What is 'Science' in Social Science? An Epistemological Investigation

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Abstract

The word science refers to a specific mode of inquiry in seeking knowledge. Thus, "What is 'science' in social science" is a question of the status of science or social science and the nature of knowledge itself. If social science claims the scientificity in its approach to knowledge, their difference becomes only a matter of difference in their distinct object of study. Further, this paper wants to argue that the difference between them is not only a matter of difference in objects of study or degrees of reliability of knowledge but also a matter of difference-in-kind. Thus, the notion of 'science' in social science merely denotes the aspiration of social science to produce as reliable and accurate knowledge as natural sciences.

Keywords: Science, Social Science, Epistemology, Demarcation, Falsification, Theories of Complex Phenomena, Method

Introduction

This article examines the role of "science" in social science, which is a particular mode of inquiry for seeking knowledge. Therefore, the question of "What is science in social science?" goes beyond the status of science or social science and touches on the very nature of knowledge. If social science claims to use a scientific approach to knowledge, then the difference between natural and social sciences becomes a matter of their distinct objects of study. However, this paper argues that the distinction between natural and social sciences goes beyond differences in their objects of study or the reliability of their knowledge; it also represents a fundamental difference in their nature. The first section of this paper explores the status of science as an epistemic discourse, while the following section attempts to understand "science" within the context of social science. Finally, this work asserts that "science" in natural and social science is distinct, reflecting the nature of science and social science.

SECTION 1

Thinking, it is often said, is the gateway to scientific breakthroughs. But 'to think' does not necessarily guarantee any scientific progress. Then what kind of thinking is associated with the epistemic discourses of science? Is there anything called a scientific and non-scientific way of thinking? Though the question seems to evade any tailor-made reply, it can be said that the ontology of thinking, though the conscious activity, goes beyond the realm of the probable. 'To think' is to contemplate the possibilities that might seem implausible to human cognition. Thus, the structural epistemological core of science involves three interrelated steps that aim to approach the closest approximations of truth. The first step is considering all possible and impossible solutions to a given problem. The second step, which we refer to as "inclusive elimination," involves the scientist assessing the limits and eliminating a wide range of "invalid" possibilities to narrow down the probability space. We call it 'inclusive' because the rejected possibilities can anytime return with the needed empirical and theoretical backup in the future. What is required is a genius who will push the limits of reality; thus, the 'now' rejected possibility is not altogether eliminated—that is, if not, the possibility is certainly devoid of any potential—but merely kept aside. 3) The third process, simultaneous with the second, is the attempt to find empirical and critical theoretical backing for the

range of limited possible results that are now left. In this third stage, Karl Popper (2005) 's 'problem of demarcation' really comes into play: the issue of empirical content and testability he is concerned with becomes central. After these three formative stages, the team has to come up with either the claim of a new theory or one or more than one auxiliary hypothesis that supports any given theory. The issue of ad-hoc hypotheses where the claims are not 'independently testable' is avoided here for its lack of present authority. The 'kept aside' possibilities can become handy in forming these auxiliary and ad hoc hypotheses. Thus, it can be claimed that thinking is beyond such categories as scientific and non-scientific. Still, there are scientific and not-so-scientific ways of backing it up and giving it a specific epistemological value.

The project's title directly hints toward a philosophical investigation to discover the overlapping space between these two modes of knowledge production. While science tries to decode the hidden core of reality beneath multiple layers of appearances, social sciences attempt to see those inter and intra-relations between different social phenomena by using what they claim to be scientific methods. Though both disciplines influence each other, the nature and the space of the influence—which are different—play a significant role in bestowing the desired status. The nature of influence that social science has on science seems not to be 'structural' because the internal history of science is immune to any such 'contingent relation of historical influence.' Before moving forward, it will be helpful to understand the distinction between science's external and internal history. It is not intrinsically important in science to highlight the context of discovery; the context in which the scientist is inspired to conceive the theory can form an interesting anecdotal piece where the scientist's subjective, socio-political, and ideological concerns come to the fore. It is here that literature and varying social factors influence scientists. But this kind of influence is not significant enough in science, which is only concerned with the correlations, actions, events, disturbances, and occurrences that directly bear the epistemological justification of this discipline. The contextual factors involved in scientific discoveries can be studied as either the sociology of science or the external history of science.

On the other hand, what matters is the empirical validity of proposed hypotheses by their ability to overcome different stages of rigorous tests and experiments. The internal history of science is an epistemic sequence of divergent relationships between different domains and orders of hypotheses. These theories are empirically valid from experiments and discoveries preceding and succeeding the claims. Einstein's thought experiment, which involves him and his girlfriend traveling at the speed of light, maybe intriguing. Still, its relevance to science lies not in the experiment but in how Einstein justifies it. Specifically, whether he can support it with empirical content or sophisticated mathematical and theoretical calculations would lend credibility to his discovery.

After this long discussion, we can say that social science influences the outside space of science as social science has no bearing on how science works; social sciences are under an epistemic debt from science. While the influence of science has its discursive epistemic value, the impact of social science is not significant as the internal history of science is independent of this influence.

What is science, a method, an approach, and a discipline? To grasp the workings of science, we must also understand what is not science. While demarcating the boundaries between science and pseudoscience can be challenging in many respects, it remains a crucial task. This is not because science requires its exclusive domain but because we must scrutinize any claims of scientificity made

by other fields or modes of inquiry with different objects of study. The paper wants to make clear that the argument is not for a discipline that will be exclusive and free from other spaces of influence. However, mapping a discipline's outline can only be deemed successful if we determine whether it can be delineated reasonably, even if that requires some hybridized spaces along the borders. In such a mapping, the discipline's core must be assessed based on the functionality of its methods. The degree of success in mapping a discipline can be gauged by demonstrating the effectiveness of its core in practice.

The knowledge question is intricately related to the questions of method and methodology. Though the distinction between method and methodology is highly fluid because of the question of context and value, it can be safely put forward that method is a specific, rigorous, carefully chalked-out pathway that guarantees a particular kind of knowledge at the expense of other forms of knowledge. A method should be planned to keep different markers in mind; the object of investigation is the most significant. Through an example, we want to argue how method—as a specific way of reasoning and observation—is varied in humanities and science. In his book Ways of Seeing, John Berger puts forward a method of seeing that differs from the method of looking he describes elsewhere. He argues that the depiction of the female body in Western painting has traditionally demanded a particular mode of perception from the viewer. It is this specific method of seeing that generates the effect of nudity. This method requires *a priori* knowledge of Western art history, which seems obsessed with the female body. The viewer must assume a particular subject position that blurs the boundary between the space within the painting and the external space. In this way, the nude woman depicted in the painting appears to avert her gaze or cast subtle downward glances as if she were directly exposed to the viewer's gaze. Thus, the woman is represented or constructed by the perceiver's vision: for she is reduced to an object to whoever takes the subject position. In contradistinction with such a method contingent on the cultural politics of representation, the scientific method seems free from ideological overtones and dogma questions. Let us consider the simple method of induction as used in scientific endeavors: one has to gradually move towards a general theory from specific observations by detecting patterns and forming tentative hypotheses.

Distinguishing between method and methodology is crucial to understanding the nature of knowledge. While the method is a tool employed in pursuing knowledge, it is just one component of the larger and more complex methodology mechanism. This mechanism includes the values and justifications that underlie a particular characterization of the scientific method, such as objectivity, reproducibility, simplicity, or past successes. The Stanford Encyclopaedia of Philosophy specifies the larger area of scientific methodology, which can include: specific laboratory techniques; mathematical formalisms or other specialized languages used in descriptions and reasoning; technological and other material means; ways of communicating and sharing results, whether with other scientists or with the public at large; or the conventions, habits, enforced customs, and institutional controls over how and what science is carried out. It is essential to distinguish between method and methodology to understand the meaning of "science" in social sciences. While social sciences borrow tools from science, their process differs from other disciplines. This distinction arises not only from the different objects of investigation but also from the diverse ways of communication, conventions, customs, and ideological limitations inherent to each discipline.

In his essay "The Problem of Demarcation" (1999), Popper attempts to distinguish scientific activity from non-scientific activity by proposing the method of falsification. The history of scientific

progress is a series of bold conjectures and a humble but rigorous attempt to refute those conjectures. The Popperian scientist's necessary skepticism is an attempt to move beyond mere claims of validity and strive for the closest possible approximation of the truth. Scientists work with tentative theories, which can only be proven through exposure to potential falsifiers. Before moving forward, it is necessary to understand the nature of both the conjecture and its refutations. These conjectures must be bold in the unique sense that they will face the real-world sans the protective belts of sophisticated mathematical tricks and a whole range of secondary statements. The boldness of predicting the relationship of different aspects of the world of appearance, or the courage not to disown it in the face of all the prima facie evidence of the senses, makes the Popperian conjecture highly vulnerable. According to Popper (2005), the testability of a scientific theory is a crucial characteristic that determines its scientific status. However, Popper's demarcation principle suggests that the scientific nature of a theory can be assessed regardless of empirical evidence. What matters is whether the theory can propose a set of testable predictions that could potentially falsify it. Therefore, a theory's scientific value depends on how testable and open it is to criticism from empirical data. Thus, as Lakatos rightly observed, this distinction is not between scientific and non-scientific theory but somewhat between scientific and non-scientific methods.

To illustrate the method of falsification, consider the tentative theory that "metals expand when heated." This theory can be falsified not by simply observing the expandability of metals but by testing whether objects that are not metals also exhibit the same characteristic when heated. This kind of refutational experiment can be helpful, but it is simultaneously a process of infinite regression. The researcher can never be sure about the knowledge he is supposed to claim. This sense of supreme skepticism is good as it pushes the boundaries of possibilities, but science is not all about theories; what matters in science is applicability and practice. In his "The 'Corroboration' of Theories" (1991), Hilary Putnam criticized Popper because of his emphasis on one element over the other in this binary of theory/practice. The question of method is essential because of the practice and the kind of knowledge that a systematic practice can yield; method per se is of secondary importance. According to the Popperian method, the most outlandish theory— the most rigorously tested— can never claim the epistemological prestige of general law, for it always trembles with the anxiety of being permanently tentative. This confused status is not at all conducive to the application of science. Thus, the claim that falsification is a regressive method seems to hold ground compared to verification.

While in a verification method—let's say 'induction'—the researcher derives basic statements from general laws to *verify* those laws, in case of falsification, the Popperian scientist uses the primary arguments against those theories from which they are derived. Thus, one of the basic criteria of scientific knowledge is that it can be reached only through falsification. Despite the criticisms of Popper, it can be argued that his method of falsification allows for a rough distinction between science and social sciences. While verification may be possible in social sciences, the process of falsification is often much more challenging.

It is necessary to understand how both Lakatos and Putnam refuted the refutation method of Popper by arguing that science is not merely a sum of some conjectures and refutations. Science is an elaborate and complicated research program; the theories or the general laws constitute the core which is stubbornly defended by auxiliary hypotheses and a detailed and flexible problem-solving mechanism. These protective belts not only discard the refutation as a form of an unsolved anomaly but also sometimes turn them in favor of the general laws. For Popper, scientific research cannot

embrace ad-hoc hypotheses which are not independently testable. Still, some gray areas—anomalies and unsolved puzzles— escape the scientific grasp of any research problem. If the scientist discards his core theory only to cater to this hiatus, any scientific progress seems impossible. After proposing his model of scientific research, Lakatos (1978, p. 05) suggests that scientists can predict novel facts, which may be entirely unprecedented or even at odds with rival theories. This capacity distinguishes scientific research from, for example, Marxism, where theories are often constructed merely to justify preexisting facts. In a progressive scientific research program, the theory leads to the almost exact prediction of novel facts; However, there is a difference between foreseeing and knowledge; the scientist 'knows' what he is 'foreseeing.' As the critique of his proposal shows, Popper is aware of what Lakatos is saying; Popper has anticipated both what Lakatos and Putnam have later argued. Lakatos' argument of the scientist's creative ability to predict novel facts is implied in the second sense of boldness that Popper associates with the scientist's conjecture (Popper, 2005). That being said, Lakatos was correct in asserting that scientific progress cannot be solely measured by the success of verification or the rigor of refutation. Instead, what truly matters is the scientist's innovative tenacity in refusing to abandon their research program in the face of a crisis. As has been noted repeatedly, the most significant breakthroughs often occur during these moments of upheaval. Again, 'all programs grow in a permanent ocean of anomalies.'

In his article "The 'Corroboration' of Theories," Putnam (1991) supports Lakatos' argument by suggesting that general laws and scientific paradigms are immune to refutation. This does not mean that refutation is not a possibility within scientific research but instead that the regressive effects of refutation are often detrimental to applied science. While presenting a critique of Popper by arguing that a falsification is a form of verification, Putnam claims that the basic premise of both the Inductivists and Popperians overlooks the importance of supplemental and sub-auxiliary statements. The supposition that predictions can be drawn from scientific theories is incorrect; the combined system of general laws and additional hypotheses generates predictions. This overlooking of Auxiliary Statements (A.S.) has important nuances: failed predictions no longer testify to the failure of the theory; the failure might be the incapacity to find appropriate A.S.

Thus, the gray area of Popper's otherwise ingenious demarcation proposal lies in its heavy dependence on subjective methodology, which asks for intellectual honesty from the scientists. He is pretty aware of this fault as, at the very beginning, he admits that he is dealing with rather the heroic or romantic idea of science. Nevertheless, this discussion of different scientific methods explains the epistemic nature of the discipline and prepares the field for the following discussion of science in social science.

SECTION 2

Epistemological inquiry requires organizing and classifying knowledge's complex and often disordered nature. Such an approach is necessary because knowledge is inherently chaotic, multifaceted, and challenging to comprehend. One of the main reasons behind scientific accuracy is its engagement with isolated, self-contained bodies of knowledge. Joe Moran claims: "The goal of a scientific discipline was therefore necessarily narrow: to establish the laws that explain natural phenomena within its field, and thus to account for only a small part of reality" (Moran, 2002, p.06). As the field of study narrows, the possibility of precision becomes naturally high. But the success in deriving rigorous and productive knowledge in one area can never be reason enough to neglect that unattended part of reality in which the structural discourse of science declares itself independent. The

knowledge of social phenomena—the relationships of different nonphysical objects within society—is far more problematic because the reduction of space, even if possible, is ultimately an illusion. F.A. Hayek observes the phenomena of mind and society; in the social sciences field, one of the primary conclusions reached through theoretical analysis is the recognition that individual events are often dependent upon many specific circumstances. It is unlikely that we will ever fully ascertain all of these factors, making the ideal of prediction and control an unattainable goal. Moreover, the notion that we can uncover consistent connections between individual events through observation is a false hope, as Hayek (2018, p. 269) argues.

Let us take the example of the Second World War as the space of social study. Although examining social phenomena from the unique perspective of Jewish cultural and historical tragedy may be fascinating, it ultimately hinders the social sciences' goal of controlling data. This is because unknown factors often can significantly influence the research outcome and cannot be easily controlled or accounted for. In contrast to social sciences, science can yield accurate results in its predetermined and controlled laboratory atmosphere. Thus, social scientists' desire for precision and accuracy by using the rigorous and empirical scientific method is ultimately bound to frustrate them because of the difference in the object of investigation.

This study agrees with Hayek when he claims that the objects of scientific study are simple phenomena and the objects of social sciences are complex phenomena. The nature of the object distinguishes simple and complex phenomena. Hayek proposes the demarcation as physical and nonphysical objects of study. Physical phenomena are simple, while nonphysical phenomena are complex. The number of variables used to theorize complex phenomena is infinite. Therefore, the uncontrollable variables are beyond the scope of falsification. Falsification as a demarcation method can only be applied when the limited numbers of variables are related to each other in a causal relation. In the case of social sciences, the almost infinite number of data or variables makes a causal link impossible; the question of falsifying or refuting the generalization, thus, does not arise.

Consider the case of the human body. Medical Science studies the human body's phenomenon by assuming that the human body is a physical object and is influenced by a limited number of internal and external variables that can be controlled. Social science believes that factors outside the physical realm also impact the human body when studying it. The scope of this study is unlimited as one can study the human body through culture, the economy, the environment, law, etc. Therefore, the human body is a complex phenomenon for the social sciences.

When the numbers of data or variables are infinite, the causal relations of variables are impossible to establish. Causality denotes a strict sense of repeatability, i.e., when A happens, it will always result in B. Consequently, it is understood that it has happened only because of A when event B occurs. In the sciences, if we take the primary example of the effect of heating metal, we understand that metal expands when it is supplied with heat under certain suitable conditions. Consequently, if metal expands under the same conditions, it is supplied with heat. This repeatability is an integral part of the concept of causality. On the other hand, causality is impossible in the social sciences. For example, it would be illogical and wrong to say that Gandhi was the cause of the Partition, as that would mean that every time someone like Gandhi was born in India, it would inevitably be partitioned.

Again, Gandhi cannot be the cause of the Partition of India because the variables of the Partition of India are numerous, and all of them cannot be known. For instance, a whole of events influenced the Partition: example, the division of Ben Gal, the Poona Pact, the birth of the Congress and the Muslim League or the individual roles of Subhash Chandra Bose, Jawaharlal Nehru, Mohammed Ali Jinnah, and so many others that are impossible to know. Therefore, to establish a causal relationship between Gandhi and the Indian Partition, we must neutralize even unknown variables. Therefore, causal relationships can't be found in theorizing a complex phenomenon, and if the causal relationship is not possible, then the question of refutation or falsification does not arise. Furthermore, the impossibility of causal relations in complex phenomena implies that the regularity is not there, which results in generalization.

According to Hayek, 'the conception of law in the usual sense' barely applies to 'the theory of complex phenomena.' He further argues that if we assume that all the other parameters of such a system of equations describing a complex structure are constant, we can, of course, still call the dependence of one of the latter on the other a "law" and describe a change in the one as "the cause" and the change in other as "the effect." But such a "law" would be valid only for one set of values of all the other parameters and would change with every change. This would not be an instrumental conception of a "law" (Hayek, 2018, p.276).

Thus, it can be logically concluded that social science cannot produce general laws. At this juncture, statistics might seem to be a probable solution for the problem of dealing with complex phenomena. Generally, statistics is understood as playing with large numbers of variables in which complex phenomena consist. But this statistics technique is of little help in explaining complex social phenomena; explaining a social phenomenon means probing the relationship of variables. But statistics, as Hayek observes, "proceeds on the assumption that information on the numerical frequencies of the different elements of a collective is enough to explain the phenomena and that no information is required on how the elements are related" (Hayek, 2018, p.265). Thus, generalizing statistics regarding numbers is insufficient to explain social phenomena' complex nature.

The markers of categorization in science are strict because the boundary can be sharply drawn based on experimentation results. After repeated experiments and tests, the scientist can change a bucket of water into ice at a whim; he must repeatedly examine the interaction between temperature and three different states of appearance. Thus, at zero degrees centigrade, the categorization between water and ice can be fixed (keeping all the other variants constant). On the other hand, social science remains vulnerable, as any sharp classification is bound to fail. The categorization recently implemented between the creamy and non-creamy layers of Other Backward Classes based on a strictly financial point—six lakhs—might have efficacy in terms of applicability. Still, the strict distinction is based on socio-political-educational policies relative to other variables. Furthermore, the student with a family income of six lakhs ten thousand can never be strictly restricted from the student who benefits from having, let's say, twenty thousand less annual income. Thus, the distinction in social sciences can never claim the strictness of scientific differentiation, which has the intrinsic logic and support of experimental results.

One of the main demarcation criteria between science and social sciences is the issue of prediction. By dint of predicting novel facts, the scientist attempts to penetrate the layers of appearance. Predicting novel facts from theory is not mere guesswork because the prediction is reached after

passing through critical theoretical and severe empirical tests. But as Lakatos reminds us, it is essential to remember that in a progressive scientific research program, the prediction of hitherto unknown facts follows from the solid structural base of general law. In social sciences, the issue of prediction becomes problematic because a given set of calculations may lead to any of a set of different outcomes.

After familiarizing himself with the context in which the other person is viewing any particular situation, the social scientist can predict something wrong. Still, this prediction—in any way—cannot be undermined because, in the case of social sciences, the possibility of one of a set of different outcomes being genuine cannot be ruled out. In science, on the other hand, a false prediction implies a faulty method, flawed theory, mistake in calculation, or all of the above three. Peter Winch argues that the lack of certainty in social scientists' prediction is due to the question of 'what is involved in following that particular rule; thus, this added condition of circumstances behind an outcome makes things problematic:

The rule here [in social sciences] does not specify any determinate outcome to the situation, though it does limit the range of possible alternatives; it is made determinate for the future by choice of one of these alternatives and the rejection of the others—until it again becomes necessary to interpret the rule in the light of yet new conditions (Winch, 1990, p.92).

Let us consider the following case. The women empowerment event in Pakistan can liberate women and enrage the fundamental pockets active within the nation. Now, the social scientist can predict in favor of the latter possibility is higher, keeping in mind the present socio-political condition of Pakistan. But let us surmise that the former possibility becomes true after fifty good years. This result does not necessarily bog the social scientist because the condition behind the rule has changed. Thus, even false prediction remains compatible.

The relationship between the investigator and the object of study differs in science and social science. In science, the scientist stands at a distance from his object; there is no intrinsic relationship between them, whereas the social scientist—being a member of society—investigates society. Thus the nature of social science's knowledge is of a reflective kind. In social science, one can ask who can write history: a disciplined practitioner or an outsider. If a practitioner of a discipline writes history, then his account will constantly be subjected to the lexicon of the discipline. If an outsider tries to document the history of a discipline, he won't be able to understand the epistemic body unless he incorporates himself into that discipline. But this is a problematic claim. There is no point where one can legitimately claim that he is an insider of that discipline. Knowledge attained through ethnography cannot be reliable because an ethnographer always faces the threat of fragmented and misleading knowledge because he is an outsider.

We cannot apply objective knowledge' in natural sciences to social science. The language used in the natural sciences is constructed. There is no risk of falling into the trap of 'metaphoricity' or the value-ladenness of natural human language. There is no way of avoiding the essential metaphoricity for a social scientist. Thus the objectivity of social science's knowledge remains a matter of degree.

The trajectory of this discussion suggests that science and social science have a massive difference in nature. This difference is not a matter of degree but a matter of kind. When Hayek demarcates

science and social science knowledge as theories of simple and complex phenomena, he treats the difference as a matter of degree. But the difference in degree constitutes a profound change between theories of simple and complex phenomena. It is evident from the discussion that while recognizing social science as theories of complex phenomena, it cannot produce general law like natural sciences.

Moreover, the question of causal relation and predictability are not compatible with the concept of complex phenomena. Then the difference between science and social science becomes a matter of kind, not a matter of degree. The knowledge offered by social science is of a different kind than science. Then the notion of 'science' in social science does not refer to a change in terms of degree. Thus the idea of 'science' in social science merely denotes the aspiration of social science to produce as reliable and accurate knowledge as natural sciences.

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