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The validity of the scientific declaration in experimental social research

SUMMARY

This paper analyzed the validity of scientific claims in experimental social research, aiming to initiate a debate on the multiparadigm approach and the conditions for its viability. The methodology adopted was theoretical in nature and argued that, to obtain reasonable, correct, and precise knowledge, it was essential to adhere to the heuristic rules of a single research format. Such adherence also facilitated the elimination of systematic and random errors, something considered crucial to the quality of the research. The study concluded that the reliability of the conclusions was directly linked to adherence to a coherent paradigm, distinguishing reliability from the concept of probability. However, it was shown that probability could approach certainty as knowledge became more precise. The results of the study supported the pragmatist theory of truth. Finally, it was concluded that the repetition and consistency of the results obtained by different researchers using the same strategy were key criteria for increasing the reliability of knowledge.

Keywords: reliability, probability, paradigm, knowledge

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The validity of the scientific declaration in experimental social research

RESUMEN

Este trabajo analizó la validez de las afirmaciones científicas en la investigación social experimental, con el objetivo de iniciar un debate sobre el enfoque poliparadigma y las condiciones para su viabilidad. La metodología adoptada fue de naturaleza teórica, y sostuvo que, para obtener un conocimiento razonable, correcto y preciso, fue fundamental adherirse a las reglas heurísticas de un único formato de investigación. Dicha adhesión también facilitó la eliminación de errores sistemáticos y aleatorios, algo que se consideró crucial para la calidad de la investigación.El estudio concluyó que la fiabilidad de las conclusiones estuvo directamente ligada a la adhesión a un paradigma coherente, distinguiendo la fiabilidad del concepto de probabilidad. Sin embargo, se demostró que la probabilidad pudo acercarse a la

certeza a medida que el conocimiento se volvió más preciso. Los resultados del estudio apoyaron la teoría pragmatista de la verdad. Finalmente, se concluyó que la repetición y la consistencia de los resultados obtenidos por diferentes investigadores con la misma estrategia fueron los criterios clave para aumentar la fiabilidad del conocimiento.

Palabras clave: fiabilidad, probabilidad, paradigma, conocimiento

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A validade da declaração científica na investigação social experimental

RESUMO

Este artigo analisou a validade das afirmações científicas na investigação social experimental, com o objetivo de iniciar um debate sobre a abordagem multiparadigma e as condições para a sua viabilidade. A metodologia adotada era de natureza teórica e defendia que, para obter um conhecimento razoável, correto e preciso, era essencial aderir às regras heurísticas de um formato único de pesquisa. Tal adesão facilitou também a eliminação de erros sistemáticos e aleatórios, algo considerado crucial para a qualidade da investigação. O estudo concluiu que a fiabilidade das conclusões estava diretamente ligada à adesão a um paradigma coerente, distinguindo a fiabilidade do conceito de probabilidade. No entanto, demonstrou-se que a probabilidade poderia aproximar-se da certeza à medida que o conhecimento se tornasse mais preciso. Os resultados do estudo corroboraram a teoria pragmatista da verdade. Por fim, concluiu-se que a repetição e a consistência dos resultados obtidos por diferentes investigadores, utilizando a mesma estratégia, foram os critérios-chave para aumentar a fiabilidade do conhecimento.

Palavras-chave: fiabilidade, probabilidade, paradigma, conhecimento

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INTRODUCTION

Most authors in the philosophy and methodology of science consider the defining characteristic of scientific research to be its focus on obtaining new, real knowledge. This was addressed, in particular, by P.V. Cupinin (Akyld and Argan, 2010). However, the concept of truth itself is very abstract and has lost its uniqueness following the critique of the compatibility theory of truth. Despite this, truth is fundamental to the functioning of the scientific system itself. N. Le Mans posited that truth is the basic symbol of a particular social system (Luhman, 2000), which allows for the creation of a dictionary of science.

In the late 1970s and early 1980s, historiography witnessed the emergence of a new direction: social history. This development marked a significant shift in civic history, shifting the focus toward social processes and structures as the fundamental means of historical explanation (Burke, 2012;Bernal, 2012).The consolidation of this trend is evident in its institutionalization, both cognitively and socially.

The social institutionalization of this historiographical movement was manifested through cooperation and the division of labor within research groups. Collaboration among scholars, regular communication, and the creation of formal structures, such as associations, societies, and journals, were decisive factors. For example, the Journal of Social History has been published in the United States since 1967, and in Great Britain, the journal Social History began publication in 1976. This demonstrates the consolidation of a new historical program within the international scientific community of historians (McClellan III and Dorn, 2015).

The existence of new problem situations, which have been the subject of research by groups of researchers with a consensus on programs and methods, demonstrates the existence of

mechanisms for the cognitive and social institutionalization of social history. Annual meetings of professionals in the field of social history have been held on numerous occasions, paying attention not only to the realities of the social institutionalization of historians. This demonstrates how social history has managed to establish itself as an academic discipline with its own methods and debates, attracting a dedicated community of scholars (Shapin, 1982;Zilsel and Zilsel, 2003).

Despite their similarity, the terms social research and sociological research have distinct essences in modern science. Social research focuses on "social facts," that is, numerical properties or summary characteristics obtained from mass observation (Rohall et al., 2024;Antoshkin et al., 2017). An example of this could be population density or crowd behavior patterns. This type of research is not tied to a specific discipline, and its method is not exclusive to a particular science (Allan, 2012).

While social research can be carried out by professionals from various fields such as lawyers, doctors or economists, sociological research is defined by its subject matter and the methods of sociology (Hedgecoe, 2008;Back, 2012).Sociological research is therefore limited to a narrower set of problems posed by the discipline. In contrast, social research is broader and encompasses any problem that can be considered "social."

Unlike social research, which does not require a specific discipline, sociological research is conducted exclusively by professional sociologists. Sociologists use a particular scientific method to address specific issues within the field of sociology, giving it a more specialized and rigorous approach. This distinctive approach is what differentiates sociological research from social research, which is more generalist in its scope and methodology (Hogg & Ridgeway, 2003;Janowitz, 1975).

The objective of this research is to analyze the impact of social history on historiography in the late 1970s and early 1980s. In this regard, it seeks to identify the mechanisms of social and cognitive institutionalization that allowed this new movement to consolidate within the scientific community, examining the emergence of research groups, specialized publications, and professional associations. Therefore, the study will detail how the focus on social processes and structures transformed historical explanation.

Methodology

This research was conducted using a conceptual and analytical approach, dispensing with empirical data collection or experiments. The work focused on a rigorous theoretical analysis of fundamental categories of knowledge, such as reliability and probability.

To this end, a comprehensive review of specialized literature was conducted, examining various academic sources to construct a logical and coherent argument. The research argues that adhering to the rules of a single research paradigm is crucial to obtaining solid and reliable scientific knowledge. This approach aligns with qualitative research (Espinoza, 2020), which is essential for a deep understanding of a topic, and follows the principles of research ethics, which guarantee rigor and transparency in the analysis of sources (Espinoza-Freire, 2022).

The method was based on deductive reasoning, which allowed us to examine the relationship between the concepts of reliability and probability, and their consequences for the validity of scientific conclusions in the social sphere (Espinoza, 2020). In this way, a solid theoretical framework was built that serves as a basis for future research.

THEORETICAL FRAMEWORK

Theories of truth in experimental science

One of the most influential theories in experimental science is the practical concept of truth, driven by pragmatism. Pragmatists pioneered a fundamental distinction between epistemic truth, conceived as an ideal and often unattainable goal of science, and the reliability of knowledge, a more pragmatic and attainable goal. According to this perspective, only knowledge that can be "confirmed, consolidated, or verified" in practice can be considered true (Al Salaimeh et al., 2011).

For many researchers, reliability is not just a desirable quality, but a central characteristic of knowledge that is "well-founded, evidence-based, indisputable, and synonymous with truth" (Haack, 1976). Unlike absolute truth, reliability is validated through its ability to be replicated and to produce consistent results in different contexts. This approach reinforces the notion that the validity of a scientific claim lies in its usefulness and its ability to withstand empirical scrutiny.

Social vs. sociological research

Despite the similarity of their names, the terms social research and sociological research have distinct essences in modern science. Social research focuses on the collection and analysis of "social facts," which are numerical properties or summary characteristics obtained from mass observation (Antoshkin et al., 2017). Examples of these facts include population density, crime rates, or mass consumption patterns. This form of research is inherently nondisciplinary; its method is not exclusive to a particular science and can be used by economists, demographers, or political scientists (David, 2004).

In contrast, sociological research goes beyond mere data collection. While it may use the same data as social research, its purpose is to analyze and explain these social facts through the lens of sociological theory. It is a disciplinary endeavor that seeks to understand the social forces and structures underlying observed phenomena, interpreting the data within a specific conceptual framework. The sociological approach asks not only what happens, but why and how social facts are interconnected within the social structure.

While social research can be conducted by professionals from diverse fields, such as lawyers, doctors, or economists, sociological research is defined by its subject matter and the methods specific to sociology (Hedgecoe, 2008; Newton, 1997). Therefore, sociological research is limited to a narrower set of problems posed by the discipline. In contrast, social research is broader and encompasses any problem that can be considered "social."

The role of the sociologist in research

Unlike social research, which can be conducted by professionals from various disciplines, sociological research is the exclusive field of the sociologist. This specialist does not limit himself to observing reality; he uses aScientific method intrinsically linked to the theories, concepts, and paradigms of sociology (Hogg and Ridgeway, 2003). This distinction gives it a rigorous and specialized approach that goes beyond the mere collection of massive data. Its main objective is not only to describe social facts, but also to interpret and explain them within a sociological theoretical context, which fundamentally differentiates it from more general social research (Brüssow, 2022).

In this sense, sociologists are architects of social knowledge. Their role entails the ability to identify relevant social problems, formulate pertinent research questions, and design studies that capture the complexity of human interactions. They utilize both quantitative (surveys, statistical analysis) and qualitative (in-depth interviews, participant observation) methodological tools, selecting the one that best suits the phenomenon under study. Through this process, sociologists can reveal the underlying structures, power dynamics, and collective logics that shape society, thus contributing to a deeper and more critical understanding of social phenomena. Their work, therefore, is vital for informed decision-making in public policy, academia, and society at large.

Reliability of knowledge and its relationship with probability

The text establishes a fundamental and often misunderstood distinction: theReliability and probability are "polar categories," with both absolute and relative differences (Kopnin, 1974). Probability is defined as a measure of the likelihood of an event occurring when there is insufficient evidence to support its certainty. It is, in essence, a quantification of uncertainty.

In contrast, the reliability of knowledge refers to the solidity of its foundations, which come from accumulated evidence and the consistency of results. Reliability is an inherent quality of knowledge that has been validated, while probability is a measure of the possibility of its occurrence. This distinction underscores that reliability does not depend on chance or mere possibility, but on the consistency and empirical support of the information (Blackburn, 1985). Consequently, knowledge may be highly probable, but if its foundations are not solid, its reliability remains low.

Probability as a path to certainty

As knowledge becomes more correct, precise and complete, its degree ofProbability approaches 1, which allows it to eventually become certainty (Schum, 1989). In scientific practice, the reliability of knowledge is what raises its degree of probability. Knowledge that has been demonstrated to be consistent and predictable through multiple tests reinforces confidence in its validity.

This validation process is a continuous cycle. Each new piece of evidence that confirms a hypothesis increases its reliability, which in turn increases the likelihood that the hypothesis is an accurate representation of reality. Therefore, it is not an instantaneous transformation, but rather a progressive accumulation of evidence that reduces uncertainty. This is the fundamental principle of empirical science, where predictions are repeatedly validated until knowledge is deemed robust enough to become an accepted law or theory (Tang, 2018). In this sense, reliability acts as the bridge that connects probability with certainty, allowing knowledge to advance from an informed guess to an established truth.

Reliability as a pillar of scientific truth

In experimental science, reliability is not just a characteristic; it is afundamental pillar. From the perspective of pragmatism, truth is not an abstract ideal, but something validated through evidence and consistency with observable facts (Haack, 1976). Therefore, only knowledge that "we can confirm, consolidate, or verify" can be considered true (de Chiusole et al., 2024).

The reliability of knowledge is established when it is capable of beingreplicated and produce consistent results. This replicability is what gives it its status as "truth" in an experimental context. In this sense, an experiment is reliable when, when performed several times under the same conditions, it yields the same results. This consistency is crucial, as it allows the scientific community to verify and accept the findings. Without replicability, the results of an experiment would be mere incidents, incapable of building a solid foundation of knowledge.

This validation process is what differentiates science from other forms of knowledge. Replication is not just a procedure, but a litmus test for any hypothesis or theory. A result that cannot be replicated by other researchers is viewed with skepticism, regardless of how promising it initially appears (Riggs, 2002). Reliability, therefore, is the assurance that scientific knowledge is robust and does not depend on chance, luck, or the researcher's subjectivity. It is the foundation that allows experimental knowledge to advance incrementally and reliably.

Types of errors in research

In the research, theErrors are an inevitable part of the process, as error is defined as the difference between the measured value of a variable and its actual value (Neyman, 1977). Although it is impossible to completely eliminate them, the goal of rigorous research is to minimize them so that their impact is negligible. This proactive approach is essential to ensure that the results are faithful representations of the reality studied.

Understanding the different types of errors (systematic and random) is crucial, as it allows researchers to identify their sources, implement strategies to minimize them, and ultimately increase the reliability of their findings. Systematic errors, for example, are typically consistent and predictable, often the result of a poorly calibrated measuring instrument, whereas random errors are unpredictable and can arise from variations in the environment or the study subject. Recognizing this distinction allows researchers to apply appropriate corrective methods, such as instrument calibration or increasing sample size, to strengthen the validity of their conclusions (Banerjee et al., 2009).

Systematic and random errors

There are two main categories of errors:Systematic and random errors. Systematic errors are characterized by constant or regularly changing errors across repeated measurements, which can consistently bias research results (Dunkin, 1996). A common example of this type of error is a poorly calibrated measuring instrument that consistently gives readings slightly above the true value.

In contrast, random errors are distinguished by their variability and diversity, manifesting themselves unpredictably across multiple measurements of the same quantity (Pollard and Richardson, 1987). An example of random error might be a small fluctuation in an instrument's reading due to momentary variations in the environment, such as a draft or a slight change in temperature. These errors do not follow a predictable pattern, so they often cancel each other out as more measurements are taken.

Understanding this distinction is crucial to the reliability of research. While random errors can be reduced by increasing the number of observations, systematic errors cannot. In fact, systematic errors can go undetected if the researcher is unaware of the sources of bias in their methodology (Daniel & Onwuegbuzie, 2000). Therefore, rigorous research not only seeks to minimize variability but also to identify and correct any inherent biases that may compromise the validity of the findings.

The role of model and paradigm in research

A paradigm or model can be understood as a set of theories unified by rules for scientific research (Lakatos, 2008). These rules determine the permitted and prohibited steps in the research process, providing a fundamental conceptual framework that guides the work of scientists. In this way, a paradigm is not just an idea, but a structure that organizes how a problem is approached, hypotheses are formulated, and results are interpreted.

The strength of this framework is crucial for the coherence and validity of findings, as it defines the structure upon which knowledge is built. For example, in the natural sciences, Darwin's paradigm of evolutionism laid the foundation for all subsequent biological research, defining which questions were relevant and what type of evidence was needed to answer them. This framework ensures that scientists within the same discipline can communicate and work collaboratively and cumulatively (Harre, 2013).

In this sense, the paradigm functions as a lens through which researchers view and understand the world. It defines what is considered a legitimate scientific problem and what methodologies are acceptable for solving it. The adoption of a paradigm by a scientific community implies acceptance of its basic assumptions and methodological principles, which allows for sustained progress in the discipline. Without a common paradigm, scientific work

would lack direction and fragment into a series of isolated efforts, unable to build a coherent body of knowledge (Kornai, 2000).

Paradigms in experimental sociology

In experimental sociology, two main research programs have emerged: quantitative and qualitative methods. The debate between these approaches is not simply a matter of data collection techniques, but is based on deep conceptual disagreements about the methodological problems inherent in social research (Coulondre and Libourel, 2002).

The choice of one paradigm or another directly influences the types of questions asked and how evidence is interpreted. For example, while quantitative methods seek to measure and establish large-scale causal relationships, qualitative methods focus on a deep understanding of experiences and social meanings. This fundamental difference demonstrates that methodological perspective is a central component of research, determining both the scope and depth of knowledge that can be generated (Heaney, 2003).

The importance of search strategy

A research program is essential for obtaining reliable knowledge, as it predicts potential errors that could interfere with data acquisition and proposes methods to neutralize them (Aromataris and Riitano, 2014). This ability to anticipate is what gives it its value, since research that does not anticipate potential flaws is likely to produce biased or inconsistent results.

To achieve rigorous research, it is crucial to follow the rules of this program, which includes a well-defined search strategy that specifies the permitted and prohibited steps in its implementation (White and Iivonen, 2001). This methodological discipline ensures that the process is transparent and reproducible, allowing other researchers to validate the results. Without a clear and well-articulated research program, data collection becomes a chaotic exercise, undermining the reliability of any findings.

Consistency and reliability in results

The repetition and consistency of results obtained by different researchers using the same strategy are vital to increasing the reliability of knowledge and reducing the likelihood of random errors (Boynton et al., 1998). This replication process is one of the cornerstones of the scientific method.

Replicating studies not only validates findings but also reinforces confidence in the methodology used, ensuring that the results are not the product of chance or individual biases. When an experiment is successfully replicated by an independent research team, it strengthens the evidence that the results are genuine and not an artifact of the specific conditions of the first study (Ho et al., 2016).

In this sense, the replicability of a study is the guarantee of its validity and generalizability (Riggs et al., 2017). A result that cannot be replicated is generally dismissed as an anomaly or an error. This methodological rigor is what allows science to build a solid and cumulative body of knowledge, where each new finding is based on a foundation of verifiable evidence.

RESULTS AND CONCLUSIONS

The reliability of conclusions in experimental social research is intrinsically linked to methodological rigor. Obtaining knowledge that is reasonable, correct, and precise is not an accident, but the result of strictly adhering to the heuristic rules—the design principles and validation criteria—that define a research paradigm. These principles act as a compass that guides the researcher, ensuring that the knowledge production process is coherent and robust. The internal consistency of the method guarantees that conclusions are not merely subjective but follow logically from a well-defined framework. This rigor is what distinguishes

scientific research from mere opinion, elevating knowledge from a simple belief to a grounded and verifiable truth.

The authenticity of knowledge is jeopardized when the paradigmatic context is ignored or elements from diverse research programs are haphazardly combined. Each paradigm (such as quantitative and qualitative) is based on distinct philosophical assumptions about the nature of reality and how it can be known. For example, one approach may seek causality and generalization through numerical data, while another may focus on deep, interpretive understanding of human experiences. Attempting to merge these approaches without a solid conceptual framework can lead to internal contradictions and an incoherent research design. This uncritical mixing can dilute the strength of both paradigms and result in unreliable findings, as conclusions may lack a clear logical or methodological basis, generating knowledge that is neither rigorous nor coherent.

This reflection on the need for paradigmatic consistency has profound consequences and opens a field of debate on the so-called polyparadigmatic approach. While the text warns about the dangers of mixing, this is a topic that has generated extensive debate in social research methodology. On the one hand, it is argued that a polyparadigm approach could offer a more complete view of reality by combining different perspectives. The complexity of social phenomena often requires multiple lenses of analysis, and a single paradigm may not be sufficient to capture all its dimensions.

On the other hand, the critique argues that the incommensurability of paradigms makes their fusion logically unfeasible. The epistemological assumptions of one paradigm can come into direct conflict with those of another, making their integration impossible without compromising coherence. This study lays the groundwork for future publications that delve into the conditions under which research integrating multiple paradigms could be methodologically sound and not compromise the reliability of its results, proposing a path toward an approach that, rather than chaotically mixing them, builds solid conceptual bridges between different ways of understanding social reality.

LIMITATIONS OF THE STUDY

One of the main limitations of this work was its purely theoretical nature. As a conceptual study, no empirical research was conducted to test the methodological claims made. Conclusions about the need to adhere to a single paradigm, or the risks of a chaotic combination, were based on logical arguments rather than direct evidence from actual research cases. Therefore, the study did not evaluate the feasibility or results of the multiparadigm approach in practice, leaving unresolved the question of whether a combination of methods could, in fact, generate reliable insights under certain conditions.

FUTURE STUDIES

This work laid the groundwork for future research that could empirically address its limitations. Future studies should move from conceptual debate to practical experimentation, assessing whether or not it is possible to generate reliable knowledge using a multiparadigm approach. Subsequent research could design case studies that apply mixed methodologies and rigorously assess the consistency and replicability of the results. The goal would be to determine the conditions under which a combination of paradigms could be methodologically sound, thus advancing our understanding of the debate over the integration of approaches in social research.

RECOGNITION

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