

Scientific method in psychology Part 1: Steps, Description and ways of research for Competitive Exams

The scientific method is an approach that practitioners of psychology are interested in for assessing, measuring, and predicting behavior.

It is the process of appropriately framing and properly answering questions. It is used by psychologists and those engaged in other scientific disciplines, to come to an understanding about the world.

Scientific Nature of Psychology

- Psychology is a science: An approach using the scientific method for the observation, description, understanding, and prediction of any phenomenon.
- Scientific method: The procedure employing a systematic, pre-defined, series of steps for attaining optimal efficiency, accuracy, and objectivity in investigating the problem of interest
- Systematic: it follows a specified system, an organized ways of collecting and tabulating information.
- Pre-defined series of steps: certain steps following a specific sequence that is not to be altered; disruption of the sequence will ruin the essence of the approach
- Objectivity: It is unbiased; the researcher's likes and dislikes do not interfere with the study or its findings

Steps of Scientific Method

1. Identifying the Research Problem

- The most important step while conducting research is identify and specify the area of interest in which one is going to conduct a research.
- The research problem can be identified in many ways, including personal interest, brainstorming, scientific developments, knowledge etc.

2. Review of the Related Literature

Searching the research findings in relation with the research one is going to conduct, in order to see how others approached the same or similar issues. Also, it can give some idea as to what would be the probable outcome of one's research.

3. Formulation of Hypotheses

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- A hypothesis is a speculative statement about the relationship between two or more variables. By reviewing the related literature, one is able to formulate the hypotheses pertaining to the variables of interest.
- Reviewing the related research articles helps one formulate various hypotheses.

4. Designing and Conducting the Research

- After reviewing the related literature and making hypotheses, the research is conducted by using different strategies such as Questionnaires, mail interviews, telephonic interviews, face to face interviews etc.
- A variety of research designs is available to the researchers, who can choose the one that best suits their study.

5. Analysis of Data

After collecting information, the data will be tabulated with the help of statistical methods and computation in order to see whether the finding prove or disprove the hypotheses.

6. Drawing Conclusions

Conclusions are drawn after the statistical analysis of data. On the basis of this, a decision is made about the rejection or acceptance of the hypothesis.

Non-Manipulative/Descriptive Methods

The methods in which the phenomenon of interest is studied the way it exists in nature. The researcher does not interfere with the events, and acts as a passive recorder.

Manipulative/Experimental Methods

- The methods that is responsible for the scientific nature of psychology. In these methods the researcher exercises control over the variables and events.
- He may introduce variables of interest, or may withhold them. These methods are used for determining cause and effect relationships.

Descriptive Research Methods

Observation

- Systematic observation is used; one of the methods most frequently employed by anthropologists, sociologists and ethnologists.
- Phenomenon of interest is observed, studied, and the observations are recorded.
- The recorded observations are analyzed.
- Conclusions are drawn on the basis of analysis.

Types of observation

- Observation without Intervention

Naturalistic Observation

Type of observation in which the phenomenon of interest is studied/observed in the natural setting without any interference by the observer; The observer may make narrative records, take field notes, use audio or video equipment, or may use a combination of some or all strategies.

- Observation with Intervention

The observer intervenes, and manipulates the situation, events and/or variables in order to:

1. Create a situation which does not occur frequently
2. Test the impact of variables on behavior
3. Gain access to a situation that is otherwise not accessible or open to observation

Types of "Observation with Intervention"

- Participant Observation
- Structured Observation
- Field experiments

Participant Observation: The observer becomes a part of the situation and plays an active and significant role in the situation, event, or context under study. It can be of two types:

1. Disguised Participant Observation
2. Undisguised Participant Observation

Structured Observation: Employed when the researcher intends to study a situation, which occurs infrequently or is inaccessible otherwise.

- The observer may "create" a situation or initiate it.
- The control exercised by the observer is less than that in many other techniques.
- Mostly employed by clinical and developmental psychologists

Field Experiments: Experiments in the natural setting; the degree of control is far less than that in laboratory experiments.

- One or more independent variables are manipulated in the natural setting in order to see their impact on behavior.

- **Confederate:** the researcher is assisted by one or more confederates who behave in a preplanned manner so as to initiate an experimental condition.

Correlation Research

A method used for identifying predictive relationships among naturally occurring variables

Correlation

Can be said to exist when two different measures of the same individuals, objects, or events vary together e.g. Relationship between I.Q. score & academic achievement or entry test marks & academic achievement. Correlation is a statistical concept.

Nature of Correlation

- Positive Correlation
- Negative Correlation
- Zero Correlation

Measures in Correlation Research

- **Questionnaires:** can be used in- person, can be mailed, or used via Internet.
- **Interviews:** can be personal and face-to-face, or telephonic.
- **Official Record:** Official statistics, raw data, crime records etc.
- **Remember!!!** Correlation is not causation

Surveys

Most frequently used method for obtaining information quickly and evaluating people's interest, liking, disliking and opinions without indulging in long- term procedures and techniques.

It is also easily used because it is a cheap method and information is gathered without much difficulty.

- Surveys consist of presenting a series of questions or statements to the participants, and asking them to respond.
- Surveys are used when quick information is required in limited time e.g. opinion polls, product preference.
- Also useful when information is required from a large number of people e.g. population census.
- More suitable when the goal of the study is to find out about public opinion, attitudes, preferences, like and dislikes etc.

- Sources of data/information in Surveys
 - Questionnaires: in person, mailed, internet
 - Interviews: personal, telephonic
 - Newspaper Surveys

Steps Involve in Conducting the Research:

There are mainly five steps, which are essential while conducting surveys i.e.,

- i. **Conceiving the problem:** The purpose of the study must be carefully thought out and precisely defined. How is the information to be used? From whom it is obtained? What kind of information to be gathered etc.
- ii. **Designing the instrument:** There are numerous ways by which information can be gathered from the general public such as mailed questionnaires, telephonic interviews, through internet etc. It must be carefully thought that which procedure is most effective in obtaining the needed information.
- iii. **Sampling the population:** The problem of obtaining a representative sample of the population is one of the most difficult as well as significant in the field of measuring popular reactions. The sample to be studied must be drawn in such a manner the each individual has an equal chance of being selected, and that the drawing of one does not influence the chances of any other being drawn. With this procedure, each age, sex, income, religious and ethnic group in the population will be proportionately represented in the sample. Off course there are a number of ways of properly drawing a sample.
- iv. **Conducting interviews:** Even when the questions are carefully worded and carefully designed, a poor interviewer can bias the results. Experiments have shown that females are the best interviewers: at least 21 years of age, who like people, who are unbiased, who are good listeners, who have some college education, and who are fairly familiar with the section they are working in.
- v. **Interpreting the results:** Even when all the findings are carried out properly, there is always a chance of misinterpreting the results. Errors in questionnaires, statistical methods, and investigator's own subjectivity can easily bias the results.

Unobtrusive Measures of Behavior

- Indirect ways of data collection
- The persons who are the focus of interest may not be present at the time of investigation
- May be used for supplementing information collected through observation
- May be used as a replacement of observation
- In situations where direct observation is not possible

Unobtrusive Measures of Behavior Include:

- Archival data
 - Already existing records, documents, different forms of literature, newspaper items, photographs, movies, documentaries, biographies, autobiographies etc are used as evidence/ information e.g. using newspaper records to study the rate of crime during the past 20 years.
 - May be used to supplement data gathered through other sources
- Physical Traces
 - Remains, remnants, fragments, objects and products of past behavior are used as evidence; usually employed to supplement data from other sources.
 - Physical traces can be of two types:
 - Use traces

Cues to the use or nonuse of objects and items provide significant evidence e.g. wall chalking, graffiti on walls of public places, milk cartons or tissue boxes in the garbage bags.
 - Products

Study of products, tools, weapons, sculpture etc used less frequently than physical traces.