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Disinterring 100 New Scientific Fallacies Direct and Indirect: Using Discourse and Narrative Analyses to Unearth New Scientific Fallacies

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Abstract: This paper is by no means our first one on scientific fallacies, we had published at least two papers on this topic earlier over the last couple of years or so. The earlier papers were tied to the twin concepts of discourse analysis and narrative analysis, two emerging concepts in the social sciences, and ones with immense potential. We had proposed in those earlier papers, that both discourse analysis and narrative analysis, i.e. a perusal and scrutiny of scientific papers and scientific literature would enable us to discover and unearth i.e. bring to the fore, a large number of scientific fallacies. The underlying assumption behind this assertion is that the current compendium of scientific fallacies is grossly and woefully inadequate, and does not lend itself to high quality research. We therefore begin this paper by reviewing the current set of fallacies, or at least the most important ones, and show how they are used in science. We also distinguish between formal fallacies and informal fallacies, and propose an entirely new distinction, namely direct fallacies and indirect fallacies. The latter only influence scientific outcomes indirectly, and one or more downstream fallacies could be tied to them. They may also be labeled and termed as fallacy inducing situations. We will argue that indirect fallacies must be documented in order to improve the quality of scientific research; this is the imperative need of the day given that the entire discipline of the philosophy of science is badly outdated. Of course, the philosophy of science itself needs to be taught in schools at the appropriate level, and we will argue that the entire science of pedagogy is badly outdated too.

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I. INTRODUCTION

This paper is by no means our first one on scientific fallacies, we had published at least two papers on this topic earlier over the last couple of years or so. The earlier papers were tied to the twin concepts of discourse analysis and narrative analysis, two emerging concepts in the social sciences, and ones with immense potential along with argumentation theory. The names of the two papers were, Initiating "discourse analysis" as a tool to differentiate between science and pseudoscience: Another valuable tool to advance objectivity and rigour in science", and "Swiveling from an enumeration of scientific fallacies to a root cause analysis of scientific fallacies: An approach with immense implications for science." We had proposed in those earlier papers, that both discourse analysis and narrative analysis, i.e. a perusal and scrutiny of scientific papers and scientific literature would enable us to discover and unearth i.e. bring to the fore, a large number of scientific fallacies. The underlying assumption behind this assertion is that the current compendium of scientific fallacies is grossly and woefully inadequate, and does not lend itself to high quality research. We therefore begin this paper by reviewing the current set of fallacies, or at least the most important ones, and show how they are used in science. We also distinguish between formal fallacies and informal fallacies, and propose an entirely new distinction, namely direct fallacies and indirect fallacies. The latter only influence scientific outcomes indirectly, and one or more downstream fallacies could be tied to them. They may also be labeled and termed as fallacy inducing situations because they have the potential to negatively impact the quality of research in many indirect ways.

We will argue that indirect fallacies must be documented in order to improve the quality of scientific research even if many people choose to disagree with the terminology itself; this is the imperative need of the day given that the entire discipline of the philosophy of science is badly outdated, and this is at least our opinion and our view. Future historians of the philosophy may choose to drop indirect fallacies entirely from the list of fallacies, but we must allow history to pursue and chart its own course. Of course, the philosophy of science itself needs to be taught in schools at the appropriate level, and we will argue, and with full reason, that the entire science of pedagogy is badly outdated too. School syllabi must teach scientific method and the philosophy of science at the appropriate level, and as

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a part of scientific method and the philosophy of science, scientific fallacies need to be taught. Of course, the list of scientific fallacies also needs to be expanded at the same time; hence, this paper. Some of the fallacies, we must mention at the very outset, in order to stave away unfair criticism, may already exist in some form; they are nonetheless repeated here because they are not as widely represented in scientific literature or probed or investigated as they quite possibly should be, or are otherwise probed and investigated from a faulty or from a different or a non-ideal perspective.

It is not as if our approach is all hat and no cattle, and neither can our approach constitute a one man army; consequently and resultantly, new fallacies must be identified constantly and continuously by as many scholars as possible either directly, or from indirect fallacies through narrative analysis, discourse analysis, or any other method, behavioural analysis included; Some of the attributes and qualities proposed in our book, "A practical compendium of top life skills and universal human values from a social sciences perspective" may also help, at least indirectly. We also believe that fallacies should be named logically and rationally, so as not to confuse, and bewilder researchers. This is a part and parcel of our broader principle to democratize science. Whenever, there is a question of whether a fallacy should be considered as a direct or an indirect fallacy as per our conclusion, we have taken a decision on a case to case basis. In keeping with the ideals of the globalization of science perspective, we will also stress and emphasize those issues that make sense from a multicultural and cross-cultural perspective, though we will cover other fallacies as well. Our paper also mostly deals with the "Culture of science" and the "philosophy of science" as we believe that these subfields have mostly been ignored by previous researchers in this regard, and in this connection. [1] [2] [3]

- *What is a Fallacy?*

The study and formal evaluation of fallacies are central and vital to the study of logic and reasoning with play a vital and central part in science. A fallacy may be defined as a mistaken belief, an error in reasoning or judgment, or any form of an unsound argument that can be highly deceptive and misleading. Fallacies also represent flaws that render arguments logically invalid, pointless or futile, even if they appear to be appealing or convincing on the face of it. People most often use fallacies unintentionally due to poor logical reasoning skills or absence of scientific knowledge, or intentionally to tap and deceive others into believing in something that is patently false or absurd, or to manipulate and persuade them otherwise. Fallacies are also most often classified into formal fallacies and informal fallacies as we will see later on in this paper. Studies of fallacies have had a long and chequered history as the term was introduced in the Western intellectual tradition by the Aristotelian in the book De Sophisticis Elenchis or sophistical refutations, who categorized fallacies into linguistic fallacies and non-linguistic fallacies. Indian logic on the other hand, classified logic into systems such as Asiddha, Savyabhichara, Satpratipaksa, Badhita and Viruddha, and these classifications are around two thousand years old, but the discipline and field of study as such matured and came of age in the nineteenth century when the German philosopher and logician Gottlob Frege, pointed out that the primary tasks of a logician would be to distinguish incorrect reasoning from correct reasoning in order to improve the quality of scientific endevaour, and to avoid the pitfalls associated with fallacious argument and unsound reasoning. [4]

The noted English scholar and theologian Richard Whately defines a fallacy broadly as, "any argument, or apparent argument, which professes to be decisive of the matter at hand, while in reality it is not". He also classified fallacies into logical and material fallacies, a system of classification that is not in vogue today. Contrarily, Francis Bacon classified fallacies into four groups, namely idols of the tribe (or Idola tribus) representing errors inherent to human nature itself, idols of the cave (or Idola specus) or errors that arise from an individual's unique character, personal experiences, inclination, education, compulsions, and passions, idols of the marketplace (or Idola fori) or errors that emerge from the imprecise and confusing nature of language, and idols of the theatre (or Idola theatri) or errors that stem from dogmatic adherence to philosophical systems and theories. This mechanism of classification has however retreated from public use more or less completely, and vanished into the annals of history. In his 1843 work, "A System of Logic", philosopher and political economist John Stuart Mill classified fallacies into fallacies of simple inspection (a priori fallacies), fallacies of observation, fallacies of generalization, fallacies of ratiocination, and fallacies of confusion. This classification too, is somewhat obsolete. Sometimes, argumentation theory is used to identify fallacies. Argumentation theory refers to an interdisciplinary study of how arguments are created, analyzed, probed, scrutinized, and evaluated in real-world contexts. Fallacies can be associated either with deductive arguments or inductive arguments, though they are more common with deductive ones. Fallacies are also most commonly classified into formal and informal fallacies. A formal fallacy, also known as a deductive fallacy, logical fallacy or non sequitur fallacy is a flaw in the structure of a deductive argument itself, which renders the entire argument invalid, and makes it always wrong. On the other hand, an informal fallacy originates from a reasoning error

[1] Swiveling from an enumeration of scientific fallacies to a root cause analysis of scientific fallacies: An approach with immense implications for science Sujay Rao Mandavilli SSRN, August 2025

[2] Initiating "discourse analysis" as a tool to differentiate between science and pseudoscience: Another valuable tool to advance objectivity and rigour in science, Sujay Rao Mandavilli, Published IJISRT, June 2024

[3] A practical compendium of top life skills and universal human values from a social sciences perspective, Sujay Rao Mandavilli, Google books, 2025

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other than a flaw in the logical form of the argument itself. [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15]

II. DIRECT AND INDIRECT FALLACIES

We would also like to classify fallacies into direct fallacies and indirect fallacies, as we believe, and would like to argue, that this classification and categorization would prove to be extremely useful from a practical point of view, and for more mundane scientific activity. A direct fallacy from our point of view, is one that directly leads to errors, while indirect fallacies or fallacy inducing situations, only indirectly leads to errors. Indirect fallacies create situations or scenarios that induce errors. Indirect fallacies can be linked to one or more downstream fallacies because they induce them. Indirect fallacies may also be called fallacy inducing situations, and some skeptics may prefer this term, if they do not prefer the term indirect fallacies, or find it unappealing, unpalatable, or unsuited to their taste. From our point of view, indirect fallacies must be documented in order to improve the quality of scientific research. In other words, if indirect fallacies are sensed or detected in a particular context or situation, the downstream implications of such fallacies must be ascertained and determined, either in that particular context, or in general, so than the overall quality and efficacy of scientific research may improve, with attendant benefits to society. In other words, indirect fallacies must be tied with, or linked to direct fallacies. Additional discourse analysis and narrative analysis may be employed in this regard along with argumentation theory, and the latter would be quite obvious to most. Whenever, there is a question of whether a fallacy should be considered as a direct or an indirect fallacy as per our conclusion, we have taken a decision on a case to case basis, and provided a rationale and a justification for our decision.

We may attempt and initiate a short list of the more common, and the more widely invoked scientific fallacies at this juncture. A list of the more common scientific fallacies must include the "post hoc ergo propter hoc" fallacy (or "after this, therefore because of this"), which often falsely and incorrectly assumes causation from correlation, and that just because the second event followed the first, the first caused it; the hasty generalization fallacy, which attempts or seeks to draw a broad conclusion from an extremely small sample of non-representative data; and the false dilemma fallacy or false dichotomy fallacy, which presents two options as the only set of possibilities when many more can exist. These are also related to argument from anecdote, or using personal experiences to draw false generalizations. Other fallacies include the ad hominem attack or attacking the person instead of the idea, straw man arguments or misrepresenting the opponent's position, and the appeal to authority, or appeal to tradition fallacy. We also then have cherry picking, or selective amnesia, and obfuscation of data. Another interesting fallacy is the slippery slope fallacy. According to this fallacy, it is claimed that a seemingly small or innocuous action will have catastrophic consequences. We also then have the begging the question fallacy, the appeal to ignorance fallacy, the bandwagon fallacy, the circular reasoning fallacy, the equivocation fallacy, the false analogy fallacy, and the red herring fallacy. There are several more fallacies of course, and we had discussed many more of them in our previous papers. We had also reviewed discourse analysis and narrative analysis in our previous papers, and it would be pointless and futile to repeat them here. [16] [17] [18] [19] [20]

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A. Direct Fallacies

Let us now present below a list of what we have called direct fallacies, omitting those which are already widely studied or represented in popular scientific discourse. While we have taken care to cover as many realistic and practical scenarios that are not yet widely studied in science as per our informed opinion, there could indeed be many, many more that we might not have covered or omitted at this juncture. This is because there can never be a one man army; consequently and resultantly, new fallacies must be identified constantly and continuously by as many scholars as possible either directly, or from indirect fallacies through narrative analysis, discourse analysis, or any other method, behavioural analysis included. This is what we have been emphasizing all along, and will continue to emphasize into the future. Some which have already been studied have also been covered, whenever we believe we can shed new light on them or view them from a different perspective. In keeping with the ideals of the globalization of science perspective, we will also stress and emphasize those issues that make sense from a multicultural and cross-cultural perspective, though we will cover other fallacies as well. As previously explained, we also cover those fallacies that we believe are more closely aligned to the philosophy of science, culture of science, and the sociology of science.

That is what we believe, makes this paper much more unique, and sets it apart from other papers in the field. According to most conservative sources, an error points out to a mistake in fact or process, while a fallacy refers a specific type of error that is a defect in reasoning or logic. There is also a difference between a fallacy and a bias. A fallacy refers to a flaw in the structure or logic of an argument, while on the other hand, a bias is a psychological tendency that causes an individual to think in a certain way. A clear distinction between the three has however, not been maintained by many scholars; therefore, we personally prefer to use the term fallacy wherever a situation or an occurrence jeopardizes or compromises with the quality or composition of scientific output. Moreover, the term fallacy is a much more powerful term, and lends itself to recording, documentation, systematization, categorization, and archival much more easily than errors or biases. They are likely to drive the tempo and quality of scientific activity much more forcefully and powerfully than mere biases or errors do. Furthermore, we need a greater level and degree of collaboration between logicians and philosophers of science on one hand, and psychologists and behavioural scientists on the other. This kind of collaboration will indeed be required in order to exhume and disinter more fallacies.

- *Assuming or Pretending to Believe that the other Person is an Ignoramus and will Believe Anything that is Being Said*

Assuming and pretending are two different things, and have two distinct meanings in the English language. To assume means to suppose or to believe that something is the case, without adequate justification, evidence or direct or indirect proof. To pretend means behave so as to make it appear that something is the case when in fact it is not. The first assumes an unintentional cause, while the second assumes an unintended cause. This fallacy may be classified as either a direct fallacy or an indirect fallacy, or perhaps sometimes even both. However, we believe that this can have direct consequences and results, and have a direct bearing on the nature and quality of scientific activity, hence we have decided to include it in our list of scientific fallacies. Of course, this scenario, lends itself to further errors, which must be examined on a cases to case basis. In such a case, an Individual A falsely believes that individual B, often from another culture or from a different intellectual background – sometimes from a real or perceived inferior standing in society or in the intellectual field, will believe anything that is being told without cross-questioning, or critical cross-examination or cross-scrutiny. This causes individual A to propose inferior solutions or commit errors without a care that they will be detected. This scenario is of paramount importance in cross cultural studies. May we christen this the naïve collaborator theory, and the naïve audience theory subject to approval from the wider and more informed scientific audience. Of course, collaborator and audience could mean two different things, and these represent two different scenarios as such.

- *Lacking Complete Knowledge but Assuming he does*

In such as case, a person or an individual may lack complete knowledge, but assume that he does. This may be due to ignorance, arrogance, naivety, hubris, or several other factors, not to speak of a combination of several of them. This may cause him not to research an issue or a topic thoroughly enough or meticulously enough. As they say, incomplete knowledge is dangerous, or a little knowledge is a dangerous thing. Alternatively, a person or an individual may assume that he has covered or read all the scientific literature and material. While as a matter of fact he does not. The incomplete information fallacy as it currently exists, mostly refers to drawing conclusions or inferences from insufficient grounds or premises. However, the meaning and intent of this paragraph is different. Hence, this fallacy. We can still call it the incomplete knowledge fallacy or the incomplete information fallacy. Alternatively, a researcher may be deluded into believing that incomplete sets of data or information at his disposal represent complete set of data or information.

- *Assuming that No Prior Knowledge Exists*

The scenario described in this paragraph is somewhat different from the incomplete knowledge fallacy or the incomplete information fallacy. In such as case, the researcher or the individual falsely, naively or erroneously believes that no prior knowledge exists in the field, or that no research has already been done. This causes him to reinvent the field and causes him to commit errors in the process. The researcher also erroneously ignores to look up or consult previous and prior research. The resultant quality of research naturally bound to be much lower. We can choose to call this fallacy the assumption of no prior knowledge fallacy.

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➢ *Not Keeping up with Latest Research or Technology*

In many cases, researchers may fail to keep up with latest research or latest technology, while at the same time erroneously believing that they are uptodate. Hence, they may become obsolete even without realizing it. This is extremely common, widespread and ubiquitous in today's rapidly changing and rapidly evolving world. This may be due to naivety, arrogance, ignorance, hubris, or "pompous naivety" as we had observed in the case of late Dr Gregory Possehl, Indus archeologist. In some cases, it may be due to negligence, carelessness or nonchalance. This may either be due to cultural attributes or personal attributes, though we could be concerned with both. We can call this the unconscious obsolescence fallacy, though suggestions are indeed invited from other researchers at all times. Obsolescence refers to the process of becoming outdated or obsolete, and no longer worthy or capable of being used. The term has wide connotations in today's world, and everything under the sun becomes obsolete one day or the other, and sooner than later.

➢ *Assuming that there are No Other Researchers Working in the Field*

The scenario described in this paragraph is somewhat different from the incomplete knowledge fallacy or the incomplete information fallacy. In such as case, the researcher or the individual falsely, naively or erroneously believes that no other researchers are working in the field, or that no research has already been done or is being done. This causes him to reinvent the field and causes him to commit errors in the process. The researcher also erroneously ignores to look up or consult previous and prior research, or research currently being conducted and executed. The resultant quality of research naturally bound to be much lower. We can choose to call this fallacy the assumption of no concurrent research fallacy.

➢ *Cultural Obsolescence*

Cultural obsolescence is said to occur what the values, norms, mores, traditions, practices or etiquette associated with a given society or culture become obsolete or outdated, or are otherwise, and in general, rigid, and non-changing. This is of course difficult to define, let alone precisely, but must still be studied by social and cultural anthropologists with the due attention that it demands and deserves. We also have on the other hand the doctrine of cultural relativism which means that each culture needs to be studied on the basis of its own merits and principles. We can call this the cultural obsolescence fallacy. Social and cultural anthropologists must tread a delicate balance here, as not all cultures can either be tarred with the same brush, or viewed in the same light. Of course, this is both a direct and an indirect fallacy, and is associated with many downstream consequences as well.

➢ *Assumption of Cultural Superiority*

Some people may believe that either their own culture, or some other culture is either innately or inherently superior. Therefore, they may be tricked or goaded into believing that the works produced by that culture are superior, and works produced by other cultures are inferior. This may not of course always be the case. Some westerners may falsely and naively assume their own scientific literature to be superior, and the scientific literature or output produced by other nations to be inferior. Some Indians too may think that way, and naively and implicitly assume western works and western literature to be superior. Indians themselves may pooh pooh works produced by other Indians. Of course, they may have a just cause here; and work produced by other Indians is often of inferior quality, at least as at present. In some cases, individuals may also falsely assume that cultural hegemony will last forever, and refuse to bring themselves uptodate thereby producing shoddy scholarship. In other words, they are late to understand changes to status quo. We can call this the assumption of cultural superiority fallacy. Of course, this is both a direct and an indirect fallacy, and is associated with many downstream consequences as well.

➢ *Assumption of Cultural Backwardness*

We can call this the assumption of cultural backwardness fallacy. The assumption here, particularly among people of western nations, or more scientifically mature and evolved nations is that backward cultures cannot produce scientists, intellectuals, or any great thinkers worth their grain and their salt. This was at least the notion and the assumption a couple of decades ago, but is only not slowly and haltingly changing. Of course, there are errors on different sides of the table and the equation here, given that the quality of research produced by developing countries has hitherto been less than impressive, spectacular and stellar, though this may be slowly changing now. As a result of this, people in western or developed countries tend to overlook research carried out in other parts of the world – with the baseless and unfounded assumption that they may be worthless or shoddy – This leads to their obsolescence eventually, and their loss of control. Of course, this is both a direct and an indirect fallacy, and is associated with many downstream consequences as well.

➢ *Cultural Homogeneity Fallacy*

As per this fallacy, a researcher or a scientist may be tempted to conclude that all people of a culture must be similar. Therefore, a researcher or a scientist, who after having read the books or works produced by a culture, and having found them worthless, concludes erroneously that all other works produced by the culture may be worthless or shoddy – This leads to their obsolescence eventually, and their loss of control. The oft-quoted and oft-cited phrase "a single shelf of a good European library was worth the whole native literature of India and Arabia" as stated by Thomas Babington Macaulay in 1835, reflecting a colonial-era belief that non-European knowledge was worthless in every conceivable way. While this may have been partly true at one point in time, other parts of the world are now catching up too. We can christen this the cultural homogeneity fallacy. Also, cultural stereotyping is sometimes common. Examples of cultural stereotypes prevalent in the 1970's were that all Indians were uneducated, or that all Indians were snake charmers. Of course, this is both a direct and an indirect fallacy, and is associated with many downstream consequences as well.

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- *Not Knowing the Essentials of Another Culture Completely but Assuming he does*

This fallacy may be called the fallacy of inadequate cultural assessment. In such a case, an individual may not know the essentials of another culture completely but assuming he does. This naturally causes him to make false or erroneous judgments. For example, there are several valid and bona fide criticisms of colonial Indology, and among them are that they did not invest sufficient, time, money or resources in understanding Ancient India, and that the entire field of Indology was primarily driven by linguists, thus pre-empting a multidisciplinary approach. We can christen this the inadequate or incomplete cultural analysis fallacy. Of course, this is both a direct and an indirect fallacy, and is associated with many downstream consequences as well.

- *Being Oblivious to the Cultural Requirements of Others*

In some cases, individuals may be oblivious to the cultural requirements of others. This has led to all kinds of horrors being perpetuated in the past. For example, we have has British colonialism, French colonialism, Dutch colonialism. We also had the caste system in India, Jim Crow laws in the USA and Apartheid and racial segregation laws in South Africa. This can be surmounted through cross-cultural dialogue, cultural brokerage or mediation, cross cultural research design, emic perspectives of different types, and subaltern studies. Subaltern studies as it emerged in the 1980's, focuses on reexamining history from the point of view of the oppressed classes, or the disenfranchised classes rather than from the point of view of the power elites. As we had observed and noted multiple times in our previous papers and publications, may western researchers were concerned about space exploration, but ignored or brushed under the carpet, the needs to people in developing countries. Another variant of this fallacy is the cultural insensitivity fallacy.

- *Assuming that All Cultures of a Given Area or Region are Similar*

Some people may naively or erroneously believe that cultures of a given area or a given region are similar to one another, and are dissimilar to cultures in a different area or region. This may naturally lead to erroneous conclusions. For example, Indians may unknowingly choose to ignore the cultural differences between people of different countries in Eastern Europe, or in the former Soviet Union, or be oblivious of them. This may lead to subpar or less than perfect cultural analysis, particularly social and cultural ones.

- *Association with Ideology Fallacy*

This is both a direct and an indirect fallacy given that it has the potential to induce many downstream fallacies. An ideology may be defined as a set of beliefs or values attributed to a person or group of persons, usually those that are held for reasons that are not purely rational and logical. We have discussed and dissected ideologies multiple types of ideologies in the past, and have crucially scrutinized different types of ideologies as well such as racism, apartheid, Eurocentrism or Indocentrism. We also then have scientific ideologies. The term "Scientific ideology" may refer to two distinct concepts: either a system of beliefs within science that is dogmatic and resistant to revision and change, such as the mid-Nineteenth century of Indology, or the more specific idea of an "ideology of science" which was coined by Georges Canguilhem, and describes an system that shares science's methodological ambition but is devoid and bereft of a formal framework. Ideologies can be identified through thick analysis as we have proposed, which carried out a 360 degree evaluation of any statement of any kind. We can call this the association with ideology fallacy. There is another interesting twist here; some people fallaciously or naively believe that just because a person has some affiliation with a group or body, so he must possess all the characteristics of that entity or body. This is some kind of a false or fallacious association fallacy. Interestingly, a Marxist scholar once proclaimed, "We need not fear communism, only communalism". Yet, Marxism was both directly and indirectly responsible for the death of tens of millions of innocent people.

- *Association with Counter Ideology Fallacy*

A counter-ideology is a response to an existing ideology that seeks to challenge or refute it. The approach here is to either directly counter the opponent's points or offer alternative explanations, belief systems and solutions. While a counter-ideology can address aspects like existing order or a vision for the future, it is sometimes taken to an extreme, until it itself is fossilized and ossified into a new ideology. For example, we have valid and bona fide criticisms of anti-racist movements, new age movements, new age Indology, and post-colonial movements in general. One interesting theory we would like to invoke at this juncture is the recent out of Africa migration hypothesis, which in our perspective lacks epistemological coherence or coherentism, and is over simplistic at best. Some valid and bona fide criticisms of current postcolonial theory include its focus and emphasis on specific regions at the expense of some others, overemphasis in some cases on the ancient past at the expense of the present, and its lack of methodological validity and rigidity. Therefore, we may have the case of an underdog assuming that his reactionary campaigns are justified and turning it into vendetta. We can call this the association with counter ideology fallacy.

- *Belief in Scientism*

Scientism is the often generally held belief that both science and the scientific method are the best, optimal or even the only way to render truth about the world and reality objectively and precisely. Falling prey to scientism is extremely easy but must be resisted with full force and with full vigour at least by social and cultural anthropologists. Many scientists still falsely and erroneously believe that culture not important; They often ignores the importance of culture and cultural factors in shaping society. This may often be due to misinformed opinion, belief and faith in obsolete and outdated paradigms, and non-syntheses of paradigms and frameworks from different fields – for example, some scientists recommend artificial food pills as the future of food, but conveniently ignore the fact that

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culture will reject them. We can call this the scientism fallacy.

➢ *Appeal to Scientific Tradition Fallacy*

The appeal to tradition fallacy is another important logical error in which an argument concludes that something is correct or good simply because it has long been a widely established practice, tradition or belief. This fallacy, which is also sometimes known as the "argumentum ad antiquitatem" fallacy, replaces evidence and reasoning completely, claiming that tradition alone is adequate or sufficient proof. While this fallacy is common, sometimes even scientists fall prey to it. That is why we believe, that the appeal to scientific tradition fallacy must be popularized. We strongly believe that all paradigms need to be evaluated and reevaluated constantly in science, though this is mostly not done. A constant and continuous assessment of assumptions is required as well, and we had written about this earlier. The name of the paper was, "Advancing the use of "Continuous zero-based reassessment of assumptions, hypotheses and methods": A vital tool and technique in the interests of better science", and it was published in the year 2024. [21]

For example, if Ayurveda is to be accepted as a bona fide and a legitimate science, it must be reviewed and scrutinized constantly, and from a modern and contemporary perspective. In some cases, we may also have scientific dogma and intransigence. Dogma refers to a fixed set of unchanging beliefs held for reasons other than sound logic and reasoning. Dogma is alas, and rather unfortunately so, present within the tradition and context of science, and in such cases, may refer to scientific dogma. Some individuals may also be adept and clever in presenting dogma as non-dogma, and cloak it in such a way, that others are not able to see through them.

➢ *Oversimplification Fallacy*

Over simplification refers to the process of simplification of something to such an extent that a distorted impression is presented to the outside world, and essential details are omitted. Often, eminent scientists and even eminent researchers fall prey to oversimplification. This can be dangerous and intuitively counter-productive given that it can deeply and foundationally compromise on the quality of research. We are reminded of the blind men and the elephant fable. In this case, different men touch different parts of an elephant, and falsely assume it to be a different object such as a rope or a stick.

➢ *Appeal to Knowledge of Science Fallacy*

In some cases, individuals appeal to their knowledge of science in general, other their claimed knowledge in general notwithstanding the fact that they may not possess adequate or sufficient knowledge on a particular subject, or a given area of study or field of enquiry. Individual may at times use this claim to bamboozle or intimidate others into believing that they are inferior or know nothing. This may be called appeal to knowledge of science fallacy. A variant may also be labeled the appeal to dogma fallacy.

➢ *Big Personality Fallacy*

Some individuals may also prefer to call themselves big individuals, and label other individuals as small, puny, unaccomplished individuals and as light weights. They may also use cultural and racial attributes to boost and solidify their cases. They may also use non cultural attributes such as age and gender. This imparts a cloak and an aura of invincibility. In case of educational attainments or educational accomplishments fallacy, an individual makes a direct appeal to his own educational qualifications and educational degrees (or professional certifications as the case may be) in order to make new or fresh claims that lack epistemological validity, or are in some ways, dubious or devious. This would naturally compromise the quality of research adversely. This may be termed or referred to as the appeal to educational qualifications fallacy. In some cases, approval from big people may be mandated or mad compulsory, and this would be in lieu of proper technical or scientific reviews which the "big man" may be unable to perform or execute. In some cases, excessive weightage is given to opinion, particularly of big people, and this is allowed to override more rock solid evidence and data. Some individuals may also have a large and unnatural cult following, and this may make them oblivious to scientific errors and fallacies. Contrarily, the contributions of "small men" or "small people" may be routinely, constantly and systematically overlooked without investigation, scrutiny, or review.

➢ *Appeal to Accomplishments Fallacy*

In such a case, an individual makes a direct appeal to his own past accomplishments, real, bloated or exaggerated in order to make new or fresh claims that lack epistemological validity, or are in some ways, dubious or devious. This would naturally compromise the quality of research adversely. This may be termed or referred to as the appeal to accomplishments fallacy. Some researchers may be tempted to base poor quality work on previous reputation in order to boost their academic credentials and their volume or quantum of output. In other words, they may falsely believe that doing some good grants immunity against bad. This attribute may also sometimes be associated with researcher fatigue, sloth or decadence.

➢ *Promotion of Self-Interest and Vested Interests*

Some individuals may cleverly and surreptitiously or clandestinely promote their own vested interests without the other person realizing it. Some individuals may cleverly make use of conflict of interest to promote their own self-interests. This may in many cases impact or compromise the quality of research. Vested interests may also include group interests and class interests. This class of errors would naturally encompass the promotion of hidden agendas as well. We had written about vested interests and conflicts of interests extensively in the past. Please read our paper, "Towards a formal analysis of "vested interests" as an

[21] Advancing the use of "Continuous zero-based reassessment of assumptions, hypotheses and methods": A vital tool and technique in the interests of better science *IJISRT* 2024: 1. February, Sujay Rao Mandavilli

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intrinsic part of social science research techniques: Another crucial component of social and cultural progress" As such, this would constitute both a direct fallacy, and an indirect fallacy. 22

- *Association with Vested Interests or Cabals*

In many cases, there may be an association with vested interests or cabals. This may be termed as fallacy by association. These is an extremely example we can cite here; colonial Indologists have been associated with Dravidian nationalists and in some cases with Dalit nationalists, though they have been canonically against Hindutva groups. Likewise, Marxist historians have been in cahoots not only with colonial Indologists, but with Dravidian nationalists and Dalit leaders as well, though they have been opposed to Hindutva groups. This is obviously one-sided, and a fallacy. That is why we had labeled it the colonial Marxist imperialist school of Indology.

- *Group Think Fallacy*

Group think is another dangerous fallacy associated with pseudo science. Group think as such refers to a psychological observation where desire for harmony and conformity within a group overrides all other factors. This naturally leads to both errors and fallacies directly as well as directly. Group think is often associated with the absence of diverse perspectives, or even the encouragement of diverse perspectives. This may either be because the members of the group are either homogenous, or lack exposure to outsides ideas, views and perspectives, often choosing not to entertain them. In extreme cases, pressure is put on members of the group to confirm. In other less extreme cases, only a culture of conformity is promoted.

- *Dealing with a Limited Set of Issues*

In some cases, individuals deal with a limited set of issues only. This is also one of the hallmarks of an ideology, given that ideology driven proponents and ideology drenched proponents do deal with a limited set of issues. We had also made observation of this in a previous paper of ours that dealt primarily with ideologies. Worse still, some people tend to deal with a limited set of issues, yet falsely or naively believe that they are covering everything . in any case, the name of the paper was "Developing methods, tools and techniques to identify and isolate ideologies: Why this is an essential prerequisite of twenty-first century science and non-science".[23]

- *Recency and Non-Recency Bias*

In some cases, individuals are likely to have a strong bias or prejudice towards or against an issue based on the age of the claim of the matter at hand, i.e. either its recency or non-recency. Some individuals may use terms such as "latest" (i.e. latest research has shown), or obsolete (for example, Mr X's ideas are obsolete) without carrying out a thorough investigation or analysis. This is based on the assumption that what is new is not necessarily better, and even some recent paradigms or frameworks may be flawed. In some other cases, there may be a bias towards older data, though this may be relatively rarer. In some cases, there may also be a suspicion of the new or suspicion of the old. What is more common is the common belief that anything new is better, and what is less common is the belief that anything old is better, on the basis of the "old is gold" analogy.

- *Believing in a Mythical Past and Winnowing the Past for Glory*

Mythology is the collection of myths, or sacred stories, typically associated with a particular culture. It may also refer to the academic and scholarly study of those myths, given the fact that myths are widely studied in the context of social and cultural anthropology and sociology, and such studies include legends, folklore, ballads, hymn, etc. Myths are also sometimes seen as narrative explanations that a society or culture uses in order to understand and contextualize its cultural makeup, its history, and its customs and traditions to boot. Myths may also be seen as manifestation of social and cultural worlds. Much of history and tradition can be heavily mythified, and this can include the case of King Arthur of Britain, the early history of Japan, and not to speak, India. Some cultures lack the ability to separate myth and reality, fact and fiction, and this naturally includes countries such as India where fact can be assiduously separated from fiction only with a great deal of difficulty. All in all, it requires a great deal of skill, discipline and scientific temperament and attitude in order to accomplish as task as complex and challenging as this. Some individuals may also resort to invoking the names of Gods, or otherwise make an appeal to religion in order to bolster their claims. The last scenario is still unfortunately, rather common in India. All this must change in the next couple of decades or so, though it may require in some ways, a generational change.

- *Bias Towards or Against Data Generated from Some Sources*

In some cases, there may be a latent or an inherent bias or prejudice towards data generated from some sources, and a latest or an inherent bias against data generated from some other sources. For example, while many Indians believe that their own historical traditions are highly accurate and must be interpreted literally, many western scholars believe the exact opposite. Many western scholars with the exception of FE Pargiter and others, have discounted Indian historical tradition almost completely. This may have led to flawed historical constructs and narratives. Of late, even Michael Witzel of Harvard University has admitted that early and ancient Indian texts do contain valid and bona fide historical information. Likewise, many Indians are highly skeptical of work carried out by Marx Muller, Ralph TH Griffith, Horace Hayman Wilson, Hermann Grassmann and others, often accusing them of misunderstanding and misrepresenting Indian culture and Indian traditions.

[22] Sujay Rao Mandavilli (2024) Towards a formal analysis of "vested interests" as an intrinsic part of social science research techniques: Another crucial component of social and cultural progress *IJISRT* 2024: September

[23] Developing methods, tools and techniques to identify and isolate ideologies: Why this is an essential prerequisite of twenty-first century science and nonscience, Sujay Rao Mandavilli, 2025

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Likewise, it is common to be biased against new or new-fangled sources which are yet untested and unproven; in many cases, a systematic review or a thorough evaluation is not done.

- *Inability to Adopt a Cross-Cultural Perspective*

Cross-cultural studies study, and probe issues from the prism and lens of multiple cultures. A cross-cultural research design may be defined as a systematic and a structured method and technique that is used for studying and comparing human behavior, attitudes, and customs across different societies or cultures with the primary goal of identifying both universal patterns of human behavior and culture-specific variations. As per this approach and techniques, cultural biases need to be minimized and even neutralized. In order to accomplish this, emic approaches of various types as discussed in our previous papers, and etic approaches are gainfully employed and used. Similar yardsticks are used to study different cultures, and non-biased and representative sampling is used while adhering to the principle of cultural sensitivity at all times. Examples of cross-cultural studies include cross-cultural comparisons, holocultural analysis, and controlled comparisons. Many researchers lack to ability to investigate issues from a cross-cultural perspective, given that they are not formally trained in it. Some researchers simply have too much cultural baggage.

- *Wrong Cultural Context Fallacy*

Sometimes, a solution may be proposed or implemented for a particular culture and cultural context for which it is wholly or wildly unsuitably or unadaptable. This is because it has been directly lifted out of the context of another culture, in which it may work and perform impeccably, flawlessly and seamlessly. This kind of fallacy is still very common to this particular day, and this is indeed what our globalization of science movement is all about. That is why we still have terminologies and concepts such as Eurocentrism, Indocentrism, Sinocentrism and Afrocentrism in the first place.

- *Inability to Adopt a Long-Term Perspective*

What is meant by short term? The term “short-term” means occurring over a relatively short span of time, such as six months to one years (even in some cases, shorter spans than that), though there is no rigid and precise definition as such. The term medium-term on the other hand, refers to spans and durations of between one year and five years. The term long-term commonly refers to periods of more than five years with some room for ambiguity and variation of interpretation. Many researchers and thinkers are badly afflicted with the short-term thinking syndrome since they are often preoccupied with career-driven goals, and other short-term preoccupations.

- *Judging the Past or Future Based on the Present*

In some cases, people tend to judge the future based on the realities and the constraints of the present, or may even choose to judge the past based on the limitations and fallacies of the present. This can be both fallacious and misleading. This is akin to projecting the present into either the past or the present. In some other cases, other groups of people may project the realities and the constraints of the past into either the present or the future. This is also wrong. That is why we had developed concepts called aeternitism or omnimodism; this is by no means an easy or a facile exercise, but it can at least be attempted. An interesting example that we will provide in this context is this: At a time, not too long ago, it was fallaciously and erroneously assumed that people of East Asian descent were genetically, racially and biologically inferior; that error has been corrected now given the success of many East Asian cultures economically, and in both science and technology. That error has now been replaced by another potentially new error. It is now assumed that people of South Asian or African descent are intellectually and genetically inferior. We will not buy this argument unless it is thoroughly and comprehensively ratified and verified.

- *Preconceived Notions Fallacy*

A preconceived notion refers in common and in everyday parlance to. an opinion formed beforehand without adequate evidence. Synonyms for preconveived notions might include parti pris, preconceived idea, preconceived opinion, preconceived conception, among others. Preconceived notions are often based on solely or chiefly on personal experiences, cultural influences, cultural biases or prejudices, mental shortcuts and confirmation bias and can additionally also significantly impact how a person perceives the world at large and also interacts with it in many different ways. Examples of preconceived notions might include cultural stereotypes or prejudices, racial stereotypes or prejudices, belief in fixed gender roles, judgments based upon appearances, clothing or behavior. This fallacy may be labeled as preconceived notions fallacy, and may cause researchers and scholars to commit cardinal errors of judgment and execution.

- *Wishful Thinking*

Wishful thinking refers to the formation of a certain set of beliefs or expectations based on what an individual in his heart of hearts wants to be true, rather than basing his expectations on evidence, logic, reason, or reality. Even though wishful thinking may provide temporary and short-lived succor, relief, and comfort, relying too much or excessively on wishful thinking may lead to poor decision-making and eventual disappointment and frustration. Wishful thinking therefore, may be classified as a type of cognitive bias driven by purely emotion and desire rather than on critical, realistic analysis. It is also extremely important to distinguish wishful thinking from genuine optimism because the latter is realistic and based mostly on facts and reality.

- *Non-Constructive Criticism Fallacy*

Criticism refers to and encompasses either a fair or unfair (balanced or prejudiced and non-objective) judgment and analysis of the merits and faults of something, or someone, including, but not limited to, a person's work, or intellectual output. Even though criticism is sometimes equated and associated with negativity, criticism often provides positive and actionable feedback, and serves as a

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vital tool for improvement and progress, and can be the trigger and springboard for creativity. The above is generally referred to as constructive criticism which, unlike destructive criticism, is not vague, personal, vendetta or agenda driven, and purely negative. Constructive criticism must be adopted during reviews, and alas, this is often not the case, because too many ideologies abound and are presently afloat. We had discussed this is a paper that dealt with peer-review. Some people are also not open to constructive criticism or provide non-constructive criticism in the guise of constructive criticism.

- *Non-Objectivity Fallacy*

While this may be categorized and classified as either a direct or an indirect fallacy, this kind of fallacy, which is associated with a large number of potential and manifest errors, is simply too important to be ignored. That is why we have listed and classified it under the list of direct fallacies or errors. Objectivity refers to the quality of being based solely on facts and reality rather than personal feelings, prejudices, subjectivity or biases. An observation or a statement is considered to be objective if it remains and stays true regardless of an individual's perspective or opinion, and is as such unclouded by his judgment. As of today, objectivity is largely elusive in many fields of scientific activity, but this may be because too many ideologies abound or run rampant. Non-objectivity also ignores hard data and facts, and may also be associated with obfuscation of facts, cherry picking, selective amnesia, and the distortion of facts or information. Individuals may also resort to convoluted logic and reasoning to distort results and perception. There may also be a conflict with truth, and paradigms may not be based on balance and harmony and holistic evaluation of views. Downplaying negative aspects or elements may also be resorted to along with selective and malicious interpretation of data. Therefore, a large number of fallacies must be grouped under, and associated with this head and categorization.

- *Fallacy of Non-Synthesis of Information*

Synthesis refers to the formal and systematic process of combining diverse sets of elements, ideas, or frameworks into a new, coherent, cogent and a much more complex whole. This distinguishes it and sets it apart from analysis, in which case, a subject is broken down into its constituent parts. Synthesis is common across various academic fields, and intellectual fields of inquiry, and as such is one of the pillars of modern science. We had also spoken about epistemic coherentism in an earlier paper, in which we had argued that data across time, space and academic disciplines must tally and synthesize with one another. Therefore, from our perspective, non-reconciliation of facts is a cardinal error. internal contradictions and external contradictions must not persist across paradigms and frameworks, and multidisciplinary, interdisciplinary and transdicisplinary approaches must be adopted in this epoch of seamless connectivity. Transdisciplinary research is of course not always possible or necessary, as it makes sense only in some contexts. Refer to our papers titled "Implementing "Epistemic coherentism" in twenty-first century science: "Epistemic coherentism" as an essential pre-requisite of interdisciplinary and transdisciplinary research", and "Envisaging a new era in interdisciplinary and transdisciplinary research: Presenting the COMPASS model for interdisciplinary and transdisciplinary research" for further clarity and details. [24] [25]

- *Intellectual Dishonesty Fallacy*

This kind of a fallacy may be classified as either a direct fallacy or an in indirect fallacy but given its importance and its potential significance, we choose to classify it as a direct fallacy. Of course, many downstream fallacies may be linked to, and correlated with it. For example, certain individuals may resort to the utilization of paradoxes in individuals or non-individual entities to change the narrative and prove a point; they may dupe, deceive or otherwise intimidate gullible or unsuspecting people. They may also in some cases, resort or take recourse to the exploitation of differences between people cleverly and deceitfully; they may take recourse to exploiting scientific or technical ambiguities; they may take recourse to exploiting vulnerabilities of people, their naivety or their lack of technical knowledge or expertise; they may make false accusations against people or take recourse to malicious slander. They may at times sweet talk people to divert attention from real or more important, pressing, burning and urgent issues. They may indulge in variable talk, talking sometimes good, sometimes bad. They may talk behind people's backs to corner and isolate them. They may resort to setting up intellectual traps much in the manner of booby traps. They may falsely accuse people of saying things they didn't say or doing things they didn't do. They may promote promoting conspiracy theories against other scientists or researchers. They may choose to ignore, distort or manipulate (or falsify) inconvenient and problematic and bury it under the desk much in the manner of the German researcher Jan Hendrik Schon or Charles Dawson of the Piltdown man hoax and infamy.

Some people may make excessive use of emotions, or resort to flattery, sophistry, solipsistic and tendentious arguments, or resort to character assassination. They may set up pseudoscientific tests such as the pencil in the hair test devised by the South African apartheid regime. They may resort to the unmanifested proof or evidence fallacy – just because proof is not available or not yet found, it is assumed to be false. In some cases, they may misuse people's lack of aptitude or lack of temperament. They may resort to exaggerating claims, promoting an oversized or overhyped view of one's own accomplishments, unapplied self-criticism, avoiding debate and discussion, resorting to brainwashing and mental persuasion; making tall,

[24] Sujay Rao Mandavilli (2025) Envisaging a new era in interdisciplinary and transdisciplinary research: Presenting the COMPASS model for interdisciplinary and transdisciplinary research *IJISRT* 2025: June

[25] Sujay Rao Mandavilli (2024) Implementing "Epistemic coherentism" in twenty-first century science: "Epistemic coherentism" as an essential pre-requisite of interdisciplinary and transdisciplinary research *IJISRT* 2024: November

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unsubstantiated and grandiose claims; use of dubious claims and devious tactics; goading people towards an action or a goal in a non-ethical way, working by cutting off flow of information, etc. Some people resort to coercion or bullying. Some confuse and confound people, and resort to any information overdose. Some resort to clever talk, weasel words, and insidious talk. Some pretend not to understand issues in some cases, or deliberately appear to be confused. Some prefer career advancement over scientific progress; some researchers may refuse to review papers that do not confirm with their own views.

Some individuals resort to making use of chaos and confusing to promote vested interests; they may also resort to misusing the errors of the era or zeitgeist to promote false and unacceptable views. Some resort to deceit and calumny, presenting non-established facts as facts, trying to use complex, bombastic language with the assumption that other person may not be able to understand it or will be flabbergasted, avoiding discussion or debate, assuming that there is no communication between sets of individuals to promote mischievous claims, assuming that other parties lack access to knowledge, etc. The latter is also associated with some form of intellectual naivety. This area of inquiry and field of study and action is so vast and indeed so humungous, that we believe that collaboration between philosophers of science and scholars of science on the one hand, and psychologists and behavioural analysts on the other is needed, and is indeed the crying hour of the day. Such a collaboration will do yeoman service to science and society as a whole, and can unearth and disinter new fallacies to boot. We must begin sooner than later. Therefore, it also goes without saying that a large number of fallacies must be grouped under, and associated with this head and categorization.

- *Conflict with Scientific Method*

The term “scientific method” refers to a systematic process that is primarily and chiefly used to investigate phenomena through the mechanism of objective observation and experimentation. Scientific method typically involves a series of sequential steps such as formulating a research question or a hypothesis, conducting research in a controlled and a systematic manner, formulating a testable hypothesis, testing hypotheses with an appropriately designed experiment, analyzing results carefully, and drawing a set of conclusions. Scientific method therefore, provides a logical framework for gaining reliable knowledge and is used to test explanations for observations. Therefore, it also goes without saying that a large number of fallacies must be grouped under, and associated with this head and categorization. For example, we may have poorly defined hypotheses, too many hypotheses, untestable hypotheses, mismatch between research question and design, no clear traceability across all steps of the scientific method, Inadequate comparisons, irrelevant comparisons, inadequate conclusions, untestable conclusions, excessive jargon and gibberish, etc. we may also have vague claims, weird or outlandish claims, and untestable claims. Again, narrative and discourse analysis needs to be employed and used along with argumentation theory, in order to unearth a large number of new fallacies. Needless to say, this needs to be a continuous and a grounds-up approach, technique and process. [26] [27] [28]

- *Mixes Science with Pseudoscience or uses Only Pseudoscience*

A core and a crucial component of science is the scientific method which adheres to a scientific method which is used to test and objectively evaluate claims. On the other hand, pseudoscience presents claims as being scientific (i.e. false claims presented under the garb and cloak of science) without employing or making use of evidence-based, and testable methods and techniques. Key differences between science and pseudoscience include the emphasis place by legitimate and bona fide science on falsifiability and independent third-party peer review, versus pseudoscience's primary reliance on biases, prejudices, experiential knowledge, anecdotal evidence and innate and inherent resistance to critical evaluation and scrutiny. Sometimes, vague and imprecise methods are used by pseudoscientists, along with calumny and deceit. Therefore, it also goes without saying that a large number of fallacies must be grouped under, and associated with this head and categorization. Again, narrative and discourse analysis needs to be employed and used along with argumentation theory, in order to unearth a large number of new fallacies. Needless to say, this needs to be a continuous and a grounds-up approach, technique and process. [29] [30]

- *Does not use Logic or Reasoning*

Logic as it is understood in science, and by the educated layman, connotes or refers to a systematic study of processes of correct reasoning, focusing primarily and chiefly on the principles and rules that allow for sound arguments to be made, and valid conclusions to be drawn. The term is derived from the ancient Greek word “logos”, which means "reason". Logic also seeks to analyze the relationship between premises and conclusions, identifying whether the truth of one or more of the premises leads to an epistemologically valid conclusion. We also then have the

[26] Merton, Robert King; Barber, Elinor; Barber, Elinor G. (2006). "Accidental Discovery in Science". *The Travels and Adventures of Serendipity: A Study in Sociological Semantics and the Sociology of Science*. Princeton, NJ: Princeton Univ. Press

[27] Kepler, Johannes (1604) *Ad Vitellionem paralipomena, quibus astronomiae pars opticae traditur* (Supplements to Witelo, in which the optical part of astronomy is treated)[c] as cited in *Smith, A. Mark (June 2004). "What Is the History of Medieval Optics Really about?". Proceedings of the American Philosophical Society. 148 (2): 180–194*

[28] Achinstein, Peter (2004). "General Introduction". *Science Rules: A Historical Introduction to Scientific Methods*. Johns Hopkins University Press. pp. 1–5

[29] Gordon MD (2021). *On the Fringe: Where Science Meets Pseudoscience*. Oxford University

[30] Newbold D, Roberts J (2007). "An analysis of the demarcation problem in science and its application to therapeutic touch theory". *International Journal of Nursing Practice*. 13 (6): 324–30

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concept of a syllogism which is a type of logical argument that uses deductive reasoning in order to arrive at a conclusion from a set of (usually two or more) given propositions or premises. Logic is often classified into informal logic or everyday logic, and formal logic, or structured logic. Sometimes, symbolic or mathematical logic is also used. Reasoning on the other hand, stands for a cognitive process of drawing conclusions or making inferences from existing knowledge and information, and involves critical thinking, judgment, and decision making skills. Individuals may not employ sound logic and reasoning either in the production of scientific work, or evaluation or criticism of work by other scholars. For example, they may adopt the position of unacceptable or disproportionate criticism. They may also attack the fringes of a proposal, rather than its central concepts or tenets.

Therefore, it also goes without saying that a large number of fallacies must be grouped under, and associated with this general and broader head and categorization. While many more fallacies can be identified under this head, we will probably need horizontal collaboration between logicians and philosophers of science on one hand, and behavioural scientists and analysts on the other hand. Again, narrative and discourse analysis needs to be employed along with argumentation theory, and used in order to unearth a large number of new fallacies. Needless to say, this needs to be a continuous and a grounds-up approach, technique and process. No one person or individual can adequately perform the task.

- *Non-Optimized and Non-Ideal Solutions*

Sometimes, non-tweaked, non-optimized, and non-ideal solutions may be presented by scientists. This may be either due to personal bias or prejudice, or lack or absence of competence or knowledge. For example, weak data and evidence may be used to support or argue for a claim. We had discussed the difference between strong evidence and weak evidence in a previously published paper. The title of the paper was "Differentiating strong data and evidence from weak data and evidence: Another heuristic for use in general and social sciences research". Therefore, it also goes without saying that a large number of fallacies must be grouped under, and associated with this head and categorization along with other residual categories. For example, a researcher may choose to ignore public trust and public opinion, avoid objective scrutiny, avoids functional and utility based approaches, avoid interdisciplinary and transdisciplinary approaches, avoid the use of foundational knowledge, avoid innovative and creative thinking, recommend highly improbable solutions, avoid irreducible simplicity; i.e. complicating issues, sticking to issues with narrow scope and limited significance, etc. Sometimes, unqualified statements are made, excessive weightage is given to public opinion, and some scholars and researchers resort to misusing misinformed public opinion for their own petty or devious end. Again, we have had the strange case of Dr Gregory Possehl putting or airs and dominating the show, despite his poor grasp and knowledge in matters pertaining to Ancient India, the Indus valley civilization excluded. Again, narrative and discourse analysis needs to be employed along with argumentation theory, and used in order to unearth a large number of new fallacies. Needless to say, this needs to be a continuous and a grounds-up approach, technique and process. [31]

B. Indirect Fallacies or Situations that Create a Fallacy

We had earlier also distinguished between formal fallacies and informal fallacies, and had proposed an entirely new distinction, namely direct fallacies and indirect fallacies. The latter only influence scientific outcomes indirectly, and one or more downstream fallacies could be tied to them. They may also be labeled and termed as fallacy inducing situations because they have the potential to negatively impact the quality of research in many indirect ways. Therefore, it also goes without saying that a large number of fallacies must be grouped under, and associated within the head and categorization of indirect fallacies. While many more fallacies can be identified under this head, we will probably need horizontal collaboration between logicians and philosophers of science on one hand, and behavioural scientists and analysts on the other hand. Other specialists may also need to be roped in, as and when the need arises. Again, narrative and discourse analysis needs to be employed along with argumentation theory, and used in order to unearth a large number of new fallacies. Needless to say, this needs to be a continuous and a grounds-up approach, technique and process. We also stand by, and abide by this classification because we are more preoccupied and concerned with the social, cultural and emotive aspects and components of science. We also list indirect fallacies because it will allow and enable other researchers to document new fallacies much more easily and quickly.

- *Non Service to Science, Society and the Education System Fallacy*

Many scientists still stick to the non service to science, society and the education system fallacy. For example, while Indology may have started off on a somewhat firm footing in the eighteenth century after some earlier account of India by Megasthenes and Alexander the Great some two thousand years ago, it has at the present point in time, degenerated and deteriorated into an incoherent mess, full of paradoxes and contradictions. It was somewhat controversial earlier on, but it is now virtually on its deathbed, and faces terminal decline, awaiting a fresh reboot. Some fifteen years ago, Witzel who had come under the influence of Steve Farmer, corresponded with the Author stating that this was barely the case. The jury is out on who is right and who is wrong. Let the informed, education, and the non-prejudiced public and laity decide. Service to science, society and the education system must be the motto and guiding star of any scientist, scholar, researcher and public intellectual; yet, that is barely the case now. Codes of conduct barely apply to most scientific professions under the sun, and even if they do, are barely taken seriously. Intellectualism itself is badly

[31] Sujay Rao Mandavilli (2025) Differentiating strong data and evidence from weak data and evidence: Another heuristic for use in general and social sciences research *IJISRT* 2025: June

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obsolete. Such attitudes are barely conducive to the production of high-quality scientific knowledge, and may induce fallacies indirectly. That is why we had written about the need for a school of twenty-first century intellectualism extensively. The name of the paper was, “Redefining Intellectualism for a post-globalized world: Why present-day intellectualism is obsolete and why a comprehensive reassessment of intellectualism is required”, and it was published in August 2023. 32

- *Arrogance and Disrespect*

A person may be described and styled as arrogant if he has an excessive feeling of self-importance, and falsely believes that he is better or superior to other people. This may be demonstrated through assertive, unpleasant, demonstrative, and dismissive behavior, often looking down on others superciliously and condescendingly, while also ignoring their feelings and opinions. Arrogance may be demonstrated through behavioural traits, perception, and may be driven by underlying insecurity or inferiority complexes, persecution complexes, etc. Disrespect is the act of showing or demonstrating a complete or total lack of respect, esteem, or courtesy toward someone or something. It is often characterized by rude, bossy, domineering and disrespectful behavior and can be communicated through verbal and nonverbal acts of commission and omission. Such an attitude is barely conducive to the production of high-quality science.

- *Hubris*

Hubris is similar to arrogance and to pride, but there is a subtle difference between the two. Hubris may be defined as an extreme, arrogant, or excessive form of pride or self-confidence that leads a person to repeatedly ignore warnings, overestimate their own competence, and defy limitations. In the opinion and view of both ancient forms of inquiry and modern scientific traditions, this overconfidence often precedes a dramatic downfall. As they often say, “After a pride, always comes a fall”.

The concept of hubris is thought to have it roots in early and ancient Greek society, where it was considered to be a serious offense against the gods and the natural order. Individuals who displayed any form of hubris, were considered to have exceeded a threshold, and were punished and reprimanded with severe punishments. Examples from Greek mythology included Icarus who flew close to the sun, Arachne the boastful weaver, and Oedipus the arrogant. Hubris may led to downfall. As they once said, “The sun never sets on the British empire”; but that empire is now history. We had also described the phugoid cycle in our papers on Anthropological Economics. Even Indians too are not free from what we had called “pompous naivety” at least many of them.

- *Snobbish Attitude and Snobbery*

This class of attributes we believe is so extremely important that we believe it to be no offense to repeat it multiple number of times. However, each categorization is different, hence this approach. Snobbery refers to the general attitude of a person who believes they are superior to others based on their own superficial and self-proclaimed traits and characteristics such as social class, wealth, power, position or pelf. This sense of superiority typically leads to a condescending and disdainful behavior and attitude for those they consider to be inferior. Snobbery may also be rooted in deep-rooted personal insecurity and the need and desire to feel important. The key characteristics of snobbery include condescension, exclusivity, self-appraisal and self-judgment, pretentiousness, deceit, and concept. Examples of snobbery include class snobbery, social snobbery, intellectual snobbery, cultural snobbery, and racial snobbery.

- *Revenge and Vendetta*

Revenge may refer to the act of retaliating or retributing for a wrongful act or injury by inflicting harm on the person responsible, as a form of a self-initiated compensation. Revenge is often motivated by a desire for vengeance or retributive justice, and often driven a desire to "get even", “play it fair and square”, or punish someone for a grievance, whether real or alleged, and with or without evidence. Vendetta on the other hand, refers to a prolonged and bitter feud often marked and characterized by bitter violence and malevolence, between families or rival political or non-political groups. The term is directly traceable from the Italian language and has its origins in Latin for "vengeance". Vendetta is often driven by prolonged and repetitive cycles. It is intellectual and scientific vendetta that we are more concerned about. Scientific feuds, or bitter rivalries between scientists, are a commonplace occurrence, and an intrinsic part of the history of science. These are often torched and fueled by ambition, ego, and competition for credit, funding, and reputation. These conflicts are a mixed bag, and can be either productive or non-productive. These can accelerate discovery but may also be associated with adverse and negative consequences such as character attacks, plagiarism, and misconduct.

- *Nonchalance and Indifference*

Nonchalance refers to the state or quality of being nonchalant. This is generally associated with a calm, relaxed and detached demeanour or conduct that suggests a total lack of concern, empathy, limited to no enthusiasm, or absolute disinterest in affairs in which they ought to show interest and commitment. A nonchalant person maintains a generally composed or detached attitude even in situations that might otherwise provoke strong emotions in other individuals. However, the underlying intensions of this casualness may vary on a case to case basis, but has mostly negative connotations, barely positive. For example. It can be a genuine personality trait carried forward since childhood, a deliberate tactic or an emotional mask, or a callous and an unthinking response. Nonchalance is similar to apathy and emotional unavailability, though there are slight differences in meaning between all the three concepts.

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Nonchalance is also different from stoicism, as the latter is mostly seen in a positive light. Indifference on the other hand refers to the total or complete absence of interest, feeling, or concern toward someone or something. It is similar to apathy and mostly has a negative connotation. This kind of an approach is common among some scientists, as many may by driven by academic or institutional pressure or careerism.

- *Intellectual Aloofness*

Aloofness in general refers to the quality of being distant, stoic, detached, or uninvolved in a given situation or context, leading to scenarios in which the individual appears unfriendly, callous or uninterested. The term can also be used to describe a person's or an individual's behavior, such as being reserved, standoffish, and reticent and not willing, eager or enthusiastic to participate in activities. It may also refer to an emotional and mental state of being shy, withdrawn and unapproachable. A person exhibiting aloofness might be unsympathetic, unapproachable, or not amicable or friendly. Aloofness is most often seen as a state of mind, much less commonly a perception. Intellectual aloofness can be academically and intellectually disastrous, given that it can induce scholars into fantasy, make believe worlds, and make them lose touch with reality. It can therefore, trigger errors and fallacies in the long run.

- *Lack of Aptitude and Temperament*

Aptitude in general refers to a natural ability or a natural and an inborn (often deeply ingrained) talent to learn or perform a task quickly, easily or readily, and it is often measured by means of a an suitably designed and devised aptitude test. These tests evaluate various aspects of an individual including his cognitive abilities such as logical reasoning skills, problem solving skills, numerical skills, and verbal ability. Aptitude may either be a more general capacity or a specific talent, and is quite different from knowledge or skill, given that aptitude denotes the ability to acquire a knowledge or skill. In the realm and context of general and applied psychology, the term "temperament" broadly refers to consistent individual differences in behavior that are mostly biologically based and are relatively independent of learning, system of values and attitudes. Aptitude and temperament may vary widely from researcher to researcher, and this naturally impacts the quality and quantum of scientific output.

- *Behavior Arising from Inferiority Complex*

An inferiority complex refers to a persistent and a constant feeling of insecurity or inadequacy in individuals, leading to low self-esteem, self-doubt, and the belief that one is fundamentally deficient compared to others. Inferiority complexes are mostly studied at the level of an individual, though they may be studied at the level of a group, culture or society as well. Inferiority complex can manifest itself in the form of social withdrawal and less commonly aggression which is used to compensate for a feeling of deficiency, and it can be carefully and systematically managed through long-term therapy or self-help methods. Key characteristics of inferiority complex include chronic feelings of inadequacy, low self-esteem, continuous and constant self-doubt, and inability to take productive action.

- *Behaviour Arising from Persecution Complex*

A persecution complex, which is also less commonly known as a persecutory delusion, is a persistent, and an irrational belief that one is being unfairly targeted, harmed, or conspired against by other people or groups of people, even when there is no evidence or evidence to the contrary. Persecution complex may be tied to or associated with many types of mental health disorders, such as schizophrenia, compulsive obsessive disorder, bipolar disorder, etc.

- *Non-Conformist Attitude or Rebellious Attitude Fallacy*

Nonconformity in general refers to the general failure or overt refusal of individuals to follow the norms, customs, or standards prevalent in a group or in a given society. It may even refer to situations where individuals deliberately express different opinions and act in ways that deviate from or defy social and cultural norms, traditions and expectations. The term non-conformity is also widely used in the context of the social sciences. In social psychology and sociology, for example, nonconformity is viewed in opposition to conformity, the latter being the act of aligning one's own beliefs, views, attitudes, norms', and behaviors with those of others. Non-conformity can be driven by feelings or a desire for independence, anti-conformity bias, a desire to induce social and cultural change, or sheer intellectual ability, skills and talent. Non-conformity can be either positive or negative. For example, some individuals may desire to promote or drive social change; other research suggests that highly intellectual individuals are more likely to be non-conformists.

- *Fallacies Arising from Ethnocentrism and Ethnic Rivalry*

Ethnocentrism in general refers to the tendency to view one's own native or adopted culture, ethnic group, or nation as the epicenter and be all and end all of everything and to judge all other groups by its own standards, norms and yardsticks. Ethnocentrism also consequently and resultantly involves the mistaken belief or notion that one's own culture or way of life is innately and inherently superior to that of other cultures. Ethnocentrism typically leads to cultural biases, prejudices, stereotypes, and misunderstandings. The term is generally attributed to the American sociologist William Graham Sumner in his 1906 book "Folkways", in which he defined it as the perspective which views "one's own group as being the epicenter of everything, with all other cultures being scaled and rated in relative terms with reference to it". While ethnocentrism may lead to group loyalty, group cohesion and a diffusion of tradition, it can also breed and engender vanity, close-mindedness, and pride. Ethnic rivalry often refers to a fierce rivalry between ethnic groups. While it can have positive aspects, it has mostly a negative connotation.

- *Fallacies Arising from Jealousy*

Jealousy is a highly complex and a multilayered emotion that stems or arises from an individual's the fear or perceived threat of losing something or someone he values

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and cherishes to another third party or a rival. Even though the term is sometimes used interchangeably with envy, jealousy generally and typically involves the fear of losing what an individual already has or possesses, while on the other hand, envy is the desire to possess or acquire what another individual owns or possesses. Envy often arises from comparing oneself to someone else who is perceived to be superior, privileged or advantaged, and yearning or longing for a quality, possession, attribute, characteristic, accomplishment, or achievement that they themselves do not have. The latter is most commonly driven by rivalry or resentment, less commonly by admiration or aspiration.

- *Untrained in Science or Scientific Method*

The term "science" which is very broadly and widely used in many walks of everyday life refers to a systematic and organized discipline and field of endeavour that systematically builds upon, and organizes knowledge in the form of testable hypotheses and predictions about all facets of the natural and non-natural world. It therefore has two distinct meanings. On one hand, it may refer to a body of reliable scientific knowledge, while on the other hand it may also refer to the process and the mechanism by which that knowledge is built upon, tested, refined, and confirmed or refuted. The scientific process is driven by systematic observation, objectivity, skills, knowledge, and a strong desire to solve everyday intractable problems and gain a deeper and a broader understand of how the world works. The scientific method which is also vital and central to science, is used to describe a logical, and a systematic approach that is used to investigate natural phenomena and establish facts through a rigorous process of testing and experimentation. The steps in scientific method include observation, hypothesis formulation and building, experimentation, analysis, and documentation of results. Scientific results must also be formally and appropriately communicated to the general public. Wherever, scientists lack a formal training or understanding on the core concepts of science, errors and fallacies will invariably and inevitably result.

- *Lacks Knowledge or Scientific Knowledge, Skill and Expertise*

Scientific knowledge refers to a reliable and an internally and externally consistent body of knowledge about the universe that is carefully, systematically and methodologically built, tested, and refined over a period in time by a diverse set of scholars and by employing the scientific method. Scientific knowledge must be distinguished from all other forms of knowledge because it is always based on facts and empirical evidence, is open to scrutiny, constant assessments and reassessments, revision, and relies solely and chiefly on logic and reasoning as opposed to mere beliefs, intuitions, hunches, gut feel, or traditions, both intellectual and non-intellectual (also scientific and non-scientific). Scientific knowledge is always empirical, observable, testable, provable, verifiable, falsifiable, dynamic, sell-correcting, self-regulating, objective and universal. Wherever all the above attributes or characteristics are not fulfilled, met or satisfied for some reason or the others, fallacies and logical absurdities will invariably and inevitably result.

- *Lacks Access to Knowledge*

Knowledge drives all aspects of everyday life, along with data and information. Knowledge is the very foundation of science and technology along with scientific method, dexterity, talent, aptitude and skill. Knowledge at a very broad level, encompasses both awareness and understanding of hard facts, truths, and skills, acquired through formally or informally through prolonged experience or education. The formal field of study of knowledge is referred to as epistemology, which deserves to be a vital and vibrant field of study and inquiry. In the broad field of epistemology, knowledge is a highly important, pivotal and central concept, and is often characterized as "justified true belief" which must be distinguished from unfounded or baseless opinions.

- *Conflict of Interest and Vested Interests*

We have classified this as both a direct and an indirect fallacy. A conflict of interest (A term that is becoming increasingly common in the social sciences) typically refers to a situation in which a person's personal or private interests conflict with, or adversely impact their professional duties or professional responsibilities. This kind of a conflict may or may not imply any wrongdoing, malfeasance, or fraud. A vested interest on the other hand, is a personal stake or involvement in the success or failure (i.e. outcome) or an event or occurrence with a pecuniary or non-pecuniary gain or loss. It provides a basis for acting or behaving in a certain way, especially to protect one's own monetary or non-monetary well-being.

- *Dogma and Rigidity of Thought or Intransigence of Thought*

Dogma, the way most people understand it refers to a single belief or set of different but often related beliefs that are held as being authoritative and unquestionably or incontrovertibly true by a particular individual or by a particular group. The term also sometimes has a more neutral meaning or connotation, referring to the fundamental and foundational principles of a system, particularly a complex one, but it is more commonly used with a negative connotation to imply that a belief is adhered to, or a statement is made without adequate or sufficient grounds or that its proponents are not willing to discuss it openly and freely. This may be due to vested interests, conflict of interests, ideology, or lack of knowledge and awareness. Dogma is also somewhat like intransigence which connotes the refusal of an individual to change one's views or opinions pertaining to an issue to agree about something. Dogma can be found either in religion or in science. It would be fallacious to claim that all scientists are non-dogmatic. This is what we have been harping on all along. Dogma will perhaps reduce if scientific method itself improves, or the philosophy of science gets a foundational reboot. Dogma often arises from dogmatism which refers to a rigid and non-changing attitude espoused by an individual.

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- *Lack of Flexibility and Dynamism*

The word flexibility in the English language and in everyday usage and parlance, refers to the ability of an individual or a group of individuals to change, adapt, or adjust easily to suit new or altered conditions or situations. This concept applies to many different contexts, but it is mental flexibility that we talk about here. This is naturally different from physical flexibility which is an altogether different concept. Dynamism refers the quality of being characterized by continuous change, or adapting dynamically to progressive change. Dynamism It contrasts with stasis, rigidity or a fixed, and an unchanging state and can be variously applied to peoples, abstract entities, or systems. We must also talk about vitality and vigour here; these are also related and vital concepts.

- *Lack of Analytical Ability*

The term "analysis" is being increasingly and widely used in today's world, and in some respects is the exact opposite of synthesis. It refers to a process by means of which a complex entity or issue is broken down or segmented into smaller, and much more understandable parts in order to comprehend or derive its nature, essential functions, essential features, or relationship with other entities. As a fundamental technique, it is widely used across a wide range of disciplines, ranging from the physical science and computer sciences to psychology and the social sciences. The general process of analysis include objective definition, gathering of data and information, breaking down and analyzing the information received, modeling, transformation of data, and arriving at conclusions.

- *Lack of Scientific Autonomy*

Autonomy in simple and plain language, refers to is the capacity of an individual, group, or entity to make its own informed, and uncoerced decisions without undue external pressure or influence. The concept originates from the two ancient Greek words auto (or self) and nomos (meaning law or rule). Therefore, the term autonomy literally means "self-governance". Autonomy is a complex idea that has been explored across multiple fields, including, but not limited to, psychology, philosophy, sociology, and political science. Lack or absence of scientific harmony can naturally adversely impact the quality of an individual's intellectual and creative output.

- *Lack of Balance and Harmony*

Balance in a general sense of the term, refers to a state of equilibrium, stability, or harmony between two or more opposing forces, elements, needs, or forces that are fundamentally in conflict or opposition to one another. The specific meaning of the term depends on the context, such as physical balance in the human body arising from, or attributed to brain functions, work-life balance, financial balance, or balance in nature. The term balance can therefore, have a physical or a mental, i.e. non-physical connotation. Harmony refers to the combination of parts into a congruent, pleasing or an orderly whole, characterized by overall agreement. It is used either in a mental, visual or an acoustic sense. Other related terms include poise, equipoise, and equanimity. The term poise is primarily used in a physical sense, while the term equipoise is mostly used in a mental sense. Equanimity refers to calmness and composure, particularly in a difficult situation.

- *Lack of Breadth of Vision*

The term "vision" in our terminology and intent, refers not to the physical sense of sight, but the stated or conceived long-term goals of an individual or an entity. The specific meaning therefore, is much more dependent on the context, and on the situation. A personal vision therefore is a very powerful tool that guides an individual's life, career, and accomplishments throughout his life. It is therefore a strategic and a long-term, and a comprehensive picture of how a person wants their life to look, encompassing personal and professional goals, intentions, and core and foundational values. Breadth of vision refers to a kaleidoscopic and a 360 degree vision that an individual possesses or must possess. People without vision are likely to stumble and falter badly.

- *Lack of Clarity of Purpose, Sense of Purpose and Direction*

Clarity in the generally understood sense of the term refers to the quality and attribute of being clear, easily understood, and free from any form of confusion or ambiguity. Clarity of purpose on the other hand, refers to the deep, and the fundamental understanding of a person's own goals and aspirations, and the driving forces or reasons behind them. A sense of purpose also provides a strong sense of direction, focus, and motivation. People without clarity of purpose and a sense of purpose and direction are likely to stumble and falter badly in all walks of life.

- *Lack of Capability and Expertise*

The term capability usually represents the power or ability of individuals to perform a task effectively and efficiently. The term is often applied to individual, thought not always. In some contests, it applies to organizations. Incapable individuals tend to perform rather badly in their research careers. So will capable individuals in an inefficient organizational setting. Expertise on the other hand, is a high level of specialized skill or knowledge acquired over a period in time through extensive study, training, or practice. An individual with a high level or degree of expertise, is almost certain to achieve a superior degree of performance in their field compared to a novice, and one who is untrained in the field or profession.

- *Bad Character*

The term character has several distinct and non-overlapping meanings, though it most commonly connotes an individual's moral qualities, his mental or emotional make up particularly with respect to his ethics or morals, and less commonly his standing or reputation in society. The term in this context is most commonly used in psychology and ethics, and is contrasted from personality, which is deemed to be more representative of an individual's general behavioral patterns. Key aspects of an individual's character include his moral compass or moral framework, integrity, principles, value systems and strength of character.

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➢ *Poor Collaborative Skills*

Collaboration refers to the process by means of which, sand through the mechanism of which, two or more people or organizations work together in harmony and unison to create something or achieve a common or a shared goal. Quite unlike cooperation, collaboration implies a much deeper, and more active partnership where participants pool resources, ideas, and knowledge. Key characteristics of collaboration include shared ownership, active contribution by all members involved, commonality of purpose, and interdependence of tasks. Individuals must be able to communicate effectively with others within and outside organizations, and within and across functions and disciplines. Individuals with poor communication skills are likely to fail badly, and quite catastrophically too.

➢ *Lack of Commitment and Dedication*

The term "commitment" refers to a quality or attribute of being dedicated or obligated to a cause, or to a course of action. Commitment requires a willingness to dedicate time, energy, or resources to something one believes in or cherishes and is an extremely powerful motivator for human behavior, and often goads them to accomplish great tasks. The term "dedication" on the other hand, refers to the quality of being devoted or committed to a task, or to a purpose or cause. It is also in some ways associated with devotion to a cause. Both devotion and dedication are characterized by unwavering focus, commitment, hard work, and the willingness to allocate a significant amount of time and energy to a cause one believes in. Key aspects of dedication include motivation, perseverance, passion, and sacrifice.

➢ *Poor Communication Skills*

The term communication is widely used in everyday life, and both in scientific and non-scientific activity. The term communication in general refers to the process of conveying information, data, concepts, ideas, thoughts, and feelings between two or more people through a shared and mutually understandable system of signals. This is a fundamental aspect of human interaction and most commonly involves a sender, a message, and a receiver, with the goal exchanging messages with one another. Encoding and encryption and decoding and decryption are also typically employed. A person or an individual with poor communication skills is likely to perform poorly in scientific activity, and commit a large number of errors or fallacies.

➢ *Lack of Comprehension and Understanding*

Comprehension refers to the general ability of individuals to understand or decipher something, regardless of whether it is written, spoken, or observed materials. Comprehension refers to the mental process of grasping the meaning or significance of information and forms an integral part of the process of learning and communication. Understanding on the other hand, is a complex cognitive process that involves grasping the meaning and significance of information by making course connections as needed, gauging and grasping underlying principles, and constructing mental models as and when necessary. Understanding extends far beyond merely acquiring knowledge or rote memorization of facts, and it allows individuals to interpret, explain, and apply what they have learned in a specific or a given context.

➢ *Lack of Conceptualization and Abstraction Skills*

Conceptualization refers to the extremely important and vital act or process of forming a clear, specific idea or concept in the researcher's mind. Conceptualization skills represent a foundational step in various academic fields, right from scientific research to problem-solving, and its it is widely and foundationally used to refine broad, and relatively imprecise and abstract ideas into cogent, coherent and precise, frameworks. In academic and social science research, conceptualization is the process of precisely defining what a researcher means by different concepts and variables used in his study with the goal of eliminating confusion as far as possible, and ensuring that the intended audience of the research has an unambiguous and precise understanding of the concepts being investigated. Abstraction on the other hand, refers to the process of simplifying complex ideas, objects, or phenomena by focusing only on their bare essential, while removing less important and trivial details. Abstraction is widely used in many disciplines to manage complexity, eliminate redundancies and enable clearer thinking.

➢ *Lack of Credibility and Reputation*

Credibility refers to the intrinsic quality of an individual to be trusted or believed, particularly in this case, pertaining to intellectual matters. Credibility is not generally a quality or an attribute a researcher assigns to himself; alternatively, it is granted by an audience or the general public over time based on a number of critical factors. Credibility is key to effective communication and dissemination of ideas, and is highly important in fields such as research and scholarship. Researchers without credibility are perceived poorly, and even perform poorly in many cases, due to credibility deficit. Such researchers may be more prone to tampering with and manipulating data, for example. Key components of credibility include trustworthiness of character, expertise and competence, dynamism and vitality. Originality and quality of research also matter and count. Reputation on the other hand, refers to the collective opinion or perception that people have about a researcher or organization, based on their demeanor or actions. Unlike credibility, which can be assessed much more quickly and readily, reputation is generally seen as a long-term, socially constructed concept that can be either favorable or unfavorable to an individual, constituting either and asset or a liability.

➢ *Lack of Critical Thinking Skills*

Critical thinking refers to a streamlined and an intellectually disciplined process of dexterously and skillfully scrutinizing, conceptualizing, analyzing, synthesizing, applying, and evaluating information on various fronts and dimensions of study. Critical thinking as such refers to a higher-order thought process that goes way beyond simple observation and rote memorization of facts and form a judgment based on a reasoned analysis. Critical

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thinking is a necessary adjunct and concomitant for success in various walks of professional and personal life, as it allows for individuals to make informed decisions and solve complex and seemingly intractable problems. Lateral thinking or thinking outside the box as described by the notable psychologist Edward de Bono, is a method of problem-solving that uses an indirect, creative, and non-linear approach to find unconventional solutions. Lateral thinking replaces vertical thinking, and looks at issues from radical and highly unconventional perspectives. Quite literally it looks at issues "from outside the box" as a metaphor for creative and radical thinking and thought processes.

- *Lack of Intellectual Curiosity*

Intellectual curiosity refers to a person's intrinsic inquisitiveness that is often driven by motivation and desire to seek out knowledge deeply and comprehensively and gain a broader understanding about the world at large. Intellectual curiosity often drives individuals to explore issues, ask deep and probing questions, and engage deeply and multifacetedly with their subjects of interest or intellectual engagement, and also helps them move beyond a superficial understanding to find deeper and hidden answers to challenging questions. Intellectual curiosity is often considered to be a key requisite for personal growth, academic and professional success, and intellectual development. Lacking intellectual curiosity will render individuals unable to learn.

- *Lack of Dependability and Reliability*

Dependability refers to the general quality of being trustworthy and reliable at an individual level. A dependable person is one who can be trusted to deliver what is expected from him and required out of him, consistently and over a protracted span of time. Individual reliability on the other hand, represents the degree to which a person can be consistently relied upon to perform a task or behave in a predictable and in a non-irregular manner. individual reliability is therefore, a multifaceted concept encompassing a wide range of behavioral, psychological, and situational factors. It is of great importance for building both trust and reputation, and effective collaboration in many types of personal and professional settings. Core components of individual reliability include consistency, accountability, integrity, and proper communication skills at the very least. Dependable and reliable scholars may produce more reliable and consistent findings, given the fact that they have a reputation to protect, rather than an ego to satisfy.

- *Lack of Intellectual and Academic Discipline*

The word discipline has several distinct and differentiated meanings based on the context in which it is used and applied. however, it fundamentally refers to a controlled, systematic, methodological and an orderly approach, whether applied to oneself, others, or in an academic field. Self-discipline is the ability to manage one's own actions, emotions, and thought processes in the face of temptation, adversity or challenges in order to achieve a specific goal. Academic discipline refers to a branch of knowledge or a specialized field of study taught and researched in higher education. Disciplined researchers produce better quality research than undisciplined ones, and do so consistently.

- *Inability to Work Hard*

Hard work refers to the application of a great deal of effort, commitment and dedication toward a goal or a cause, even when faced with daunting challenges and pitfalls. It involves persistence, discipline, and stamina to see a task through to completion, while overcoming all forms of negativity and potential lack of motivation. Hard work is sometimes seen as an intrinsic or an inherent trait, but is also a cultivated and inculcated attribute that results from conscious choices. Hard work is essential for achieving success in any field of endeavour and study along with smart work. The two are often seen as complementary, and go hand in hand with one another. People who work hard produce better quality results, and are prone to committing less number of errors.

- *Absence of Efficiency and Thrift*

Efficiency refers to the ability of an individual to achieve a maximum degree of output with a minimum level of input, by minimizing waste of resources such as time, effort, money, and materials. This is often done by means of carefully orchestrated strategies and practices developed over time. Efficiency is often a core concept for success and accomplishment in various fields, whether it be research, academic pursuits, or personal productivity. Efficiency is sometimes contrasted with effectiveness. While an effective action achieves a desired result, an efficient action achieves that result in the most optimal way by minimizing inputs such as time and effort. For best results, a judicious and harmonious mix of both would be required.

- *Compromise with Ethics*

Ethics is a very important branch of philosophy, which is also known as moral philosophy. Ethics is a field which probes and investigates questions about what constitute morally right or wrong actions and behavior in a given context or setting. Ethics seeks to provide a systematic and a rational framework for guiding decisions, evaluating actions, and navigating moral dilemmas in various facet of professional and personal life, right from individual behavior to complex social issues. The term is sometimes used interchangeably with "morality," though there is a distinction between the philosophical study of ethics and the practical beliefs, traditions and customs of morality. Scholars and researchers who do not adhere to values, norms and ethics in their professional and academic life are naturally more prone to committing fallacies and errors than those who do.

- *Lack of Creativity, Innovation and Imagination*

Creativity refers to the ability of an individual to produce novel and valuable ideas or works by using his fecund and fertile imagination and by combining existing knowledge in new and novel ways. Creativity may be defined as a cognitive process that enables individuals to solve problems, communicate, and create in unique and often in different ways, and it applies to scientific activity as

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well. Innovation on the other hand, refers to the practical implementation of creative ideas that result in the introduction of new scientific or intellectual output. Innovation often helps converting creative ideas into tangible value for society or for science. Imagination however, is a valuable cognitive tool, and it represents the ability to envisage new scenarios, and form ideas of things that are not present or have never before been experienced by other scientists or researchers.

- *Absence of Intellectualism*

Intellectualism is a very important perspective in science and intellectual creativity that emphasizes the use, development, and exercise of the intellect or of intellectual faculties, or alternately mental acumen and thought process. Intellectualism is often identified with what is called the "life of the mind" and a dedication to intellectual pursuits, requiring skills such as critical thinking, research and synthesizing ability, reflection, rumination and introspection. An intellectual approach typically prioritizes reason, facts, and knowledge over base emotions, instincts, dogma and assumptions. We had also suggested in our multiple papers and publications that present-day intellectualism is badly outdated, and is in a dire need of a radical overhaul. Readers are kindly requested to refer to those papers for further and additional details.

- *Lack of Precision, Accuracy and Rigour*

Precision refers to the quality of being exact, precise, consistent, and highly reliable. The term precision when viewed in a technical or scientific context, refers to the consistency or repeatability of a measurement over several experiments, regardless of whether that measurement is correct or not. The term can also apply to the social sciences, i.e. human actions and communication patterns, where it refers to accuracy of performance and execution. Exactitude on the other hand, refers to the quality of being highly accurate and precise with a strong commitment to correctness and precision thrown in. Accuracy is the quality of being correct, true, or exact, at all times, and the term is generally contrasted with precision, which refers to the consistency or repeatability of a measurement. Rigour refers to the quality of being extremely thorough, meticulous and careful at all times. It is often applied to intellectual or academic work to ensure it is robust, unbiased, and free from inconsistencies. The term emphasizes a disciplined and meticulous approach to a task, whether it's a scientific experiment, a philosophical argument, or a process.

- *Absence of Problem Solving Skills*

Problem-solving skills refer to different abilities and techniques researchers and scientists may use in order to identify, analyze, and resolve difficult issues effectively. Problem solving skills usually involve a combination of different types of cognitive, analytical, and creative thinking skills that are used to navigate seemingly insurmountable obstacles and achieve desired outcomes in a wide variety of contexts and situations which include professional and scientific settings. Core components of problem-solving skills include effective problem definition skills, conceptualization skills, analytical skills, ideation skills or brainstorming skills, etc. Traits and abilities that support problem-solving include creativity, imagination and critical thinking skills. Absence of such skills will render researchers less effective and efficient.

- *Absence of Logic and Reasoning*

We have defined absence of logic and reasoning as both a direct fallacy and an indirect fallacy. Logic as it is understood in science, and by the educated layman, connotes or refers to a systematic study of processes of correct reasoning, focusing primarily and chiefly on the principles and rules that allow for sound arguments to be made, and valid conclusions to be drawn. The term is derived from the ancient Greek word “logos”, which means "reason". Logic also seeks to analyze the relationship between premises and conclusions, identifying whether the truth of one or more of the premises leads to an epistemologically valid conclusion. We also then have the concept of a syllogism which is a type of logical argument that uses deductive reasoning in order to arrive at a conclusion from a set of (usually two or more) given propositions or premises. Logic is often classified into informal logic or everyday logic, and formal logic, or structured logic. Sometimes, symbolic or mathematical logic is also used. Reasoning on the other hand, stands for a cognitive process of drawing conclusions or making inferences from existing knowledge and information, and involves critical thinking, judgment, and decision making skills. Individuals may not employ sound logic and reasoning either in the production of scientific work, or evaluation or criticism of work by other scholars. For example, they may adopt the position of unacceptable or disproportionate criticism. They may also attack the fringes of a proposal, rather than its central concepts or tenets.

- *Lack of Enthusiasm, Energy and Resourcefulness*

Enthusiasm in general refers to feeling of intense and sometimes infectious excitement, and a high degree of interest, eagerness, or motivation toward a specific activity, subject, or goal, that goads them and motivates people and individuals to perform better and contribute more. Enthusiasm is therefore a vibrant and a proactive that energizes individuals, radiates energy, and can also inspire others in turn. Characteristics of enthusiastic people include an optimistic outlook, infectious amounts of energy, vitality and dynamics, goal-oriented actions, passion, etc. Benefits of enthusiasm include increased levels of motivation and productivity, enhanced creativity and innovation, higher levels or morale, and enhanced well-being and personal growth. Lack of enthusiasm, energy and resourcefulness leads to lower quality results on the whole.

- *Absence of Scientific Temper and Skepticism*

Scientific temper is a intrinsic and an inherent way of life in individuals that involves using scientific method to approach problems and make informed and calculated decisions, rather than relying on superstition, prejudice, bias, preconceived notions, or traditions alone. A scientific temper also requires rational thinking, curiosity, and evidence-based decision-making. The term is attributed to

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India's first Prime Minister, Jawaharlal Nehru, in his 1946 book, "The Discovery of India" which was written while he was in prison. Core components of scientific temper include a questioning and reasoning attitude, open-mindedness, and what we call objectivity in mindset. Skepticism on the other hand, denotes a questioning attitude or doubt towards any claim or belief, requiring suspension of judgment until sufficient evidence is gathered or furnished. Both scientific temper and skepticism are required for high-quality scientific activity, and are necessary to avoid errors or fallacies. Skepticism must be distinguished from skeptopathy or pathological skepticism; the latter is highly undesirable, and is mostly seen in a negative light.

- *Inability to Keep Oneself Uptodate with Latest Research*

Individuals, particularly researchers, scientists and scholars must possess the ability to keep abreast of the latest goings on or happenings in their respective fields of study and inquiry. Not doing so, will render them ineffective and obsolete. Unfortunately, many individuals become obsolete subconsciously or unconsciously, and from our observation and assessment, most colonial Indologists are badly outdated.

- *Excessive Preoccupation with Religion or Religious Identity*

Religion may be defined as a social-cultural system of attitudes, beliefs, and practices pertaining to matters related to the sacred or supernatural. Religion often provides a moral and an framework and helps people dissect and deal with complex questions regarding topics such as life and death. Religious life often involves multifaceted activities such as worship, devotion, participation in religious activities, membership of religious institutions, etc. Religious identity refers to an individual's sense of belonging or association with a religious group, and is shaped by his own personal beliefs, attitudes, proclivities, inclinations, communal practices, and socio-cultural contexts. Religious identity is therefore a complex and evolving aspect of a person's life that provides an overarching theoretical and conceptual framework for shaping their core values, beliefs, attitudes, worldviews, thought worlds, and sense of purpose. People who are excessively or overly preoccupied with religion and religious matters may consider worldly matters to be too trivial and too mundane. This may impact the quality of their work as well. Additionally, do read our work on generic identity theory and extended identity theory. The names of the papers are "Generic Identity Theory for the Twenty-first Century: Towards grand unified approaches in identity formation, identity transformation and identity dilution or neutralization", and "Formulating 'Extended identity theory' for twenty-first century social sciences research: Modeling extended identity in relation to real-world observations and data". 33 34

- *Excessive Preoccupation with Language or Linguistic Identity*

Language may be defined as a formal and a structured system of communication, comprising of documented or undocumented grammar and vocabulary, which helps it convey meaning in a reliable and a consistent fashion. Language is often expressed through the medium of speech, signs, symbols, or writing and is also additionally characterized by a high degree of diversity and productivity. Language is not a fixed or a static concept, but a fluid one that is constantly constructed, negotiated and reinterpreted through mechanisms such as complex social interactions. An individual's linguistic identity is highly dependent upon their cultural, ethnic, and social identities as well. For example, we have acrolects, mesolects, and basolects. The last type is also sometimes alternatively spelt as basilect. Additionally, do read our work on generic identity theory and extended identity theory. The names of the papers are "Generic Identity Theory for the Twenty-first Century: Towards grand unified approaches in identity formation, identity transformation and identity dilution or neutralization", and "Formulating 'Extended identity theory' for twenty-first century social sciences research: Modeling extended identity in relation to real-world observations and data".

- *Excessive Preoccupation with Politics or Affiliation with a Political Entity*

Politics constitute a set of activities that are associated with group decision making processes, or other forms of power relations and power equations among a diverse set of individuals, such as the distribution and the sharing of political power among citizenry. The branch of social science that studies politics and government related affairs is called political science. The term "politics" originates from the Ancient Greek word politika which means affairs of the cities, and political science itself connotes a scientific study of government related matters and topics, politics, and political structures, employing methods such as statistical analysis, case studies, and comparative research. The discipline also includes in its fold important subfields such as political theory, comparative politics, and public policy, and many people increasingly major in political science today. Political affiliation is anathema to science, as researchers are expected to stay neutral in all matters. Additionally, do read our work on generic identity theory and extended identity theory. The names of the papers are "Generic Identity Theory for the Twenty-first Century: Towards grand unified approaches in identity formation, identity transformation and identity dilution or neutralization", and "Formulating 'Extended identity theory' for twenty-first century social sciences research: Modeling extended identity in relation to real-world observations and data".

[33] Sujay Rao Mandavilli (2019) Generic Identity Theory for the Twenty-first Century: Towards grand unified approaches in identity formation, identity transformation and identity dilution or neutralization.

[34] Sujay Rao Mandavilli (2023) Formulating 'Extended identity theory' for twenty-first century social sciences research: Modeling extended identity in relation to real-world observations and data *IJISRT* 2023: July. 1 July.

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➢ *Excessive Preoccupation with National or Territorial Identity*

Nationalism in the most commonly occurring definition of the term, refers to an ideology that emphasizes primary loyalty to one's nation or territorial entity at the expense of all other loyalties and affiliations, and promotes its interests, with the stated and avowed goal of achieving or preserving self-governance and sovereignty. Nationalism manifests itself in many different ways, from promoting and parading national identity to advocating for political independence or a particular nation's interests, or even causes enmity, rivalry or war. People who are preoccupied with nationality commit cardinal errors and promote theories such as the autochthonous Aryan theory and the Out of India theory. Additionally, do read our work on generic identity theory and extended identity theory. The names of the papers are "Generic Identity Theory for the Twenty-first Century: Towards grand unified approaches in identity formation, identity transformation and identity dilution or neutralization", and "Formulating 'Extended identity theory' for twenty-first century social sciences research: Modeling extended identity in relation to real-world observations and data".

➢ *Excessive Preoccupation with Race of Racial Identity*

In fields of study such as biology and genetics, the term "race" was once used to widely refer to genetically distinct and diverse populations found within a species, as identified by geographic separation and phenotypic traits such as skin color, hair texture, and body build. New variants may occur through genetic drift, speciation or macromutation. In research years, much of genetic research has comprehensively disproven and discredited the concept of races as previously used and understood, concluding that human genetic variation is continuous, preferring the concept of dynamic ethnobiological identity instead. Racism refers to the belief that one group of humans is superior to another; this idea was criticized by UNESCO and other bodies who have issued statements against it. Excessive preoccupation with race of racial identity causes errors associated with Eurocentrism and other ideologies. Additionally, do read our work on generic identity theory and extended identity theory. The names of the papers are "Generic Identity Theory for the Twenty-first Century: Towards grand unified approaches in identity formation, identity transformation and identity dilution or neutralization", and "Formulating 'Extended identity theory' for twenty-first century social sciences research: Modeling extended identity in relation to real-world observations and data".

➢ *Errors Arising from Personal Enculturation Patterns*

Enculturation which is also sometimes known as inculturation refers to the process by which people acquire and consciously, subconsciously or unconsciously imbibe the dynamics and contours of the culture into which they were born, or in which they were raised, and acquire the values and norms typical, appropriate or necessary to that culture and its thought worlds and worldviews. Acculturation however refers to the process of acquisition of the values of a host culture by aliens or immigrants. Transculturation is said to take place where two are more cultures are involved, and the merger is always partial, never complete, because each culture still manages to retain its original identity, at least partially. The term was originally coined by the Cuban anthropologist Fernando Ortiz in 1940, and has widely been used ever since. We had also presented the paper, "Postulating 'Ethnography of Enculturation': A high-level overview of various social science research techniques that can be used to study human enculturation processes", in 2023, and this paper deals with the ethnography of enculturation. It explains how enculturation or acculturation processes must be studied in order to identify and isolate the thought processes and mental makeup of an individual. It therefore goes without saying that some individuals are much less scientifically inclined, and this can be traced to processes of enculturation or cultural attributes. [35]

➢ *Errors Arising from Group Enculturation Patters*

Enculturation which is also sometimes known as inculturation refers to the process by which people acquire and consciously, subconsciously or unconsciously imbibe the dynamics and contours of the culture into which they were born, or in which they were raised, and acquire the values and norms typical, appropriate or necessary to that culture and its thought worlds and worldviews. Acculturation however refers to the process of acquisition of the values of a host culture by aliens or immigrants. Transculturation is said to take place where two are more cultures are involved, and the merger is always partial, never complete, because each culture still manages to retain its original identity, at least partially. The term was originally coined by the Cuban anthropologist Fernando Ortiz in 1940, and has widely been used ever since. We had also presented the paper, "Postulating 'Ethnography of Enculturation': A high-level overview of various social science research techniques that can be used to study human enculturation processes", in 2023, and this paper deals with the ethnography of enculturation. It explains how enculturation or acculturation processes must be studied in order to identify and isolate the thought processes and mental makeup of an individual. It therefore goes without saying that some individuals associating themselves with some cultures are much less scientifically inclined, and this can naturally be traced to processes of enculturation associated with that culture or cultural attributes. Group enculturation can also promote group think in some cases, and some cultures are less open to individuality and non-conformity than some other cultures. We had also introduced the concept of massculturation in a previous paper.

➢ *Careerism and Professional Rivalry*

Careerism in the broad and in the general sense of the term, refers to the excessive pursuit of career advancement, a desire for intellectual power and hegemony, and academic prestige, often at the expense of other more important and

[35] Sujay Rao Mandavilli (2023) Postulating 'Ethnography of Enculturation': A high-level overview of various social science research techniques that can be used to study human enculturation processes *IJISRT* 2023: July. 1

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vital factors such as personal integrity, ethics, or healthy competition. Individuals who are excessively preoccupied with their own career goals, tend to be more interested in one's one career rather than anything else, ignoring broader intellectual development and skill acquisition in the process. They may also pander to their own whims and fancies, leading to errors in the process. This attribute may also lend itself to professional and academic rivalry, and bitter disputes. For example, we have seen the case of Michael Witzel on the one hand along with Steve Farmer, and Asko Parpola and Iravatham Mahadevan on the other. Both groups disputed bitterly over the identity of the Harappans and the nature of the Indus script.

- *Naivety and Gullibility*

Naivety refers to the state of an individual who is inexperienced, unsophisticated, or totally lacking in worldly knowledge or worldly wisdom. While in some cases, it is regarded positively as innocuousness or amiable simplicity, it is much more often seen in a negative light as gullibility, immaturity, or a total absence of critical judgment. Gullibility on the other hand, is total a failure of social intelligence in which a person can be easily tricked or manipulated into pursuing a less than ideal course of action. This may even be driven by an excessive willingness to believe what others say, giving excessive weightage to other people's opinions without due diligence, skepticism or critical thinking. Gullibility is either a latent or manifest vulnerability that can be easily exploited by other people for their own personal, professional, or monetary gain. For example, inability to see through individuals or their intentions, and the inability to sense bias and prejudice, are both considered to be naivety and gullibility.

- *Absence of Practicalism*

Practicalism refers to the attention to, and preoccupation with worldly issues and practical matters, and as a philosophical concept, it emphasizes real-world application over abstract and unusable theory. The core idea and the core philosophy of practicalism involves creating workable solutions to problems instead of arcane and esoteric ones, and prioritizing actions solely based on their utility and relevance to everyday life. The term is sometimes used loosely and interchangeably with pragmatism, which shares similar goals but is a much more formally recognized philosophical school of thought, with roots in history and a multiple set of doctrines. However, practicalism is mostly seen as being focused more on matters pertaining to actionable, real-world utility, while pragmatism includes much broader explorations and investigations of the term and concept.

- *Absence of Pragmatism*

Pragmatism as it is widely used in the context of science, refers to an American philosophical tradition that views both thought and language as tools for predictive analysis, creative problem-solving, and actionable work, rather than as a means to describe, reflect, represent, or otherwise mirror objective reality. The core and foundational idea of the term pragmatism is that the meaning and truth of beliefs can be best understood only by examining their practical consequences. The term originated in the United States around the year 1870, and the school itself was founded by eminent and noteworthy thinkers of the likes of Charles Sanders Peirce, William James, and John Dewey. The word itself is thought to originate from the Greek pragma, meaning "action" or "deed". Pragmatism would be essential to high-quality science; science would be dead without it.

- *Excessively Normative and Prescriptive*

The term "normative" describes actions that set standards and rules for behavior, values, or beliefs which other individuals are expected to follow. As a concept, it is widely used in fields such philosophy, law, medicine, and the social sciences to refer to what ought to be, what must be, or what is considered to be a correct or an ideal standard in a particular context or situation. A normative statement or judgment therefore, expresses an opinion or a value judgment about whether something is good or bad, or morally right or wrong. It is a claim about how things should ideally be, rather than a purely descriptive statement, which simply states how things are. Excessively normative and prescriptive solutions can often act as a barrier for original thought and creativity. These must be avoided by scientists, intellectuals and thinkers in most cases, and under most scenarios.

III. CONCLUSION

This paper was by no means our first one on scientific fallacies, as we had published at least two earlier papers over the last couple of years or so. The earlier papers were tied to the twin concepts of discourse analysis and narrative analysis, two emerging concepts in the social sciences, and ones with immense potential. We had proposed in those earlier papers, that both discourse analysis and narrative analysis, i.e. a perusal and scrutiny of scientific papers and scientific literature would enable us to discover and unearth i.e. bring to the fore, a large number of scientific fallacies. The underlying assumption behind this assertion is that the current compendium of scientific fallacies is grossly and woefully inadequate, and does not lend itself to high quality research. We therefore rightfully began this paper by reviewing the current set of fallacies, or at least the most important ones, and showed how they could be used in science. We also then went on to distinguish between formal fallacies and informal fallacies, and proposed an entirely new distinction, namely direct fallacies and indirect fallacies. The latter only influence scientific outcomes indirectly, and one or more downstream fallacies could be tied to them. They may also be labeled and termed as fallacy inducing situations. We had also argued that indirect fallacies needed to be documented in order to improve the quality of scientific research; this is the imperative need of the day given that the entire discipline of the philosophy of science is badly outdated. Of course, the philosophy of science itself needs to be taught in schools at the appropriate level, and we will argue that the entire science of pedagogy is badly outdated too. We therefore, do hope expect and anticipate that this paper will find a due place under the sun, and will goad and trigger other individuals and intellectuals

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into action to unearth, exhume and disinter as many new fallacies of different types as practically possible. These must also of course be integrated with school and educational curriculum in due course as and when the science of pedagogy suitably evolves and advances. This will greatly improve scientific temper among the general public as well, and lead to a ripple and cascading effect: it will boost the quantum and quality of scientific output by a considerable margin with attendant benefits for society was well.