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## 1 Introduction

At the heart of contemporary scientific practice lies the art of questioning. In order to explore the various facets of science today, we must first examine this foundational skill. Looking back at the origins of scientific inquiry, we find that it began with a curious impulse towards the natural world, unbounded by the divisions between disciplines such as philosophy, mathematics, physics, and history. The goal was to understand the workings of nature, our place within it, and our responsibilities towards society. Over time, this pursuit of knowledge has led to a multitude of discoveries and innovations, contributing greatly to the betterment of humanity.

However, amidst this progress, we seem to have strayed from the fundamental questions that sparked our scientific journey. Understanding the self (or consciousness), for instance, remains a fascinating and largely uncharted area of research. Despite significant technological advancements, we are still captivated by the intricacies of this subject.

Through this article, we aim to reflect on the current state of scientific practice and its potential to create positive change in the world. By re-examining the fundamental aspects of research, we can realign our vision towards building a better future. In the following section, we explore the role of the mind and the innate nature of human intellect, which can bring about transformative changes in our perception of the world. By adopting a broader perspective and transcending barriers of bigotry, we can create a society that values knowledge, joy, and peace as intrinsic aspects of our way of life.

## 2 Imbibing a broader perspective

### 2.1 The road towards making scientific advancement

The process of any scientific advancement involves observation, hypothesis, prediction, experimental verification, and ultimately theory; this process has been used historically to understand and interpret the world around us. Let us take the science of understanding our universe. We could for instance think about the curiosity people carried to understand the motion of heavenly bodies such as the stars, planets, the solar system, comets, etc. People came up with various theories in an honest and humble attempt to *understand*, *interpret* and *predict* such phenomena. Rene Descartes, a French Philosopher, proposed that our universe is in a nutshell, a giant clockwork. Thereafter, Newton's three laws of motion gave a completely different interpretation of our universe. However, some of the nuances in this process of developing grand theories, such as Newton's laws, tend to be overlooked, despite their roots in direct observation of our reality.

A superficial observation of modern scientific methods reveals an abundance of complex mathematical tools and expressions, which provide insight into the mindset of contemporary researchers, particularly in the field of theoretical physics. Let us now look at some of the subtleties involved within the process which have also been regarded by many researchers of the preceding centuries.

### 2.2 Yearnings from the previous epoch

If our ways of examining various physical phenomena were to put in contrast with the preceding epoch, we find today, a pragmatic mind overshadowed by the power of Mathematics or “**scientific ego**”. Does it render curiosity in its own right, dubious? No! This is where the role of “**scientific temperament**” comes into the picture. Human beings have the innate nature of learning and adapting to the environment around them. Most naturally, one creates questions based on their exposure. It is therefore imperative to *distinguish between the experiment and its experience*. Let us consider a little Gedanken experiment. Consider the case of dropping a ball from an arbitrary height above the ground: It is easier to notice the outcome of this little experiment which is that the ball falls down on release. However, taking a closer look, it is the information that is being perceived through our senses that helps us experience the ball falling to the ground. If to a hypothetical observer who has not had any experience of objects being pulled towards earth on their release, we hand over a hypothetical object that instead of surrendering to gravity, flies above upon its release it would not be unlikely for that observer to conclude an opposite set of results for the same experiment. Thus, it is our experiences that contribute to shaping our belief system more than just the experimental verification of a phenomenon.

As the inventions and discoveries that researchers come up with are a product of their intellectual capabilities and creative intuition, it is impossible to ignore the **crucial role** that the **mind** plays

in driving scientific progress. One such instance comes from the old Italian Philosopher, Giordano Bruno. Being a proponent of the Heliocentric view of the solar system, his ideas were taken as a threat to the prominent belief system of that time, as a result of which he was burnt alive. In today's context, one of his reflections, "*Time is the father of Truth, its mother is our mind*" further emphasizes on the role of the mind and its vital implication in shaping our experiences.

This episode raises a thought-provoking question for our community: given how far a group might go to uphold a prevailing perspective on a given topic, is it not important to reflect on our own deeply ingrained beliefs about the nature of reality or how the universe operates? In other words, it's worth considering to critically examine our own beliefs and remain open to changing our views based on new information or evidence.

After all, many of the celebrated achievements in science have come to be as a result of a *bold insight*. August Kekule, a German Chemist took a bold leap after having dreamt of a snake eating its own tail; Erwin Schrodinger, an Austrian Physicist took a leap of faith in coming up with an equation that could describe the physics at small-length scales, more precisely Quantum Mechanics. Today, such ideas form a vital basis for all of the modern science being practised in the conventional setting. Even though such concepts are delivered to the upcoming generations in schools and universities with a great deal of enthusiasm yet we tend to miss out on the derivations for some. For instance, we could start with Newton's second law of motion which states that *the rate of change of momentum of an object is directly proportional to the external force being applied*. When written in form of a mathematical assertion this eventually takes the familiar form of  $Force = mass \times acceleration$ . Following a similar line of thought, we do not have any derivation for the Schrodinger equation that sits at the heart of all quantum mechanics and quantum field theories today. To strengthen the argument, we also do not have any explanation whatsoever to the ways Ramanujan, an Indian Mathematician, came to write down his formulae. Even without formal training in the field, he was able to make significant contributions.

Such instances only bring up more questions than they give answers! Nikola Tesla, a Serbian-American scientist was able to provide a completely alternative way of generating electricity. He was known to envision a particular machine with all the relevant details in his mind, before actually starting to build it. On a similar note, Einstein describes his realization of the equivalence principle as the "happiest thought of his life". All of these instances of scientific advancements and discoveries form a vital pillar for the way we practice science as well as, lead our daily lives. Thinking about the way these brilliant minds came across such ideas, we would soon realize that we are not left with anything else but their own beautiful experiences in various forms of manifestations. Be it Kekule's dreams or Ramanujan's inspirations from the goddess of knowledge. If it were not for their unique experiences we would probably be still struggling to describe the Physics of the atomic scale or busy figuring out the structure of Benzene ( $C_6H_6$ ). These instances of scientific breakthroughs highlight the importance of the human mind, the role of silence and intuition in sci-

entific discovery. They remind us that science is not just about equations and formulas, but also about creativity, imagination, and the willingness to embrace the unknown.

### 3 Back to the basics

The lack of realization of the self or understanding of **consciousness** sits at the roots of most problems in our society. While we all seek a world where peace and prosperity prevail, we often fail to translate this aspiration into action. However, scientific research can act as a tool to enable us to carry the sense of greater good and work towards building a world free from sorrow. Understanding consciousness and its role in shaping our reality could provide the much-needed impetus for scientific research to create benevolent solutions for society. By exploring the depths of consciousness, we could gain insights into the nature of existence and use this knowledge to create a more harmonious world. Science can help us unlock the secrets of the universe, but it is only with a deep understanding of our own consciousness that we can truly create a world that is free from pain and suffering.

#### 3.1 From Silence to Science

Clearly, **silence** does play an important role in any of our scientific advancement. Furthermore, many researchers have as well reflected upon the power of the mind and cogitating on a particular subject in silence. Newton states for example, “*Truth is the offspring of silence and unbroken meditation*” which gives us an insight into the realization that silence acts as a mother to the realization of true nature behind the phenomenon and entails creative instinct. This forms a rather profound realization to carry while conducting research. Thus, the innate nature of the human mind is that of silence. Nikola Tesla also remarks [1], “... *But instinct is something which transcends knowledge. We have, undoubtedly, certain finer fibres that enable us to perceive truths when logical deduction, or any other willful effort of the brain, is futile.*” We could thus choose to embrace our creative intuition and unique experiences, rather than solely relying on the limited perspective of making observations through experiments.

It is no wonder, how our technological advancements have only proven to provide benevolent solutions from times immemorial. From the very development of smart devices to the creation of remarkable Artificial Intelligence bots, we already seem to have conquered the materialistic aspect of our reality. However, we seem to have also prioritized the material over the immaterial. One of such aspects that remains significantly less understood is that of **consciousness**.

Although there seems to be a consensus on the view of consciousness being an emergent phenomenon yet we could take a step back to the retrospect of the kind of answers we wish to seek. At the end of the day, do we really look forward to understanding ‘it’ or perhaps wish to gather

a superficial understanding of the same? Is it the Mathematics that we are really trying to unveil or rather a deeper sense of utilizing our understanding to further work towards creating even more benevolent advancements for society? As various research groups continue to examine various models in an attempt to explain the phenomenon, we still remain baffled by the complexities of the subject. This in turn has not only proven to be yet another push towards interdisciplinary research but has also, in a way, tried to stitch together varied opinions on the subject and drive the research in a much more efficient manner. Moreover, consciousness acts as a common subject to speculative sciences as well as spirituality (not to be confused with religion). For instance, a strong viewpoint has been put forth by various spiritual organizations, on consciousness being a metaphysical form of energy instead of it being an epiphenomenon of the various electromagnetic forces and neurochemical interactions of the brain [2].

However, the spiritual route is ‘subjective’ by nature of investigation whereas science takes an objective path of investigation towards the same. Moreover, given the complexities of the subject, we could perhaps take a balanced approach. In which case it becomes absolutely necessary to clean the mind of its superstitions, blind faith and an unnatural attitude of over-skepticism. We could thus harmonize our creative intellect with our own experiments with silence. By doing so, we may even discover new phenomena that could lead to the creation of a new field of study. This approach is similar to how many fields, such as Cosmology and Psychology, were not initially classified as science until the nature of their investigation became more defined.

### **3.2 A balanced approach**

Looking back at the history of various explorations, we find that it is the nature of investigation towards a particular subject which forms the basis for its classification as a ‘field’. Many areas of research today were not even classified as doing “science” during the early stages their exploration. Cosmology, for instance, falls in this category but such a classification is by no means limited. The field of ‘Psychology’ as well only came to be regarded as a science much later after its birth.

Zooming in on the Psychological lens provides scope for a more holistic approach to natural sciences. The process of thinking, on a conscious and subconscious level, is second nature to humankind. Psychological research has concluded the impact of negative biases on vulnerabilities to physiological and mental disorders such as depression [3]. Despite appreciating the aftermath of poor self-talk, there is still an ongoing misconception about the origin of thoughts.

Integrating neuroscience and psychology as a paradigm for our inner being can be a first step towards a exploring via a new perspective. From individuals holding the view that thoughts originate from the brain to some referring it to a ‘voice in their head’, there is a definite imbalance in outlook. The widely accepted scientific view of the “localisation of function” states that respective areas in the brain each have a role. Furthermore, Zaidel [4] concluded that the left and right

hemispheres each have different cognitive abilities. However, there has been little to no previous research that could explain the correlations of any brain regions to the genesis of thoughts. Clearly, there is a lack of research into an area that impacts every aspect of our lives.

Turning back to our line of exploration we also find that there is a significant block. As a digression, we could take a simple scenario of conducting research (say in the field of Mathematics). Pondering over our credibility of doing so we would naturally turn to our educational qualifications, and based on the conventional setting of our society today, one has to specialise in a particular sub-domain through the rigour of a PhD at the least. Therefore, returning to our context of making significant advancements on the topic of “consciousness” can we completely rely on our specialisations? A key reflection by Viktor Frankl, an Austrian Psychiatrist [5] states, “*a ‘specialist’ is a man who no longer sees the forests of truth for the trees of facts*”. Does it not reinstate our ignorance towards taking a different perspective towards the question of practicing science? We could perhaps take a leap of faith here.

Exploring the area with a balanced mindset could have tremendous implications for the progress of science. By embracing creativity, intuition and personal experiences, we could potentially unlock new and innovative ways of thinking and problem-solving. This, in turn, could lead to the development of more efficient solutions for society. Furthermore, by shifting the focus away from a purely mathematical approach, we may be able to uncover deeper insights into the nature of reality, the human mind and the universe as a whole. This could ultimately lead to a more holistic understanding of ourselves and our place in the cosmos, with profound implications for our collective well-being.

## **4 Sciences paving the way for a better world**

Science has contributed to creating a brighter tomorrow in several ways. Through medical breakthroughs, such as vaccines and antibiotics, deadly diseases have been eliminated, and the general health of society has improved. Technological advancements have enhanced communication, transportation, and access to information, thus making the world more interconnected. Renewable energy sources and sustainable technologies have emerged as viable solutions to address climate change and minimize our impact on the environment. Additionally, science has expanded our knowledge of the universe, deepening our understanding of our place in it and inspiring further exploration. Despite these achievements, we still need to confront the challenge of comprehending the self by gaining insights from our immediate interactions with the environment. We can reflect on a few such instances to understand this challenge more thoroughly.

## 4.1 Reflections based on our interactions with the immediate environment

According to the biological investigation of the natural world, we seem to be a consequence of our genes and environment. However, even considering the case of identical twins, we find them to emerge as completely different personalities despite their exposure to an identical environment (family, resources, school, extracurricular activities etc.) just by the age of 5. A detailed investigation by Julia Freund and group [6], remarkably indicates a positive correlation between the active coverage of territory and individual differences in adult hippocampal neurogenesis via a mice model of experimentation. Such speculation further enthrals us to explore the ‘why?’ more than the ‘how?’.

One of the views is that the differences in personality are a by-product of the way an individual interacts with the environment. However, this would then be dictated by an internal choice made by the individual. Although we could further extend the argument of identical twins having the same biological characteristics yet we would lack the explanation towards them interacting differently. There seems to be missing an intrinsic variable!

Let us turn towards sports, especially the ones that attract huge spectatorship. For instance, in case of Football, research has shown that the home team has 1 point advantage over the away teams. While this could be due to factors like travel fatigue, jet lag [7] etc. there are other unusual contributing factors as well. Imagine, a team of players who have been training their whole life losing just because they have to travel. Skysports observed a decline in home advantage (HA) as crowds became less hostile and teams were more used to travelling [Sky Sports bust common football myths: Home advantage?]. There have been speculations on the role of crowds as well. The explorations by Zajonc and Sales [8], clearly demonstrates the nature of dominant and subordinate responses in the presence an audience. The research concluded that ‘the presence’ increases the arousal or drive of the individual, leading to either a positive or negative response. Supplementing this research we also notice the work by Goumas [9], thereby providing a correlation between the degree of ‘home advantage’ in English and Scottish football and the size of the crowd. The interested reader could visit [Crowd effects and the home advantage] for further reading. This again points us towards reconsidering some of our scientific notions and view them from a fresh perspective.

Despite various speculation on such matter, theories only attempt to explain ‘how’ people behave in different situations but do not explain ‘why’ they behave that way. Even though some behavioural science tools do suggest how we could overcome such an impact yet most of it comes from a qualitative means of exploration. From a broader perspective, the explicit reasons for such phenomenon still remains an open ended question!

On a similar line of thought, think of a scenario of having a job interview. We might have been preparing day and night for the opportunity. This might even be a dream job after all. Let us contrast cases in which a really close person expresses his best wishes by saying, “Good luck, you will ace

it!” to the same person discouraging us by exclaiming, “You are a loser and will not get the job!”. How will this impact our performance? Based on the pretext of the scene ‘we (along with our skill-set)’ act as an unchanging variable to the system. Furthermore, we remain fully aware that the best outcome can be achieved only if we do our best, which in this case would be by making the best use of our knowledge and skills. However, it is our ‘choice’ that enables us to perform differently. It can be noticed that we do not tend to perform rationally given the enslavement towards our emotions [Are Thoughts Energy? How to Use Them to Influence Reality].

Now, let us turn to a practical model. There are 2 aspects of the model: ‘ourselves’ and the environment. We know that we can only control what we do. However, having the capability to influence the environment through our actions we still cannot control it. In the situation of the job interview, the most rational thing would be to give our best but the we fail to make a rational decision as a result of the external environment. Therefore, one of the logical conclusions could be that of the manifestation of the nature of the thought. A detailed speculation by Hayani et. al. and Lewina et. al. [10, 11] demonstrates how optimism is linked with the well-being and life span of an individual.



Similarly, we could pick up various small instances from our lives such as, picking up emotional cues from day to day conversations concerning an individuals feeling towards us; having dreams unrelated to any of our moments we have lived through, correlations between the state of our mind and the external environment etc. thus pointing towards the missing piece in the puzzle of consciousness or the missing intrinsic variable. Therefore, addressing such issues with a balanced outlook could help us work towards the puzzle even more efficiently.

## 4.2 A pragmatic approach

A dominant belief seems to give the remote to our external environment for most of our behavioural characteristics. Most scientific discoveries and technological advancements have provided benevolent solutions to our daily lifestyle. However, the motivation for most takes a materialistic point of view or more precisely that a comfortable life will inevitably lead to contentment. Usually, many individuals tend towards unhappiness not because of their incapability of earning huge assets but



rather their failure to drive an impact. Most of us tend to question the purpose of our lives, however, when it comes to research and development, we often ignore this aspect of humanity. Therefore we could inculcate a foresightedness towards our research alongside gauge its long term application for further benefit for the world.

Despite the benefactions made by science, we still struggle to put it to the best of its capabilities to work towards effective solutions to critical issues concerning mankind. Smart-devices for instance, have helped us in various ways but it has also caused harm in many other ways. Today we are struggling with various psychological disorders as well, and various technological advancements certainly contribute heavily towards the same. They have made our lives comfortable but have depleted us at an internal level. If we were to check the percentage of time spent with the boons of science, we would soon render most of it as unavailing. Another perspective comes from the issues faced by the upcoming generations. We often find the upcoming generation as being more sensitive and weak, not physically but emotionally. It is astonishing how in just a generations' time we come to be facing some of our worst nightmares and alongside carry the notion of making an advancement day by day!

Therefore introspecting on some of our ways of acquiring a belief system and pondering on our ways of practicing science we could strive to create a better society. On a practical level,

- We could better our insights on the workings of nature by exploring the 'intrinsic variable' and thus drive scientific research to create a benevolent space.
- We could inculcate, in our ways of delivering science, an openness towards ideas and experiences alongside the humility towards centuries of scientific progress.

Thus, we can foster an outlook in which the pursuit of scientific knowledge is guided by an impartial and innovative intellect, and science serves as a means to build a future that is devoid of biases and discrimination, and instead prioritizes intrinsic values such as happiness and peace as the foundations of a sustainable tomorrow.