Beyond Truth: From Epistemic Situatedness to Scientific Ethics as Method

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Abstract

This paper examines a philosophical inquiry into the nature of understanding, reasoning, and scientific progress, beginning with a fundamental question: Is judgement possible without context, perspective, or presupposition? A negative answer prompts a reconsideration of "absolute truth" and "causality" within scientific practice. After surveying positions ranging from scientific realism to instrumentalism, the paper argues that scientific progress is better conceived as a collective departure from recognised error rather than an approach towards an unattainable absolute truth.

The discussion does not remain epistemically neutral. By adopting a sober, historically informed view of scientific motivation and the power structures within which science operates, the paper contends that the preservation of reliable public science requires the institutional adoption of scientific ethics as method—not as an individual virtue, but as a structural condition for the continued viability of science. The aim is not to offer a comprehensive ethical theory, but to articulate a conceptual framework demonstrating its necessity.

Introduction

We live in a world shaped by extraordinary scientific achievements. Commercial aircraft cross continents with remarkable reliability; telescopes such as James Webb deliver detailed images from billions

of kilometres away; medical interventions routinely alter the course of disease. These successes invite a deceptively simple question: if scientific theories are provisional, fallible, and historically situated, why do they work so well?

This question points to a central tension in the philosophy of science. On the one hand, modern epistemology has shown that human understanding is never neutral or context-free. Judgement always arises from within conceptual frameworks, historical conditions, and prior commitments. On the other hand, scientific knowledge appears uniquely dependable. Some theories clearly outperform others, not merely rhetorically, but in their capacity to predict, explain, and intervene in the world. How can both claims be true at once?

This paper argues that the apparent tension dissolves once we abandon the idea that scientific progress consists in approaching an absolute or final truth. Instead, scientific advancement is better understood as a collective process of identifying and eliminating recognised errors. Truth, on this account, functions not as a destination that can be reached, but as a regulative ideal that orients inquiry without guaranteeing finality.

The guiding question of the paper is therefore this: Is judgement possible without context, perspective, or presupposition? A negative answer does not lead to relativism, nor does it undermine the success of science. Rather, it forces a re-examination of how reliability is achieved under conditions of epistemic limitation.

The argument unfolds in two stages. In the first part, a descriptive epistemology is developed. Drawing on philosophical hermeneutics,

fallibilism, and contemporary philosophy of science, it is argued that understanding is always situated, theory-laden, and corrigible. Yet this situatedness does not collapse evaluative standards, because those standards themselves emerge historically through sustained interaction with a resistant world.

The second part moves from description to normativity. If scientific knowledge advances through the collective detection and correction of error, then its reliability cannot rest solely on individual virtues such as honesty or good faith. It depends instead on institutional conditions that systematically expose claims to criticism, revision, and replication. Scientific ethics, on this view, is not an optional moral supplement to research practice, but a methodological requirement grounded in the very structure of fallible inquiry.

The aim of this paper is not to construct a comprehensive ethical theory, nor to idealise science as value-free. It is rather to show that under conditions of epistemic situatedness, the survival of reliable public science depends on treating ethics as method: a set of structural commitments that make ongoing self-correction possible, even in the presence of bias, power, and competing interests.

Part One: Descriptive Epistemology

Hermeneutic Situatedness: Understanding Always Occurs from Somewhere

Understanding and judgement invariably involve four elements:

Pre-understandings: prior beliefs, experiences, and conceptual frameworks

Context: historical, social, and linguistic conditions

The phenomenon: the object of inquiry

Reasoning: the process through which these elements interact

This condition (hermeneutic situatedness) is rooted in philosophical hermeneutics, particularly the work of Hans-Georg Gadamer. Understanding is always temporally and contextually located; it never arises from a neutral or timeless standpoint.

Scientific illustration. A Newtonian physicist perceives "motion in absolute space," whereas a relativistic physicist perceives "change in space–time." The observational data are identical; the interpretation is theory-laden, as Quine famously argued.

From Situatedness to Relativism: A Necessary Distinction

If all understanding is situated, does this entail radical relativism? The answer is no. Not because we possess access to absolute truth, but because evaluative criteria emerge through our interaction with a resistant world.

Pragmatic realism: we presuppose a mind-independent world because this presupposition works.

Situated yet testable criteria: predictive accuracy, coherence, and explanatory scope have proved historically dependable.

Reflective situatedness: modern science incorporates awareness of its own fallibility.

Worldly resistance: empirical reality constrains theoretical invention; the phlogiston theory failed because the world refused to comply.

Causality: From Metaphysical Necessity to Interventionist Accounts

Following Hume's critique of causal necessity, contemporary philosophy of science adopts interventionist accounts (e.g., Woodward), defining causation in terms of manipulability: if intervening on A reliably alters B, a causal relation is established. This preserves scientific practice without invoking metaphysical necessity.

The Collapse of Foundationalism

Attempts to ground knowledge in indubitable foundations have failed:

Descartes' cogito presupposes a stable self.

The existence of paraconsistent logics undermines the universality of classical logic.

Gödel's incompleteness theorems show that no sufficiently strong axiomatic system can be both complete and consistent.

The result is fallibilism: justified belief without absolute certainty.

Part Two: Normative Methodology

Scientific Ethics as Method Rather Than Virtue

Ethics conceived as personal virtue is insufficiently robust. A methodological conception—embedded in institutional structures—ensures that error is exposed even when individuals are biased or compromised.

Five Structural Principles

Data transparency

Open methodology

Critical openness

Revisability

Structural independence

These principles counteract the influence of power, ideology, and financial interest.

Power, Politics, and the Political Economy of Science

Power relations shape scientific inquiry:

Social power influences research agendas (as shown by feminist epistemology)

Commercial interests distort publication practices (e.g., the Vioxx case)

Thus, scientific ethics as method is necessary but not sufficient; broader structural reforms are required.

Conclusion

The argument presented here is that scientific ethics emerges naturally from fallibilism, epistemic situatedness, and historical experience. We understand from positions; we cannot attain absolute truth, but we can reduce error; and history demonstrates that open, transparent science is more successful.

Truth functions as a regulative ideal: a guiding orientation rather than an attainable endpoint. This modest realism avoids relativism while preserving the critical practices essential to reliable public science. Scientific ethics, understood methodologically, is therefore indispensable to the survival of science itself.