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Object Absolutism: Implications for Empiricist and Psychologist Epistemology of Mathematical Statements

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ABSTRACT: The study presented in this paper was conducted to ascertain the extent to which object absolutism as a theoretical presupposition affects the epistemology of mathematical statements as presented by empiricists and psychologists in the philosophy of mathematics. To achieve this objective, the method of content analysis was adopted for the study. The two schools above were randomly selected from the schools in the philosophy of mathematics. It was discovered in the course of the study that objects absolutism, as an exclusivist theoretical assumption, berates the contributions of the cognitive subject to knowledge claims and therefore promotes skepticism if empiricism were validated and solipsism if psychologism were adopted as foundations of mathematical statements. Hence, it was concluded that the way out of the quagmire created by object absolutism is to promote a foundational analysis that investigates the foundations of knowledge by presupposing knowing.

KEYWORD: Object, Absolutism, Subjectivism, Epistemology, Mathematical Statements, Foundations, Knowledge.

INTRODUCTION

Object absolutism is a concept used in the paper to refer to the assumption that all forms of legitimate knowledge claims arise exclusively from sources external to the cognitive subject. Its usage is situated within the context of the demonstration of the foundations of knowledge. The idea is consistent with Locke's notion of the human mind as a tabularaza (Stumpf, 1982). It means that aside from the object, which here refers to sources external to the cognitive agent, the subject inputs nothing to knowledge claims, apart from being used as a vessel of expression of the thing known. In knowing, the mind becomes the thing known, and the communication of knowledge is, therefore, the mere expression of the state of the mind.

The object absolutist orientation has two sides to it in epistemic analysis, which analysis refers to the demonstration of the foundations of knowledge. On the one hand, external sources of knowledge are presented as satisfaction for foundational inquiry. The other side is the assumption of skepticism about the object. In light of the first aspect, empiricism, positivism, and all forms of representational semantic analysis in epistemology are excluded. Rationalism, on the other hand, encompasses all forms of idealism and subjectivism. These other orientations of object absolutism are ad hoc compensations or escapes from skepticism of the object. But whether one decides to countenance the absolutist ontology of the object or to create a mental ontology as compensation for the consequent skepticism arising from object absolutism, the idea as a concept covers all forms of exclusivist epistemic orientation in foundational analysis. Hence, extreme objectivism is no more guilty of object absolutism than extreme subjectivism. It explains why both

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mathematical empiricism and mathematical psychologism, which are two extremes of exclusivist epistemologies of mathematics, are brought together in this analysis. Both schools are victims of the one-sided epistemology of mathematics. But their one-sidedness is not the source of their identity. Despite appearances, the paper's thesis is that both the empiricist and the psychologist schools of mathematics are based on the validity of a single assumption: object absolutism. Empiricism is quick to present the objects of external experience as the foundations of mathematics. Such a presentation is often riddled with so much skepticism because of its unsatisfactory structure. However, psychologism, which doubts the sufficiency of such sources as mathematical foundations, resorts to the ontological convenience fallacy by assuming that the objects responsible for mathematical truths are mentalities. It explains why some mathematical psychologists are also avowed empiricists with respect to the foundations of other non-mathematical systems of knowledge claims.

In the course of the essay, a concept has occurred and will occur elsewhere as an instrument of analysis; that concept is the "fallacy of ontological convenience." The term refers to the epistemic procedure of establishing skepticism in the foundations of knowledge that results from the assumption of the legitimacy of object absolutism. It involves the act of positing the existence of some putative queer entities as the sources of knowledge, where such sources are absent in the empirical world. An archetypical example of the fallacy of ontological convenience is Plato’s ideal world, posited to resolve the problem associated with the foundations of predicates and predications. So, the logical consequences of Platonism are the consequences of all foundational analyses that seek to resolve the skepticism of the object by recourse to the fallacy of ontological convenience.

The paper is part of a series of studies on the foundations of mathematics. It was warranted by the discovery that the problem of object absolutism that bedevils the foundations of mathematics is not different from what has existed in general epistemology. The objective of the paper is, therefore, to demonstrate how the assumption of object absolutism is the underlying theoretical presupposition in both the theses of mathematical empiricism and mathematical psychologism, notwithstanding their different ontological referents as foundations of mathematics. The method adopted for the project is content analysis. It took into account the writings of mathematical empiricists, mathematical psychologists, and other relevant works by philosophers. The choice of the two schools of thought was made randomly but was restricted to schools of thought in the philosophy of mathematics.

EMPIRICISM

The linguistic ability of man is a matter of concern to humans. The output of this ability, especially in declarative sentences, is often faced with the demand for justification. Such output is more common in the language system called mathematics. Mathematical statements' truths are commonly assumed to be self-evident. But the basis of the recognized self-evidence has been a subject of enquiry for many years. Recognizing such a problem as epistemic, traditional philosophy has sought epistemological solutions.

In attempting to address this matter, traditional epistemology has committed itself to the cognitive autocracy of the object, which produced the justification epistemology of the privileged judge with an assumed normative basis. Such assumptions, as shown above, only lead to the fallacy of ontological convenience. But painfully enough, traditional epistemology operates ignorantly in this framework and thus extends its influence from the realm of knowledge in general to the department of knowledge in particular. Thus, to the question, how is mathematical knowledge possible?, the answer becomes given on the basis of the legitimized or countenanced ontology of the responding system.

Consequently, one who is familiar with the major tenets of empiricism as well as the orientations of individual empiricists would not be surprised by J. S. Mill’s response to the question of the foundations of

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knowledge. The legitimating ontology of empiricism is the empirical object or the experiential realm. Hence, empiricism is from the Greek word "emperia," meaning experience (Home, 1997). Such a legitimating basis is taken as an axiomatic or normative ground for the validity of any knowledge claim.

Whereas other empiricists busied themselves with demonstrating how each concept satisfied the empiricist myth, J. S. Mill was perfectly concerned with the processes and foundations of inferences. He had, however, accepted as an empiricist creed the fact that all legitimate knowledge derives from experience. Mathematics was a legitimate subject for Mill. Therefore, mathematical knowledge derives from experience. The legitimate process of inference for him was induction. The inductive process never excluded mathematics. Lehman quotes Mill as arguing that "the science of numbers is thus no exception to the conclusion we previously arrived at, that the processes even of deductive sciences are altogether inductive and that their first principles are generalizations from experience" (Lehman, 1979, p.121).

Pythagorean philosophy may have had a deep influence on Mill's empiricism. Pythagoras and his followers taught that everything is made of numbers. Plato believed that the form of the forms is unity of forms or the number one. The implication of this is the uniqueness of each form. Due to the fact that the forms are exemplars of things, then the uniqueness of the forms is the uniqueness of the individuality of things. Individuality, as such, is the number one. Hence, to "be" as a unit of existence is to satisfy the number one. In this way, Plato systematically accomplished the Pythagorean project. Successes in physics and astronomy have led modern-day scientists to believe that everything is mathematically related to each other. The basis of mathematics had been accepted as arithmetic prior to the demonstration of Cartesian coordinates. Thus, geometry, which represented the description of space, became understood in terms of points or numbers. Pythagoras implied it in his argument. Modern science has confirmed it. Zeno demonstrated it in his analysis. Even though contemporary physics is demonstrating a tendency towards pure logic more than arithmetized geometry, the scientific climate of the modern period favoured Mill's arguments. Thus he opined thus: "All observable things are characterized by quantity. Propositions... concerning numbers... are propositions concerning all things whatsoever "(Lehman, 1979, p.124).

The quantities referred to by Mill represent numbers. What are numbers? Frege went to work regarding this question by arguing that numbers were properties. There is, however, no reason here why Mill would not have answered the question in that way. After all, his argument is that numbers are characteristics. But the answer to that question has been discovered to demand more than Frege envisaged. The decision to settle for classes or classes of classes (as in Russell (1992)) as the meaning of numbers does not solve the problem of numbers in epistemology. A much more fundamental question, in this instance, becomes that of the possibility of predicates. Here, the role of the individual argumentative place and the logical activities of the subject (i.e., the cooperative act according to which knowledge is possible) cannot be underestimated. Thus, it is first the individual, then the operation on the individual, and finally the predicate. How that happens would be a topic for another paper. The priority of the individual places a demand on its understanding. What is a number?

According to Mill, because arithmetic is an empirical fact, the numbers are these physical facts (Lehman, 1979). The implication of this is that arithmetic propositions are therefore not a priori but a posteriori. Thus, Mill argues:

We may, if we please, call the proposition, "three is two and one," a definition of the number three, and assert that arithmetic, as it has been asserted that geometry, is a science founded on definitions. But they are definitions in a geometrical sense, not the logical; asserting not the meaning of a term only, but along with it an observed matter of fact…. We call "three is two and one" a definition of three; but the calculations which depend upon that proposition do not follow from the definition itself, but from an arithmetical theorem

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presupposed in it, namely, that collections exist which, while they impress the sense, thus $^{0}{}_{0}{}^{0}$, may be separated into two parts, thus $_{00\ 0}$ (Mill, 1950, p.124).

Here, Mills' mathematical empiricism reaches its turning point. The arithmetization of geometry has succeeded in the achievement of a geometrized arithmetic. What is implied here is that geometry is arithmetic and arithmetic is geometry. Thus, numbers are basically the collection of empirical points. The arithmetic notion of infinity is even possible in Mill’s reductionism. The translation of a plane into a straight line in traditional Euclidean geometry made it possible for all the points of a single plane to be contained in a straight line at its infinity. The achievement of this mathematics is the possibility of interchangeable formations. Thus implying the openness to an extensive isomorphism of a single consistent model. Consequently, contemporary science is familiar with the call to interpret physical, logical, geometric, and arithmetic theories in a single model (Korner, 1971). In this guise, the Galilean dream is evident to Mill. All statements are empirical points in physics, astronomy, geometry, and arithmetic.

The physics of points, which number theory represents, views numbers in terms of actual empirical aggregates of points. However, as Frege put it, "... what in the world can be the observed fact, or the physical fact (to use another Mill's expression) asserted in the definition of the number 77864" (Lehman, 1979, p.124). The traditional frustration in general epistemology is what is here demonstrated in special epistemology by the empiricism of numbers. The fundamental assumption that language pictures the world, which had bewitched epistemology unexpressed until it was questioned in Wittgenstein (1993), is the problem of Mill’s empiricism. It is difficult to conjecture how points encountered in the physical world provoke the notion of numbers. When he defined numbers as properties of classes, Frege came so close to overcoming the Mill’s tangle. But Frege’s problem remains the impossibility of saying what numbers are beyond the fact that they are classes. What these classes are remains a problem in Frege’s epistemology. A definition in mathematics is not just an abbreviation of concepts. It is the characterization of a fact such that one, by such a standard, would be able to distinguish such a fact from others. Thus, it is a qualification or a description. Until such a definition of class is given by Frege and his followers, that notion remains inscrutable.

The problem of numbers remains equally unresolved in Mill. It makes no sense to say that numbers are empirical facts or aggregates of them. Even if the idea of number is granted to empirical facts, it is noteworthy that there are equally a thousand and one such other ideas that relate to empirical facts. Which ones are the numbers referring to?

Underestimating the subject's contribution to epistemic analysis is bound to result in confusion, failures, and repercussions. It is foolish to try to understand the movement of a piloted ship without the sailor or technical control structures. The search for the foundations of knowledge outside of due consideration of the process of its construction is bound to be problematic. The epistemology of Mill is a function of ontological stipulation as the realm of mathematical knowledge. Thus, it commits itself to the fallacy of ontological convenience. But the admiration for Mill is that he came close to talking about numbers in the context of the class of aggregate. What Mill lacks is a way to separate numbers from the things-themselves or from the argumentative places of a concept.

PYSCHOLOGISM

The concept of psychologism in the foundations of mathematics is associated with Kant, Husserl, and the three main English empiricists. Psychologism is the conception of mental representations as the foundation of numbers in foundational analysis. The search for the legitimate object of knowledge in an epistemology of mathematics is to delineate the realm of mathematical research as a science. A characteristic of Locke’s empiricism is its ignorance of the substance that produces ideas. The spiritualized substance of Berkeley’s system could not resolve the problem of Locke’s ignorance of material substance. David Hume brought these

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tendencies to their logical conclusion. Hence, Hume's absolute concern with impression and a corresponding denial of substance was the necessary consequence of Locke's empiricism. At that point, British empiricism had devolved into ideas and had lost sight of the thing-in-itself. As a result, skepticism of the thing-in-itself is not uniquely Kantian. The skepticism of substance, material and immaterial, was the skepticism of the thing-in-itself. The discovery of Kantian epistemology is not synonymous with the discovery of the actual substance. The substance of Kantian analysis is an empty set. It has no content.

Husserl's phenomenology is the search to quell Western contradictions in learning by the bracketing of naturalistic presuppositions of objectivism. It marks the return to the subject of consciousness, which opened the way to subjectivism and ideational theorizing.

As a result, the psychologists' arguments in mathematics are:

(a) that numbers and other mathematical entities are ideas and

(b) that sense or intentional meanings are ideas (Resnik, 1980, p.27).

Within Locke's model, these ideas are ideas of observation and reflection. Locke uses the term idea to"... express whatever is meant by phantasm, notion, species, or whatever it is which the mind can be employed about in thinking." (Resnik, 1980, p.27). The solipsistic orientation of the psychologistic model makes the explanation of intersubjective understanding of a singular fact difficult. Thus, to the question of whether different men could actually have identical ideas, "Locke assumes that this is something which could never be known because one man's mind could not pass into another man's body, to perceive what appearances were produced by (his) organs" (Resnik, 1980, p.28). This analysis jeopardizes the explanation of the possibility of meaningful communication. It becomes difficult to state the basis of intersubjective understanding.

Locke, however, seeks to remedy this by arguing that "the sensible ideas produced by any object in different men's minds are most commonly very near and undiscernibly alike" (Resnik, 1980, p.28). In the light of Locke's framework, it is really difficult to establish the basis of "sure nearness". Is it in the things or in the subjects? Locke finds it hard to address this problem properly.

The simple idea of perception is, for Locke, the foundation of numbers. The continuum follows through addition. The foundation of necessary addition is not produced by Locke's epistemology. Thus, the introduction of addition as a compensatory basis for the proof of the number series, founded in his discontinuous universe, is arbitrary. Concerning the basis of numbers, Locke writes as follows: "Among all the ideas we have, there is none more suggested to the mind by more ways, so there is none more simple than that of unity or one. It has no shadow of vanity or composition in it...'' (Resnik, 1980, p.29).

The origin of the idea of one is the individual idea of perception and reflection. Thus:"... every object our senses are employed on, every idea in our understanding, every thought in our minds, brings this idea along with it" (Resnik, 1980, p.29). For the natural number continuum, Locke writes, "... by adding one to one, we have the complex idea of a couple; by putting twelve units together, we have the complex idea of a dozen, and so of a score, or a million, or any other number" (Resnik, 1980, p.29). But it is pertinent to ask what twelve refers to without its qualified object. What is twelve?

The feat of Locke's analysis is appreciable, but its inherent problem makes it unacceptable. The absolutization of the contribution of the object to language blinded Locke from recognizing his feats. Numbers in Locke were known in terms of argument places in the class of simple ideas. So understood, numbers are points. In this way, knowledge becomes a picture of the world uttered out of necessity by the subject. Yet the problem of Locke's idealism goes even deeper. It touches down on the basis of the universality of mathematical truths in the face of solipsism.

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Edmund Husserl is another prominent proponent of this school of thought. Husserl made the origin of the concept of number purely psychological (Resnik, 1980). He had believed that the concept of number is incapable of definition. The indefinability of this concept is recognized by mathematicians, he argues. Consequently, mathematicians:"... at a point in their system, instead of giving a logical definition of the concept of number, they describe the way in which we arrive at this concept." (Resnik, 1980, p.41). The numbers in Husserl's system are purely psychological or mental. After all, Husserl's system is subjectivist. Consciousness is the awareness of something. The implication of this is the absence of social facts. The existing facts are those of consciousness. But the impossibility of intersubjective transcendence makes a mess of the psychologist's project. Such a mess has been dramatized by Frege as follows: "If the same thought is not taken by me and by (another) as the content of the Pythagorean Theorem, then properly one should not say "the Pythagorean Theorem" but rather "My Pythagorean Theorem," or "his Pythagorean Theorem" (Resnik, 1980, p.32). At that point, what one is talking about becomes unknowable to another.

Husserl admired Descartes so much that he went Cartesian. The Cartesian problem was the resolution of academic contradictions. The evidence for science jeopardized faith in science. Its domain of reference did not demonstrate the necessity of science. Conflicting astronomical frameworks challenged the mind of the Cartesian schoolboy. The consequence of this for the Cartesian adult was the rejection by doubt of previous beliefs. The same situation resulted in Husserl's following the contradictions in Western scholarship due to the desire for objectivity. Husserl rather ended up with a rejection of objectivity (Stumpf, 1982). But the rejection of objectivity in absolute terms does not solve the problem of the epistemologist. Subjectivism and its solipsistic consequence is skepticism, which is a function of the traditional belief that knowledge pictures the world. If knowledge were understood in this way, these shocks would not have been part of our research history.

IMPLICATIONS OF OBJECT ABSOLUTISM FOR EMPIRICIST AND PSYCHOLOGIST MATHEMATICS

The evaluation of each of the two schools of thought ran throughout the text. But it is important to state that empiricism is inconsistent with the supposed empiricist semantics, which upholds the validity of the correspondence theory of truth and the reality of intersubjective experience. There is nothing in experience to show how some aggregates of objects exclusively satisfy number words outside of a second-level mental analysis. Besides, if a significant statement pictures the state of affairs (Ozumba, 2001), it is difficult to demonstrate which state of affairs is pictured by the number 67839. Hence, judged from the empiricist paradigm itself, mathematical empiricism is false.

Psychologism promotes a certain form of subjectivism that defeats intersubjective possession of knowledge claims. Such subjectivism promotes solipsism and brings into question the objective status of mathematical truth. So, if my Pythagoras theorem is different from your Pythagoras theorem, then how is mathematics as a science possible? Psychologists did not in any way resolve Frege's quandary. So, apart from being guilty of the fallacy of ontological convenience, the nature of mentalities posited by psychologists is not intersubjectively assessable.

What is absent in both the empiricist and the psychologist's foundations of mathematics is the recognition of the inputs of the cognitive subject to knowledge claims. Such inputs to knowledge can only be discovered when the foundations of knowledge are sought by studying knowledge within the knowing process. Here, the resources of cognitive science could be seen as useful and very instructive, without the fear of circularity. But both schools, assuming that the cognitive object is the absolute source of knowledge, are exclusivists, and exclusivism leads to skepticism about the foundations of knowledge.

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CONCLUSION

In conclusion, object absolutism is the basic theoretical presupposition of empiricist and psychologist philosophies of mathematics. Such a theoretical assumption has dire consequences for their epistemologies. For empiricists, it leads to skepticism as a result of inadequate foundational analysis, whereas for psychologists, whose thesis is guilty of ontological convenience, the problem becomes more complicated as systems defeat objectivity in mathematical analysis.

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