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Metaphysical Logic

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PREFACE

It is natural to bear some presuppositions about the nature of this text. The nature I find myself conforming to when assessing my ideas is that of harsh skepticism. If it brings any consolation, I admit the shortcomings of an informal education are that of natural myopic ignorance that falls on me when discussing heavily academic topics. My education comes from my analysis of an array of texts, and the theories I develop are simply what comes from those admittedly unconventional analyses. I however believe the lens by which I view these critical texts allow me to see potential shortcomings and theories that may be apparent. Much like how the self-taught musician might come to create something more interesting than those derived from the formal. This is not to dismiss the entelechies of a formal education but to provide some defense against a heavy skepticism that falls on the reader when parsing a text like this one.

It must be known that this text is an attempt to actually 'do philosophy' which might seem overly ambitious. However, in reading the likes of Spinoza, Descartes, and Kant I just became so inexplicably enthused with the ideas violently perambulating in my head. I should note that I must and will indulge myself in critical analysis of other works after completing this. So, it comes to the forefront of the mind when reading to question why tackle metaphysics and logic and to an extent epistemology. The current philosophical explanation of the process of creation and generation of theories and things novel has not given an answer that I completely agree with. It is either too fixed or too vague. Kuhn, Feyerabend, and Popper all provide a stepping stone for which I used to fully put forth my ideas.

Novelty takes on a magical almost metaphysical-like effigy. Einstein, when creating Special Relativity said the idea came to him in a dream. Which dreams are fixed neurologically in the subconscious. It gives us the ability to see when our eyes are closed. It is telling that dreams are still a topic of dense contention in even the most empirical of spaces. Descartes appealed to a benevolent god to confirm that our reality is not being deceived. The phenomenology of dreams and the conscious mind also finds me at the frontlines of their discussion.

Conflating science with metaphysics does leave room for a great amount of incertitude. I often have trouble appealing completely to any sort of metaphysics as I believe almost all phenomena in life should be subservient to a theory or observation proved by mathematics. The

great questions of science and physics are a place where metaphysics might soothe one into a placatory lull. I reciprocate what Descartes says about metaphysics that the only secure foundation for metaphysical knowledge is through clear and distinct ideas that the mind can grasp with certainty.

Metaphysics should not be based on faith or blind apprehension. It should be clear and logically sound. It, however, finds itself in the realm of uncertainty like most modern theoretical physics. The GUT of particle physics or the never-ending debate of quantum relativity. The cognitive dissonance in the mind of a determinist when confronted with the spooky action at a distance. Metaphysics falls under all the same difficulties. When concerning itself with being or aesthetics it draws significant parallels to the downtrodden physicists trying to understand the beginning of the universe. Therefore, although I find myself believing that all things should be proven I am slowly starting to discard that dogmatic skepticism.

Natural uncertainty in life is one of the most exciting prospects of inquiry to me. I would like to think any open-ended question or debate is what lights a fire without light in me. Reading Joyce or Pynchon and allowing my mind to puzzle over the dense array of allusions and archaic words that bear a meticulously crafted portmanteau. Or creating a song that finds itself so far out of the conventional song structure as opposed to the platitudes of conventional harmony and rhythm. Creating novel music and literature bears strong philosophical inquiry into the nature of music itself or what makes literature true literature. Is music that falls outside of the conventional norm good or is it music at all? It is in this subjective vs objective where binary opposition becomes all too constricting. To a certain extent one could argue that it is all subjective as the aesthetic experience is individual. One could also argue that that which is good builds on fundamental objective principles. This of course is not the subject of the book, however, can apply to the framework I build later in this text.

The natural state of current philosophy leaves a minutia of room for original theories and I am here to hopefully put forth a small contribution that I hope to build upon throughout undergraduate and graduate school. The lens through which my framework may face challenges is that of Empiricism, Rationalism, and Kantian Transcendental Idealism. However, I hope that the reader bears an open mind about the framework and theories presented in this text. This text, although terms will be defined, presupposes that the reader has an in-depth and large breadth of philosophical knowledge in epistemology and metaphysics. Some lesser-known

assumptions in knowledge are Deleuzean metaphysics, Feyerabend's philosophy, and Fichte's idealism.

INTRODUCTION

It appears as though I obtain a natural duty to address every theory of the philosophy of math and metaphysics when actualizing a framework that is a restructuring of the creative process. As my framework and theories, I present have merely found themselves just out of the womb, I have foreseen that the ends at which this framework produces could hopefully answer some unanswered questions in neuroscience and philosophy. It seems now, especially with the state of theoretical physics and neuroscience, that theoretical speculation is commonplace. This is not a critique but an observation, that when I put forth a framework of understanding some heavily contentious phenomena, it is through an innate desire to answer questions that continue to remain unanswered. The sciences have the positives of being empirical. However, where the sciences break away from the empirical substrate is where the parallels to philosophy might get drawn.

As with most frameworks, it begins with presupposing natures that put forth the conditions at which a framework is at all possible and to some extent to which a nth function of our consciousness is at all possible. Such as the Fichtean ego = ego or the Kantian categories. The challenge presuppositions face is the limitation and need for complete logical fluency imbued within the arguments presented. It seems all too constricting to present a conditional or necessary notion to a function. To this, I call upon the Fichtean presupposition of ego = ego as it seems pertinent to address. As the future of this text might bear some resemblance to his idealism, however, it is a departure from it. The principal ego = ego || self = self falls under the scruples of claiming the not-self as an objective notion by stating that the not-self is simply a limiting condition of the self. The problem that naturally arises is that if the not-self according to Fichte is the limiting condition of the subjective self then the not-self is just a projection of the subjective self. This is a denied antecedent in which if the self is wholly subjective then any negation of that cannot be objective. If now the not-self under the flawed guise of an objective negation is then used in the productive imaginations dialectical flirt, it is to derive that a mind-independent reality is thus not possible. This solipsism then poses numerous logical issues on knowledge beyond our mind and axiomatic consistency. The dialectical interplay of the self and not-self thus does not have the grounds to create anything novel if it is all subjective. As if the entire world is mind-dependent then anything creative is simply just a rearranging of its contents in its head.

However, although the solipsism derived here is extremely guarded toward the self. And although Hegel provides amends to Fichte's shortcomings in the Phenomenology of Spirit. His idealism and subsequent approach with the dialectic of self which remains subjective and the not-self which has now taken on a dynamic independent reality with its structure and necessity still falls under the limitation of a strict dialectic. In which does not fully account for the alterity in the world that generates new theories or novelty. The Hegelian dialectic constricts itself to the reconciliation of contradictions and the achievement of a final synthesis. This limits the potential for genuine novelty. As the dialectic concerns itself with the thesis and antithesis where novel theories might arise from a variety of ways and not through a single constricting dialectic of negation and contradiction. There are theories that address the constriction of this tight framework and of

It thus brings us to the philosophers of science. Plurality is of notable frequency in modern theories of scientific creation. It seems it is the bridge between conflicting scientific theories. Although numerous philosophers have put forth very appealing theories on the sciences and the emergence of novel theories, I shall call upon Feyerabend's critique of the scientific method and his epistemological anarchism.

Epistemological anarchism is essentially Feyerabend's theory that scientific creation is not subservient to any fixed universal rules, namely that of the scientific method. He put forth a methodological pluralism and dismissed the consistency criterion. He claims that a multitude of brilliant discoveries have been the sum of ingenuity, intuition, and curiosity. This is apt to some extent; however he leaves out the exact method of which this intuition and ingenuity flirt. It also leaves his theory vulnerable to relativism, in which science becomes a subject of intuitive subjectivism by account of all methods being equally valid. It blurs the lines in which a clear credible entelechy of scientific research then becomes nothing more than another fleeting outcome of theory.

The critique of relativism while being important does not find itself at the forefront of my framework. The major qualms I take with Feyerabend's epistemological anarchism is the gap of how intuition, ingenuity, and curiosity produce novelty. It is in this gap that I find myself in. This gap leaves metaphysicians and epistemologists foaming at the mouth for a subsequent explanation. This major issue with throwing out terms like intuition and ingenuity capriciously is that these are terms fall under major taxonomic uncertainty. The way in which you infer

Feyerabend's intuition and ingenuity flirt even if actualized might still be too constricting as it draws parallels to the already mentioned critique of the Hegelian dialectic. It thus poses a challenge in which a reevaluation of philosophical paradigms is necessary. The reason for doing this is following the logical progression of Kantianism and Post-Structuralism, two central tenets of which my framework places itself amongst.

The Kantian categories of the understanding lay a framework that posits the four categories of quantity, quality, relation, and modality as necessary conditions for the possibility of experience. It is apparent that Kant did not divulge an in-depth processing of novelty and creation of theory. It can however be interpreted what Kant might say on the creation of novel theories or music. I infer from his deduction that the mind constructs concepts and tests them against hitherto logical framework being the categories. An example might be a mathematician who might create new models by applying mathematical categories of quantity or relation to abstract structures. The scruples with a nebulous inference like this are Kant never clarifies if creation necessitates empirical intuitions. There are some examples of math such as complex numbers that transcend direct sensory experience, however there are also types of math that are a direct result of sensory experience. However, others such as Euclidian geometry necessitates interactions with postulates derived from experience. The more significant issues I take with assessing novelty from the Kantian categories is that novelty and creation of theories is far too dynamic to be accounted for by certain pre-established categories. It can explain deduction and negation, however some theories that arose from a random realization on the back of logical reasoning are left to interpretation on how the categories might account for them. For me, the issue of this lack of explanation is ever clear with the question "Is the creation of music synthetic or analytic, a priori or a posteriori?" It is in this question where dichotomies of synthetic or analytic, a priori or a posteriori fails to account for a dynamic creative process of musical creation. Music might emerge from interacting with an instrument which diminishes the a priori or a posteriori because it is wholly new and creative but interacts with the empirical world. This is indicative of the lack of accountability the categories have when something as fluid as musical creation is called into question. This necessity for fluidity is addressed in modern theories of post-structuralism.

For which I call upon Deleuze and his notions of difference and repetition and their interaction with the virtual and the actual. It seems to me that Deleuzian metaphysics as of recent

has been the most convincing and ideal framework that accounts for novelty. For Deleuze philosophy should not be about tracing the tracing the conditions of representation but should focus on the production of reality through processes of differentiation. He proposes a virtual and an actual. Where the virtual is an omniscient dimension that contains every potentiality and is actualized in the plane of immanence when the actual proposes a theory. Deleuze accounts for empirical notions in that they interact with the process of difference and repetition. The empirical is actively involved in creation. However, it is in the virtual and the actual where Deleuze founders to some shortcomings. Deleuze contests that the immanence plane contains both the virtual and the actual coexist. The lack of boundaries makes it hard to apply Deleuze's ideas to situations such as ethics or politics. The lack of boundaries might lead to some monism where all distinctions are dissolved. There also seems to be a lack of difference between actual objects and virtual images. It is where Deleuze's post-structuralism falters just enough to necessitate a more robust theory with terms scrupulously defined.

Within the vague and aporetic frameworks and theories is from which I have decided to independently craft my own. The primary issues of very robust frameworks that seemed impossible to crack were the lack of something. Where that be terms or explanation of a subsequent area of philosophy. The subtle contradictions or lack of clear terms leave a multitude of questions open. It seems pertinent now to try and resolve the critiques which I have brought forth. In order to address novelty and creation it necessitates that I discuss math and nature of its creation and sagacity.

I hope that to some extent I was able to elucidate the shortcomings of several frameworks and theories and have left the door a sufficient amount of room to be opened.

PRE-IMPOSITION

Math, it seems, finds itself in the trough of the realist and anti-realist battleground. In the frontlines it contains the dual perspectives that math is discovered or invented. It is here where the most potent theories of math have been formed. Some argue for the universality of mathematics while others question the context in which a mathematical framework is developed.

It is pertinent that I define what math is, however, as easy as that seems it is a far more ambitious undertaking than it might appear. Therefore it is a goal to define math according to the nature in which I derive its beginnings and means to end. The reason I begin justifying my framework with mathematics is because math is seen as the pinnacle of novelty and creativity. Although the creation of a song and a mathematical theory may differ it seems the conditions to which either were conceived draw similarities to each other. It also is apparent that math arose from counting and records of counting generally numbers one, two, and 'many.'

However, it is important for me to also define exactly what I mean by pre-imposition. Pre-imposition is the stage before any sort of math was discovered or created it. When I say imposition, I am positing that there is a moment where there was a primary mover of conscious math. Prime mover here extends to any human that first thought of any semblance of math. This commonly extends to the use of numbers, patterns, magnitude, or forms. The exact moment a human imposes some mathematical structure on the world I call post-imposition.

The thing-in-itself might be the pre-imposition where without human representation and perception it is just the true essence of the word. The ability to posit such a time, however, forces me to think about pre-imposition as it truly is. Is my mental image of the pre-imposition governed and controlled by my own representation. It seems logical to me to think of a time without humanity as I just see the growth of nature, however, I am able to see this as I myself frequently walk around nature. Thus I am led to believe that what nature looks like now is what it looked like before humanity with variation I am unable to discern.

This criticism and subsequent logical deconstruction of anti-realism is not to completely dismiss anti-realism. The criticism of realism will follow once we approach pre-imposition. Pre-imposition is governed by the two central theses: (1) Natures edifices exhibit structure and patterns independent of humanity; (2) Patterns and structures that arose through necessary survival are not any less mathematical then those that simply exude a natural pattern. We notice

in the two theses that pattern and structure are of clear importance. Being perceivably penultimate on the hierarchy of pre-impositions laws. When I say patterns, I mean to say any clearly reoccurring sequence. Flowers with pedals of the same number, mountains in fractal sequence, and plants containing spirals. These patterns, although we understand them through mathematics and some have variation and deviate from the norm, still contain these reoccurring sequences. We know that these structures exist independently of human perception, which is the first central theses of pre-imposition being that nature's structure exists independent of humanity.

We must consider life before any mathematics was formulated. We clearly note that the earth, despite the lack of math, continues to grow. Plants and flowers grow, bees create hives, and galaxies form spirals. None of these phenomena have yet been imprinted by math, however we note that plants follow specific forms of math out of necessity. The Fibonacci-Sequence while coming from the post-imposition is notable within the pre-imposition phase. We see that independent of humanity plants follow this sequence. So, while the sequence itself is a product of post-impositional thought, it is observable in human independent structures. The plant itself, no matter what, is going to find itself adhering to this sequence. It can be noted that although the sequence is a vessel of which we can understand the structure of the plant there is a clear method at which the plant grows. By simply observing the plant and noting its behavior it adheres unintentionally to a mathematical sequence that is unknowable to the plant.

We may also observe phenomena such as time. The notion of time and its autonomy separate to human perception is also a major point of pre-impositions nature. Time, as we understand it, is a product of mass imposing on the fabric that is space-time. As we know it for as long as the earth exists, we observe time dilation. We may consider phenomenological aspects of time such as the temporal realism of Heidegger, however it is to note that time dilation is a phenomenon independent of human perception. As no matter when or where you are, if you place yourself outside a field or inside a field with dense mass such as a black hole you will find yourself older or younger than those who remain in a static mass like Earth. This thought experiment remains pre-imposition as again the phenomenon of time dilation while actualized by a being is still a phenomenon outside of our perception.

The primary feature of the pre-imposition is that we see the world is not tainted by humanity. It is in the natural pre-imposition where math according to Platonism lives as an abstract form. The plants and nature abide by an abstract mathematical form. Such as the

aforementioned Fibonacci sequence or fractals and geometric patterns. If we put ourselves in the pre-imposition era of life, we notice that structure still prevails. However, we must note why structure exists seemingly independent of human imposition. Here we might notice a natural selection and necessity to survival. The question that then follows is what makes survival advantage through patterns any less mathematical? It could be that nature discovers these mathematical formations by natural evolution. For we ask how do plants know to abide by the Fibonacci sequence even in the necessities of survival? It is ever mysterious why certain phenomena in nature almost in a sense choose to abide by certain mathematical structures. Although this might not be intentional, we still see mountains adhere to fractals, beehives to geometry, plants to the Fibonacci sequence and the golden ratio.

The failure of anti-realism is the disregard of the beauty and structure of pre-imposition aesthetics. It seems anti-realism theories do not just change; they are expected to be overturned or revised as contexts and perceptions shift. It conforms to mere conveniences when confronted with mathematical explanations of such phenomenon. According to anti-realism there must be no theory that is truly universal. This places anti-realism in the false paradox. We presuppose here theories are any systematic framework of thought. Where if we take anti-realism to be the truth then every theory must then be potentially and eventually false.

(P1) If anti-realism is true

(P2) Theories are mere coincidences or context-based explanations

(P3) Theories formulated must and will be eventually false or expected to be overturned

(C) If anti-realism is a theory, it must then also posit itself as false.

For if anti-realists reduce mathematical and scientific explanations to a series of coincidences and phenomena under certain contexts then no theory will be holistically true. This is self-referential because if anti-realism holds that no theory can be universally true, then this statement itself would also have to be considered not universally true. If we live in a supposed world where anti-realism is true then this puts scientists and mathematicians in a fraught hysteria as their theories and the never-ending provisional status of theories. The reductio I put forward admittedly seems like it treats anti-realism as a theory and not a true framework. However, note that math is also much the same, although math predicts phenomena under anti-realism it is expected to be overturned. Anti-realism should then fall under the same self-refutation. Some may argue that anti-realism transcends natural theory. However, the concept of anti-realism was

posited by a human and therefore should find itself overturned once humans understand more about neuroscience.

To put this more into perspective let us consider what anti-realism is like completely independent of the human mind. We must look at anti-realistic pre-imposition where everything is just chaos. The issue I find is anti-realism does not confirm why there is structure. It simply states that plants or mountains are just the way they are and the way we understand them are human imposed. It is necessary to derive meaning from the world, however if mathematical theory is just fortuitous coincidences, then that does not address the inherent structure of nature.

POST-IMPOSITION

"The world is my representation": these are the words that mark section one of Schopenhauer's magnum opus. This single statement reveals itself to me as a pinnacle of anti-realistic rhetoric. The statement is also the mark of the post-imposition. In the previous section I discussed the emergence of patterns and natural structures produced by nature independent of human perception and manipulation. I will build off my observations and critiques of the last section and continue to develop the pre-and post-imposition duality.

However, I will take the time to address the main potential criticism against this duality I posit. It most likely comes to mind 'Is this pre-and post-imposition duality too constricting?' to which I answer no. The problem with the duality of a subject-object opposition is with how much of the subjective and objective becomes blurred. With pre-and post-imposition, the distinction is made clear with the central first theses of pre-imposition. (1) Natures edifices exhibit structure and patterns independent of humanity. Once humans are born and begin any mathematical procedure is once we shift to post-imposition. As noted, historians believe math first began with counting. The primitive number system began with "one, two, many." This paper is not an exploration of the history of mathematics however, it was pertinent to address the duality of pre-and post-imposition. As we see the pre-imposition is clearly marked by the lack of humanity and the post-imposition is clearly marked by the imposition of perception. Therefore, it is hard to see and constrict elements between the two.

We must note that when counting was first perceived we notice that no matter what language or country the values of one and two remain fixed. The language and symbols used to convey them may differ, however, the concept of one is fixed to be a singular thing. This perceived universality is the beauty of mathematics. Now we consider whether counting is a pre-imposition or a post-imposition concept. It appears that many flowers stick to exact pedal numbers when fully grown. This implies some fundamental structure in the flower to grow to five petals. It is asinine to imply a Lily has a consciousness so we know the Lily simply follows the DNA pattern that has evolved for survival. Yet the number of choice remains three.

The transition between pre- and post-imposition marks a paradigm in mathematics. We can clearly note this major shift in the development of addition. Counting in itself is an exercise

of addition being repeatedly adding one. Then when losing something we take one away in the form of subtraction. When trading in large quantities you lose and in numbers which are marked by something more complex than just counting. This also led to multiplication and division where materials and resources need to be distributed and divided. We see here that math arose through empirical intuitions and subsequent cognitive flexibility. You can say that math would simply have never been created without the sensibility. This, while being a substantial claim, is completely logical as humans would have never perceived math without our empirical intuitions. However, through our observations come axioms. While axioms, being seemingly independent and universal, are rooted in observation. Take one of the Euclidean postulates "A straight line segment can be drawn joining any two points." This postulate is a fundamental and logical observation about line segments; however, the postulate is a universal claim. It seems that no matter in what culture or country a line segment will always be between two points. Then there are the subsequent deductions Euclid proceeds within 'The Elements.'

We thus move towards axioms, proofs, and logical deductions. Euclid is known for his mastery of logical deduction and it is through his deductions he either created or discovered the entirety of Euclidean geometry. It is easier to frame it like this; if you gave a kid with an infinite IQ a copy of the axioms and postulates and sat him in front of a geometry final exam on Euclidean geometry, he should be able to deduce every answer correctly and explain rigorously why. Let us follow a Euclidean line of reasoning; Euclid proposes the Isosceles Triangle Theorem which states in isosceles triangles, the angles at the base are equal to each other. Now it is entirely too difficult to explain a complete geometric proof in words without any picture. However, I will demonstrate some of the logic he uses. 'Given line segment AF = AG and AB=AC the angle ∠FAG is common.' It is the culmination of these seemingly basic logical principles that geometers use to deduce some of mathematics' most famous theorems. However, it seems that the process of proving the propositions rather than creating it seems more like discovery through logical manipulation. As in every line with a new logic or postulate imposed on it, uncovered something new. When I say Euclidean geometry is entirely deductive, I mean it is fundamentally deductive although choosing the axioms and postulates takes creativity in the subsequent utilization it seems to uncover math rather than create. It also goes to show that now no matter what proposition five has been true for 2324 years with no sign of being overturned. The answers Euclid derived were inherent in the axiomatic system. This can be proven as he

does not create anything with his proofs but rather goes down a list of logical thinking that uncovers answers that were within the system. To claim that Euclid is creating something is equivalent to saying when someone in an argument claims the opponent utilized a fallacy is a creation opposed to deduction. The opponent might believe at first this is not founded in logic, however when the opponent's argument is reduced to p's and q's you find that through the argument lies a fallacy.

It now seems important to move towards more chimerical math that seems in itself more conceptually dense and seems to transcend a traditional empirical foundation. For this I will call upon the Leibnizian differentials, Cauchy's, and Robinsons grounding of infinitesimals. Before I talk about the way in which mathematicians manipulate infinity, I should address infinity itself. Infinity takes mainly two forms, that of actuality and potentiality. Potentiality denotes an infinity that essentially extends forever which could be the addition of one repeatedly or moving towards a limit. Actuality denotes a complete infinite quantity such as the set of all natural numbers. This is the Aristotelian duality of infinities. We find Leibniz at the same crossroads as Aristotle for they both rejected actual infinity. He believed the concept of infinity applied to numbers leads to contradictions and paradoxes. He proposed differential calculus founded on the bases of potential infinity. He introduced derivatives which are the infinitesimal rate of change between x and y. Infinitesimals are not real but are indispensable for the operations of calculus. Leibniz used them symbolically for the purpose of calculation. The problem with Leibnizian infinitesimals lies in the lack of an axiomatic or purely logical proof of it. The law of continuity, while conceptually valid once applied to differential calculus, did not withstand the rigor of foundation. Upon analysis of Leibnizian differentials we see that the fundamental understanding of infinitesimals was largely philosophically oriented. What is interesting about this is Leibniz's account of the ontological status of infinitesimals was quite contradictory. He would at times call them real but at other times refer to them as useful fictions. The law of continuity, however, puts infinitesimals in an anti-realistic framework; such that infinitesimals are simply useful concepts that help solve actual problems. This instrumentalism is taken in shrewd juxtaposition to his seemingly realistic philosophy. Leibniz may address this potential flaw in his system by claiming that while infinitesimals are not real, they are inherent to the structure and logic of reality. This is a mere interpolation of Leibnizian philosophy as the parts are there, however it must be estimated how Leibniz responds. In seems rather miscellaneous to judge an infinitesimal a product of the pre- or

post-imposition. Given subsequent analysis I attempt to answer this. However the inference of how Leibniz might have responded will light a fire in the mind of any anti-realist.

Therefore, it follows from Leibnizian differentials to Cauchy's theory of limits. This shift was seen as necessary for, as previously mentioned infinitesimals fell under the scrutiny of an informal grounding in Leibniz's metaphysics regardless of the fruit it bears. Cauchy's theory of limits was the transmigration of an informal differential calculus to a rigorous and grounded mathematical theory. To track this transmigration we also note that the original concept of a limit was simply one of x gets closer to a point a, f(x) appears to approach a certain value L. However, Cauchy developed the ε-δ theory of limits. Instead of the infinitely small changes in x and y, ε-δ theory used real numbers to define limits. This then extended to Cauchy's definition of a derivative using limits. The ε-δ limit allows for the calculation of the instantaneous rate of change. Without the limit, you are left with the average rate of change over an interval, not the specific rate at a point. Here we see that ε-δ is crucial in ensuring the derivative is not a mere approximation. It ensures the difference quotient converges to the derivative in a controlled, predictable manner. It seems the nature at which Cauchy created his theory of limits came from the need to replace vague notions of infinitesimally small quantities with the precise concept of quantities becoming arbitrarily small under specific conditions.

I would now like to discuss the continuation of infinitesimals from a rigorous grounding. This might seem like what Cauchy did, however, Cauchy disposed of infinitesimals for limits which was remarkably successful. Yet therein lies a mathematician that expanded infinitesimals rigorously yet maintained the foundation. For this I would like to discuss Non-Standard Analysis posited by Robinson. Non-Standard Analysis seeks to maintain the use of infinitesimals originally conceived by Leibniz. The core concept in Non-Standard Analysis is the hyperreal set. Hyperreals are conceived using many approaches, however, there are two which seem to be in most prevalent use. The superstructure approach and the ultraproduct approach. The superstructure approach essentially creates an extended universe that includes both standard and non-standard elements. A superstructure is a cumulative hierarchy that includes all possible sets that can be constructed from X using set operations up to any finite level of complexity. This in tangent with IST that expands ZFC. Govern the behavior of sets in terms of "standardness" and "non-standardness." The ultraproduct approach begins with a set of all sequences of real numbers indexed by the natural numbers N. This set itself is a ring, however, not a field because

of the non-divisors. We impose a non-principle ultrafilter on the set. Once we impose the ultrafilter the ultraproduct is then constructed. This ultraproduct is thus the field of hyperreals. We can understand this better through the compactness theorem because the field of hyperreals are models of R.

Thus this brings us to where Cauchy's theory of limits and Robinsons Non-Standard Analysis finds itself outside of post-imposition. I will call General Relativity into question to answer that question within the frame of Cauchy's theory of limits. Specifically the notion of geodesics and curved space-time. Geodesics contain mathematical derivations of the metric tensor called Christoffel Symbols. Christoffel Symbols are mathematical tools used in the context of Riemannian geometry to describe how coordinates change in curved space. Christoffel symbols are indispensable in expressing laws like Einstein's field equation. This indispensability is crucial to the abstract identity of mathematical objects. An empirical proof and prediction of Einstein's field equation is the Einstein ring which is a pre-imposition affirming observation. For if eclipses happened before humanity, Einstein rings were a phenomenon that would have happened. I now will extend this to answer how Robinsons Non-Standard Analysis finds itself outside of post-imposition. For this I will call into question the development of Categorical Quantum Mechanics. The success of CQM finds itself necessarily in finite Hilbert spaces. However, once we use non-standard analysis you can construct a new *Hilb category. That extends the finality of standard CQM Hilbert spaces to separable infinite dimensions. This remains theoretically sound but also still has not yet been empirically verified. In the sense that CQM as a finite study of a Hilb space has had meaningful contributions to quantum processing yet the application of NSA to CQM to allow for infinities has yet to be empirically meaningful. I chose this specifically as we are in the same phase with this theory as the Einstein Field Equations were before being empirically verified. I specifically chose this as it demonstrates the ongoing incipience of mathematical and physical discovery. This CQM using NSA could be the link between gravity and quantum mechanics we need and we cannot know that. It is rigorous and logical in its own system and scientists remain skeptical until any meaningful empirical verification.

All of this analysis simply shows that scientific theories without mathematical rigor would be no less chimerical than divine philosophy. The indispensability of math in theories of science has no doubt been discussed. Cauchy's theory of limits and Robison's non-standard

analysis in their respective scientific application and their indispensability is a prime example of one such argument for mathematical realism. Which comes in the form of the Quine-Putnam argument.

(P1) We ought to have ontological commitment to all and only the entities that are indispensable to our best scientific theories.

(P2) Mathematical entities are indispensable to our best scientific theories.

(C) We ought to have ontological commitment to mathematical entities.

This argument has been in prevalent use for realists. Yet as apodictically certain as it seems, it still falls under the scrutiny of pragmatism, naturalism, and general anti-realism. Founded by such Maddy and Sober who argue for a sort of naturalism. Maddy famously claiming that we ought not have ontological commitment to all the entities indispensable to our best scientific theories. However, Naturalism is not the answer to the debate as a realist or an anti-realist can run with it and pass naturalism off as the bastard of their own. While strong objections neither Maddy nor Sobers objections fully deconstruct the indispensability argument. What they do, however, is call into question the fraught debate of a confrontational holism posited in the argument. Maddy herself in fact believed in a mathematical realism with her Set Theoretic Realism. The pure anti realist objections against the indispensability argument while valid from the subjective frame of reference of the philosopher positing them, do not completely dismantle the argument.

Post-imposition marked by the imposition of cognitive faculties and human perception now must address how humans attain the ideation of math. We note that there is an inherent subjective nature of our perception and human perception is individual. Therefore, although math might be the discovery of abstract mathematical objects it is fruitless to completely argue for pure realism because if human perception is individual there will always be an anti-realist retort. This I call the realist problem as there is an infinite number of arguments against realism.

(P1) If mathematical theories are created or discovered by a being.

(P2) Beings have individual perceptions.

(C) Arguments for Anti-realism is infinite as long as perception is imposed on reality.

This argument is to show that as long as human perception is imposed on reality and is in itself individual then anti-realism will always have an argument. Infinite here is to mean that anti-realism will always exercise some argument within the scope of human reasoning. As anti-

realism is a broad term to account for constructivism, nominalism and much more. Infinite here I recognize as no matter the conditions or the environment of the argument as long as P1 and P2 is true anti-realism inherently will prevail. This is to claim that it is unproductive to argue for or against a pure realism or anti-realism. So now it logically follows that I must create a framework which accounts for the inherent subjectivity of perception and the subsequent application of creativity in math and science, the universality and predictability of mathematical theories and theories of science, the role of experience in creating or novelty and the role of logic or deduction.

FRAMEWORK OF CREATION

The framework I propose situates itself in an odd area in terms of the pre- and post-imposition. It must be called into question whether post-imposition is a subjective phenomena or a universal phenomena which happens once in history (the shift from pre-imposition to post-imposition). Here I will differentiate between the historical shift and the subjective phenomena. I will call the former the universal post-imposition and the latter the subjective post-imposition. Pre-imposition will not contain any distinction as it is a universal. There is no subjectivity intertwined within that which is not individual. As pre-imposition is not related to an individual or subjective conscious, rather, nature as a whole. The cognitive experience of the individual is central to the subjective post-imposition. Whereas the paradigm shift between the pre-imposition (stripped of human consciousness) and the post-imposition (the explicit imposition of consciousness onto nature) is central to the universal post-imposition. My framework primarily is within the post-imposition.

Once a being is cognitive of the world, they are now post-impositional and in the infinity of their potential choices lie in the infinite (metaphysical realm of potential) and that which is deducted, abstracted from pattern is a product of sensory, empirical (memory) and cognitive processing through difference and repetition lie in the understanding. However, such creation that arise through genuine pure novelty arise from the infinite and the emergent virtual. Where the infinite accounts for infinite possibilities the emergent virtual is a realm ancillary to the infinite where pure abstraction lies. The process contains empirical information however the proposition may not be reducible to deduction or logic and must be an independent novelty of unpredictability. For the former process I call logical abstraction and the latter transcendental logic. It would be regrettable to claim a transcendental logic proposal transcendental if it were reducible to a deductive system. Where the person may have leaped through potential deductions and came to a seemingly transcendental abstraction that would truly be the bastard of an irregular logical abstraction.

The necessity at which this framework comes from a lack of rigorous foundation which Deleuze postulates the plane of immanence. Where the interaction between the virtual and the

actual is blurry. “The lack of boundaries might lead to some monism where all distinctions are dissolved.” My framework also posits that the virtual is emergent and not omnipresent. The infinite does not interact with the actual but rather is filtered through the logical abstraction. Language is the mediator of whether a being becomes cognitive and capable of self-consciousness. Therefore, any sort of abstract reasoning is ultimately possible because of the language we use to think it in. The motor decisions and learned behavior largely come from some sort of stimuli (I touch the hot stove, it burns me, I do not do that again i.e.)

It must then be called into question whether a derivation of something empirical is purely novel. For this we may call derivative novelty. The pure proposition/deduction of Euclidean geometry is an instance of derivative novelty. For Euclid, the theorems deduced are merely discoveries within the system through logical deduction. We see that Euclid interacts with his reason and empirical notions to proceed with the deductions. Learned logical relations lie in the understanding yet the choice of applying them to the given line of deduction is based on logic. The infinite and the understanding interact in such a way that the infinite is every possible choice. If you learn a new word, then that learned word enters the infinite where the choice to use that word is forever in a state of potentiality. The infinite is largely a theoretical framework to understand the potentiality of our choices. Euclid might have chosen certain logical relations and deducted his proposition as such or from mere deductions the potential logical relations that arose made sense. The creation of the axioms is empirically validated therefore while the deductions might have been purely logical, the base on which they lay is entirely empirical. Yet during logical abstraction someone may use a certain trick they learned but applied to a new problem to derive an entirely new answer. Or by pure observation of a given system someone might see a flaw and an obvious fix creating a new answer to a problem. A sensory deduction of the system, the way to fix the problem could have included something they learned but now we must ask what if someone creates something entirely new to understand a system. Our learned relations and capacity for logic are intertwined. As discussed, our empirical notions and rational are intertwined with a process of difference and repetition. The difference and repetition being the generative force of empirically derived thought. The complex repetition interacting with the pure force of the difference-in-itself. Interacting with the infinite, the sensory, and the rational to form the productive derivations in the understanding. The rational here is to mean the capabilities of problem solving yet this process must be defined within the context in the next

paragraph. This process, however, extends to the creation of sentences and how the words of choice lie in the infinite, and are called down by the understanding once intertwined with external stimuli (a conversation etc.) The act of putting our thoughts to words is in fact a primary example of how the understanding interacts with empirical and rational notions through difference and repetition. The formation of a sentence might be entirely novel, yet it is both empirically derivative and potentially novel. This then calls into question, if something is empirically derived by the conventions that govern the English language what makes something truly novel?

I would now like to discuss problem solving and the nature of pattern recognition and the cognitive leaps required. The problem here might be dissecting a challenging movies theme or solving quantum gravity. Here the sensory and the rational, through an instantaneous process might sift through potentials that are coherent or incoherent given the sensory and what it is interpreting. This might derive numerous answers to one question that is interpretive or if the question is rigid then this process might draw similarities but might be different. The sensory might observe the problem and call down pre-established theorems from memory or if the problem requires a leap in logic the mind through the same either instantaneous process or a deliberate process will again sift through potentials and reason through the outcomes. We now consider the development of a system to solve a problem. A certain system or theory might have a gap or some unexplainable facet of the theory (general relativity and infinities etc.) We can create sufficient theories to account for the gaps but then there still might exist a bigger problem that is left unexplained (quantum relativity etc.) Our problem solving generally relies on this notion of abstraction in which the reasoning pulls back and utilizes this either instantaneous or deliberate process of comparing or contrasting potential answers to the problem. This is also evident when analyzing an argument for contradictions and once found might make the entire argument fall if established on false grounds. What makes the process of problem solving also inherently empirical is that the mind is sort of founded on axioms because when solving a problem, we implicitly know what answers are illogical (we know a does not equal b and so forth.) This is a learned function through the conventions established by language and math yet is also sensorily validated.

I now must divulge the properties and subsequent explanation of the transcendental logic. This logic opposed to the abstraction is that of potential genuine novelty. The way in which

genuine novelty might form is multitudinous. There might appear to be two different types of genuine novelty. Yet the two apparent types are ultimately funneled from the infinite, the subconscious and finally though the understanding.

Once information enters the brain it then coagulates in the infinite where the infinity of the choices you can possibly make in accordance or in tangent with information that is stored. Then there is the infinite and the storage of information interacting in the subconscious. This is the activity of the subconscious where the brain unbeknownst to the being is constantly active. Then once the being must posit and new or novel connection the emergent virtual funnels a connection through the understanding where the human is made aware of a potential connection and then runs it through empirical and logical validators. This is the pure transcendental logic; the first type of novelty. In which the infinite posits infinitely many choices, and the subconscious runs through them and then once the understanding needs some sort of explanation to an unanswered problem the subconscious funnels it into the understanding through the emergent virtual where the potential breakthrough may lie. This is to say that there are numerous theories that might come from the subconscious even after the dense interplay pre-emergence. It is simply that the one which is a breakthrough must essentially be discovered.

It has been established that the infinite is influenced by what we learn and see. When we place an idea or theory at the forefront of our understanding, we deeply engage with it and might notice a part of it missing or we become transfixed with an unsolvable problem. Here we may call down unrelated notions to express our ideas, or we may think back to an unusual experience. We might draw potential connections and rule out the ones that do not logically make sense. This is a type of necessary novelty where we see a problem that must be fixed and begin to posit the ways it might be solved. By the mere factor of reading and seeing a gap or a hole in an explanation we then go down a path where the infinite opens itself up to a multitude of potential ideas and answers.

It is pertinent now to differentiate between two types of novelty. The two are necessary and spontaneous. Necessary novelty is reflective of the kind mentioned above where we notice a gap in a theory or explanation, and this necessitates the brain's process of generating potentials. However, there is a spontaneous randomness in which perhaps there is not a logical gap that necessitates a generation of potentials. Yet the brain finds a spontaneous need to apply a potential. This can be called subjective necessity in which different to objective necessary

novelty that generates potentials through an empirical observation of a logical hole or gap; subjective necessary novelty is the confined process of the brain's need for an explanation when one might not be objectively necessary.

It is also necessary to clarify that the infinite is not necessarily a real realm. It is like n+1 in a series. It is simply a tool to understand the nature of potential. It helps because we imagine new sensory data as new information constantly being funneled into in the infinite new potentials are generated. And this conceptually allows us to understand say why we choose certain analogies to explain things. This is a conceptual way to understand the infinity of our potential thoughts.

IMPLICATION AND CONCLUSIONS ON METAPHYSICAL LOGIC

The paper aims to provide a logical and novel framework to understand paradoxical and conflicting problems at the forefront of philosophy. It began with basic criticisms against theories long thought grounded and founded in logic. Most of the theories sadly succumbing to a fleeting senescence and not coming to true fruition much like the case with Deleuze and the incomplete account of the immanence plane. Then we look at novelty and creation through the lens of mathematical philosophy and explore the realist and anti-realist problem and a potential bridge. The bridge being an impositional duality in which the importance of independent mathematical objects is preserved yet the subjective human experience is also preserved. It is through this impositional duality which elucidated a theory of novelty. Because it seemed only logical to provide a basis from which the theories might come from and not just the analysis of the theories themselves and their incipience.

It is clear that the paper and the ideas are merely infantile. Yet though they may be infantile they are innately fecund. The goal of this paper was to put forth my potential solution to the ongoing realism and anti-realism debate. And subsequently provide a new philosophical framework to understand the nature of novelty and originality. The latter of which is marginally less developed, however, with time and more thought it might take a strong shape.

It now is necessary to discuss the potential implications of my paper. As of yet my paper still remains in a very theoretical space. However, I believe as it stands the paper preserves logic and deconstructs and builds on vague or aporetic frameworks. The implications as they slowly cascade and reveal themselves might divulge the uncertainty behind the neuroscience of creativity. In what way has yet to reveal itself to me, however, that is one potential implication. There could also be implications on greater epistemic conflict.

The next is the implications that my theory could have on understanding objectivity in mathematics. If the PA system overturns and burgeons aporetically, then my theory may account for this shift, therefore, we may use my theory as anticipatory measure. This is mere conjecture on how we might implement my dual framework into broader model theoretic adjacent discourse. Another is to potentially analyze my dual framework from the eyes of a mathematician and build a new fundamental theory on the back of the pre-and post-impositional shift that is tenable against both realist and anti-realist scrutiny. If we pull back and look at the

Incompleteness Theorem or Non-Standard Analysis, they both operate conceptually on philosophical levels. This is the sort of analysis I propose my dual framework might elucidate. And subsequently my theory of creation.