What percentage of prisoners reject prison norms and internalise norms of the inmate world? What percentage of women leading unhappy marital life take initiative to divorce their husband? What was the cost of poll violence (in crores) in Lok Sabha elections in last seven elections (between 1980 and 1999) in India? How many mandays have been lost due to strikes and lockouts in industries in India in last two decades? This type of research is based on the methodological principles of positivism and adheres to the standards of strict sampling and research design.

Qualitative research

This research presents non-quantitative type of analysis. It describes reality as experienced by the groups, communities, individuals etc. For example, how does the structure and organisation of wall-less prisons (or minimum security jails) differ from that of the central or district jails (or maximum security jails) and contribute to the reformation and resocialisation of criminals? What has been the partywise stand on women's reservation in parliament and state assemblies?

Comparative research

In this research, the similarities and differences between different units or cultural or social groups are studied. For example, comparing marriage system of Hindus with Muslims, art and culture of tribals with non-tribals, customs and social practices of rural people with urban people, the difference between Indian family and American family, nature and causes of crimes committed by females in India with those of females in America, England, Canada, etc.

Longitudinal research

This involves the study of the problem or the same body of phenomenon over a period of time. For example, prevalence of AIDS among males and females in India in 1979, 1989 and 1999. Such studies indicate the trend.

The research can also be *cross-sectional*. This study covers a broad range of phenomena at a single-point in time, e.g., study of 410 households conducted by I.P. Desai in Gujarat.

We may add two more types of research to these types, i.e. *prospective research* which is a research that follows the same body of

phenomena forward through a period of time, beginning with the present and the *retrospective research*, which studies a body of phenomena, working backward from the present over a period of time.

METHODS OF SCIENTIFIC RESEARCH

Before analysing methods, it is necessary to understand difference between 'scientific method' and 'scientific methodology'. *Method* is a tool or a technique used to collect data. It is procedure for obtaining knowledge based on empirical observations and logical reasoning. *Methodology* is a logic of scientific investigation. *Methodology* means description, explanation and justification of methods and not the methods themselves. When we talk of methodology of any social science, say of sociology, we refer to the method(s) used by sociologists, e.g., survey method, experimental method, case-study method, statistical method and so on. The word 'technique' is also used in the contexts of inquiry in any science, e.g., techniques in a mass opinion survey, for conducting interviews, for observation, and so on. There is a right way and a wrong way or a good way and a bad way to do anything in science as in any other work. The techniques of a science are the ways of doing the work of that science. Methodology is concerned with techniques in this sense. It (methodology) inquires into the potentialities and limitations of some technique or other. It is a plan and procedure for carrying out the research. It refers to research techniques and strategies for obtaining valid information. It is an approach to understanding phenomenon. It is a procedure of empirical investigation. It is not concerned with building knowledge but how knowledge is built, i.e., how facts are collected, classified and analysed.

The approach of a social scientist is different from that of a natural scientist. A natural scientist (i) does not participate in the phenomenon he studies, (ii) does not interview elements, (iii) has a laboratory for conducting experiments, (iv) uses instruments and chemicals, and (v) can control many variables in his experiment. Against this, a social scientist (i) participates in the phenomenon under study, (ii) interviews elements from whom collects data, (iii) has no laboratory, (iv) does not use any instruments for measuring etc., like barometers and so on, and (v) cannot control many variables.

Thus, the difference in the approach of two scientists is of *methodology* and not *method*. Methodology refers to *philosophy* on which

research is based. This philosophy includes assumptions and values that serve as basis (rationale) for research and are used for interviewing data and reaching conclusions. It is said that the methodology used in natural sciences is more rigorous than that of social sciences.

One view expressed is that research techniques used in physical sciences cannot be used in social sciences. Thus, sciences which do not use methods of physical sciences are not really scientific. Here science is presented as an ideology, embodying the highest *values*. This is called *scienticism*. It is used as a term of criticism directed towards the view that science can provide mankind with an all-embracing philosophy of life and the solution to all problems. However, the view that social sciences are not scientific because they do not use techniques of physical sciences is a very old view which represents only a type of traditionalism. Techniques and methods used in empirical phenomena in social sciences are crucial in scientific work and thought.

Methods of Research

Field study method	in which subjects are observed under their usual environmental conditions of life rather than under laboratory conditions. The subjects may or may not be aware of being observed. Often interviews are used in this method
Experimental method	in which variables being studied are controlled by the investigator. In other words, the effect of one variable is observed while other relevant variables are held constant.
Survey method	in which a systematic study of a particular community or a group or an institution is made for analysing the problem/issue/ event.
Case study method	in which phenomenon is studied through thorough/intensive/ in-depth analysis of the cases, i.e. an individual, group, community, episode or any other unit of social life. Variety of facts are related to a single case.
Statistical method	in which data is collected quantitatively or by statistics. A statistics may be a measure of central tendency of dispersion of correlation of a difference between two samples
Historical method	in which information is collected about the past from written records of all types, reports, documents, newspapers, diaries, travelers' accounts, etc.
Evolutionary method	in which change is studied in stages through time from earlier and generally simpler forms through a long series of small changes. Each change results in minor modification but the cumulative effect of many changes over a long period of time in the emergence of more complex forms

With above difference in method and methodology, we can now take up methods of scientific research. Broadly speaking, there are several methods of conducting a scientific research in sociology. These are: (1) field study method, (2) experimental method, (3) survey method, (4) case study method, (5) statistical method, (6) historical method, and (7) evolutionary method.

Field study method

This is the method which involves direct study of field situations. Though this method has broken down the narrow walls of the traditional experimental laboratory in research on complex problems of human relationships but it permits the introduction of controls into the data collection. There is difference between the field study method and survey method. Survey has a greater scope while field study has greater depth. While survey always attempts to be representative of some known universe, a field study may or may not involve sampling. The field study is concerned with a thorough account of the processes under investigation (say, study of poverty and unemployment in the village) than with their typicality in a larger universe. In survey, we always ask about the distribution of social variables in the larger group with which we are concerned. For example, in a survey of unemployment in the whole country, the country is so sampled that all subgroups are properly represented and the relative weightage of factors, as they contribute to the total outcome, is ascertained. Other difference between survey and field study method is that in field investigation, we study a single community or a single group in terms of its social structure, i.e., the interrelations of the parts of the structure. Thus, a field study provides a more detailed and a more natural picture of the social interrelationships of the group than does the survey.

We can take one example to understand the difference in the two methods—that of attitudes towards family planning. In survey method, the whole nation or whole state or whole city may be covered. The cross-section survey would seek to get account of the distribution of these attitudes among the subgroups in the population. The sub-groups may be rural and urban people, males and females, educated and illiterate, poor and rich, Hindus and Muslims, and so forth. A field study concerned with the same problem might deal with a single village. Obviously, the field study and national/state survey

are not so much alternative ways of studying problems but they are supplementary procedures which can be used most effectively in combination. The two major advantages, according to Festinger and Katz (1953:58) are: (i) we can assess as to what extent the degree of generality from the findings of the field study of specific situation fits into the national pattern. This will help in interpreting the findings more wisely; (ii) both the survey and the field study produce findings for hypotheses which can be more adequately tested by use of other approach.

Field study method is used more by social anthropologists for functional analysis of simple societies while the sociologists find survey method more useful. Malinowsky, M.N. Srinivas, Andre Beteille, S.C. Dube, and a few others used field studies in their researches while R.K. Mukerjee, I.P. Desai, M.S. Gore, K.M. Kapadia, Aileen Ross, Sachchidanand, A.M. Shah, etc., used survey method in the study of family in India.

Festinger and Katz (1953:65) have described following six steps in the conduct of a field study:

- *Preliminary planning:* deciding scope and objectives of study and the time-table of stages.
- *The scouting expedition:* by either living in the group or making frequent trips, the researcher explores the significant variables in the situation and the types of instruments to be constructed. In this phase, the fieldworker makes unlimited contacts with wider segments of informants, seeks informants who have a wide range of contacts, locates formal and informal leaders, spends considerable time in participant observation and studies available records and secondary sources of information.
- *Formation of the research design:* the design for final study is marked out. These designs are usually exploratory and hypotheses-testing.
- *Presenting of research instruments and procedure*: like interview schedules, questionnaires, behavioural scales and other methods of getting information.
- *Full-scale field operation:* sometimes the actual fieldwork may require new instruments and new hypotheses. The personnel and skill of a field worker differ from the requirements of a large-scale survey.
- *The analysis materials*: obtains frequency distribution on all measures, uses correlational analysis, and interprets findings.

Experimental method

This method includes field experiment as well as laboratory experimentation. In field experiment, the study is conducted by comparing experimental group with the control group. In laboratory experiment, the investigator creates a situation with the exact conditions he wants to have and in which he controls some and manipulates other variables. He then observes and measures the effect of the manipulation of the independent variables on the dependent variables in a situation in which the operation of other relevant factors is held to a minimum. For example, field experiment can be conducted in an industry. By providing several facilities (like housing, loan, educational, recreational, profit-sharing, etc.) its impact can be seen on increase in productivity. One example of laboratory experiment is Festinger's study of voting behaviour in 1947. In this experiment (quoted by Festinger and Katz, 1953: 138-139) an attempt was made to vary a single factor, namely, whether or not the subjects knew the religious affiliation of other members of the group. Groups were first set up in which every member of the group was initially a stranger to every other member. Exactly comparable conditions were created for each group. The nominees for whom the subjects voted were participants whose behaviour was standardised. These same participants identified themselves as having different religions in different experimental groups, thus controlling personality factors and first impressions. The results obtained showed direct relationship with the variable manipulated (i.e., religion).

Techniques of manipulation or control of variables can be introduced at almost any stage in the laboratory experiment, say, decision about the subjects, composition or size of the group, duration of existence, variable to be manipulated, and so forth. However, laboratory experiments do not represent an easy road to the collection of data for the resolution of theoretical problems.

Before-after experiment is a type of controlled experiment in which both the experimental group and the control group are measured with respect to the dependent variable (the factor that is expected to change) before as well as after the exposure to the independent variable (the experimental treatment). The before-after type of experiment sometimes is conducted without a separate control group. In this case, the same group is compared before and after the experimental treatment, the group before the treatment serving in effect as the control

group. We can take the example of studying the voting behaviour of people in four *dhanis* (areas) A, B, C and D in a village. People in all the four *dhanis* in the village are approached by a group of people for voting a particular candidate in the state legislature election. Selected information is given to the villagers in all the four *dhanis* about this candidate. A poll is conducted in the four *dhanis* to find out the percentage of people who will vote for this candidate. In coming week, the villagers in two *dhanis* A and B are given new information about the candidate that he has a criminal record, that he has association with anti-social elements, that he owns a 'sena' who members possess weapons and coerce people for a particular action, that he is a womaniser and a corrupt person and so on. The poll is once again conducted in all the four *dhanis* after supplying this information regarding the possibility of percentage of people voting for this candidate.

After this second poll, yet more information is supplied to villagers in the two earlier *dhanis* A and B about the candidate that he is very close to the chief minister of the state, that he has contacts with important state and central leaders, that he has the possibility of being appointed as a minister after the election, that he will arrange for canal irrigation facility for the village cultivators, that he will get all roads *pakka* linked with near-by town and so on. The third poll is then taken in all the four *dhanis* to find out change in the possibility of getting vote percentage by this candidate. In this experiment, different information was supplied to the villagers in two *dhanis* A and B on three different occasions and then the poll was conducted and effect of good and bad information about the candidate on the voting possibility of the villagers was studied. This explains before-after experiment. Here, the dependent variable is voting behaviour, the control groups are C and D *dhanis* and the experimental groups are A and B *dhanis*. By comparing the percentage of people who are likely to vote in favour of the candidate in C and D *dhanis* (controlled groups) with those in A and B *dhanis* (experimental groups), we can measure change in the percentage of voters.

Survey method

This method involves a systematic and comprehensive study of a particular community, organisation, group, etc., with a view to the analysis of a social problem and the presentation of recommendations

for its solution, e.g., survey on rural poverty, increase in crime, political corruption, effect of high and low investments in the industry, violence against women female crime, functioning of prisons, bonded labour, child labour, party-wise stand on women's reservation in parliament, performance of government in one year, assessing opinion on handling of Kargil issue by the government in power, introducing ex-gratia scheme for war widows and so on.

Case study method

It is studying the phenomenon, event, situation or development through a thorough and detailed analysis or intensive study. The case may be an individual a group, a community, a society, an organisation, a process or any unit of social life.

Statistical method

This method involves drawing statistical inferences and generalisations about population through mathematical values. Statistical inference is based on probability theory. A wide variety of statistical techniques is available to test sample data and determine probable degree of accuracy of generalisations about the population from which the sample was drawn. Generalisations based on this method are never statements of absolute certainty.

Historical method

This method collects facts by going in the past in different periods. Sources of information include written records, newspapers, diaries, letters, travellers' accounts, documents, etc., e.g., study of change in the caste system.

Evolutionary method

This method studies development from simpler forms through a long series of a small changes. Each change by itself results in minor modification in the phenomenon but the cumulative effect of many changes over a long period of time is the emergence of new, usually more complex, forms. It studies cumulative effect by analysing how each change brings modification.

VALUE OF SCIENTIFIC RESEARCH

The important uses of scientific research are: (1) it improves decision-making; (2) it reduces uncertainty; (3) it enables adopting new strategies; (4) it helps in planning for the future; and (5) it helps in ascertaining trends.

It is because of this value of scientific research that today many sociologists are engaged in research---some on full-time basis and some on part-time basis. Many university teachers divide their time between teaching and research. The funds for research are provided by the UGC, ICSSR, UNICEF, Ministry of Welfare and Justice, Government of India, World Bank, etc. Though these funding agencies do not interfere with the scientific method used in research but they are choosy about the topics of research and sometimes do not permit publicity to the findings of research, particularly when the research findings reflect inefficiency and callousness in the functioning of government agencies and the bureaucrats engaged in their management.

The scientific inquiry should not be conducted when availability of adequate data is doubtful, there is time constraint, cost (of inquiry) is higher than value, and no tactical decisions need to be made.

VALUE-FREE SCIENTIFIC RESEARCH

The term 'value' here does not have an economic connotation. Value is an abstract generalised principle of behaviour expressed in concrete form in social norms to which the members of a group feel a strong commitment.

'Science' refers to disinterestedness; scientific inquiry/investigation presents facts as they are; while a scientist has a moral responsibility of giving findings without any biases and prejudices. Motivation for a scientist in conducting research is curiosity, developing theory and interest in change.

There are two views about the neutrality and objectivity in scientific investigation: one that science and scientists can be value-free (value neutrality) and other that science and researchers cannot be value-free (normativism). Weber accepts the former position. He thinks that if a researcher separates his daily life from his professional role, he can be free of biases. On the other hand, Gouldner (1962: 1970) believes that value-free science is a myth, though it is desirable. Manheim (1977:93) says: "Value-free research is a desirable goal to

wards which social scientist can strive without any necessary expectation of actually attaining it. This becomes possible when the social scientist remains careful in choosing the problem of research and states what he finds, i.e., follows data wherever they lead, regardless of how much the conclusions may please or displease him or the research consumer."

Mills (1959) and Wadsworth (1984) hold that (i) objectivity is unattainable, (ii) some standpoint or value judgement is necessary for solving social problems, (iii) our socialisation is based on values which direct our thinking and action, (iv) disclosing bias or personal belief is less dangerous than pretending to be value free, and (v) social sciences are normative. Apart from studying what it is, they should also be concerned with what ought to be (Sarantakos, op. cit.:18-19).

Radical critics claim that behind a facade of objectivity and neutrality, some scientists prostitute their research talents to the support of the interests of the funding agencies. Frederichs (*Insurgent Sociologist*, 1970:82-85) has even gone to the extent of saying that these unethnical scientists have even supported racism, militarism and other forms' of oppression. But some scholars (like Horton and Bouma, 1971) referring particularly to sociological research are of the opinion that the issue whether sociological research has been widely corrupted in this manner (of supporting even oppression) may be debated. Becker (1967) has said that it is indisputable that problems of bias and partisanship and present in all research and that research findings are often helpful to the interests of some people and damaging to other people.

My contention is that a researcher in social sciences, specially in sociology, has a responsibility to society and he cannot escape that responsibility. He has not only to explain and clear away the misinformation in people's social thinking through scientific research but has also to provide 'right' information about many aspects of human behaviour. Our professional ethics demand the following standards in research: (1) accuracy in collecting and processing data, (2) using relevant methods and techniques in research, (3) interpreting data according to appropriate methodological standards and avoiding falsification of data, and (4) reporting findings accurately and honestly.

Indian sociologists have greatly succeeded in establishing that poor people in villages do not contribute to rural poverty and that the

sustainable development of rural areas can be made possible by providing required infrastructure and making people less dependent on government and being more self-reliant; or that the exploitation of women can be reduced/prevented by making them realise that they are not helpless but possess resources to contain all types of victimisation and they also have the required capabilities to participate in decision-making processes in man's patriarchal world. They (Indian researchers) have thus helped greatly in giving accurate knowledge about social life and human behaviour.

Indian sociologists may not be able to make any specific predictions through the scientific researches but their analysis of society, social life and social behaviour has surely made people realise the type of society that will emerge in near future, i.e., society where empowerment of women will be a functional necessity, functional jointness will be the important characteristic of the family system, caste superiority will be rejected and communal harmony will be emphasised, corrupt and inefficient power elite will not be tolerated, police will be compelled to protest the interests of victims and act as a catalyst agent of social change, employees in all organisations will be compelled to accept the concept of accountability, and so forth.

This is not predicting specific developments through research or pointing out the expectations of the people for the future but only describing the pattern of trends and changes which seem most probable. This may be described in simple words as 'social forecasting'. The basic thing is that science, specifically sociology, has to be value-free and research has to be objective and unbiased, and scientists, including sociologists, refrain from becoming public advocates of programmes and policies which power elite consider socially desirable.

Further Readings

Babbie, Earl, *The Practise of Social Research* (8th ed.), Wadsworth Publishing Company, Albany, New York, 1998.

Bailey, Kenneth D., *Methods of Social Research* (2nd ed.), The Free Press, New York, 1982 (first published in 1978).