

“A” Level Sociology

A Resource-Based Learning Approach

Module One: Theory and Methods

Unit M10: Defining Science

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

"Examine the nature of 'science' and consider the extent to which sociology may be regarded as scientific".

The Aims of these Notes are to allow you understand:

1. The relationship between sociological perspective, methodology and methods.
2. The definition of "science".
3. The concept of a "scientific ethos".

The Objectives of these Notes are to allow you understand:

1. The concept of methodology and its relationship to methods.
2. The concept of a "scientific methodology" as compared with, for example, a "religious methodology".
3. The social context in which "doing scientific research" takes place.

Introduction

In these Notes we are going to begin to explore the "**theory**" aspect of the "**Theory and Methods**" section of the AEB syllabus in more detail. Whilst we have spent some time looking at both the various **methods** used in sociological research and some "**theoretical aspects**" of that research (such as **concepts** of **reliability** and **validity**), we need now to turn towards a deeper consideration of the **relationship between theory and method within sociology**.

In these Notes, therefore, we are going to initially focus on the concept of "**methodology**" and, in so doing, examine two basic ideas:

1. Firstly, how different sociologists have attempted to study the social world and, in particular, the principles of investigation they have used to guide their research.
2. Secondly, the question of whether or not **sociology** can be considered a "**science**". In this respect we will be examining the **nature** and **status** of the **knowledge** that sociologists (as social scientists) produce about the social world.

As you might expect, questions relating to such ideas as theory, methodology and the status of knowledge are necessarily **complex** (mainly because they tend to be fairly **abstract** ideas) and we need to be reasonably **clear** and precise about their **meaning** if we are to adequately understand both the nature of sociological thought and the knowledge that is produced by different sociologists.

I want to begin, therefore, by trying to **define** the **concept** of **methodology**. Once we understand this idea and its significance in relation to the kind of knowledge we can produce - and the kind of statements we can make - about the social world we can then turn towards an examination of the question "Is Sociology a Science?".

The Concept of Methodology.

Like a number of concepts in sociology (or the social sciences in general come to that), the concept of methodology tends, on occasions, to be used in fairly loose, imprecise, fashion (especially when it is confused with the concept of "methods").

However, in basic terms, **methodology** refers to the **logical principles** we **adopt** when **considering** which **methods** to use in our study of the social world. In this respect,

- a. "**Methods**" of social research refers to the actual **tools** we use to conduct our research (**questionnaires, interviews, participant observation, comparative methods** and the like).
- b. "**Methodology**", on the other hand, is concerned with two main ideas:
 1. Firstly, what **methods** can the sociologist **legitimately** use to **discover / produce knowledge** about the social world?
 2. Secondly, how **valid** is the **knowledge** produced by the use of different **methods**?

As I've just noted, the **first** of these questions is rather academic here, since we have already looked at various **methods of sociological research** (both in terms of

what they involve and, most importantly, in relation to questions of reliability and validity - two concepts that are related to methodology).

However, the **second** of these questions is important here, since by answering it we should be able to arrive at an understanding of the way **different methods** of research come to be **associated** with **different methodologies**.

As I've suggested, one of the easiest ways of coming to terms with the concept of methodology is to think in terms of **validity** ("how accurate a picture of social reality is produced by the application of various methods of research to the social world?").

We can **illustrate** this idea by referring to something with which we are already familiar, namely **different sociological perspectives** (and for the sake of illustration, we can restrict ourselves to looking at "Structuralist" and "Interactionist" perspectives).

- Sociologists who adopt a **Structuralist perspective** (such as Functionalism, Marxism and so forth) do so because they want to **focus** their attention on **institutional relationships** - in simple terms, this can be expressed by the idea that the relationships people form in their lives take-on an "external" appearance - that is, these **relationships** are **experienced** by people as **pressures / constraints** on their behaviour.

For **example**, when you choose to take on the role of a student in College you take-on certain responsibilities and routines (attending lectures and tutorials, doing homework, sitting exams and the like). These responsibilities act as constraints on your behaviour and, in very basic terms, you cannot take-on the role of a student if you do not agree to do the type of things I've just noted.

Structuralist sociologists, therefore, are interested in the "**structural relationships**" that condition the way people behave and, in this respect, such sociologists are **not particularly interested** in what you, as a student, may **feel** about your education (for example, whether or not you think that a "student" should be made to do the above things). A **Structuralist**, therefore, is concerned with an understanding of the "**big picture**" - questions such as **why societies develop family groups, what purpose is served by the development of an education system** and the like.

If we think about this in **methodological terms**, such a sociologist will attempt to produce **valid knowledge**, about "education" for example, by using **methods** that attempt to **explore the nature and extent of social pressures** that act upon the individual. In this respect, he / she might want to investigate the nature of socialisation processes in a society, since it would be evident that some form of socialisation process is instrumental in "causing" people to go to school or making them want to be a "student".

In these terms, "**individual behaviour**" would show a great deal of **regularity** (for example, the number of people having or wanting to take-on the role of student). For a **Structuralist**, "individual behaviour" would effectively be seen in terms of the way **people are shaped and moulded** until they become a **product of their socialisation**.

If you see human behaviour in these terms then:

- a. **Valid knowledge** about the social world can only be **produced** by **understanding** the **objective features** present in any socialisation process.
- b. Knowledge produced by a sociologist attempting to understand "how an individual feels", for example, would **not** (methodologically) be considered to be **valid** since it relies upon the **subjective interpretation** of both the individual and / or the sociologist.

To put this another way, Structuralist sociologists tend to be concerned with an understanding of the social world "as it is", rather than how we, as individuals, might think that it is or, indeed, how we might like it to be.

If, for example, you want to be a student then you must **conform** to the rules of the institution that defines the concept "student" - you might not like the rules, you might think they are ridiculous and unfair - but what matters is that they exist (and it is understanding **why they exist** that is of interest to Structuralist sociologists).

For a sociologist who adopts an **Interactionist perspective**, on the other hand, the **methodological focus** is effectively **reversed**.

Question:

If valid knowledge can, according to Interactionists, only be created through the subjective interpretations of the individual going about their daily life, what research methods might Interactionists favour (and why)?

In relation to the above, we have seen that:

- a. **Methodological questions guide** us in relation to our **choice of methods** of research. This is true to the extent that if you believe a particular method is unlikely to produce what you would term valid knowledge, then you are hardly likely to use it in your research...
- b. Our sociological perspective (the way in which we "see" the social world) is related to:
 - **Methodology**, which in turn is **related** to the
 - **Method(s)** you see as appropriate for the task of producing valid knowledge.

In the above we have looked very briefly, by way of an **initial introduction**, at some aspects of the concept of sociological methodology. Before we start to examine questions of methodology in more detail, however, it might be useful, at this point, to refer to the **AEB syllabus** where you will find the instruction to:

"Examine the nature of science and consider the extent to which sociology may be considered as scientific".

In terms of the above, it is evident that we have got to do two things:

- a. To examine the question "**What is science**".
- b. To examine the question "**Is sociology a science?**".

In relation to the **first** of these questions, we can organize this section Notes into **three main areas**:

- **Firstly**, an outline of the "**criteria**" of a science. That is, we need to look at the **generally-accepted ideas** in our society about **what** the concept of "**science**" involves.
- **Secondly**, we need to understand the **social context** in which "**scientific knowledge**" is produced. In this respect, we need to understand something about how a **scientific community is organised** (how scientists are expected to behave in relation to both other scientists and, most importantly, in relation to the generation and dissemination of knowledge, for example).
- **Finally**, we need to explore the concept of a "**scientific methodology**" (and its relationship to methods) as a prelude to looking in greater detail at various sociological (or "social scientific") methodologies.

What is Science?

Whether we are aware of it or not, we all carry around with us some sort of **conception of science** - mainly because we live in a society in which "science" has come to play such an important part.

We can illustrate this "taken-for-granted" view about science in the following way:

Make a brief list of the kind of ideas that you associate with "science":

For example: It deals with "facts", rather than "opinions".

While we may have a "**commonsense**" view about science, it would be useful to look initially at a couple of more precise **definitions**...

Giddens ("Sociology", 1989) notes that:

"Science is the use of systematic methods of investigation, theoretical thinking and the logical assessment of arguments, to develop a body of knowledge about a particular subject-matter.

Scientific work depends upon a mixture of boldly innovative thought and the careful marshalling of evidence to support or falsify [refute] hypotheses and theories.

Information and insights accumulated through scientific study and debate are always to some degree tentative - open to being revised, or even completely discarded, in the light of new evidence or arguments."

Question:

What does Giddens mean by "systematic methods of investigation"?

This very general outline of "science" can be augmented by looking more-specifically at what does and does not constitute a "scientific methodology".

The unfortunately named Jack **Nobbs** ("Sociology In Context", 1983) argues that some of the "**generally accepted criteria of a science**" are:

1. Scientific methods are employed. In this respect:

- **Empirical evidence is gained from observation.**
 - (McNeill ("Research Methods", 1985) notes that "**empirical**" means,

"Based upon evidence from the real world [facts], as opposed to theoretical knowledge that refers to ideas that are abstract or purely analytical".

"Analytical" sciences, such as mathematics, evaluate knowledge in terms of arguments or categories that are predefined - for example, the argument that " $2 + 2 = 4$ " is true for all time (it cannot be refuted) because an analytical science sets-out the initial conditions under which both the argument and the proof of that argument can be stated.

- **Data is collected and collated** ("collation" means the way in which data is related to other data).
- **Facts are presented statistically** (in essence, this involves the idea that data can be **quantified**).
- **Experimentation and research are used** in an attempt to add to knowledge.

2. Theories are proposed and hypotheses tested to try to establish generalizations or laws.

3. Attempts are made to refute hypotheses; consequently scientific laws may be amended and given greater validity.

4. As scientific laws have a universal application, they form the basis of accurate predictions.

5. The subject matter is capable of clear-cut and useful classification (for example, botany / chemistry).

6. That science becomes increasingly esoteric; that is, it is difficult to express many of its ideas in layman's terms, so a specialized language is developed.

7. A science has its own specialized subject area and operates within a paradigm or "ideological framework" (that is, explanatory models made-up of a set of related concepts, theories, hypotheses, laws and methods of inquiry).

8. A science must be objective and value-free; its practitioners study things as they exist and are not concerned with how they ought to be.

On the basis of the above, therefore, we can conclude that "**science**" involves:

1. A recognisable **methodology** based upon the **identification, collection and elaboration of factual evidence.**

2. A **theoretical rationale** that **tells scientists how** to go about the task of "doing science".
3. The **development of laws or "law-like" statements** about the world.
4. A **clear separation between "facts"** (descriptions / explanations of the world "as it is") and "**values**" (opinions as to what we would like the world to be).

Question:

Considering the above, why do you think it might be important, to sociologists, for Sociology to be considered a "science"?

Two related reasons spring immediately to mind in relation to the above question:

- **Firstly**, it is clearly important that **sociologists** lay claim to having some form of **specialised knowledge** about the nature of the social world.

In order for the observations of sociologists are taken seriously (treated as **valid knowledge**), it clearly matters that such **observations** are **based** upon some form of "**scientific methodology**". This follows because of the **status** of such knowledge;

If the observations of **sociologists** were **no-more valid** than the observations of **non-sociologists** (such as my uncle Bert), then sociology, as a subject, would effectively cease to exist.

This is something you might like to consider in terms of **post-modernist** views about the status of different forms of knowledge.

- **Secondly**, related to the status of knowledge in society is the question of the **status of sociologists**. In our society, "**scientific knowledge**" represents the **highest form of knowledge** possible - it is knowledge that (however unpalatable it may be) is objective.

Scientific knowledge has proven worth - or, as **Keat and Urry** ("Social Theory as Science", 1975) have put it, scientific knowledge has "instrumental utility" (in other words, it works and can be shown to consistently work...) and, as social scientists, **sociologists aspire to this kind of social status** (you didn't think we were only in it for the money, did you?).

Question:

Considering the above, what reasons can you suggest to explain why it might be important to sociologists for Sociology to be considered "a science"?

The Social Context of Science.

Thus far, we have considered **science** in terms of its "**theoretical characteristics**" - that is, the **principles** involved in "**doing science**". However, it should be evident that, for sociologists, the **process** of "**doing science**" is also a **social** one, in that:

1. The **principles** of a **scientific methodology** have to be **elaborated** and **reproduced** in a **social context**.

That is, a **scientific methodology** has to be **created** by its **practitioners** and, most importantly, **policed** to ensure that "non-science" is not passed-off as "science".

2. The **practitioners** of a **scientific methodology** have to try to ensure that the **consumers** of **scientific knowledge** recognise the **objective status** of the **knowledge** produced.

Again, this involves an **implicitly political process** whereby **objective knowledge** can be **validated** and **subjective knowledge** **invalidated**.

In this respect, in order to understand the concept of science, we have to understand what **Merton** ("Science and Technology in a Democratic Order", 1942) calls the "**scientific ethos**".

For **Merton**, the development of a **scientific ethos** (defined in terms of a number of general conditions that science must satisfy if it is to attain and maintain its scientific status) was seen as an **institutional imperative**:

That is, it represented a **set of basic conditions** that needed to be **satisfied** if **scientific knowledge** was to be considered as **objective** - as opposed to subjective or "ideological" - knowledge.

Glover and Strawbridge (The Sociology of Knowledge", 1985) explain Merton's conception of a scientific ethos in the following terms:

"Merton viewed it as being composed of a set of norms, values and rules which are legitimised by the scientific institution. They are held to be binding and scientists are emotionally as well as rationally committed to them. The ethos of science is functional in that it serves the goal of the scientific institution. That goal is to add to and develop the body of tried and tested knowledge. However, the values and norms are felt to be binding not simply because they are functional but because they are right and good: they have a moral force."

For **Merton**, therefore, a **scientific ethos** was necessary ("**functional**") because it represented a **set of institutionalised norms** that **defined** the overall nature of "**proper**" **scientific enquiry** (it enabled scientists to **organize** and **define** legitimate scientific knowledge). In this respect, it was **functional**:

1. For the **practitioners** of science, because it created the **institutional framework** whereby the work of **individual scientists** could be **evaluated** and **legitimated** in **accordance** with a **general set of guiding principles**.

In this respect, the **institutional imperatives** of a scientific ethos served to **protect the status** of scientists, as a community, from outside charges of subjectivity.

2. For **society** as a whole, because **scientific knowledge** (and the uses to which it could be put) represented a form of knowledge that had been **rigorously tried and tested** before it was presented to society as an objective form of knowledge.

Thus, the **status of scientists** could be **maintained**, whilst **society** as a whole could be **protected** from the work of "**pseudo-scientists**" (people who presented their work as "objective" without satisfying any of the conditions required by "real science").

Questions:

Before we look at Merton's definition of a "scientific ethos", consider the following:

- a. **What might be the main benefits, to scientists, of the adoption of a scientific ethos"?**
- b. **What might be the main benefits, to society as a whole, of the existence of a scientific ethos?**

The Scientific Ethos.

For Merton, a "scientific ethos" consisted of four major concepts:

1. Universalism:

The argument here is that the **scientific community** must **evaluate knowledge** purely on the basis of **objective, universally-agreed, criteria**. **Values** - either those of the scientific community or society - can **play no part** in the evaluation of knowledge.

Thus, **criticism** of a **scientist's work** must involve the **attempt to refute** his / her **methods, conclusions** and so forth. The **personal characteristics** of the scientist (gender, nationality, class etc.) can have **no bearing** on the **truth or falsity of their work**.

2. Communalism:

Scientific knowledge is "**public knowledge**" and, in this sense, **science** is seen to **progress** or develop on the basis that **knowledge is shared**, in some way, within the scientific community. Scientists must have **free access** to each other's work in order to **replicate, evaluate** and **criticise** such work.

3. Disinterestedness:

The basic idea here is that **knowledge is pursued purely for its own sake** and the **primary responsibility of the scientist** is the **pursuit of knowledge**, not personal advancement, status, rewards and so forth.

4. Organised Scepticism:

One of the guiding principles of science is that **no form of knowledge is beyond criticism**. No scientific theory, therefore, can ever be considered totally "**true**". The most we can ever say is that it has **not been refuted (shown to be false)**. This is important because:

a. It means that the scientific community continuously subjects knowledge to **critical evaluation** (rather than simply taking it for granted) and, in this way, contributes to the development of human knowledge.

b. **No form of knowledge can ever be considered as inherently true** (that is, an article of **faith**). In this respect, **scientific truth** differs from **religious truth** in that the **former** is only "**true**" on the basis that it has **not, as yet, been disproved**, whilst the **latter** is considered, by its adherents, to be **true for all time (it cannot be refuted)**.

As we have just seen, the "**social context of science**" relates not only to the fact that scientific research takes place in the "real world", but also to the fact that we can - indeed must - locate scientific research within a socially-organised "scientific community".

- The **scientific ethos** identified by **Merton** enables us to understand the way **scientific research** is both **organised** and **validated** by reference to a specific **set of institutionalised norms and values** concerning **what does and does not constitute science**.

This is an idea that will be investigated in greater depth when we look at the question of "**how scientific is science?**" (since, as with all sociological analysis we must consider the question of the degree to which the claims put forward by scientists regarding their methodology are actually put into practice).

Merton's conception of a **scientific ethos** does, as you might expect, have its **critics** - and we will look briefly at such criticisms in a moment. However, this conception does allow us to identify the **difference** between **scientific** and **other forms of belief** (such as that of **religion**), namely, that **scientific** modes of thought involve some degree of "**organised scepticism**" whilst religious modes of thought, ultimately, do not.

Methods and Methodology.

The relationship between scientific and religious forms of belief demonstrates both a **fundamental difference** between the concepts of **methods** of research and **methodology** and a **fundamental difference** between **science** and **religion**. In this sense, a fundamental attribute of **science** is that it **is more than a method of research** (a set of instructions that one follows in "doing science").

In this respect, **science** needs to be seen as a **complete system of thought** (a **methodology**) involving, as we have seen:

1. A **set of structured imperatives** concerning the **nature of scientific forms of enquiry**.
2. A **set of methods** that one adopts in carrying-out scientific research.

In this respect, we **cannot separate scientific methods from scientific methodology**, since the one presupposes the other. As an example of this idea, we can look at the way in which some **religious sects** have attempted to use "**scientific methods**" to support their claim to **religious truth**.

In the **1992 General Election in Britain**, the "**Natural Law**" Party stood for election on the basis that the **religious teachings** of the Maharishi Mahesh Yogi were supported by **scientific principles**. The Natural Law Party argued that:

1. The Constitution of the Universe is governed by certain fundamental organizational principles (the Laws of Nature).
2. Science has attempted, with some success, to identify these "natural laws" ("The Laws of Nature which maintain the orderly universe, from the blossoming of the rose, to the earth moving around the sun, to the galaxies moving in empty space").
3. Through **Transcendental Meditation** the individual can **attune** themselves to these Laws and, by so doing, understand the organizational principles of Nature. In this way, the world can be governed in accord with the laws of nature and peace, harmony and prosperity will naturally follow...

Note: If you're interested, this form of religion is known as "**Deism**" - in simple terms, the idea that God created the world in a complete form, but does not intervene in the way people behave in that world. This philosophy was popular in the 17th and 18th centuries when scientific principles were first being elaborated in Western Europe - and, by extension, first began to systematically challenge the power of organised religion as the sole "explainers of the world". If you're not interested, I would ignore the paragraph you've just read...

If we **assume, for the sake of argument**, that the **Natural Law Party** is **correct** - that their beliefs about the Laws governing the universe are supported by scientific principles - it still **does not follow** that such **beliefs** are either "**true**" or **valid**. This follows because, as Merton argues:

Science does not allow us to admit the possibility that something is true - only that it is not false (that is, it has not, as yet, been falsified).

Religion, by its very nature, seeks to uncover a fundamental Truth - namely that the universe was created by God, or that it is organised according to some form of "natural" Law.

The **difference** between the two modes of thought is that whilst the **former** is **organised** around the **principle** that **no form of knowledge is inherently true**, the **latter** (where it seeks to use scientific methods), argues that it is **possible** to uncover **fundamental truths** about the world, the universe, "human nature" or whatever.

Question

On the basis of the above, why do you think a religious sect might want to argue that its beliefs are supported by scientific principles?

In the above respect, the work of **Sir Karl Popper** ("The Logic of Scientific Discovery", 1934; "Conjectures and Refutations", 1963), has been influential in the area of scientific methodology. **Popper** has argued that **no form of scientific knowledge can ever be considered to be absolute** - we can, in short, **never be certain** that a **theory is true** - only that it is not, as yet, "**not false**".

In these terms, the **best** we can ever say is that the extent of our knowledge about the world can only be measured in terms of the extent to which a theory has withstood the **test of refutation**. That is, its **robustness** in terms of being able to withstand the attempts of other scientists to show the theory to be false.

Thus far we have looked at the question of "**what is science?**" and arrived at the idea that it involves both a **set of organizational norms and values** (a **methodology**) and a **set of methods** followed by people who practice science.

In this respect, a scientific mode of thought and practice differs fundamentally from a religious mode of thought on the basis of its methodological principles.

Having outlined a **conception of science**, therefore, the **next step** is to look at the question of whether or not **sociology** can be considered to be **scientific**. Before we do this however, it might be useful for you to consider the extent to which you believe that sociology can be a science.

Questions:

- 1. Using Merton's concept of a "scientific ethos", to what extent does sociology conform to the principles involved in such an ethos?**
- 2. In what ways might the study of the social world differ from the study of the natural world?**

For example: What difficulties for the social scientist might be presented, by the subject matter of sociology, that are not encountered by the natural scientist?

Summary

1. Methodology refers to the logic that underpins the use of particular methods of data collection.
2. Methodology is primarily concerned with questions of validity in relation to the production of knowledge about the world.
3. Sociological perspectives are related to the choice of sociological methodologies.
4. "Science" is not a body of knowledge, but rather a set of principles that tells us how to go about the task of producing valid knowledge.
5. Science involves the attempt to discover and / or define valid knowledge.
6. A "scientific ethos" is a set of values, norms and rules governing the conduct of scientists and the production of valid knowledge.
7. For Merton, a scientific ethos is considered to be functional for both individual scientists and society as a whole (albeit in slightly different ways).
8. A basic principle of a scientific methodology is that no form of knowledge is inherently true. Science can be separated from other forms of ideology on this basis.
9. According to Popper, no theory is ever true - the most anyone can claim is that it has not, as yet, been shown to be false.

Examination Questions.

1. Outline the way in which a sociologist's choice of methodology might affect their choice of methods (8 marks).
2. What is meant by the idea of a "scientific ethos"? (3 marks).
3. Explain the statement: "Scientific knowledge is never true for all time. It is simply knowledge that has not, as yet, been shown to be false. In this respect, scientific knowledge is more-plausible than any other forms of knowledge about the world" (12 marks).
4. "Science is an ideology and, as such, is little different to any other form of ideology". Evaluate this claim (25 marks).