

# CHAPTER 8

## Selecting a Study Design

### In this chapter you will learn about:

- The differences between quantitative and qualitative study designs
- Common study designs in quantitative research and when to use them
- Common study design in qualitative research and when to use them
- The strengths and weaknesses of different study designs

**Keywords:** *action research, after-only design, before-and-after study design, blind studies, case studies, cohort studies, control studies, cross-sectional study design, double-blind studies, experimental study design, feminist research, focus studies, longitudinal studies, non-experimental studies, panel studies, prospective study design, quasi-experimental studies, reflective journal, retrospective studies, semi-experimental studies, trend studies.*

### Differences between quantitative and qualitative study designs

In this chapter we will discuss some of the most commonly used study designs in both quantitative and qualitative research. Overall, there are many more study designs in quantitative research than in qualitative research. Quantitative study designs are specific, well structured, have been tested for their validity and reliability, and can be explicitly defined and recognised. Study designs in qualitative research either do not have these attributes or have them to a lesser degree. They are less specific and precise, and do not have the same structural depth.

Differences in philosophical perspectives in each paradigm combined with the aims of a study, to a large extent, determine the focus, approach and mode of enquiry which, in turn, determine the structural aspects of a **study design**. The main focus in qualitative research is to understand, explain, explore, discover and clarify situations, feelings, perceptions, attitudes, values, beliefs and experiences of a group of people. The study designs are therefore often based on deductive rather than inductive logic, are flexible and emergent in nature, and are often non-linear and non-sequential in their operationalisation. The study designs mainly entail the selection of people from whom the information, through an open frame of enquiry, is explored and gathered. The parameters of the scope of a study, and

information gathering methods and processes, are often flexible and evolving; hence, most qualitative designs are not as structured and sequential as quantitative ones. On the other hand, in quantitative research, the measurement and classification requirements of the information that is gathered demand that study designs are more structured, rigid, fixed and predetermined in their use to ensure accuracy in measurement and classification.

In qualitative studies the distinction between study designs and methods of data collection is far less clear. Quantitative study designs have more clarity and distinction between designs and methods of data collection. In qualitative research there is an overlap between the two. Some designs are basically methods of data collection. For example, in-depth interviewing is a design as well as a method of data collection and so are oral history and participant observation.

One of the most distinguishing features of qualitative research is the adherence to the concept of respondent concordance whereby you as a researcher make every effort to seek agreement of your respondents with your interpretation, presentation of the situations, experiences, perceptions and conclusions. In quantitative research respondent concordance does not occupy an important place. Sometimes it is assumed to be achieved by circulating or sharing the findings with those who participated in the study.

The 'power-gap' between the researcher and the study population in qualitative research is far smaller than in quantitative research because of the informality in structure and situation in which data is collected.

In quantitative research enough detail about a study design is provided for it to be replicated for verification and reassurance. In qualitative research little attention is paid to study designs or the other structural aspects of a study, hence the replication of a study design becomes almost impossible. This leads to the inability of the designs to produce findings that can be replicated. Findings through quantitative study designs can be replicated and retested whereas this cannot be easily done by using qualitative study designs.

Another difference in the designs in qualitative and quantitative studies is the possibility of introducing researcher bias. Because of flexibility and lack of control it is more difficult to check researcher bias in qualitative studies.

Study designs in each paradigm are appropriate for finding different things. Study designs in qualitative research are more appropriate for exploring the variation and diversity in any aspect of social life, whereas in quantitative research they are more suited to finding out the extent of this variation and diversity. If your interest is in studying values, beliefs, understandings, perceptions, meanings, etc., qualitative study designs are more appropriate as they provide immense flexibility. On the other hand, if your focus is to measure the magnitude of that variation, 'how many people have a particular value, belief, etc.?', the quantitative designs are more appropriate. For good quantitative research it is important that you combine quantitative skills with qualitative ones when ascertaining the nature and extent of diversity and variation in a phenomenon. In the author's opinion, the qualitative-quantitative-qualitative approach to research is comprehensive and worth consideration. This involves starting with qualitative methods to determine the spread of diversity, using quantitative methods to quantify the spread and then going back to qualitative to explain the observed patterns. As already stated, the author does not recommend your locking yourself into either the qualitative or quantitative paradigm and, though you may have your preference, it is the purpose that should determine the choice between quantitative and qualitative study designs. If you already know (from previous studies or practice knowledge) the nature of diversity in any area of interest to you, knowledge about its extent can be determined only by using quantitative methods. In most cases where you want to explore both, you need to use methods that fall in the domain of both paradigms.

# Study designs in quantitative research

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Some of the commonly used designs in quantitative studies can be classified by examining them from three different perspectives:

1. the number of contacts with the study population;
2. the reference period of the study;
3. the nature of the investigation.

Every study design can be classified from each one of these perspectives. These perspectives are arbitrary bases of classification; hence, the terminology used to describe them is not universal. However, the names of the designs within each classification base are universally used. Note that the designs within each category are mutually exclusive; that is, if a particular study is cross-sectional in nature it cannot be at the same time a before-and-after or a **longitudinal study**, but it can be a non-experimental or experimental study, as well as a **retrospective study** or a **prospective study**. See [Figure 8.1](#).

Another section has been added to the three sections listed above titled 'Others – some commonly used study designs'. This section includes some commonly used designs which are based on a certain philosophy or methodology, and which have acquired their own names.

## Study designs based on the number of contacts

Based on the number of contacts with the study population, designs can be classified into three groups:

1. cross-sectional studies;
2. before-and-after studies;
3. longitudinal studies.

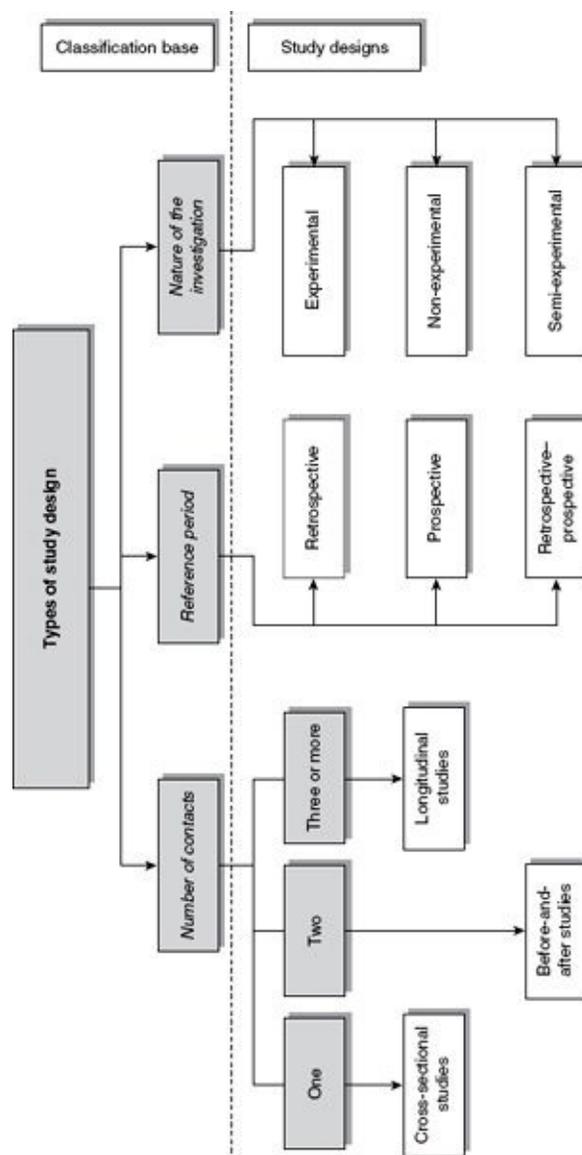


FIGURE 8.1 *Types of study design*

### ***The cross-sectional study design***

**Cross-sectional studies**, also known as one-shot or status studies, are the most commonly used design in the social sciences. This design is best suited to studies aimed at finding out the prevalence of a phenomenon, situation, problem, attitude or issue, by taking a cross-section of the population. They are useful in obtaining an overall ‘picture’ as it stands at the time of the study. They are ‘designed to study some phenomenon by taking a cross-section of it at one time’ (Babbie 1989: 89). Such studies are cross-sectional with regard to both the study population and the time of investigation.

A cross-sectional study is extremely simple in design. You decide what you want to find out about, identify the study population, select a sample (if you need to) and contact your respondents to find out the required information. For example, a cross-sectional design would be the most appropriate for a study of the following topics:

- The attitude of the study population towards uranium mining in Australia.
- The socioeconomic–demographic characteristics of immigrants in Western Australia.
- The incidence of HIV-positive cases in Australia.
- The reasons for homelessness among young people.

- The quality assurance of a service provided by an organisation.
- The impact of unemployment on street crime (this could also be a before-and-after study).
- The relationship between the home environment and the academic performance of a child at school.
- The attitude of the community towards equity issues.
- The extent of unemployment in a city.
- Consumer satisfaction with a product.
- The effectiveness of random breath testing in preventing road accidents (this could also be a before-and-after study).
- The health needs of a community.
- The attitudes of students towards the facilities available in their library.

As these studies involve only one contact with the study population, they are comparatively cheap to undertake and easy to analyse. However, their biggest disadvantage is that they cannot measure change. To measure change it is necessary to have at least two data collection points – that is, at least two cross-sectional studies, at two points in time, on the same population.

### ***The before-and-after study design***

The main advantage of the before-and-after design (also known as the pre-test/post-test design) is that it can measure change in a situation, phenomenon, issue, problem or attitude. It is the most appropriate design for measuring the impact or effectiveness of a programme. A before-and-after design can be described as two sets of cross-sectional data collection points on the same population to find out the change in the phenomenon or variable(s) between two points in time. The change is measured by comparing the difference in the phenomenon or variable(s) before and after the intervention (see [Figure 8.2](#)).

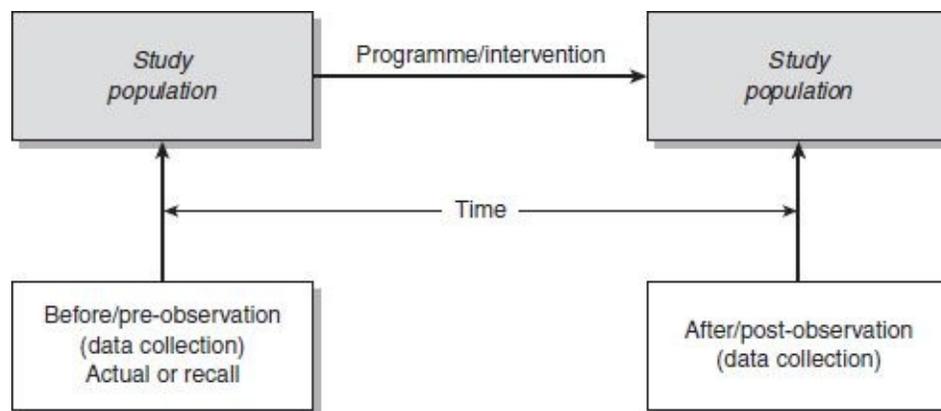


FIGURE 8.2 *Before-and-after (pre-test/post-test) study design*

A before-and-after study is carried out by adopting the same process as a cross-sectional study except that it comprises two cross-sectional data sets, the second being undertaken after a certain period. Depending upon how it is set up, a before-and-after study may be either an experiment or a non-experiment. It is one of the most commonly used designs in evaluation studies. The difference between the two sets of data collection points with respect to the dependent variable is considered to be the impact of the programme. The following are examples of topics that can be studied using this design:

- The impact of administrative restructuring on the quality of services provided by an organisation.
- The effectiveness of a marriage counselling service.
- The impact of sex education on sexual behaviour among schoolchildren.
- The effect of a drug awareness programme on the knowledge about, and use of, drugs among young people.
- The impact of incentives on the productivity of employees in an organisation.
- The impact of increased funding on the quality of teaching in universities.
- The impact of maternal and child health services on the infant mortality rate.
- The effect of random breath testing on road accidents.
- The effect of an advertisement on the sale of a product.

The main advantage of before-and-after design is its ability to measure change in a phenomenon or to assess the impact of an intervention. However, there can be disadvantages which may not occur, individually or collectively, in every study. The prevalence of a particular disadvantage(s) is dependent upon the nature of the investigation, the study population and the method of data collection. These disadvantages include the following:

- As two sets of data must be collected, involving two contacts with the study population, the study is more expensive and more difficult to implement. It also requires a longer time to complete, particularly if you are using an experimental design, as you will need to wait until your intervention is completed before you collect the second set of data.
- In some cases the time lapse between the two contacts may result in attrition in the study population. It is possible that some of those who participated in the pre-test may move out of the area or withdraw from the experiment for other reasons.
- One of the main limitations of this design, in its simplest form, is that as it measures *total change*, you cannot ascertain whether independent or extraneous variables are responsible for producing change in the dependent variable. Also, it is not possible to quantify the contribution of independent and extraneous variables separately.
- If the study population is very young and if there is a significant time lapse between the before-and-after sets of data collection, changes in the study population may be because it is maturing. This is particularly true when you are studying young children. The effect of this maturation, if it is significantly correlated with the dependent variable, is reflected at the ‘after’ observation and is known as the *maturation effect*.
- Sometimes the instrument itself educates the respondents. This is known as the *reactive effect* of the instrument. For example, suppose you want to ascertain the impact of a programme designed to create awareness of drugs in a population. To do this, you design a questionnaire listing various drugs and asking respondents to indicate whether they have heard of them. At the pre-test stage a respondent, while answering questions that include the names of the various drugs, is being made aware of them, and this will be reflected in his/her responses at the post-test stage. Thus, the research instrument itself has educated the study population and, hence, has affected the dependent variable. Another example of this effect is a study designed to measure the impact of a family planning education programme on respondents’ awareness of contraceptive methods. Most studies designed to measure the impact of a programme on participants’ awareness face the difficulty that a change in the level of awareness, to some extent, may be because of this reactive effect.
- Another disadvantage that may occur when you use a research instrument twice to gauge the attitude of a population towards an issue is a possible shift in attitude between the two points of data collection. Sometimes people who place themselves at the extreme positions of a

measurement scale at the pre-test stage may, for a number of reasons, shift towards the mean at the post-test stage (see [Figure 8.3](#)). They might feel that they have been too negative or too positive at the pre-test stage. Therefore, the mere expression of an attitude in response to a questionnaire or interview has caused them to think about and alter their attitude at the time of the post-test. This type of effect is known as the *regression effect*.

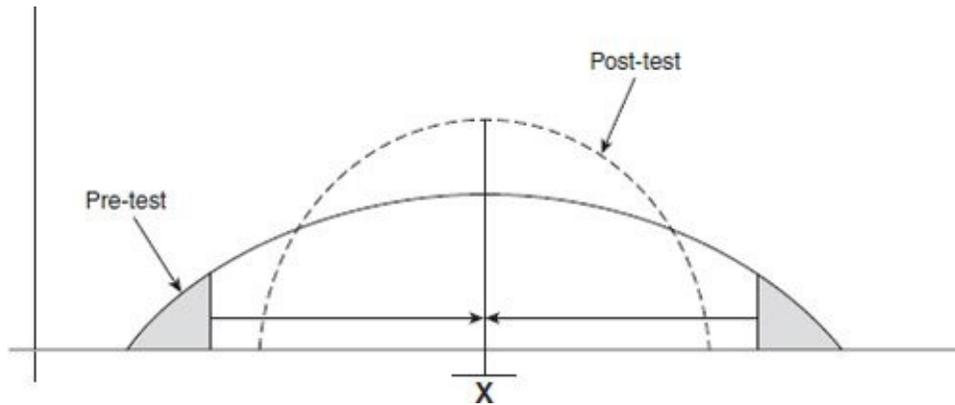


FIGURE 8.3 *The regression effect*

### ***The longitudinal study design***

The before-and-after study design is appropriate for measuring the extent of change in a phenomenon, situation, problem, attitude, and so on, but is less helpful for studying the pattern of change. To determine the pattern of change in relation to time, a longitudinal design is used; for example, when you wish to study the proportion of people adopting a programme over a period. Longitudinal studies are also useful when you need to collect factual information on a continuing basis. You may want to ascertain the trends in the demand for labour, immigration, changes in the incidence of a disease or in the mortality, morbidity and fertility patterns of a population.

In longitudinal studies the study population is visited a number of times at regular intervals, usually over a long period, to collect the required information (see [Figure 8.4](#)). These intervals are not fixed so their length may vary from study to study. Intervals might be as short as a week or longer than a year. Irrespective of the size of the interval, the type of information gathered each time is identical. Although the data collected is from the same study population, it may or may not be from the same respondents. A longitudinal study can be seen as a series of repetitive cross-sectional studies.

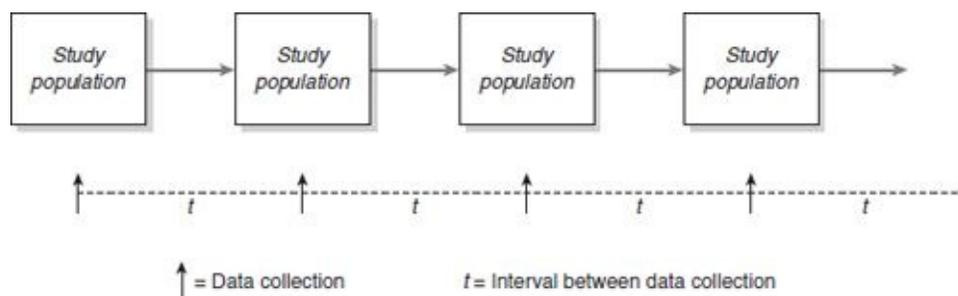


FIGURE 8.4 *The longitudinal study design*

Longitudinal studies have many of the same disadvantages as before-and-after studies, in some instances to an even greater degree. In addition, longitudinal studies can suffer from the **conditioning effect**. This describes a situation where, if the same respondents are contacted frequently, they begin to know what is expected of them and may respond to questions without thought, or they may lose interest

in the enquiry, with the same result.

The main advantage of a longitudinal study is that it allows the researcher to measure the pattern of change and obtain factual information, requiring collection on a regular or continuing basis, thus enhancing its accuracy.

## **Study designs based on the reference period**

The *reference period* refers to the time-frame in which a study is exploring a phenomenon, situation, event or problem. Studies are categorised from this perspective as:

- retrospective;
- prospective;
- retrospective–prospective.

### ***The retrospective study design***

Retrospective studies investigate a phenomenon, situation, problem or issue that has happened in the past. They are usually conducted either on the basis of the data available for that period or on the basis of respondents' recall of the situation (Figure 8.5a). For example, studies conducted on the following topics are classified as retrospective studies:

- The living conditions of Aboriginal and Torres Strait Islander peoples in Australia in the early twentieth century.
- The utilisation of land before the Second World War in Western Australia.
- A historical analysis of migratory movements in Eastern Europe between 1915 and 1945.
- The relationship between levels of unemployment and street crime.

### ***The prospective study design***

Prospective studies refer to the likely prevalence of a phenomenon, situation, problem, attitude or outcome in the future (Figure 8.5b). Such studies attempt to establish the outcome of an event or what is likely to happen. Experiments are usually classified as prospective studies as the researcher must wait for an intervention to register its effect on the study population. The following are classified as prospective studies:

- To determine, under field conditions, the impact of maternal and child health services on the level of infant mortality.
- To establish the effects of a counselling service on the extent of marital problems.
- To determine the impact of random breath testing on the prevention of road accidents.
- To find out the effect of parental involvement on the level of academic achievement of their children.
- To measure the effects of a change in migration policy on the extent of immigration in Australia.

## The retrospective–prospective study design

**Retrospective–prospective studies** focus on past trends in a phenomenon and study it into the future. Part of the data is collected retrospectively from the existing records before the intervention is introduced and then the study population is followed to ascertain the impact of the intervention (Figure 8.5c).

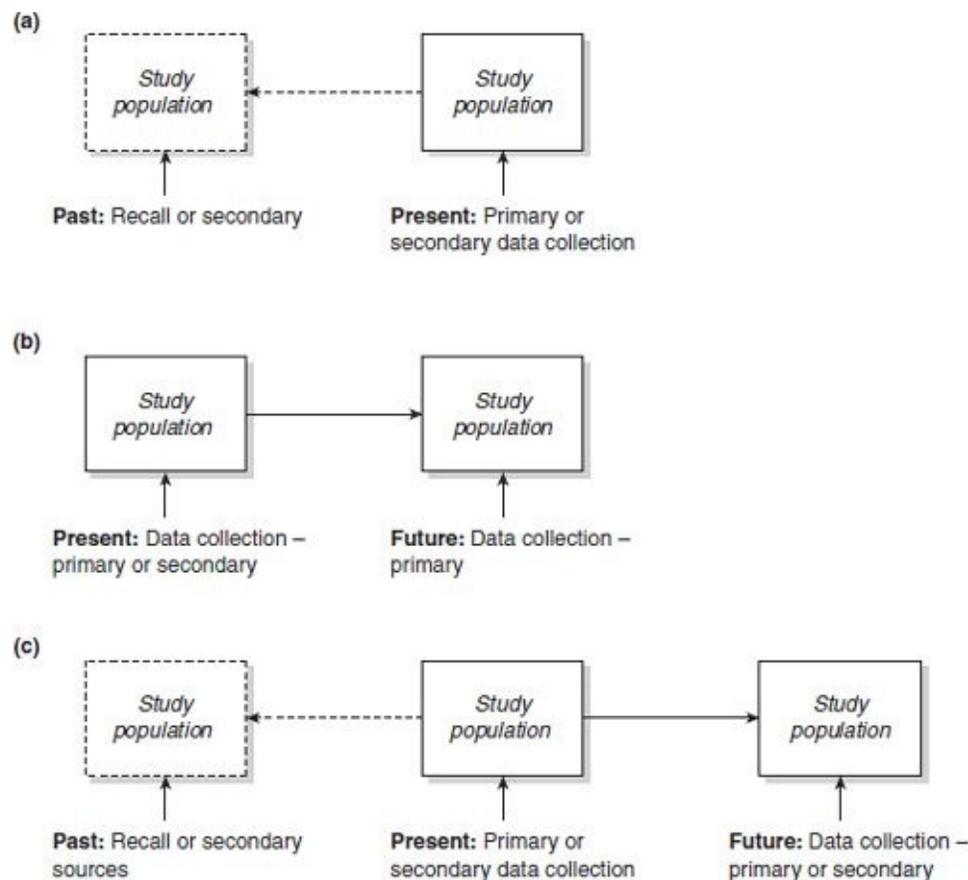


FIGURE 8.5 (a) Retrospective study design; (b) prospective study design; (c) retrospective–prospective study design.

A study is classified under this category when you measure the impact of an intervention without having a control group. In fact, most before-and-after studies, if carried out without having a control – where the baseline is constructed from the same population before introducing the intervention – will be classified as retrospective–prospective studies. Trend studies, which become the basis of projections, fall into this category too. Some examples of retrospective–prospective studies are:

- The effect of random breath testing on road accidents.
- The impact of incentives on the productivity of the employees of an organisation.
- The impact of maternal and child health services on the infant mortality rate.
- The effect of an advertisement on the sale of a product.

## Study designs based on the nature of the investigation

On the basis of the nature of the investigation, study designs in quantitative research can be classified as:

- experimental;
- non-experimental;
- quasi- or semi-experimental.

To understand the differences, let us consider some examples. Suppose you want to test the following: the impact of a particular teaching method on the level of comprehension of students; the effectiveness of a programme such as random breath testing on the level of road accidents; or the usefulness of a drug such as azidothymidine (AZT) in treating people who are HIV-positive; or imagine any similar situation in your own academic or professional field. In such situations there is assumed to be a *cause-and-effect* relationship. There are two ways of studying this relationship. The first involves the researcher (or someone else) introducing the intervention that is assumed to be the ‘cause’ of change, and waiting until it has produced – or has been given sufficient time to produce – the change. The second consists of the researcher observing a phenomenon and attempting to establish what caused it. In this instance the researcher starts from the effect(s) or outcome(s) and attempts to determine causation. If a relationship is studied in the first way, starting from the cause to establish the effects, it is classified as an **experimental study**. If the second path is followed – that is, starting from the effects to trace the cause – it is classified as a **non-experimental study** (see Figure 8.6).

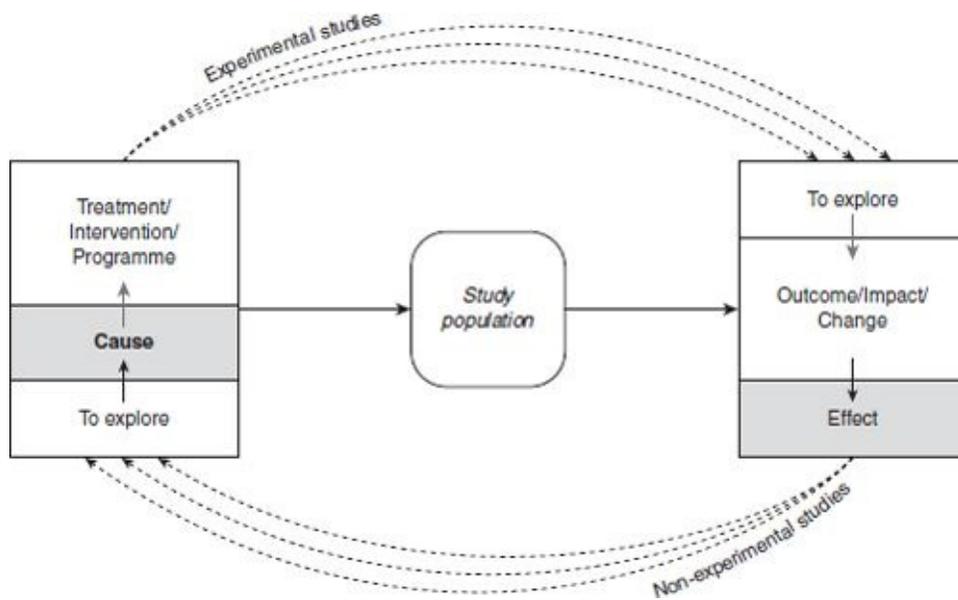


FIGURE 8.6 *Experimental and non-experimental studies*

In the former case the independent variable can be ‘observed’, introduced, controlled or manipulated by the researcher or someone else, whereas in the latter this cannot happen as the assumed cause has already occurred. Instead, the researcher retrospectively links the cause(s) to the outcome(s). A **semi-experimental study** or **quasi-experimental study** has the properties of both experimental and non-experimental studies; part of the study may be non-experimental and the other part experimental.

An experimental study can be carried out in either a ‘controlled’ or a ‘natural’ environment. For an experiment in a controlled environment, the researcher (or someone else) introduces the intervention or stimulus to study its effects. The study population is in a ‘controlled’ situation such as a room. For an experiment in a ‘natural’ environment, the study population is exposed to an intervention in its own environment.

Experimental studies can be further classified on the basis of whether or not the study population is randomly assigned to different treatment groups. One of the biggest problems in comparable designs (those in which you compare two or more groups) is a lack of certainty that the different groups are in