

PARADIGM

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Primary Disciplinary Field(s): Philosophy of Science, Epistemology, Linguistics, Psychology

1. Core Definition

The concept of a paradigm, originating from the Greek word *paradeigma* meaning "pattern," "example," or "model," represents a fundamental framework governing thought and action within a specific domain. In its broadest application, a paradigm functions as an overarching model, trend, or representative example used to understand the operations and interrelationships inherent in a procedure, a process being analyzed, or a theoretical construction. It is not merely a single rule or hypothesis but rather an entire **structure of inquiry** and understanding. This structure dictates what questions are considered valid, what methodologies are deemed appropriate, and what constitutes an acceptable solution or discovery within a given field.

Academically, the term achieved its profound significance through the work of philosopher of science Thomas Kuhn, particularly in his seminal 1962 work, *The Structure of Scientific Revolutions*. Kuhn defined a paradigm as a comprehensive collection of shared presumptions, outlooks, ideas, moral convictions, processes, and methods that constitute the typically approved theoretical framework or common understanding within a discipline. When used in this Kuhnian sense, a paradigm embodies the entire constellation of beliefs, values, techniques, and so forth shared by members of a given scientific community. It is the established consensus that permits "normal science" to proceed by providing successful models for practice.

The definition provided in psychological and general scientific contexts often highlights the role of the paradigm as an experimental construct. It can refer specifically to the detailed format of the many steps of an experiment, serving as a standardized procedure that researchers replicate or adapt to test hypotheses. For instance, in experimental psychology, a specific cognitive task designed to measure memory retrieval under specific conditions is frequently referred to as a paradigm (e.g., the **Stroop task paradigm**). Crucially, whether interpreted as a broad philosophical worldview or a specific experimental model, a paradigm serves as a template, guiding interpretation and ensuring replicability and coherence within its designated sphere.

2. Etymology and Pre-Kuhnian Usage

Historically, the term **paradigm** predates its philosophical revolution in the mid-20th century, having been utilized extensively in fields such as classical rhetoric and grammar. In rhetoric, a paradigm served as an illustrative example--a story or case used to clarify a principle or argument. This usage underscores its core function as a guiding model and a point of reference for comparison and imitation.

The most enduring pre-scientific technical application was found in linguistics and grammatical studies. Here, a paradigm refers to a grammatical class or a compilation of all inflectional formations of a term--such as the conjugation tables for verbs or the declension tables for nouns. This usage perfectly encapsulates the idea of a **fixed structure or pattern** used to generate variable forms that conform to a defined set of rules. For example, understanding the paradigm of Latin noun endings allows scholars to predict and categorize a wide array of specific words based on a foundational template. As noted in introductory academic commentary, "Most students first hear of paradigms in algebra before they ever reference them with science of any nature," illustrating its early adoption in pattern recognition fields before its philosophical elevation.

Prior to Kuhn, philosophers of science generally viewed scientific progress as a cumulative, linear ascent toward objective truth, adhering to models put forth by logical positivists. While concepts like "schools of thought" existed, there was no single concept that captured the holistic, socially embedded, and restrictive nature of scientific practice itself. The traditional 20th-century understanding lacked the conceptual tool necessary to explain discontinuous shifts in fundamental assumptions, a critical gap that Kuhn's sociological interpretation of the paradigm successfully addressed.

3. Thomas Kuhn's Conception of the Paradigm

Thomas Kuhn fundamentally altered the trajectory of the philosophy of science by introducing the paradigm as the central concept explaining the structure of scientific communities and change. For Kuhn, a mature science operates within a framework of shared theoretical and methodological commitments. This framework defines **normal science**, which is essentially "puzzle-solving" conducted by practitioners who rarely question the foundational assumptions of the paradigm itself. The paradigm provides the implicit rules that allow scientists to recognize both problems and solutions, effectively narrowing the scope of legitimate inquiry.

Kuhn identified two principal senses of the term in his writing. The first, and most expansive, refers to the **disciplinary matrix**--the entire constellation of shared commitments, including symbolic generalizations (the formal laws or theories used by the group), metaphysical commitments (ontological models of reality), shared values (standards of accuracy and simplicity), and exemplars (concrete problem solutions). This disciplinary matrix shapes the intellectual environment of the community.

The second, narrower sense of the paradigm refers specifically to the **exemplars**: the concrete problem-solutions that students encounter in the early stages of their training and that allow them to understand how the symbolic generalizations relate to the real world. These successful examples are crucial because they teach researchers, by way of analogy and resemblance, how to 'see' the world in a paradigm-consistent way. The paradigm, therefore, is not merely a theory, but a

comprehensive worldview that dictates perception and research practice, making it inherently sociological and psychological.

4. Key Characteristics of Paradigms

Shared Commitment: A paradigm necessitates the adherence and acceptance of a critical mass of practitioners within a field. It is inherently a communal achievement, defining who belongs to the discipline and who does not. This shared commitment extends beyond explicit rules to include tacit knowledge and intuition developed through practical training and observation of successful research examples.

Incommensurability: A defining characteristic of successive paradigms is that they are often incommensurable. This means they cannot be perfectly compared or judged by a neutral, objective standard because they define their own standards, terminology, and observational methods. For example, the Newtonian paradigm and the Einsteinian paradigm utilize concepts like "mass" and "space" that are fundamentally different in their conceptual grounding, making direct comparison difficult without stepping outside one framework entirely.

Holism and Specificity: Paradigms exhibit duality, functioning simultaneously as holistic frameworks covering the entire theoretical and ethical structure (presumptions, outlooks, ideas) and as specific, practical constructs, providing the exact experimental format for methodology. This dual nature ensures both broad theoretical coherence and detailed, replicable practical guidance.

Normativity and Authority: Paradigms are fundamentally normative; they dictate how science *should* be done by establishing criteria for acceptability. They set the standard for what counts as an acceptable problem, what constitutes legitimate evidence, and what signifies a successful outcome. This authoritative structure is vital for mobilizing resources and ensuring focused research progress during periods of normal science.

5. The Paradigm Shift and Scientific Revolutions

The concept of the **paradigm shift** is the core mechanism by which scientific progress, as understood by Kuhn, occurs. It represents not a smooth evolution but a radical discontinuity. A revolution begins when the current paradigm fails to adequately address persistent and critical anomalies--observations that cannot be explained or assimilated by the existing framework--leading to widespread doubt and a period of 'extraordinary science' where foundational assumptions are aggressively scrutinized.

The shift itself is often portrayed as analogous to a Gestalt switch--a sudden change in perception where the world previously viewed through one lens is suddenly viewed through another. The transition is typically driven less by logical refutation of the old paradigm and more by the

attractiveness, coherence, and explanatory power of a new alternative offered by a younger, often marginalized group of researchers. Key historical examples of paradigm shifts include the transition from Ptolemaic astronomy (Earth-centered) to Copernican heliocentrism, or the shift from phlogiston theory in chemistry to oxygen theory.

The shift is irreversible once the new paradigm is established because the new framework resolves the critical anomalies and offers a compelling new basis for 'normal science.' The community adopts the new paradigm because it promises greater future success in problem-solving and offers a clearer path for research, reinforcing the role of sociological conviction alongside empirical evidence in scientific advancement.

6. Applications in the Social Sciences

While initially formulated to describe physics and astronomy, the concept of the paradigm has been broadly applied across the social sciences, humanities, and technology, though its utility in these domains is often qualified. In fields like sociology, political science, and psychology, researchers speak of competing paradigms (e.g., behaviorism versus cognitivism in psychology; functionalism versus conflict theory in sociology) that guide different research programs, methodologies, and ethical considerations.

A significant debate arises regarding the maturity of social sciences relative to Kuhn's model. Critics argue that social sciences often exist as "multi-paradigm fields" because they lack a single, dominant, unifying framework necessary for 'normal science' to take place without internal dispute over fundamentals. This suggests that in many social disciplines, competition between frameworks (e.g., positivism, interpretive approaches, critical theory) is the constant state, rather than a temporary crisis preceding a revolution. Nevertheless, the concept remains invaluable for identifying fundamental differences in approach, such as the qualitative research paradigm versus the quantitative research paradigm.

Furthermore, in technology and business management, the term is frequently used metaphorically to describe a change in underlying operational assumptions or market models, such as the shift from mainframe computing to distributed networks, often termed a **paradigm change** in industry. In these contexts, it emphasizes a profound alteration in the strategic approach or underlying structural model of operations rather than incremental improvement, highlighting a fundamental break with established norms.

7. Debates and Criticisms

Kuhn's concept of the paradigm, while transformative, faced significant debate regarding its epistemological implications. One primary criticism, notably from philosophers like Karl Popper, focused on the potential relativistic consequences of the concept. If paradigms are truly

incommensurable, critics argue, then scientific progress cannot be judged objectively, potentially reducing science to a series of shifts driven by social power or aesthetic preference rather than objective truth. Kuhn later clarified that incommensurability does not mean impossibility of comparison, but rather the impossibility of translation without fundamental loss or distortion of meaning.

Another major critique centered on the ambiguity and imprecise nature of the term itself. Critics pointed out that Kuhn used "paradigm" in numerous distinct ways throughout *The Structure of Scientific Revolutions*, leading to conceptual confusion and difficulty in operationalizing the concept for historical analysis. This ambiguity eventually led Kuhn to refine the terminology, focusing on the distinction between the broad disciplinary matrix and the specific, concrete exemplars.

Additionally, the inherently restrictive nature of the paradigm has been criticized. While normal science focuses research efforts, it can also lead to a form of theoretical rigidity, blinding practitioners to potential lines of inquiry that fall outside the established framework. This suggests that periods of normal science, while productive for puzzle-solving, can stifle true innovation until anomalies force a necessary crisis and subsequent paradigm rupture.

Further Reading

Kuhn, T. S. (1962). *The Structure of Scientific Revolutions*. University of Chicago Press.

Stanford Encyclopedia of Philosophy: Thomas Kuhn.

Wikipedia: Paradigm (Philosophy).

Encyclopædia Britannica: Paradigm.