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Recommending Probabilistic Approaches for Hypothesis Evaluation: A Gainful Extension of the Certainty Uncertainty Principle for the Social Sciences

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Abstract:- This paper begins by reviewing our earlier and older paper on the certainty uncertainty principle which was published by us early in the year 2023, and by also examining its basic and fundamental postulates. We also then proceed to summarize our paper on racism and the 'Comprehensive sociocultural persecution complex' which was postulated as a logical extension and a practical application of the aforesaid certainty uncertainty principle for the social sciences. We also propose and examine other possible extensions of the certainty uncertainty principle such as the examination of the Flynn effect, the idea of qualified historiography, and the out of Africa theory, the multiregional hypothesis for the origin of anatomically modern humans, besides several others. We also present and propose a formula for attempting probabilistic approaches for hypothesis evaluation, and evaluate and recommend techniques for evaluating strength or weaknesses of evidence. We also correlate this paper with our various previous papers as necessary, and propose the principle and canon of non self-canceling contradictory evidence. We also hope and expect that this approach would not only constitute a logical extension of the certainty uncertainty principle, but also would be of some use in promoting the cause of rigorous and exacting science.

I. INTRODUCTION

Uncertainty is the only certainty there is, and knowing how to live with insecurity is the only security - John Allen Paulos

All that passes for knowledge can be arranged in a hierarchy of degrees of certainty, with arithmetic and the facts of perception at the top - Bertrand Russell

The uncertainty principle is an extremely important principle and concept in the field of physics in general, and quantum mechanics in particular, of which it constitutes a foundational building block. This principle was first postulated and articulated in the year 1927 by the famous German theoretical physicist Werner Heisenberg who won the Nobel Prize in physics five years later, in the year 1932. According to the fundamental and basic postulates and tenets of this theory, the position and the velocity of an object cannot both be measured precisely and exactly, and both at the same time, and there will always be an uncertainty in the measurement. If the momentum is known with certainty, the position cannot be, and vice versa. Other researchers such as Robertson, Louis de Broglie, Erwin Schrodinger also later contributed to this theory. However, Albert Einstein, Karl Popper, and others were critics of it. Another important, though somewhat unrelated theorem, is that of Godel's incompleteness theorem which was published by the eminent logician, mathematician and philosopher Kurt Godel in the year 1931. This theorem seeks to establish the limits of provability. Godel's work had important applications and implications for various fields of science, and his theory was subsequently modified by Ernest Nagel, James Newman, Barkley Rosser and others. Tarski's undefinability theorem, Tarski's undefinability theorem, or the undefinability of truth as first proposed by the Polish-American mathematician and logician Alfred Tarski in 1933, is an important result in mathematical logic, and forms one of the basic foundations of mathematics. This theorem states that arithmetical truth cannot be defined in a standard arithmetical or mathematical model, and that that there are aspects such as truth that cannot be encoded even in a complex and nuanced language. We had proposed another interesting concept called fuzzy logic in the aforesaid paper. A detailed discussion of these aforesaid principles is wholly outside the scope of this paper. [1] [2] [3]

Our concept of the certainty uncertainty principle for the social science, is quite dissimilar to the uncertainty, undefinability, and incompleteness theorems in physics, and as per our principle, we need to execute or carry out a conscious and a continuous search for uncertainties in hypotheses or statements in the social sciences, or other

[1] Smoryński, C., 1977, "The incompleteness theorems," in *Handbook of Mathematical Logic*, J. Barwise (ed.), Amsterdam: North-Holland, pp. 821–866

[2] Awodey, S. & A.W. Carus, 2003, "Carnap versus Gödel on Syntax and Tolerance," in *Logical Empiricism: Historical and Contemporary Perspectives*, P. Parrini et al. (eds.), Pittsburgh: University of Pittsburgh Press, pp. 57–64

[3] J. L. Bell, and M. Machover, 1977. *A Course in Mathematical Logic*. North-Holland

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sciences. This approach, we believe, must also be inculcated and cultivated as a mindset. Certainties must also be constantly evaluated against uncertainties in every hypothesis or statement, and only the net effect taken into account or consideration. Theories may also be deemed insufficient or inadequate if some inadequacies or uncertainties are found. We had also, additionally proposed that this approach be judiciously combined with the concept of the sociological ninety-ten rule which is irrevocably tied to the principle of exceptionism. This approach must also be adopted in conjunction with other common principles such as skepticism, dialectics, the use of Occam's razor, Russell's teapot, among others. We had also explained in a previous paper, how this approach could be used to assess and evaluate different types and forms of evidence in the Race and IQ debate; i.e. evidence both for and against the notion and idea that the average levels of IQ as determined by standard IQ tests – that seek to measure both fluid and crystallized IQ scores – and balance them out against one another. [4]

- *The 'Comprehensive Sociocultural Persecution Complex' and the Race Versus IQ Debate*

We had also revisited the twin issues of racism and scientific racism in our paper on the "Certainty Uncertainty principle" which was published around a year or so ago, in the year 2023. In this paper, we had postulated that there are many factors that could explain the so called "Race IQ divide", which does indeed exist – among whites and blacks at least. However, people from different parts of Asia have sometimes outperformed whites in scientific aptitude and ability. Skin colour is commonly attributed to a pigment called melanin. There may therefore, be no direct correlation between skin colour and IQ, and that many other issues involved. Our approach may therefore, be divided into two parts, one the one hand, we weigh the pros of the racial theory, which states that blacks are indeed racially and genetically inferior in terms of IQ, weigh and evaluate all evidence and data in support of this hypothesis, and assign it a weight and a ranking. We also evaluate the indeterminates, which refers to the data or evidence presented which cannot be reliably assessed or evaluated, since there will always be unknowns. We then proceed to gather the data against the hypothesis that blacks are genetically inferior to whites. We must also always bear in mind the fact that IQ tests may themselves be somewhat misleading and may not isolate all factors satisfactorily. This risk must also be evaluated, quantified, and given a rating. Blacks may also suffer from a persecution complex that prevents them from putting forward their very best. The term persecution refers to a systemic and often well-entrenched bias, hostility, prejudice and ill-treatment, most commonly on the basis of ethnicity, language, nationality, or religion, though discrimination on the basis of other attributes has also been observed and witnessed. Even in circumstances and situations that real discrimination does not exist, blacks may fear discrimination and go into a shell, becoming inactive or settling for low-end professions.

Other factors negatively impacting the real-world performance of blacks could include factors such as mind-orientation, parenting, enculturation or acculturation, and cultural orientation besides, several other factors such as empirically-acquired knowledge which may impact real-world performance, diet and nutrition, linguistic ability or disability, and resultant education levels. All these possibilities constitute evidence against the theory or hypothesis that blacks are genetically inferior to whites. The presence of Black success stories such as Neil deGrasse Tyson, and Oprah Winfrey also lends added credence to the theory that Blacks may not necessarily be intellectually inferior to whites, though the possibility of a bell curve must also be admitted, charted, and evaluated on the basis of the principles of our approach. A second hypothesis could be anchored on the debate and discussion as to whether the Flynn effect due to biological or cultural factors (including diet and education) and whether increases in fluid and crystallized IQ scores could betray racial differences. We may note here that the Flynn effect is the substantial and long-sustained increase in both fluid and crystallized intelligence test scores as were observed and measured in many different parts of the world in many decades of the twentieth century, named after the American-born New Zealand moral philosopher and intelligence researcher James Flynn. Again, the possibility of IQ tests themselves being fallacious, unreliable or incorrect must be admitted, and also economic factors that lead to blacks in general being fed on a lower calorie diet than whites.

We can also productively use and gainfully employ this approach and techniques to evaluate the Out of Africa theory versus the more recent Multiregional hypothesis to explain and isolate the geographical point of origin of anatomically modern humans. According to the present out of Africa hypothesis, Homo sapiens evolved in East Africa, or North Eastern Africa around 150,000 years ago, and then spread all over the world in a gradual, phased manner. One problem with this hypothesis is that it does not explain or account for why early humans may have travelled such long distances, and with apparently no valid or an apparent reason. It does not also account for fossil evidence collected in other parts of the world such as China, and Europe. It does not also explain how these other hominins originated outside Africa, and how and why modern Homo Sapiens interbred with, and eventually caused the extinction of, these other archaic species such as Neanderthal man, and Peking man. However, there is a preponderance of fossil evidence for early humans in many parts of eastern and north-eastern Africa, and this data and evidence must also always be taken into account and consideration. Evidence of mitochondrial DNA has also been presented, though this may not be reliable.

This approach and technique can also be combined with dialectics, and auto-dialectics for an optimum result. The strengths and weaknesses of both the Out of Africa

[4] Unveiling the Sociological Ninety-ten rules for Social Sciences research: Towards better hypothesis formulation in the Social Sciences in the interests of higher quality research and intellectual multi-polarity Sujay Rao Mandavilli Published in IJISRT, February 2023

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hypothesis (and several variants of it) and the Multi-regional hypothesis (several variants of it), may be studied and examined separately. We also therefore, need reliabilism in science, along with transdisciplinary approaches. We need cross-cultural debate and dialogue. We need objectivity in mindset. Therefore, the only fundamental and long-term objective of a scholar and a scientist is service to science, and service to humanity. Theories and hypotheses must also be complex enough to take into account and consideration real-world realities. They must also be formulated after taking into account and consideration, all available data and evidence. They must however, be communicated simply and effectively to the masses, and in a way they can readily appreciate, assimilate, and understand. Contradictory data must also be taken into account and consideration. More often than not, there is no self-cancelling contradictory evidence. The idea or doctrine of non self-canceling contradictory evidence means, that if a researcher find evidence in support of a theory, proposition or an idea, and also at the same time, also finds contradictory data or evidence against the idea, he must not ignore or overlook the contradictory evidence, and assume it is false. Reconciling contradictory data or evidence always leads us to a higher level. This is an important factor, and must always be borne in mind. This should also constitute the bedrock and cornerstone of dialectics, and auto-dialectics. All these criteria are not necessarily always met in modern scientific endeavour. That is why science is often not yet of top-notch quality, particularly in many or most fields of the social sciences.

Qualified Historiography is an approach of history-writing – an approach that we had proposed two years ago- and one that could be gainfully and productively employed in cases of uncertainty and unreliability of the narrative– where narratives are not reliable, absolute or certain, and are based on uncertain hypotheses, that need to be refined, redeveloped and improved, and therefore also need to be flagged off, and qualified as being preliminary or uncertain. We presented this as a practical and immeasurably useful and beneficial approach and technique that could allow us to sift the grain from the chaff, and allow us to retain absolutely certain elements, and the bare essentials. This approach we believe, can be used in a wide variety of circumstances and situations, for example, when research is still progressing, when the existing data is incomplete, when the research may be used by one or more researchers as a platform for other researchers to meaningfully build upon and consolidate, when it adds to knowledge in some way and when a hypothesis is proposed to be presented to obtain feedback from a wider audience. The certainty uncertainty principle can be used here as well, and can be used to evaluate and rank uncertain historical paradigms.

We may also employ our concept, tool and technique of the certainty and uncertainty principle for the social sciences to practical and beneficial effect in many other real-world situations. We can use it to study where claimed IQ differences (or real-world academic performance) between two groups of people are genetic or not; we can use to it study whether differences in GDP per capita between two nations are due to cultural differences or not, and to list out and evaluate all factors that contribute to the observed difference; we can use it to study whether increased intake in colleges of students pertaining to a particular racial or ethnic group in a particular territory or region, are caused or induced by affirmative action or not, or whether they are caused by a genuine improvement in academic standards and performance; we can also use it to determine to what extent alleged or observed biases in Marxist sociological scholarship can be correlated with its impact of Marxist economic philosophy, etc. Many more practical, downstream and real-world application and uses could readily suggest themselves as time progresses. This is an area and a field of study with unlimited real-world potential. This is a no holds barred area. The sky is absolutely the limit, though there could indeed be some barriers and limitations.

- *Denoting the Certainty Uncertainty Principle by Means of a Formula*

Therefore, we may also seek and attempt to denote the certainty uncertainty principle by means of a suitable formula as follows:

What is certain + what is uncertain + what is indeterminate = one hundred percent always, and represents all ends of the spectrum

Certain value = ∑ (Probabilities of each individual factor X strength of evidence for each factor)

Uncertain value = ∑ (Probabilities of each individual factor X strength of evidence against each factor)

The net value is what is certain – what is uncertain with uncertain amounts remaining unevaluated

II. FURTHER AREAS OF DISCUSSION AND STUDY

We may also adopt and employ the technique and tool of inversion in order to evaluate reliability of paradigms. Per this technique, certain evidence which is evidence for, and uncertain evidence, which is evidence against, may be inversed and reversed in order to assess, and throw further and additional light on its reliability. This approach and techniques may also preempt all forms of bias and prejudice. We must also now attempt to address the following questions. What constitutes strong evidence in support of a hypothesis? What constitutes weak evidence in support of a hypothesis? What constitutes strong evidence against a hypothesis? What constitutes weak evidence against a hypothesis? Strength of evidence can also be ranked on a scale of 0 to 10, with higher values representing a higher degree of certainty. Sometimes, other scales similar to Likert's scale can also be used, or the very weak, weak, strong, and very strong ranking, or some other related or pertinent ranking. We however, need more research on how strength of evidence can be ranked or rated. This could become an intense area of study among researchers in future. There must also be some discipline on how

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probabilities are assigned, though the best judgment method is the only reasonable method we have.

- *How to Assess Strengths of Scientific Evidence*

We may need more research on how strength of evidence can be ranked or rated in daily life, or in the normal course of evidence. This could become an intense area of study among researchers in future. However, different aspects may be reliably and effectively considered. For example, we may consider if the evidence is linked to all other aspects of the study, to all other studies, both in the same field of study, and in other fields of study. We must also for example, consider if the evidence suggested is interlined through correlation or causation, and backs up all claims made in the study or other studies. We can also assess if the evidence is based on a large sample of observations, and considers all plausible evidence and scenarios. Is the evidence presented credible or trustworthy? Is the quality of evidence also assessed in addition to the quantum of evidence? Are claims based on multiple lines of evidence? Are all criticisms taken into account, including comments by peer reviewers and external scholars? Is contradictory evidence sought? Are theories and paradigms revised from time to time? Is a lot of mumbo jumbo used? Are sophistry and solipsistic arguments used? Are there any logical fallacies? There are many different fallacies in science; refer standard literature or our pervious papers for more details and information. Scholars and researchers much also possess a scientific mind-orientation, and must eschew religious, philosophical or sectarian considerations. They must also adopt, as far as is practically possible, transdisciplinary approaches and cross-cultural research design. Are data triangulation and investigator triangulation adopted? Are different types of research techniques such as case studies, anecdotal studies, randomized control trials, observational research, and diagnostic studies also employed? We must also address, and be aware of a wide range of scenarios. For example, we have Pascal's wager which goes something like this, "If God exists and I believe in God, I'll go to heaven, which is really very good. If God exists and I don't believe in God, I may go to hell, which is really very bad." This approach is a gross oversimplification, and betrays and ignorance of various complex intermediary conditions, and a wide variety of other choices as well. One fundamental assumption and principle upon which this paper rests, is that we must admit to various kinds of possibilities, including intermediary ones.

III. CONCLUSION

We had begun this paper by reviewing our previously published paper on the certainty uncertainty principle which we had published early in the year 2023, and by examining its core concepts and core postulates. We also had then proceeded to summarize our paper on racism and the 'Comprehensive sociocultural persecution complex' which was postulated as a logical extension and a practical application of the aforesaid certainty uncertainty principle for the social sciences, and was published later in the very same year, i.e. 2023. We had then also proposed and examined other possible real-world applications of the certainty uncertainty principle such as the examination of the Flynn effect, the idea of qualified historiography, the out of Africa theory, and the multiregional hypothesis to explain the origin of anatomically modern humans. Of course, we had discussed and proposed several other uses as well. We had also presented and proposed a formula for attempting probabilistic approaches for hypothesis evaluation, and had evaluated and recommended techniques for evaluating the relative or absolute strengths or weaknesses of different forms of evidence. We had also then correlated this paper with several of our other previous papers as we deemed appropriate and necessary, and had introduced the concept of non self-canceling contradictory evidence as well, by referring to some of our earlier works. We do then hope and expect that this approach would not only constitute a logical extension of the certainty uncertainty principle, but also would be of some use in promoting the cause of rigorous and exacting science. The jury is still out on how useful other scholars find this research methodology, and technique, though we remain optimistic and hopeful.