

“A” Level Sociology

A Resource-Based Learning Approach

**Module One:
Theory and Methods**

Unit M6: Experiments

These Notes have been designed to provide you with a knowledge and understanding of the following syllabus area:

“Demonstrate a knowledge of the different quantitative and qualitative methods including different types of questionnaire, interview and observation techniques, and understand the distinction between primary and secondary data”.

The Aims of these Notes are to allow you to understand:

1. Sociological experiments as a form of data collection.
2. The limitations of experiments as a method of sociological research.

The Objectives of these Notes are to allow you to understand:

1. Ethical, practical and methodological reasons for the infrequent use of experimentation as a form of sociological research.
2. The concepts of:
 - Experimental control,
 - Dependent and independent variables.
3. The difference between the concepts of causality and correlation.
4. The concepts of control and experimental groups.
5. The “observer effect” as an example of the relationship between dependent and independent variables in sociological experiments.
6. The problems involved in the conduct and use of sociological experiments.
7. The concept of a “natural experiment”.

Introduction

While experiments as a method of both data collection and hypothesis testing are widely used in both the **Natural Sciences** (such as **Chemistry** and **Physics**) and some **Social Sciences** (such as **Psychology** in particular), it is probably true to say that, for a variety of reasons, experimentation is (and has not been) a method of data collection that is used very often in Sociology (although, as we shall see, it has been used on some occasions).

The reasons for this are many and varied and have to do with such things as:

- **Ethical considerations:**

For example, do sociologists have the **moral right** to conduct experiments upon people who may be "unwitting" (and unwilling) victims, simply because the sociologist claims to be doing so in the name of "science"?

- **Practical considerations:**

In simple terms, it is frequently the case that the kind of experiments it might be useful to conduct (such as separating identical twins at birth, placing them in different social environments and observing their social development) are simply not **practical** (and nor are they both **ethical** and likely to be met with the active co-operation of non-sociologists).

- **Methodological considerations:**

Experimental methods of data collection, by definition, involve a **complex process** whereby the **experimenter** attempts to **manipulate** and / or **control** a number of different **factors** that may have a bearing upon, for example, a particular aspect of human behaviour.

For **example**, we may want to try and understand the relationship between the socialisation of a child and the presence or absence of a father within the family. In order to do this, we would have to decide such things as:

- What social factors would we have to control in order to carryout such an experiment?
- To what extent could we control various factors?
- How could we be certain that the factors in human development we have identified are the most significant?

In this set of Notes, therefore, what I want to do is:

1. **Outline the basic rationale of experimentation.**
2. **Illustrate the way it is possible to conduct a form of experimentation within Sociology.**
3. **Provide some examples of different experiments that have, successfully or otherwise, been conducted by sociologists.**

A. The Rationale of Experimentation.

In order to understand the concept of experimentation it is useful to begin by defining the concept.

Giddens ("Sociology", 1989), for example, notes that,

"An experiment can...be defined as an attempt, within artificial conditions established by an investigator, to test the influence of one or more variables upon others. Experiments are widely used in the natural sciences, but the scope for experimentation in sociology is limited. We can only bring small groups of individuals into a laboratory setting and in such experiments, people know they are being studied and may behave differently from normal."

We will look more closely, in a moment, at two of the points noted by Giddens, namely:

- a. The artificial setting of much experimentation.
- b. The fact that people may know they are the subject of an experiment,

but before we do this, it might be useful to clarify what is meant by a number of significant concepts, namely:

- a. **Experimental Control,**
- b. **Dependent Variable(s),**
- c. **Independent Variable(s),**
- d. **Causality and Correlation.**

a. **Experimental Control.**

One of the great **strengths** of experimentation (and one of the reasons why they are so widely used in **Natural Sciences** such as Physics and Chemistry), is the fact that the **researcher** is able to **control** the **environment** in which the experiment takes place. In basic terms, this involves two important considerations:

1. Being able to **specify the conditions** under which an experiment takes place.
2. The **ability to control various factors** ("**variables**") relating to the behaviour that we want to study.

In this respect, if we are able to **tightly-control** the conditions under which an experiment takes place, it follows that when we attempt to "**manipulate**" (that is, to **change** in some controlled way) certain **behavioural factors** we can do so in a **systematic**, fashion.

b. **Dependent Variable**

The dependent variable in any experiment is the thing or behaviour that we want to explain.

For example, in a sociological context we might want to try and understand the effects that violent television images have on children's behaviour patterns. The **dependent variable** in this context would, therefore, be **possible changes in children's behaviour after they are exposed to violent television images.**

c. **Independent Variable**

In an experiment, the **objective** is to see how various **factors** affect the behaviour of the **dependent variable**.

For **example**, in the **natural world** we might want to investigate factors affecting plant growth and various **independent variables** (such as the amount of light a plant receives, whether it is placed in a hot or cold environment, etc.) could be **manipulated** to allow us to come to a conclusion about which, out of all the possible variables, was most important in relation to plant growth.

An **independent variable**, therefore, is a **factor** that **we think might have an effect upon the dependent variable**. By **changing** the **independent variable**, therefore, we can **test** this possible relationship by seeing if **changes** in the **independent variable produce changes in the dependent variable**.

In this respect, what we are, in effect, doing is **testing a possible hypothesis**. In simple terms, we might express this idea thus:

By **changing a known factor** (the **independent variable**) and **observing** the **effect** upon the **dependent variable**, we can come to some (tentative) **conclusion** about the **relationship** between the two.

In **biology**, for example:

By manipulating the factor of light (the independent variable - the thing we change) and observing the effect it has on plant growth (the dependent variable - the thing we want to explain), we can come to some conclusion about a possible relationship between the two.

In **sociology**, for example:

By manipulating the factor of television images (the independent variable - the thing we change) - in this instance, exposing children to a series of violent programmes - and observing the effect it has on their subsequent behaviour (the dependent variable - the thing we want to explain), we can come to some conclusion about a possible relationship between the two.

d. Causality and Correlation

The concept of "**causality**" means, in basic terms, that two or more things are so **closely related** that when **one changes** the **other also changes** in some way; that is, one **causes** something to **change** in the other.

In the **plant growth example**, our experiments might lead us to the conclusion that **light causes plant growth**.

As you might expect, this is a **very powerful form of statement** to be able to make, mainly because it allows us to make **predictions** about **future behaviour**. In this example, we might be able to **predict** that plants deprived of light will die.

In the **sociology** example, if we were able to show that exposure to violent television images causes a behaviour change in young children, this will have **implications** for the way in which we expose young children to such images.

A **correlation**, on the other hand, is an observation that **two or more things occur at the same time**. In this respect, it is a much **weaker statement** to be able to make because:

- a. We don't know whether or not the two things occur at the same time because one has caused the other to occur.
- b. We don't know whether or not their appearance at the same time is simply accidental - a matter of chance.

For **example**, in 1989, the end of season **first-class cricket averages** for batting and bowling in England were as follows:

- The **top ten batsmen** all had names that were no longer than one syllable (Smith, Lamb, Jones and so forth).
- The **top ten bowlers**, on the other hand, all had names that were two or more syllables in length (Ambrose, Dilley, Foster and so forth).

In this respect, it would be useful to know if the above represented a causal relationship (in which case, each County team would know not to employ any batsman with a name more than one syllable in length, nor to employ any bowler whose name was less than two syllables long), or simply a **correlation** (a possible **chance occurrence**).

Question:

Can you think of any ways we could test the above in order to be able to say that the relationship was either a causal one, or simply a correlation?

This interesting (if rather silly) example of the **difference** between **causation and correlation** is **significant** in relation to **experimentation** in both the **Natural and Social sciences**.

One of the reasons why **Natural Science** represents such a **powerful source of knowledge** in our society is its ability to **identify causes** (and hence the ability to **predict future behaviour**). In this respect, a question that we have to address later in the course is that of whether or not sociology, for example, can be considered to be a science (and, in particular, whether or not it can be scientific in the same way that something like Chemistry can be considered to be scientific).

While I don't, for the moment, want to delve into this particular area, it is apparent that if we think about one important **dimension** of "a **science**" being the **ability** to **predict** what will happen on the basis of the **observation** of **past regularities** in behaviour, one reason for the **difference** between **Natural Sciences** and **Social Sciences** (in relation to their respective **abilities to predict behaviour**) is the fact that they deal with **different subject matters**.

In the **Natural Sciences**, the **object of study** (plants, electricity, the behaviour of atomic particles and so forth) **does not have consciousness** - in short, an atom is **not aware of it's own existence** and, therefore, can't chose to upset our carefully-prepared experiments by choosing not to behave in a particular way.

In the **Social Sciences**, however, we have to take into account the fact that our **object of study** (people) does have **consciousness** - people are **aware** of the world around them and can **act purposely** towards that world (if only to act in purposely unpredictable ways simply to mess-up your experiment. It's hard to believe that anyone would be so uncooperative, but that, as they say, is life...).

While this is not to say that sociology (or psychology come to that), cannot be **scientific in its approach** to the study of human behaviour, it should alert you to the idea that it's much **more difficult** to study people in the same way (that is, using similar methods of research) that Natural scientists are able to study rocks, plants and the effect of heat upon negatively charged particles in a vacuum (or "light", if you want to be sloppy about it).

Question:

The fact that people have consciousness might present problems in terms of the way we can study the social world. What problems might face the Social scientist (but not the Natural scientist) in this respect?

The following two exercises have been designed to introduce you to some of the basic principles (and difficulties) involved in the process of data collection, interpretation and explanation.

The **first** looks at the way in which this can be done in the **Natural Sciences**, while the **second** focuses upon an example from the **social world**. These exercises have been adapted (this is teacher-speak for "stolen" - next time you're caught red-handed stealing something, just tell the police your teacher said it wasn't really theft, but more a matter of adapting something for your purposes) from:

"Teaching Research Methods" by Roger Gomm ("Handbook For Sociology Teachers", by R.Gomm and P.McNeill (eds), 1982).

In order to conduct any kind of "experiment" (in effect, to change the relationship between a number of different variables), we need to go through the following basic thought process:

- a. **We need to collect data** (two examples of which are included below).
- b. We need to **look for correlations and possible causes**.
- c. We need to **construct an hypothesis** or several hypotheses in order to give us a basis for **testing**.
- d. We need to **test our hypothesis through experimentation**.

Exercise 1:

Look at the following data and then answer the questions below.

“Distribution of selected plant species and soil characteristics (pH). The figures refer to the number of quadrats (a square frame that is thrown onto the ground by a botanist to take a random sample of plant species) out of 100 in which the plant species were found”.

Soil Acidity (pH Value)	Number of Species A	Number of Species B	Number of Species C
3	5	50	70
7	27	47	50
9	63	58	0

Questions:

What is it possible to say about the relationship between plant species and pH value for each species a, b and c?

How could you check the suggestions you have made in answer to the above?

[Note: Question 5 illustrates point b above, while question 6 illustrates points c and d.]

Exercise 2:

For the second exercise, we need to see what happens when we apply the same principles to an analysis of a **social phenomenon (education)**.

Look at the following table and then answer the questions below.

Schools and Thefts (1960 and 1979)

School No.	Number of Thefts		Size of School			"Theft Rate"			
	1960	1979	1960	1979	Sex	Intake	History	1960	1979
1	1	16	650	800	Boys	Middle class	Ex-grammar	1.5	20
2	2	13	900	1300	Girls	Middle class	Ex-sec.mod.	2.2	10
3	1	4	800	700	Co-ed	Middle class	Ex-sec.mod.	1.25	5.7
4	2	6	600	600	Girls	Middle class	Ex-grammar	3.3	10
5	2	40	1200	1200	Boys	Working class	Ex-sec.mod.	1.6	33
6	0	32	1200	1300	Co-ed	Working class	Ex-sec.mod.	0	24.6
7	0	66	2000	2000	Boys	Working class	Ex-sec.mod.	0	33
8	2	9	600	450	Boys	Working class	Ex-sec.mod.	3.3	20
9	1	37	350	1500	Co-ed	Mixed	Ex-grammar	2.8	24.6
10	4	Not Stated	1400	1200	Co-ed	Middle class	Ex-grammar	2.8	n/a

Notes:

1. All of the sample were Comprehensive schools in 1979.

2. A "theft rate" represents the number of thefts per 1000 pupils in the school. This is calculated in the following way: $\frac{1000 \times \text{Number of thefts}}{\text{No. of pupils}}$

Questions:

What correlations can be made between theft rates and other school characteristics?

What explanations can you put forward to explain these correlations?

[Note: Question 7 illustrates point b above, while question 8 illustrates points c and d.]

We can use the last exercise to now do two things:

1. To illustrate some concepts outlined earlier in these Notes:

- a. **Correlation and causality.**
- b. **Dependent variable.**
- c. **Independent variable.**
- d. **Experimental Controls.**

2. To illustrate the way that the **social world differs** from the **natural world** - and the **methodological implications** this has for the way we can both **study** and generate **valid information** about each of these worlds.

Let's have a look at the first of the above ideas in more detail, using a specific example...

1. In the **exercise** you've just done, you will have identified at least one **correlation** between "theft" and "school characteristics"; in my case, the correlation I identified was between:

- a. An increase in theft rate and
- b. The difference between Comprehensive and non-Comprehensive school type.

2. I next need to see if the **correlation** I have identified is **possibly** a **causal** one, so I can turn my **correlation** into an **hypothesis** that can be **tested**, thus:

"Are children in Comprehensive schools are more-likely to commit theft than children in Secondary Modern / Grammar schools?"

While this is not the greatest hypothesis ever constructed (it doesn't, for example, attempt to test the possible causal factors relating to theft in different types of school - a "school" itself, for example, cannot cause someone to commit a crime), it will do for the purpose of our illustration.

3. The **dependent variable** here is "**theft rate**" (this is because it is the thing we want to explain).

The **independent variable** here is "**school type**" (we can **manipulate** this **variable** to see **how** the **dependent variable** is **changed**).

4. If the **relationship** between the **dependent** and **independent variables** is a **causal** one, we will see that **as the latter changes the former also changes**. We can **test** this by looking at the table to see if our **hypothesis** is **confirmed**.

5. When we analyse the **theft rate** for different **types of school** it seems to **confirm our hypothesis**; in every instance the theft rate for a Comprehensive school is greater than the theft rate for a Secondary Modern or Grammar school.

As I've noted, we could go on from this to do **further research** to try to discover exactly why this should be the case (that is, what **social factors** are present in Comprehensive schools - but not secondary modern or grammar schools - that might be the **cause** of an increased rate of theft).

Returning briefly to our initial statement about the "**thought process**" involved in the construction of an experiment, we can **summarise** this as follows:

- a. Data collection (this is contained in the table).
- b. There is a correlation between the dependent variable "theft rate" and my independent variable
- c. My hypothesis is: "**Are children in Comprehensive schools are more-likely to commit theft than children in Secondary Modern / Grammar schools?**"
- d. I have tested my hypothesis through further observation and conclude it is:
 1. Confirmed
 2. Not confirmed (or **falsified**)

As you may have noticed, the one concept that has not been mentioned thus far is that of "**experimental control**" and this is something that we have to consider in some detail because, as you will discover, it is **crucial** to the **experiment we've just done...**

In order to make sure that the relationship between our **dependent variable** and any **independent variables** we manipulate is a **causal** one, it is clear that we must make sure that **any changes to the dependent variable are the result of changes to the independent variable alone**. That is, the **dependent variable** must **not** be **changed (accidentally or deliberately)** by some **other factor**.

This is where the concept of "**control**" comes into play, since if we **neglect** to control for all possible variables in an experiment then it is evident that it will **not** be possible to say, with any degree of certainty, that a causal relationship exists between different variables.

We are going to look in some depth at this idea in relation to the exercise you've just done in a moment, but for now we can **illustrate** the concepts we've just used as they have been applied in a **real experiment (Elton Mayo's research at the Hawthorne Factory** in Chicago - you may remember this from an earlier set of Notes ("**Participant Observation**") when we used it as an example of the **observer effect**).

Using this piece of text, we can see how the various concepts noted above fit into the equation. **Comments** about these **concepts** are indicated by including them in **[square brackets]**

“Mayo was asked to conduct various experiments on a group of workers [the dependent variable] to allow the owners of the company to create the environmental conditions in their workplace that would get the highest level of productivity out of their employees.

[Mayo controlled the conditions under which his experiments took place in a number of ways, but for our purposes here we need only note that he introduced changes in working conditions on the same groups of people. Thus, in this sense, he was able to test whether or not the changes he introduced were the cause of changed behaviour by using a controlled group of people - if he had changed the groups, then any changes in behaviour might have been the result of changes within the group, rather than in the working conditions at the factory].

Mayo manipulated the conditions under which people worked by adjusting such factors as:

Levels of heating,
Levels of lighting,
Length of rest breaks and so forth.

[The above factors were considered to be independent variables in the study] Each time a particular environmental factor was changed [the independent variable], Mayo measured any resulting changes in worker productivity [the dependent variable] over time.

However, what Mayo discovered from this study was that, no-matter what the environmental conditions, worker productivity always seemed to increase...

At least two possible explanations could be used to account for this (Mayo actually considered five possible explanations):

1. Environmental conditions make little difference to the way people work.
2. The presence of the observer (and the knowledge that they were being watched) somehow changed the behaviour of the workers...”.

[These explanations were hypotheses - possible relationships between two or more things that can be tested. After testing the hypotheses in, Mayo concluded that his carefully-controlled study had over-looked a very significant independent variable - namely, the affect that the observer had on the behaviour of the people being studied].

In relation to the concepts of causality and correlation, Mayo’s observations suggest that there may be a possible causal relationship between productivity levels and the fact that you are being observed in your work. However, whether or not this is the case in all instances may be open to doubt - more research would be needed to test this possible relationship.

However, it is clear that we can say, in relation to the above, that there was a **“positive correlation”** between the presence of the observer and levels of productivity - that is, whenever an observer was present, worker productivity increased. Again, however, even this form of correlation has to be **tentative**, since we don't know whether this effect would continue over time.

For example, worker productivity may have increased because they felt the observer was “spying” on them on behalf of the owners of the company and that if they wanted to keep their jobs they needed to demonstrate they were working efficiently.

If the workers discovered this wasn't the case, then it's possible that productivity levels would return to the norm.

If, on the other hand, the workers discovered this was the case, then it is possible to suggest that they might have devised various strategies for coping with the fact of being closely observed (especially if they found it impossible / undesirable to work at an increased level of productivity...)"

This **example illustrates** the **crucial importance of the concept of “experimental control”** and we can **relate** this to our **education exercise** by noting the following:

When I suggested that there was a **clear and consistent relationship** between **“theft rate”** and **“Comprehensive schooling”** (such as to suggest some form of **causal** relationship) I **failed** to take account of a vitally important **experimental control**, namely the fact that **“theft”** is a **social category**; it is a **concept** that is **socially-constructed**. What this means is that we have to take account of three main things:

- a. How we **define** the concept of **“theft”**.
- b. How we **interpret** someone's **behaviour** as **“theft”**.
- c. How we **act** on both our **interpretation** and someone's **behaviour**.

In the “school thefts” example used, **Gomm's** explanation for the difference in “theft rates” is instructive here:

“The statistics for 1979 were collected on the instruction of the Director of Education after the issue of thefts in school was raised by the Conservative opposition members of the County Council who claimed that since the schools had gone comprehensive discipline has collapsed and theft, violence and abuse were rampant. In order to put this to the test the Labour-dominated Education Committee agreed that the schools should supply statistics of thefts occurring during school time, and that these would be collated and published by the Education Department...The statistics for 1960 refer to the number of thefts notified to the police by schools during that year”.

Clearly, an elementary form of **“experimental control”** in this respect would have been to ensure that we were **comparing “like with like”**. Whilst this clearly illustrates one of the many **problems** that we, as **sociologists**, have with the use of **experiments** (it is very **difficult to control all variables** in a situation where their definition may change over time, for example), we can **illustrate** this idea further by considering the following ideas.

In relation to the **exercises**, there are **two distinct conclusions** we can draw in terms of our ability to study the world sociologically:

- **Firstly**, one of the **problems** we must note is that the **social world** does **not** “**objectively exist**” in the **same way** that the **natural world objectively exists**.

In **Exercise 1**, **plant species simply reacted to soil conditions**; those that didn't like alkaline soil (soil with a high pH value) simply could not grow in it. This would be **true regardless of our desire to make such plants grow in alkaline soil**.

“**Theft**”, however, is a **socially created concept** and this means the **interpretation** of people's **behaviour** (whether or not we see behaviour as “theft”) is a highly **significant variable** in the experimental equation.

- **Secondly**, it may **not be possible to study** the **social world** in the same way, using the **same methods**, as it is **possible to study the natural world**. We may have to accept that because **people** have **consciousness** - they can **act** as well as **react** - we have to use **methods** that are **more-appropriate** to this situation. For this reason, it may be that a method that is highly productive in the natural sciences (experimentation) is **not** as useful in the social sciences.

We can **apply** the above ideas by looking at one of the thefts that appeared in the statistics for 1979.

Using the **example** of how **two different people interpret** the idea of “**theft amongst children**”, we should be able to see how the idea of the “**reality of a theft**” is one that is **socially constructed, not “objectively given**”. This should also tell you something about the difficulties involved in the study of social phenomena.

Account 1: The Headteacher of the school in which the theft was reported (school 5):

“**The theft of a bar of chocolate might seem like a rather trivial offence but we set high standards in this school and it is an indication of a lack of respect both for property and for school discipline which many of the children have. If you let such matters pass then it's like ignoring the early signs of woodworm, sooner or later the whole structure will collapse, so you can see that my staff and I always treat such matters seriously.**”

What we usually do, and what we did in this case, is make a note on the child's record card - quite openly, no secret about it, you know - we're not into that game - and to bring the child onto the stage at assembly and charge him with the offence in front of the whole school. In that way we use one child's misdeeds - and punishment - as a lesson to others”.

Account 2: The Headteacher of another school in the survey (school 3):

“In this school we are very careful how we treat, what shall we call it, ‘missing property’, because children don’t necessarily share adult views about ownership - I mean rulers and pencils and to a certain extent sweets are fair game, not quite, but almost common property and we find that with a little help the children are able to sort things out for themselves.

Personally I would never charge a child with theft in those sort of circumstances - cases would have to involve quite a long history of taking property and taking maliciously, before I would call it a ‘theft’. The two sorts of things to watch out for are children who take things because they’ve got personal problems and in those cases such children can’t really be blamed and they help rather than punishment, and on the other hand taking property as part of bullying - and we really put our foot down on that”.

B. The Principle of Experimentation.

Although there’s no specific, hard and fast, reason as to why sociologists do not use experimentation as a matter of course in their research, the exercises you’ve done in this area should have suggested to you a number of **reasons** as to why **experiments** are **not widely used**. Before we look at a specific example of the general type of experimentation that has been carried-out, however, it might be useful to **sum-up** some of the **main reasons** as to why this should be the case:

1. An artificial environment:

One of the problems we face, as sociologists, is that our subject matter (people) exists in an environment that is rich in influence and meaning. In this respect, if we are to carryout experimentation successfully we have to:

a. Ensure that we have **identified** and **experimentally controlled all** of the possible **influences** that exist upon people’s **behaviour**.

b. Ensure that the **meaning** we, as **sociologists**, attach to particular **socially-constructed categories** is **shared** by the people upon whom we experiment. We have already seen one example of this in the “school theft” exercise. Another example might be if we wanted to study the effect of prolonged exposure to violent television images upon young children. In this instance, we might construct the following type of experiment:

- Select two very similar groups of young children.
- Observe them, over a period of time, at play.
- Subject one group to prolonged exposure to various types of violent television programmes (the other becomes our control group - we use this group to check that any changes in the experimental group were not the result of chance, accident, or whatever).
- Observe both groups at play.

If we find that the group subjected to violent images becomes substantially more violent in their play, (considered in relation to their play before watching violence and in relation to the group not subjected to violent images), then it would be possible to suggest that, at the very least, there is a **strong correlation** between watching violent images and behaving violently...

Question:

What possible methodological problems can you identify in relation to the above experiment?

It is important to note that **experiments** are a very **powerful** form of research **method** in the **Natural Sciences** because:

- a. The **subject matter** of such sciences does **not** have **consciousness**. For example,, atoms are not aware of either themselves or the environment in which they exist. They are, in short, unable to affect the conditions under which research takes place.
- b. The “behaviour” of something that does not have consciousness (or “self awareness”) will be **predictable** because such things respond to the same form of stimulation in the same way every time. For example:

Whenever you heat water sufficiently, it will eventually boil (change from a liquid to a gas) because the behaviour of water depends totally upon the way in which you stimulate it.

- c. Because the behaviour of matter is based on a relatively simple form of stimulation and response (you heat water, therefore it starts to boil), it follows that it is relatively easy to:

1. **Control the environment** in which the experiment takes place and,
2. **Control the independent variables** used in the experiment.

The environment in which an experiment takes place is, of course, important for Natural Sciences (water “boils” at a different temperature at different pressures), but it’s easier to control this environment in the Natural Sciences than in the Social Sciences.

2. People have consciousness.

Experimentation in the social sciences is far more difficult, mainly because:

- a. **Human beings** have **consciousness**.
- b. The **social environment** is far **richer**, in terms of possible **influences** on behaviour, than the environment in which inert (non-conscious) matter exists.
- c. Considered in combination, the above means that it is far **more difficult** (if not impossible) for the Social Scientist to **control** for **all of the possible independent variables** that may affect human behaviour.

The significance of the above should be apparent in terms of using experimental methods within the social sciences, in that the subject matter of sociology, makes it very difficult to use experimentation with the same degree of **precision** and **certainty** that it can be used in the Natural Sciences. This, however, brings us to a further consideration, namely the extent to which it is **appropriate** to try to apply methods of data collection developed in one branch of science to another branch of science with a fundamentally different subject matter...

Whilst we will look at the question of whether or not sociology can be considered “scientific” at a later point in the course, it would be useful to make a few comments about this question in this context.

1. Although people have consciousness and interpret their world in various ways, it is clear that a great deal of human social behaviour is **roughly-predictable** and non-random (that is, people do not just behave in random ways - human behaviour has a **social context** in which our behaviour takes place in relation to the behaviour of other people and what they expect from us in any given social situation. People hold various values and obey certain norms, for example.).

In this respect we could note, for example, that people all over the world raise families, break laws, work, engage in sporting activities and so forth.

What this means, therefore, is that whilst we may not, as social scientists, be able to make the same kind of precisely-accurate statements about human behaviour that Natural scientists can make about non-human behaviour, we can, nevertheless, say something about the behaviour of people in social groups.

While Sociology may not be capable of attaining the degree of preciseness achievable in the Natural Sciences, it does not follow that sociological investigation is "non scientific".

2. The **perspective** that you adopt in relation to your study of the social world will, in some respect, affect both the way in which you see the world and, of course, the way in which you think it possible to study that world.

If, for example, your focus of **attention** is upon **large scale human interaction** (**Functionalism, Marxist and Weberian Conflict theory**), then you will be concerned to demonstrate the very **broad ways** in which human behaviour is:

- **Subject to social pressures.**

For example, as Marxism attempts to show, human behaviour (and changes therein) is broadly predictable if the focus of attention is upon large-scale economic changes rather than upon the way in which individual human beings react to social changes.

- **Non-random.**

As **Durkheim** attempted to show (with a large measure of success), the phenomenon of suicide is highly dependent upon changes in society. Rates of suicide are not the product of chance, but appear to change depending upon various social factors (levels of individual integration into society, for example).

- **Predictable.**

Again, in relation to suicide, whilst **Durkheim** could not show precisely why a particular individual chooses to commit suicide, he was able to identify particular social groups who are more "at risk" of committing suicide than others.

If, on the other hand, your focus of **attention** is upon **small scale human interaction** (**Interactionist** sociology), then you will be concerned to demonstrate the ways in which human behaviour is:

- a. Conditioned by the way in which we define a situation (and the expectations about behaviour that derives from such definitions).
- b. Played-out against a social background that involves concepts of power, authority and so forth.

All experiments - whether in the Natural or Social Sciences - begin with the same basic **assumption**: namely, that **every action has a cause**.

In the **Natural Sciences**, for example, we might want to know the cause of thunder and lightening, whilst in the Social Sciences we might want to know why children from particular ethnic groups do less well in school than children from other ethnic groups.

In trying to understand **causality**, therefore, we need to be able to **distinguish** between **behaviour** that **causes** something to happen and the **behaviour** that is **caused** by the former.

For **example**, if we observe that some groups of children do relatively badly at school, we are interested in explaining this fact - we want to know what is causing this to happen.

This would be the **dependent variable** in our experiment because it represents behaviour whose cause we want to explain (it is behaviour that is affected by the application of a causal variable).

Similarly, when we are initially looking around for possible causes of such behaviour (and we need to be aware that there may be **many potential causes**), we will be looking for **independent variables** - something that causes the dependent variable to change.

The distinction is, as I've tried to illustrate, important because:

- There will usually be only **one dependent variable** (the behaviour we want to explain).
- There may be **many independent variables**.

In this respect, to find the behaviour that causes something to happen we may have to manipulate each independent variable in turn to discover if the presence or absence of that variable has an effect upon the dependent variable.

As I've suggested, this process is part of our **experimental control** and it is the **systematic application of controls** that makes sociological experiments quite different from everyday occurrences. It might, perhaps, be expressed as the difference between **scientific knowledge** (ideas that we can demonstrate to be true on the basis of repeated evidence) and **commonsense knowledge** (ideas we believe to be true as an act of faith).

Let's now, to conclude this set of Notes, have a look at a piece of sociological research that involved experimentation ("Pygmalion In The Classroom" by **Rosenthal and Jacobson**) and we can begin by briefly analysing the way in which the researchers attempted to find the cause of a particular form of behaviour...

Rosenthal and Jacobson were interested in studying low educational achievement by Mexican children (an idea that we can link in with the concept of educational achievement generally)..

The **dependent variable**, in this respect, was the intellectual behaviour of these children. That is, they wanted to try and isolate the causes of under-achievement by these children.

The **independent variables**, as in most (all?) instances of human behaviour, were potentially many and varied. Rosenthal and Jacobson could have looked at such ideas as:

- Mexican children being innately less intelligent than their peers.
- Physical environmental factors (lighting, heating, possible overcrowding. etc.) having some unknown effect upon behaviour.
- Whether or not the teaching staff were competent, well- motivated and so forth.
- The home background of the children somehow affecting their behaviour, in short, any number of independent variables might have existed to cause the observed behaviour.

Rosenthal and Jacobson decided to test the proposition that some kind of **self-fulfilling prophecy** was involved. This idea, in effect, became an **hypothesis** that they wanted to test.

Having chosen to test this idea, the independent variable in their research became the behaviour of the children's teachers.

In order to test their hypothesis they had to manipulate the independent variable and in this instance, they manipulated the variable (the behaviour of teachers in terms of their expectations about the children's intellectual ability) by posing as psychologists who could, on the basis of a sophisticated IQ test, identify children who would in the future display "dramatic intellectual growth".

By introducing a relatively controlled element into the classroom interaction between teachers and pupils, Rosenthal and Jacobson were able to test their hypothesis and demonstrate that the expectations held by teachers about their pupils was a significant factor in the intellectual development (or lack of same) of those pupils.

Summary

1. Experiments are a common, very powerful, method of research in the Natural sciences.
2. Ethical, practical and methodological problems make experiments like those conducted in the Natural sciences less common in sociological research.
3. Experiments in the Natural sciences are a major method of research because scientists can have complete control over both the conditions under which an experiment takes place and all of the possible variables that are being tested. In sociology, this is not possible for:
 - a. Ethical reasons (we cannot force people to participate in an experiment, for example).
 - b. Methodological reasons (will people behave “normally” under laboratory conditions, for example?).
4. One of the main problems with experiments is the fact that people have consciousness. This means that they can participate actively in an experiment in a way that non-conscious matter cannot.
5. The large number of possible variables involved in any form of sociological experiment means that:
 - a. It is difficult to establish exact causal relationships.
 - b. It is difficult to accurately repeat an experiment for the purpose of verifying data.
6. All experiments involve the manipulation of independent variables in order to measure the effect upon a dependent variable.
7. A causal statement is a much stronger (that, more valid) form of statement than a correlation (which may be the result of chance).
8. A major problem with sociological experiments is that of the difficulty involved in the standardization of the conditions / environment under which an experiment takes place.
9. It is possible to conduct “natural experiments” using a comparative methodology. For example, to study family life in different societies and to compare the similarities and differences.

Examination Questions.

1. Explain why it is important to have a control group when conducting an experiment (2 marks).
2. Drawing on the material below and elsewhere, assess the view that experiments like that described are neither possible nor desirable in the study of human beings (12 marks).
3. Identify one dependent variable and one independent variable in the above passage (3 marks).
4. Explain, using an example of each, the difference between causality and correlation (5 marks).

Suggested Answers

Question 1:

- a. A control group is used for comparative purposes in an experiment. Two groups with identical social characteristics are assembled. The experimental group are the people who will be experimented upon whilst the control group is not subjected to any experimentation. At the end of the experiment the two groups can then be compared to see if changes in the experimental group are mirrored in the control group. If the two groups are different in some respect this helps the researcher to hypothesize that such differences were caused by some aspect of their experiment.
- b. A control group represents one way of trying to verify that the changes introduced into an experimental group were significant (not the result of chance, for example). "Verification", therefore, simply means the attempt to check the reliability and validity of data in some way (usually - but not necessarily - by repeating a piece of research to see if the same results are gained).

Question 2:

Mainly because the more times you do an experiment and achieve the same results the more-likely it becomes that your results are not the outcome of accident, chance, or whatever.

Question 3:

One way to test the relationship might be to repeat or "replicate" the observation. For example, we could wait until the end of the next first class cricket season and see if the same thing happened. If it did, then it might strengthen our suspicion that a person's name was a causal factor in their respective ability to play first class cricket and if it didn't, then we would know that it was simply a coincidence that this happened.

The main reason for being able to test our observation in this way is the fact that if, under certain conditions, something causes something else to happen, it will always cause it to happen under those conditions.

Question 4:

Various potential problems could be noted, along the lines of:

- a. Ethical - people cannot be forced to do things against their will, for example.
- b. Practical - people may not want to co-operate. Additionally, it may not be physically possible, for various reasons, to conduct an experiment on a large group of people.
- c. Methodological - people can influence the outcome of an experiment by their conscious involvement; people are able to act consciously as well as simply react to certain events. Additionally, it is impossible to create absolutely identical control and experimental groups.

Question 5:

- a. There is a clear correlation between pH value and plant species.
- b. There is a possible (probable?) causal relationship between pH value and plant species.

Question 6:

One obvious way would be to repeat the experiment using different quadrats. Alternatively, you could attempt to grow species C in soil with a high pH value.

Question 7:

Various correlations exist, such as there being a greater level of theft at Comprehensive schools. Boys appear to have a higher theft rate than girls and working class children have a higher theft rate than middle class children.

Question 8:

There are a number of fairly obvious theories -

That boys are more criminally inclined than girls.

Social and educational changes between 1960 and 1979 have resulted in weaker controls on the behaviour of children.

The working class are more criminally inclined than the middle class (you could apply some form of "deprivation theory" here).

Less obvious - but probably more valid - theories include -

The fact that the definition of crime may have changed over time.

The rules regarding the reporting of "theft" may have been tightened-up (the most probable explanation in this context).

Question 9:

The problems involved in the above would be many and varied, of course, ranging from how we define "violence", through such problems as what type of violence (cartoons, war films, film of real-life violence, sporting violence and so forth), whether the images used should involve "pretend" violence, "real" violence and the like, to questions of whether possible behaviour changes are short-term or long-term.

In addition, we would have to take into account the fact that the way in which young children "watch television" may be very different to the way in which we make them watch television in the artificial environment created for our experiment (in their real lives, the children would be unlikely to be exposed to a constant diet of violence, watching television may take place in a social context where adults are present, children may "watch television" whilst doing other things and so forth).