**Empirical Evidence**

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*"Empirical" redirects here. For other uses, see* [*Empirical (disambiguation)*](https://en.wikipedia.org/wiki/Empirical_(disambiguation))*.*

**Empirical evidence**, **data**, or **knowledge**, also known as **sense experience**, is a collective term for the [knowledge](https://en.wikipedia.org/wiki/Knowledge) or source of [knowledge](https://en.wikipedia.org/wiki/Knowledge) acquired by means of the [senses](https://en.wikipedia.org/wiki/Senses), particularly by [observation](https://en.wikipedia.org/wiki/Observation) and [experimentation](https://en.wikipedia.org/wiki/Experiment). The term comes from the [Greek](https://en.wikipedia.org/wiki/Ancient_Greek) word for experience, ἐμπειρία (*empeiría*). After Kant, it is common in philosophy to call the knowledge thus gained [***a posteriori* knowledge**](https://en.wikipedia.org/wiki/A_priori_and_a_posteriori). This is contrasted with [*a priori* knowledge](https://en.wikipedia.org/wiki/A_priori_knowledge), the knowledge accessible from [pure reason](https://en.wikipedia.org/wiki/Pure_reason) alone.

**Meaning**

Empirical evidence is information that [justifies](https://en.wikipedia.org/wiki/Theory_of_justification) a [belief](https://en.wikipedia.org/wiki/Belief) in the truth or falsity of a claim. In the [empiricist](https://en.wikipedia.org/wiki/Empiricism) view, one can claim to have knowledge only when one has a true belief based on empirical evidence. This stands in contrast to the [rationalist](https://en.wikipedia.org/wiki/Rationalism) view under which [reason](https://en.wikipedia.org/wiki/Reason) or reflection alone is considered evidence for the truth or falsity of some [propositions](https://en.wikipedia.org/wiki/Proposition). The [senses](https://en.wikipedia.org/wiki/Sense) are the primary source of empirical evidence. Although other sources of evidence, such as [memory](https://en.wikipedia.org/wiki/Memory) and the [testimony](https://en.wikipedia.org/wiki/Testimony) of others, ultimately trace back to some sensory experience, they are considered secondary, or indirect.

In another sense, empirical evidence may be synonymous with the outcome of an experiment. In this sense, an empirical result is a unified confirmation. In this context, the term *semi-empirical* is used for qualifying theoretical methods that use, in part, basic [axioms](https://en.wikipedia.org/wiki/Axiom) or postulated scientific laws and experimental results. Such methods are opposed to theoretical [*ab initio*](https://en.wikipedia.org/wiki/Ab_initio) methods, which are purely [deductive](https://en.wikipedia.org/wiki/Deductive_reasoning) and based on [first principles](https://en.wikipedia.org/wiki/First_principle).

In [science](https://en.wikipedia.org/wiki/Science), empirical evidence is required for a hypothesis to gain acceptance in the [scientific community](https://en.wikipedia.org/wiki/Scientific_community). Normally, this validation is achieved by the [scientific method](https://en.wikipedia.org/wiki/Scientific_method) of [hypothesis commitment](https://en.wikipedia.org/w/index.php?title=Hypothesis_commitment&action=edit&redlink=1), [experimental design](https://en.wikipedia.org/wiki/Design_of_experiments), [peer review](https://en.wikipedia.org/wiki/Peer_review), [adversarial review](https://en.wikipedia.org/wiki/Adversarial_review), [reproduction of results](https://en.wikipedia.org/wiki/Scientific_Method#Reproducibility), conference presentation and [journal publication](https://en.wikipedia.org/wiki/Scientific_literature). This requires rigorous communication of hypothesis (usually expressed in mathematics), experimental constraints and controls (expressed necessarily in terms of standard experimental apparatus), and a common understanding of measurement.

[Statements](https://en.wikipedia.org/wiki/Statement_(logic)) and [arguments](https://en.wikipedia.org/wiki/Argument) depending on empirical evidence are often referred to as [*a posteriori*](https://en.wikipedia.org/wiki/A_posteriori) ("following experience") as distinguished from [*a priori*](https://en.wikipedia.org/wiki/A_priori) (preceding it). *A priori* knowledge or justification is independent of experience (for example "All bachelors are unmarried"), whereas *a posteriori* knowledge or justification is dependent on experience or empirical evidence (for example "Some bachelors are very happy"). The notion of the distinction between *a priori* and *a posteriori* as tantamount to the distinction between empirical and non-empirical knowledge comes from [Kant's](https://en.wikipedia.org/wiki/Immanuel_Kant) [*Critique of Pure Reason*](https://en.wikipedia.org/wiki/Critique_of_Pure_Reason)*.*

The standard [positivist](https://en.wikipedia.org/wiki/Positivism) view of empirically acquired information has been that observation, experience, and experiment serve as neutral arbiters between competing theories. However, since the 1960s, a persistent critique most associated with [Thomas Kuhn](https://en.wikipedia.org/wiki/Thomas_Kuhn), has argued that these methods are influenced by prior beliefs and experiences. Consequently it cannot be expected that two scientists when observing, experiencing, or experimenting on the same event will make the same theory-neutral observations. The role of observation as a theory-neutral arbiter may not be possible. Theory-dependence of observation means that, even if there were agreed methods of inference and interpretation, scientists may still disagree on the nature of empirical data.

**See also**

* [Anecdotal evidence](https://en.wikipedia.org/wiki/Anecdotal_evidence)
* [Empirical distribution function](https://en.wikipedia.org/wiki/Empirical_distribution_function)
* [Empirical formula](https://en.wikipedia.org/wiki/Empirical_formula)
* [Empirical measure](https://en.wikipedia.org/wiki/Empirical_measure)
* [Empirical research](https://en.wikipedia.org/wiki/Empirical_research) (more on the scientific usage)
* [Phenomenology (science)](https://en.wikipedia.org/w/index.php?title=Phenomenology_(science)&action=edit&redlink=1)
* [Scientific evidence](https://en.wikipedia.org/wiki/Scientific_evidence)
* [Scientific method](https://en.wikipedia.org/wiki/Scientific_method)
* [Theory](https://en.wikipedia.org/wiki/Theory)

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