

# What are scientific investigation and non-scientific investigation?

[Psychology](#), [Psychotherapy](#)



Scientific investigation and non-scientific investigation are fields of inquiry used by scholars, policy makers, health professionals and economists among others, to acquire knowledge that explains the various forms of phenomena that exist in the natural physical environment. Science is derived from a Latin word *scientia* which literally means knowledge. It is a discipline that deals with the systematic process of gathering knowledge about the structure and behavior of the natural and physical world, based on facts that are measurable and can be proven by manipulation of data obtained through experiments, and observation (Gaukroger, 2006).

Investigation is the process of enquiring into unfamiliar or questionable activities, thoroughly and systematically with the aim of getting a solution (Bauer, 1992). Scientific investigation therefore is a method used to acquire knowledge through careful observation of facts of a situation that is unfamiliar or questionable, which helps in the development of a hypothesis from which logical predictions can be proven by way of experimentation, and manipulation of empirical data (Ziman, 2000). Non-scientific investigation on the other hand is devoid of all attributes that are scientific in nature.

The careful examination, with the aim of establishing reasons for the occurrence or existence of a particular phenomenon cannot be verified with reference to data gathered by means of experiments, observations, empirical evidence or any other forms regarded as scientific. Conclusions are majorly based on claims, estimations and generalized assumptions that cannot be measured or empirically determined (Proper, 1983). Steps of

scientific investigation: The first step involves informal observations of phenomena or behavior in a way that is not systematic.

In the process, unique behavior might get noticed within the environment under investigation. For example, it may be observed that people are generally happier in warm sunny days. As questions about events arise, generalizations are made toward the noticed behavior through a process known as inductive reasoning. (Holyoak and Morrison, 2005). This involves using a specific characteristic to make conclusions about the general situation. For example, people are happier on warm and sunny days.

The second step involves the formation of a tentative answer known as a hypothesis. A hypothesis is a proposal expressing opinion based on incomplete evidence or a concept that has not yet been verified but that if true would explain a possible relationship between or among a set of phenomena (Burks, 1977). The hypotheses are normally tested using experimental studies to determine their relevance through a series of steps that are repetitive. This provides a consistent way of predicting further results related to specific situations or phenomena (Fraassen, 1980).

This begins by listing variables that are associated with the observation. A variable is a condition that has different values for different items. For example, other variables associated with warm sunny days and happiness could be weather and health. There now arises two possible explanations for the observation made; that people are less likely to get

colds and flu which limits depression and makes them happy, and people are happier in warm sunny days because the weather is bright and welcoming.

At this point, one between the two observations is selected forming the hypothesis which is subjected to further investigation to determine whether it is true or false. Thirdly, is the use of the hypothesis to generate a prediction, which can be tested. This involves applying the hypothesis to a specific real-world situation that can be observed (Patten, 2004). At this level, logic is used to make a prediction through a process known as deductive reasoning where the prediction starts from a general statement to one that is specific (Patton, 2002).

For example, if the hypothesis states that less depression is as a result of better lighting, a specific prediction is that, increasing lighting of a building on the ground floor should decrease depression among employees working on that floor. The fourth step is to evaluate the prediction by undertaking the actual research to provide a fair and unbiased result by observing if the hypothesis is correct (Bunge, 1998). Finally, observations are used to back, refute, or to refine the original.

This is based on the extent to which observations agree with predictions. If they agree, new predictions can be set and tested. If not, then the hypothesis needs to be revised because it is wrong. The scientific process is a repetitive, circular, spiral process and not a linear process (Maleske, 2005). Other elements of scientific investigation All scientific investigations must be objective. They should not be influenced by personal feelings or opinions of

the party carrying out the investigation but rather by facts that can be proven (Neuman, 2006).

This reduces the eventuality of biased interpretations and conclusions of results from an investigation. Scientific investigations must be documented. Official records should be kept for use as evidence or proof that investigation on a particular phenomenon actually took place. This would lend credibility to the process in case any there is need for further investigation (Krippendorff, 2004). Another basic expectation is to archive all documented work resulting from scientific investigation.

This involves storage of information that is not often needed into various forms of storage media like tapes, disks, paper, and slides for future reference. Data and methodology from scientific investigations must be shared to allow for careful scrutiny by other scientists. This allows other researchers the opportunity to carefully scrutinize results and also verify them by attempting to reproduce them through a practice called full disclosure (Holton, 1988). Finally, scientific investigations must allow for statistical measures of reliability of the data to be established.

**Non-scientific investigation** Non-scientific investigation is a process of inquiry into particular phenomena existing in the natural physical environment in a manner that is not systematic. The major aspects of non-scientific investigation are qualitative in nature, in the sense that the process of inquiry is not based on facts and data that is measurable and can be empirically manipulated to arrive at conclusions but reasoned explanations,

estimations, generalized assumptions and comparisons form the basis of non-scientific investigation (Salmon, 1990).

Forms of non-scientific investigation Tenacity is used to acquire knowledge from habit or superstition. Repetitive and predictable events form the basis upon which knowledge is acquired. There is no actual observation and examination of variables through research. As Stanovich (2007) observes, the element of repetitiveness and predictability hold a critical place in the field of science. Intuition is another form of non-scientific investigation through which knowledge is acquired.

The substance of the matter under investigation is determined by a hunch or feeling that could be emotionally motivated or not (Stanovich, 2007).

Through keen observation or by reading other sources, feelings and emotions may be invoked triggering studies that end up on conclusions being made. The nature of conclusions depends on the emotional disposition of the investigator. Authority by experts is another form of non-scientific investigation (Thurs, 2007). This is simply derived from the idea that expert opinion is based on information acquired earlier through various forms.

Due to the fact that individual experts are expected to offer leadership in their areas of specialization, they easily contribute information which is presumed to be knowledge. Rationalism is another form of non-scientific investigation where knowledge is acquired from reasoning and making of logical conclusions (Audi, 1999). Simply put, rationalism is based on appeal to logic.

However, logic may not necessarily explain phenomena as certain information may be convincing though such may fail the knowledge test.

Lastly is empiricism which relates to acquisition of knowledge from direct sensory observation (Keeton, 1962). This is heavily dependent on the five senses possessed by a human being including the sense of touch, smell, taste, sound and sight. Conclusion Scientific and non-scientific investigation offer useful skills of inquiry that can be used hand in hand. These two processes complement each other throughout the whole investigative process to bring about a more comprehensive and tangible investigation (McComas, 2002).

The steps under scientific investigation are punctuated by elements of non-scientific investigation giving it substance and credibility that is necessary for the process to be complete. The following non-scientific forms of investigation roughly show the correlation that exists with the scientific forms, observation (method of empiricism), reading other researchers' articles (method of authority) (MacMorris, 1989). For an investigation to be deemed complete and comprehensive, scientific investigation and non-scientific investigation must be used together.