch for example, continued to defend skepticism even after this date. In Ancient Greece, Philo of Alexandria founded the negative school of theology that was associated with contemporary forms of skepticism. Plato's Academy, also sometimes known as the Platonic Academy, also promoted skepticism, and was founded in Greece by Plato – a foundational thinker in philosophy- in the fourth century before Christ. The polymath and great thinker Aristotle studied there for a considerable period, before founding his own independent school of academic thought. The Academy came to a sudden end around one century before Christ, and was eventually destroyed by an emperor. A neo-Platonic academy was subsequently founded in Athens against the backdrop of Hellenistic thought, in order to continue the tradition of Plato's Academy, and this continued till the sixth century after Christ. This school comprised a wide range of thinkers. The philosopher Ammonius Hermiae was highly influential as the founder of the school of Aristotle-interpretation in Alexandria. Simplicius of Cilicia was an eminent disciple of both Ammonius and Damascius, and was among of the last of the Neoplatonists. Olympiodorus the younger was another sixth century Neoplatonist philosopher, and was among the last thinkers of this school.

Other Greek thinkers belonging to various periods were also skeptics. The poet Homer, the author of the Iliad and the Odyssey, argued that skepticism and knowledge had a bidirectional relationship, and that knowledge was impossible without skepticism. In the realm of medicine, the skeptical approach of the Hippocratic school helped lay the foundation of modern medicine. The Greek tragedian Sophocles believed that deities were irrational, infallible, and unpredictable; he was therefore, personally a skeptic. Thucydides, an eminent historian, philosopher, and moralist, also adopted a highly skeptical view towards morality. Lacydes of Cyrene was another important academic skeptic.

Carneades was another prominent skeptic, and was the head of a prominent skeptical academy of the period. He founded the new or third academy and defended a form of probabilism in epistemology. Clitomachus was another important stoic, and an academic and a skeptic thinker. Philodemus was yet another important skeptic of the period. He studied under Zeno of Sidon in Athens, before moving to Rome, and then to Herculaneum. The Clement of Alexandria also emphasized skepticism, and the importance of philosophical thought. The ideas of early skeptics were summarized in the writings of Diogenes Laertius, who was a biographer.

Favorinus, a student of Plutarch combined ideas of both academic skepticism and neo-pyrrhonism. Aulus Gellius, a citizen of Rome, was yet another student of Favorinus. Written entirely in Latin, his writings from the second century after Christ, include the Greek word “skeptikoi” as the name of his school. In the work “Noctes Atticae”, the Roman author and grammarian Aulus Gellius argued that there was no difference between the academics and pyrrhonists, and referred to both as skeptics. In the fourth and the fifth centuries after Christ, Augustine attacked the theories and ideas of the skeptics in his work “Against the Academics”. The idea of skepticism subsequently fell into decline, and there was very little knowledge of, and scant interest in, ancient Greek and Roman skeptic thought in Christian Europe during the Middle Ages. There was a revival of interest in skepticism only during the renaissance and the enlightenment periods that followed it. There was a great revival of interest in skepticism after the complete writings of Sextus Empiricus were translated into Latin in 1569 and after Martin Luther's “Skepticism of holy orders”. Luther did not believe in the Church's ability to grant indulgences, and pardon people; he believed that only God could do so, and had the power to do so. A number of Catholic writers, including Francisco Sanches, Michel de Montaigne, Pierre Gassendi, and Marin Mersenne deployed ancient skeptical arguments to defend moderate forms of skepticism and to argue that faith, rather than reason, must be the primary guide to truth. Similar arguments were offered later by the Protestant thinker and French philosopher and author Pierre Bayle in his influential “Dictionnaire Historique et Critique” first published in the year 1697. In the field of scholasticism which was a medieval school of philosophy, logic and reasoning was often applied. William of Ockham also contributed greatly to this school by advocating simplification. He is also known for his Occam's razor which is widely used to this day. William also incorporated much of the work of some previous theologians, especially that of the Scottish priest Duns Scotus into his own work.

Cartesian doubt also known as Cartesian skepticism is a form of methodological skepticism advocated by the seventeenth century French philosopher and scientist Rene Descartes, and highly popularized by him in western circles. Sometimes, analytical reductionism is employed to break down complex processes into more manageable units. Cartesian doubt is a systematic and a methodological process and line of inquiry of being skeptical about the truth of one's beliefs. This has today morphed into a characteristic and intrinsic method employed in philosophy. This method also

forms the philosophical basis of much of modern scientific method. His philosophy can be summed up by the words: I think, therefore I am, and I doubt therefore I think, I think therefore I exist. Methodological skepticism differs from philosophical skepticism because methodological skepticism is a methodological approach allows for true claims to be sorted from false claims by using doubt as the basis, while philosophical skepticism questions the very possibility of the certainty of knowledge. In this dichotomy, Cartesian doubt falls into the first category. David Hume's version of skepticism is based on the fundamental idea that all human knowledge is based on empirical experiences. It is therefore certain that we cannot have knowledge of metaphysical concepts, such as the existence of God or the immortality of the soul, because these concepts lie completely beyond the realm of empirical experience. Hume's ideas not only proved to be highly influential, but are also at the heart of modern scientific and philosophical inquiry. Michel de Montaigne's version of skepticism warned against the danger of locating truth in false, and in critically unexamined notions. On the other hand, Montaigne questions the reliability of many ideas and sees humans as weak and infallible, lacking in consistency, and prone to incapacity. The eighteenth century Irish philosopher George Berkeley also presented his own ideas with regard to skepticism, stating that skepticism arose from abstractness, and abstract ideas.

Many modern thinkers have contributed to the idea of skepticism as well. In the book "On Certainty", Ludwig Wittgenstein points out that the skeptic cannot raise questions about the very possibility of knowledge, as such questioning presupposes existence of such knowledge. Keith Lehrer's developed his own version of skepticism in his book "Why Not Skepticism?" According to him, a person or an individual is justified in accepting a proposition just in case that proposition coheres with the relevant part of her cognitive system. Michael Huemer ties skepticism to representative realism and direct realism in his work, "Skepticism and the Veil of Perception". The American philosopher Peter Unger defends skepticism by stating, "in the case of every human being, there is hardly anything, if anything at all, which the person knows to be so". The New Zealand logician and philosopher Arthur Prior speculated on different religions, and made important contributions to the formal study of different forms of logic. Robert Fogelin was an American philosopher, and advocate and leading scholar of modern Pyrrhonism, on which he wrote extensively, publishing many books. Argentine-Canadian philosopher and physicist.

Mario Bunge also wrote extensively on skepticism and pseudoscience. Most humanistic, atheistic, and agnostic movements also entail some degree of skepticism, which is considered central to these movements. Many skeptics have

routinely debunked paranormal claims such as miracles, UFO's etc, and some of them such as James Randi in the west, and Sanal Edamaruku in India, have been quite active in this regard.<sup>4 5 6 7 8</sup>.

#### B. Other concepts

We now discuss some other concepts below. Philosophical skepticism is a family of philosophical views that question the possibility of knowledge. In some cases, it may even reject very plausible knowledge claims attributed to basic common sense. In extreme cases, even the possibility of the existence of all forms of knowledge is denied. Psychological skepticism takes an entirely neutral stance toward the contents of the human mind and human thought processes. Epistemological nihilism is a variant of philosophical skepticism, and according to this doctrine, absolute knowledge does not exist, or, if it does exist, it is unknowable to human beings. This notion is different from epistemological fallibilism, according to which all knowledge is uncertain, and cannot be conclusively determined. There are other related terms such as obscurantism and obscurianism. In the field of philosophy, the terms obscurantism and obscurianism represent anti-intellectual practices of distorting and intentionally presenting information in such an abstruse, ambiguous or imprecise manner that it throws people off guard, and limits further all inquiry and systematic understanding of the subject.

Pathological science is an area of research where people are tricked into false results by wishful thinking or cognitive bias, and the experimenter-expectancy effect. This idea and concept also overlaps with the idea of deviant science or fraudulent science. Cargo cult skepticism is mainstream skepticism which arises from some mainstream interpretations of skepticism. In such cases, studies appear to be rigorous, but lack critical or skeptical thinking. The doctrine of epistemological fallibilism or simply fallibilism refers to the concept that no theory or idea can ever be proven beyond the shadow of a reasonable doubt, and there will always remain a possibility of doubt as to the truth of the belief. Skepticism is also sometimes categorized into popular and philosophical skepticism. These categorizations could be determined by the purpose for which they are applied. The term anti-skepticism refers to any reasonable or unreasonable opposition to a skeptical viewpoint. In the field of epistemology, phenomenal conservatism argues that it may be assumed that things exist as they appear to the human senses, except when there are specific grounds for doubting this. There are also inconsistency and logical fallacies in skepticism, and these must be examined closely, and systematically. All such fallacies and inconsistencies

4 Hellenistic Philosophy: Stoics, Epicureans, Sceptics. Bloomsbury Academic

5 Warren, James (2002). Epicurus and Democritean ethics: An archaeology of ataraxia. Cambridge University Press

6 McEvilley, Thomas (2002). The Shape of Ancient Thought. Allworth Communications.

7 Tad M. Schmaltz, Radical Cartesianism: The French Reception of Descartes, Cambridge University Press

8 Hume, David (1993). "A Kind of History of My Life". In Norton, David Fate (ed.). The Cambridge Companion to Hume

however, do not negate the need to adopt skepticism or skeptical strands in inquiry.<sup>9 10</sup>

### III. SKEPTICISM SKEPTOPATHY CONTINUUM

According to the skepticism skeptopathy continuum that we propose and chart, any axiomatic proposition or a truth claim can have two different elements, both occurring at the same time in some cases, where a positive element is known as healthy skepticism and the negative skepticism is known as skeptopathy. They are not mutually complementary, and not zero sum. Therefore, we strive to hunt for the sweet spot which is nothing but a healthy and a rational compromise between the two extreme opposite ends. We quote Paul Ricoeur in this connection, “The logic of validation allows us to move between the two limits of dogmatism and skepticism”. Therefore we must embrace rational and cogitative thought, and eschew dogma and dogmatism at all times. Dogma refers to any belief or judgment held unquestioningly, unflinchingly, and often even in the light of contradictory evidence. Often, there would be a thin life of differentiation between dogma and skeptopathy. Both would lead to the same result, that is intellectual stagnation and complete and absolute non-progress. Skeptopathy and dogma may be found among some scientists and economists as well. They become more dangerous and pronounced when coupled with scientific ideology which in turn may be coupled with a non-scientific ideology such as nationalism, patriotism, and racism. Richard Dawkins sums up dogma as follows: “Religious fanatics want people to switch off their own minds, ignore the evidence, and blindly follow a holy book based upon private 'revelation'. – Religious faith, is a state of mind, that leads people to believe in something, it doesn't matter what, without a whisper of doubt, or a whiff of evidence, and believe so strongly in some cases, that they are prepared to kill and die for it, without the need for further justification.”

In order to arrive at an optimum here, we also need a deep and thorough knowledge and understanding of scientific method, the ability to distinguish science from pseudo science, and profound rationality, and rational thought. We also need to be able to adopt dialectical and cross-cultural approaches with a fair degree of reliability, and always take contradictory evidence into consideration especially those which normally interfere with our cultural biases, assumptions, and prejudices. This must become an intensive, mainstream activity, and deviations from the optimum identified and red flagged. This can be accomplished by the scholar or author in question, or by another third party. These approaches can also be adopted to other scenarios such as constructive criticism versus destructive criticism, optimism versus pessimism, openness to new ideas versus cynicism, progressivism versus fatalism (i.e. “I know all attitude” to “leaving everything to destiny”), etc, although these are at present outside the scope of our world. This approach not

only requires a rejection of all forms of ideology but also requires the spirit and temper of dispassionate objectivity. We must also take into account and consideration, the benefits of skepticism, and the dangers of skeptopathy, at all times. At times, we must also take into account and consideration, the relativity of different issues – as opposed to any absoluteness that may be claimed -, and stand guard and vigil against the mirage of rationality. Group think must also be avoided, as must also be all other forms of logical fallacies. As a metric and an extension to this, QEPIS or Quantification of the effects of poor or Ideologically-driven scholarship (which refers to the downstream and adverse effects of poor, ideologically-driven scholarship or the continued persistence of outdated and antiquated approaches) may be calculated from time to time including its bearing on other sciences and on society. Therefore, the key criteria of evaluation of the aforesaid skepticism – skeptopathy continuum would include:

- Quantum of scientific output attained or accomplished, and the quantum of knowledge or information generated
- Quality of scientific output attained or accomplished, and the quality of knowledge or information generated.
- Opportunity loss or the difference between the optimal result or the maximum possible result, and the actual result
- Quantum of pseudo-science and poor quality science averted, along with bad theories, ideas, or paradigms. Also, a general reduction in the level in scientific ignorance.

The first two must be sought to be maximized, while the last two must be sought to be minimized. This aforesaid continuum may be plotted on either a horizontal line or in an XY diagram- i.e. a chart with an X-axis, and a Y-axis. Both approaches are indeed possible and permissible. At the same time, we must also understand the limits of knowledge. Our ability to process and assimilate knowledge, which is in epistemological terms, is justified true belief, is not necessarily infinite. Human knowledge is limited by many different constraints, including natural brain and cranial capacity, sensory apparatus and sensory mechanisms, the language people know and are able to use, people's own past accumulated experience and their mental orientation, and the mind and imagination of scientists which determines their ability to conceptualize abstract and non-abstract things is also likewise necessarily limited. The capacity of the human brain also undoubtedly affects the speed at which we process information and recognize patterns, and this in turn limits our mathematical and computational abilities as well. In sum, knowledge is only the data or information that can be processed by the conscious mind, no more. All information may also not readily present itself, and at all times. We might only be aware of a few specific forms of knowledge which may be either fluid or crystallized, such as declarative

<sup>9</sup> *A Rationalist Fights to Disprove Miracles in India* (Audio file). Public Radio International. 23 November 2012

<sup>10</sup> Alcock, James (2001). "Science vs. Pseudoscience, Nonscience, and Nonsense". In Kurtz, Paul (ed.). *Skeptical*

*Odysseys: Personal Accounts by the World's Leading Paranormal Inquirers*. Amherst, NY: Prometheus Books

knowledge (knowing that, for example, knowing that something exists), procedural knowledge (knowing how to perform or execute a task or a series of tasks), personal knowledge (knowledge based past experience and memories) and shared knowledge (true ideas widely accepted in communities and cultures). Humans are therefore, not omniscient, they possess only limited knowledge. Humans may operate within definite constraints and may not even be ready or willing to know all that there is to know. Knowledge is also often not seamless, and boundaries continue to exist between disciplines, and cultures. Therefore, we must also be aware of the natural limits and boundaries of skepticism.

Karl Popper famously defined the limits of knowledge obtained through empirical or scientific methods. His ‘falsification’ hypothesis states that genuine scientific theories can be falsified, that is, shown to be false though just one single observation. Therefore, all theories are never absolute. Immanuel Kant also attempted to define the boundaries of knowledge in his work “The Critique of Pure Reason” published in 1781, though his views were criticized by other thinkers. Ludwig Wittgenstein stated that we also may never have compelling grounds to know everything. Technology has been able to extend the power of our sense greatly, though there will indeed be limits as to how far technology can take us. In the early part of the twentieth century, the logician Kurt Godel showed through his incompleteness theorem, that in any axiom-based, self-consistent, formal and reasonable mathematical system, there will always be mathematical truths that cannot be proved true using that system. There are other dimensions such as space and time we may never be able to transcend or fully understand- for example, we may never be able to determine the specific atmospheric composition of a distant exoplanet, determine, the specific date and time down to the millisecond when speakers of Indo-European language landed on Indian soil, when down to the last second our ten thousandth ancestor was born, what Emperor Akbar ate for dinner on a specific day, etc. we may also never understand how time came into being, and what existed before the birth of time. As

Brian Cox famously stated, “I’m comfortable with the unknown – that is indeed the point of science. There are many different places out there, billions of places out there, that we know nothing of. The very fact that we know nothing about them excites and stimulates me, and I want to go out there and find out all about them. Indeed, that is what science is all about.”

#### IV. CONCLUSION

We had begun this paper by attempting to define what skepticism is. We had defined at a fairly granular level of detail, and other definitions of related and allied concepts such as skeptopathy, pathological skepticism, and pseudo-skepticism were also handled. We had also compared and contrasted all these different concepts as well, and had passed some judgment on all these. We had also presented the various thoughts and opinions of different thinkers on all these issues, and had also attempted to explain how such thoughts evolved and changed through the ages. We had also proposed how an ideal sweet spot could be accomplished and attained based on the quantum and the quality of scientific output, the opportunity loss, the quantum of pseudo-science or bad science generated in the process of different scientific studies. We had also attempted to reconcile the various concepts in this paper with the concepts proposed in our earlier papers so that meaningful extensions and additions could be made, as applicable. We had also emphasized the need for generating a wider awareness on this issue, all in the interests of good and healthy science, and balanced and reliable objectivity, and make it central to future scientific methodology, dialogue and debate. This is extremely important, as this will be one of the pillars and anchors of science, and scientific progress. Needless, to say, it will also need to be taught in schools, colleges and universities at the appropriate level, fairly comprehensively, and at a fairly granular level of detail, so that students appreciate and understand all dimensions of the issue, and apply it in their research paths and careers as well.

#### ➤ Diagrams

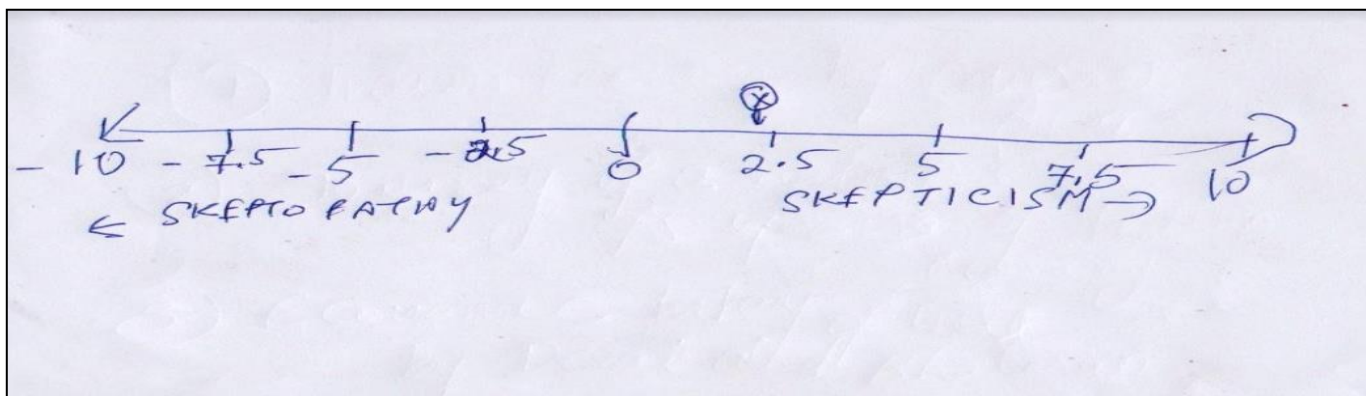


Fig 1: Here, values greater than zero represent positive and healthy skepticism, while values less than zero or negative values, represent skeptopathy or unhealthy skepticism. Note that the two from our perspective, are not necessarily mutually exclusive. In other words, any paradigm may contain differing amounts of skepticism and skeptopathy, or healthy and unhealthy skepticism at the same time

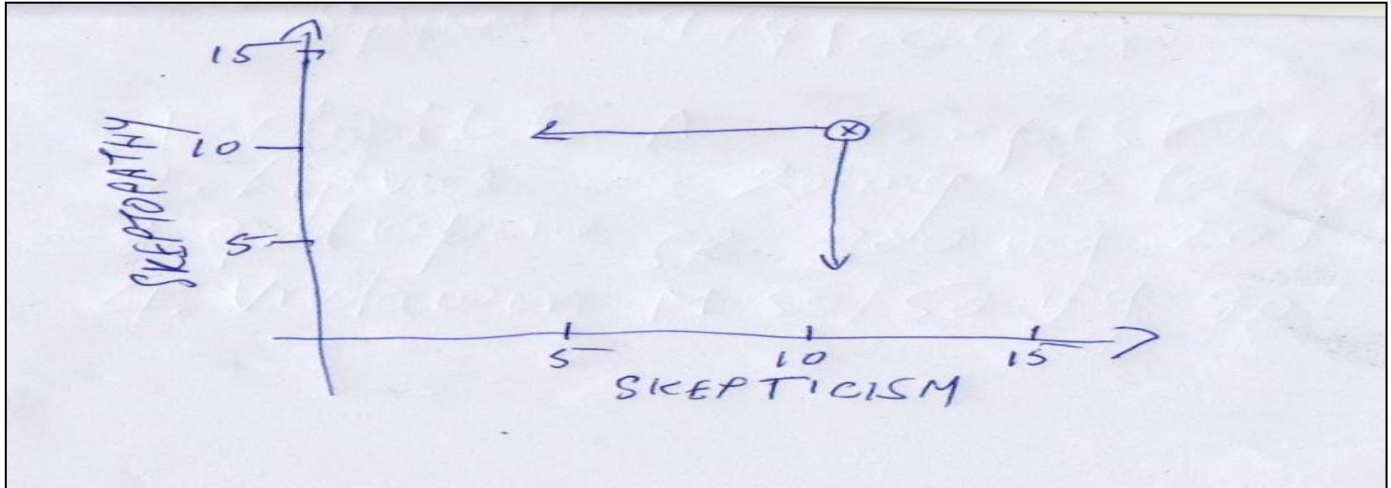


Fig 2: Here, values on the X axis represent positive and healthy skepticism, while values the Y axis represent skeptopathy or unhealthy skepticism. Note that the two from our perspective, are not necessarily mutually exclusive. In other words, any paradigm may contain differing amounts of skepticism and skeptopathy, or healthy and unhealthy skepticism at the same time.

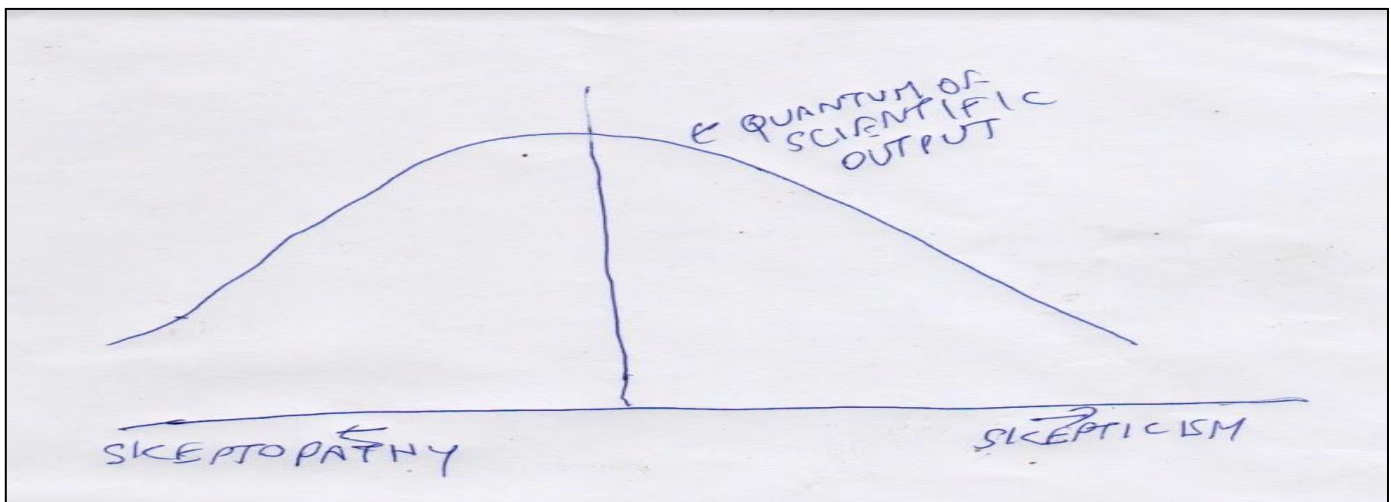


Fig 3: Here, we attempt to show the highest possible quantum of scientific output for variations of skepticism and skeptopathy. The curve need not however, be necessarily non-skewed or symmetrical at all times. Even positive skepticism is unhealthy beyond a point. Note that the two from our perspective, are not necessarily mutually exclusive. In other words, any paradigm may contain differing amounts of skepticism and skeptopathy, or healthy and unhealthy skepticism

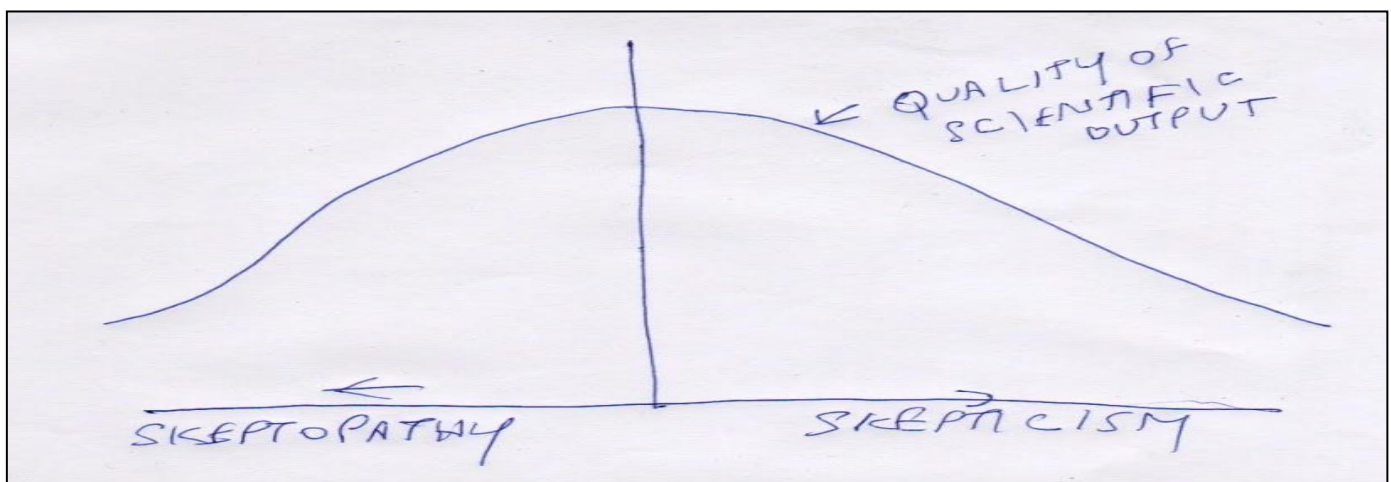


Fig 4: Here, we attempt to show the highest possible qualitative scientific output for variations of skepticism and skeptopathy. The curve need not however be necessarily non-skewed or symmetrical at all times. Even positive skepticism is unhealthy beyond a point. Note that the two from our perspective, are not necessarily mutually exclusive. In other words, any paradigm may contain differing amounts of skepticism and skeptopathy, or healthy and unhealthy skepticism at the same time

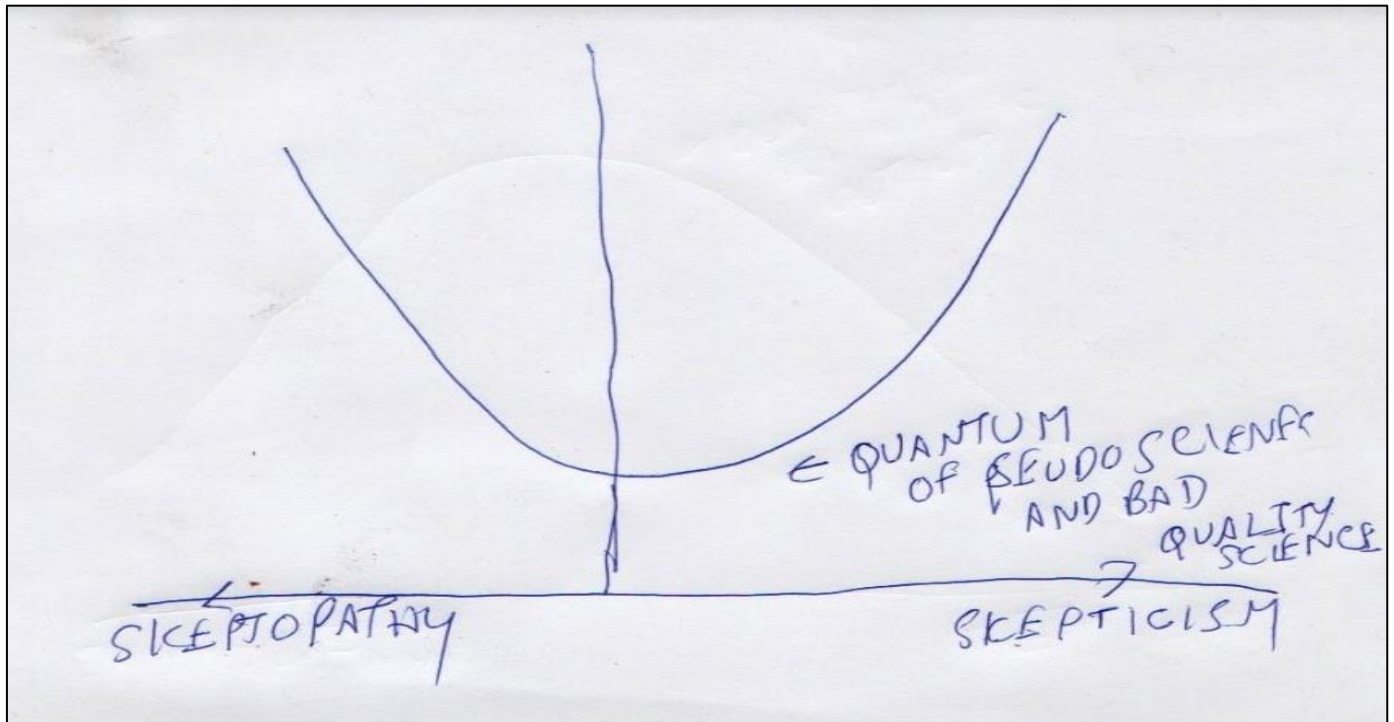


Fig 5: Here, we attempt to show the lowest possible quantum of pseudo-science or bad science for variations of skepticism and skeptopathy. The curve again need not be necessarily non-skewed or symmetrical at all times. Even positive skepticism is unhealthy beyond a point. Note that the two from our perspective, are not necessarily mutually exclusive. In other words, any paradigm may contain differing amounts of skepticism and skeptopathy, or healthy and unhealthy skepticism at the same time.

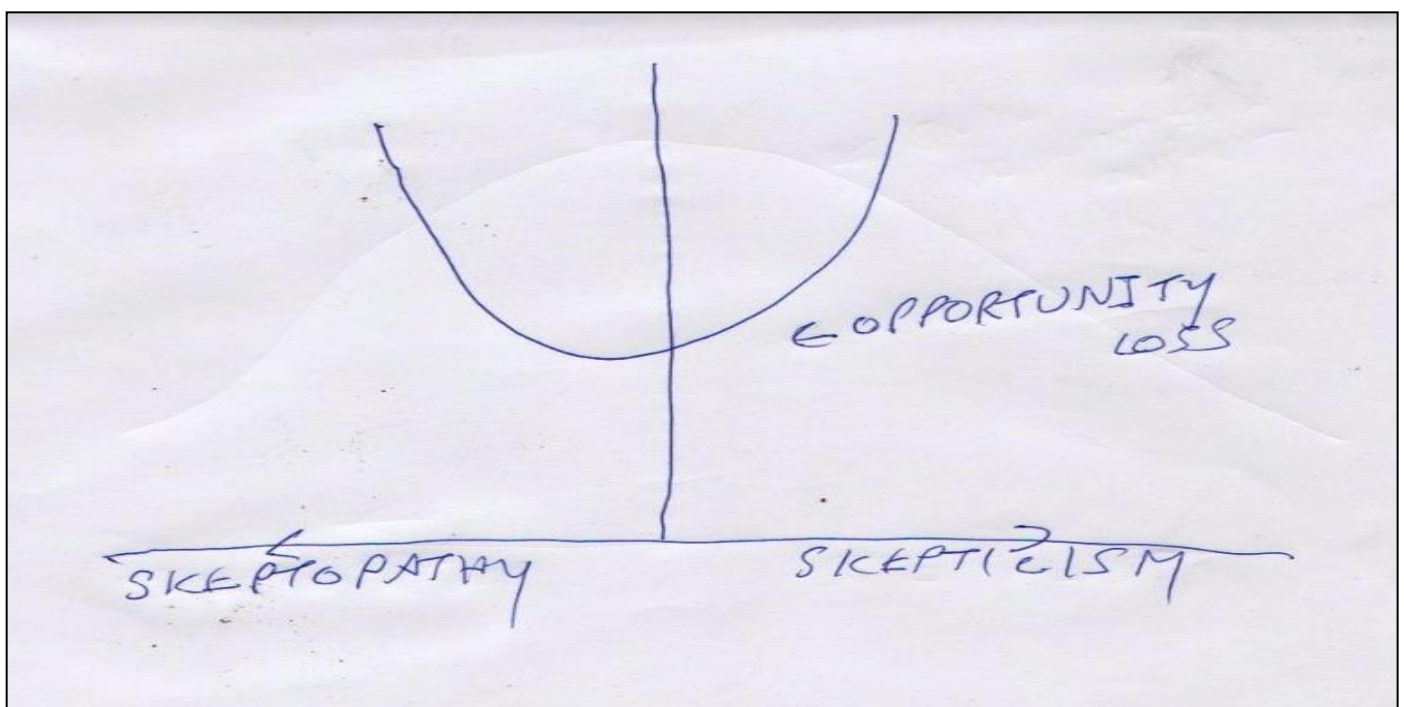


Fig 6: Here, we attempt to show the lowest possible quantum of opportunity loss for variations of skepticism and skeptopathy. Note that the curve need not be necessarily non-skewed or symmetrical at all times. Even positive skepticism is unhealthy beyond a point. Note that the two from our perspective, are not necessarily mutually exclusive. In other words, any paradigm may contain differing amounts of skepticism and skeptopathy, or healthy and unhealthy skepticism.