

Abductive Reasoning

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Abductive reasoning, or inference, is a useful tool for determining the course of scientific research.

A number of facts, from a multitude of sources, such as literature reviews and general observations, are gathered together. After an assessment of this information, the most likely hypothesis to explain the observations is adopted as the starting point of research.

Effectively, it is a process of choosing the hypothesis, which would best explain the available evidence.

Many ancient philosophers used abduction, believing that all of the answers to how the universe works could be uncovered in this way, without applied experimentation.

Scientists and mathematicians developing Artificial Intelligence use this process extensively, in their quest to design computers capable of thinking like humans.

Abductive reasoning is not the sole preserve of science, with areas such as archaeology, economics and theology using this line of reasoning.

Legal professionals are probably the experts at using abduction, when they read the facts of a case and try to hypothesize the most plausible explanation.



The banner features a bright orange background. At the top center is a white icon of a flask with a flame, followed by the word "EXPLORABLE" in a bold, white, sans-serif font. Below this, the phrase "Quiz Time!" is written in a white, cursive script. Underneath, there are three white-bordered rectangular boxes. The first box on the left shows a pair of red roller skates on a wooden deck, with the text "Quiz: Psychology 101 Part 2" below it. The middle box shows a fan of colorful pens, also with the text "Quiz: Psychology 101 Part 2" below it. The third box on the right shows a Ferris wheel at sunset, with the text "Quiz: Flags in Europe" below it. In the bottom right corner of the banner, the text "See all quizzes =>" is written in white.

Abductive Reasoning in Science

For most scientists, [abductive reasoning](#) [1] is a natural and instinctive process, a series of educated guesses, building upon observed phenomena and previous studies. Even young scientists use this process to design simple [school experiments](#) [2].

For example, a pupil may have noticed that bread appears to grow mold more quickly in the bread bin than the fridge. Abductive reasoning leads the young researcher to assume that temperature determines the rate of [mold growth](#) [3], as the [hypothesis](#) [4] that would best fit the evidence, if true.

This process of abductive reasoning holds true whether it is a school experiment or a postgraduate thesis about advanced astrophysics. Abductive thought allows researchers to maximize their time and resources by focusing on a realistic line of [experimentation](#) [5].

Abduction is seen very much as the starting point of the research process, giving a rational explanation, allowing [deductive reasoning](#) [6] dictate the exact experimental design.

Science tends to follow the rule of thumb known as '[Occam's Razor](#) [7]', where the simplest explanation is likely to be the correct one.

For example, a researcher might observe the phenomenon of increasing levels of violence shown by children over the past few years. Further research may discover that this tends to occur more in societies where violence is prevalent on television.

Abductive reasoning would then lead the researcher to propose the most obvious hypothesis, that 'If children are exposed to more violence on TV, they are more likely to exhibit violent behavior as adults'.

This is probably the simplest hypothesis and is an excellent starting point for research. It is not necessarily correct, as other factors may contribute or cause rising violence, but it is the 'best fit'. Bandura did just that, with his '[Bobo Doll](#)' [experiment](#) [8] and uncovered some interesting underlying trends.

Unlike most other [deductive](#) [6] methods, abduction is not always correct, but enhancing or exploring different hypotheses will allow a systematic approach to [scientific](#) [9] research.

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Links

[1] <http://user.uni-frankfurt.de/~wirth/inferenc.htm>

[2] <https://verify.explorable.com/kids-science-projects>

[3] <https://verify.explorable.com/mold-bread-experiment>

[4] <https://verify.explorable.com/research-hypothesis>

[5] <https://verify.explorable.com/conducting-an-experiment>

[6] <https://verify.explorable.com/deductive-reasoning>

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[8] <https://verify.explorable.com/bobo-doll-experiment>

[9] <https://verify.explorable.com/what-is-the-scientific-method>