

“A” Level Sociology

A Resource-Based Learning Approach

Module One: Theory and Methods

Unit M12a: Is Science Scientific(1)?

These Notes are 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 help you understand:

1. The relationship between theory and practice in the Natural sciences.
2. The social context of science.

The Objectives of these Notes are to help you understand:

1. The broad relationship between social structure and social action as this relates to sociological methodology.
2. The "idealised" relationship between Structuralist perspectives / positivist methodology and Interactionist perspectives / Interpretivist methodology.
3. The fundamental theoretical principles of positivist, Interpretivist and Realist methodologies.
4. The difference between reconstructed logics and logics-in-use.
5. The relationship between theory and observation.
6. The relationship between science and values,

Introduction

In this set of Teachers' Notes we're going to look at a number of **questions** and **controversies** surrounding the **theory and practice** of **(Natural) science**. In order to do this, we can organise our approach around **three main sections**:

- The **relationship** between a **scientific methodology** (in this instance, "**Positivism**") and the **practice of science** in the "real world" of everyday research practice.
- The **relationship** between the **social context** in which "**science**" is **practiced** and **questions of objectivity, subjectivity and value-freedom**. This section will be a useful introduction to the final set of **Notes** in the "**Theory and Methods**" section of the course ("**Objectivity, Subjectivity and Value-Freedom**", since you ask).
- The **relationship** between **Natural science** and "**sociological science**", considered in terms of a **Realist conception of science** that transcends the rather sterile debate between "positivist" and "anti-positivist" methodologies.

We can begin by noting what **O'Donnell** ("A New Introduction To Sociology") has termed the way the **Natural sciences** are regarded as a kind of "**absolute standard**" against which to **measure** the **claims of Sociology** (or indeed **any social science**) to be "**scientific**". In this respect, the "**scientific methodology**" practiced within the **Natural sciences** is **commonly held** to be the **ideal** against which all other claims to "science" have to be **measured**. Two points are worthy of note here:

1. The concept of "**science**" (in the sense we are using it here) is an "**ideal**" insofar as it **represents** the **pursuit** and / or **achievement** of **reliable, valid and verifiable knowledge** about the world. "**Science**", therefore, is **not**:

- a. **Knowledge itself** (no form of knowledge is inherently scientific).
- b. **Any one particular methodology** (there are a number of different methodologies which could be considered "scientific").
- c. **A particular method (or methods) of research** ("experimentation", for example, whilst widely used in the Natural sciences is not, in itself, "scientific").

2. The methodology we adopt as the "best means" of producing valid knowledge is **not the preserve** of any one branch of science or any one particular subject area.

In this respect, the **methodology** we adopt always has an **ideological dimension**. That is, we are aware that there are a number of different, competing, methodologies available to us and our choice of which to employ is based upon beliefs about the nature of the knowledge each is able to help us produce.

We will develop this in more detail in the second section of these Notes, but for now it might be useful to look at **one particular ideological dimension of methodology**, that of the relationship between what people say they do and what they may actually do when they attempt to produce "scientific" knowledge.

How Scientific are the Natural Sciences?

Thus far in this particular section of the course we've focused our attention on two main questions:

1. What do we mean by "science"?

We have considered this in relation to both a **Natural scientific methodology** and the concept of a **scientific ethos**.

2. Is Sociology a science?

We have considered this in terms of both the attempt to **apply a Natural scientific methodology** in the **social sciences** and the question of whether or not the **subject matter of Sociology** is amenable to study using this form of methodology.

If you have not looked at **previous Notes** in this series on sociological theory / methodology - or if you simply want to **refresh your memory** - we can summarise the main ideas involved in the above in the following way:

Debate within **Sociology** has tended to polarize around the question of **whether or not Sociology can** - or indeed **should** - attempt to **follow the methodology of the Natural sciences**. This "debate" (at least in Sociology textbooks) is normally seen to take the following form:

1. **Positivist Sociologists**, on the one hand, tend to **stress** the general **similarities** between the **natural and social worlds**. In this respect, various "**laws**" governing basic social development exist "out there - somewhere" waiting to be **discovered**, just as such laws governing behaviour in the natural world can be discovered (laws of motion, attraction and so forth).

2. **Interpretivists**, on the other hand, tend to **stress** the **differences** between the **natural and social worlds** - between People (that is, conscious beings) and Matter (non-conscious things).

Question:

Why is the fact that people have consciousness significant for an Interpretivist methodology?

In the above respect, a **fundamental question** tends to be the extent to which it is **appropriate** to use a "**Natural scientific**" **methodology** (designed specifically to study unthinking matter) in the **Social Sciences** (where, by definition, the subject matter has consciousness).

For **Sociologists** who adopt a **positivist methodology** (that is, the methodology employed by Natural scientists), the question of "**human consciousness**" is seen to be largely **irrelevant**, in methodological terms, for two main reasons:

- **Firstly**, although **human beings** are clearly **conscious of their environment** (both natural and social), **people do not behave in random ways**. That is, **social behaviour** (behaviour that takes note of and is directed towards others) is **patterned** in various ways. We can, for example, note **patterns of family life, suicide, crime, work, education** and the like. All human social behaviour involves these patterns since, if it did not, social behaviour would not be possible (since people would be behaving in totally random, unpredictable, ways).

The existence of **patterns** of behaviour **suggests** that, logically, there must be a **cause** (or **causes**) of this social patterning. If this was not the case people would not display a broad level of regularity and predictability in their behaviour.

- **Secondly**, if people's **behaviour** is **structured** in some way it makes sense to try to **understand the nature of the structural relationships** that must **create and underpin various broad patterns of behaviour** (since "individual behaviour" must clearly have a cause that exists outside of individual consciousness - if there is no "external causality" which places a structural framework around people's behaviour then, by definition, human behaviour would not - indeed could not - display the regularity which it clearly does display).

In simple terms, although conscious **individuals** are **free** to behave in any way they see fit, the reality of the social world is that **they do not** (or, if they do, they are categorised as "insane"). Rather, since people **conform** to various **social pressures and constraints**, it appears logical to assume that if we want to **understand human behaviour** we have to **study the social world at the level at which these "pressures and constraints" are created**, namely the **level of institutions (family, work, religion, etc.)** in any society.

We should note that where **Positivist methodology** departs from **Realist methodology** is in terms of the way we can understand **the social causes of human behaviour**.

- For **Positivism**, such **causes** have to be theorised in terms of "**observable**" phenomena / **evidence** (hence the frequent association that is made between **empiricism** and **Positivism**).
- **Realists**, however, argue that the "**underlying causes**" of people's behaviour may only be observable, as such, in terms of their effect.

In this respect, whilst **Positivism** deals with "**eternal**" **social causes (causal relations that are true for all time)**, **Realism** deals with an understanding of the **nature of underlying social relations** (which are **not "eternal"** but **specific in time and place**) which give rise to the **appearance of observable causality**. Thus "**causal relations**" clearly exist, but they are **highly specific in time and space**, not universal.

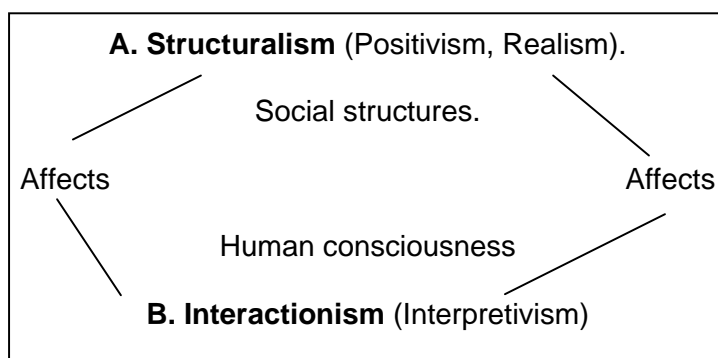
For **Interpretive Sociologists** it is precisely our **capacity to experience the world subjectively** that is significant since it introduces an element into the methodological equation (**human consciousness**) that makes it **difficult to make widespread generalisations and predictions** about human behaviour. In this respect, a **positivistic social science** is seen as a **methodological irrelevance** because:

- a. **Human social behaviour** does **not conform** to **social laws of development** (people, in effect, play an active, creative, role in the production and reproduction of their social life).
- b. **Patterns of human behaviour** are **specific** to the **culture** within which they arise. In this sense, both **consciousness** and **social structures** are **significant** aspects of the methodological equation (with the emphasis being on the former, since the latter are seen to be "simply" the product of human consciousness).

This last point is highly significant because it illustrates the idea that **textbook distinctions** between "**positivist**" and "**anti-positivist**" **methodologies** tend to be **over-stressed**, insofar as they tend to present Sociologists as using either a positivist or an anti-positivist methodology. In this respect we are aware of the fact that:

- a. **Social structures affect human consciousness.**
- b. **Human consciousness affects the way in which social structures develop.**

We can express this diagrammatically thus:



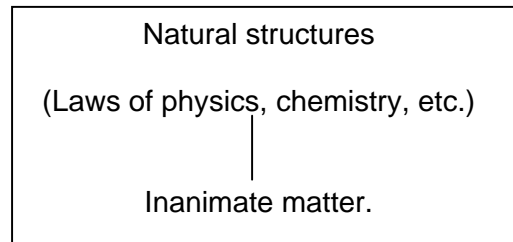
Depending upon the point at which we choose to start our analysis of human behaviour (which is, of course, a highly **subjective choice**), we can either see

- a. **Social structures** being the **most important factor** in the **determination of human consciousness** or,
- b. **Consciousness** being the **most important factor** in the **determination of social structures**.

Question:

What are the implications of this "subjective choice" in terms of sociological methodology?

For the **Natural sciences**, on the other hand, **no such problem exists** since inanimate **matter** does **not** have **consciousness**. We can express this diagrammatically thus:



As I hope you can see, this **difference between the subject matter of the Natural and Social sciences** has important **ramifications** for the nature of a "**scientific methodology**". We will return to this idea at a later point, but for the moment, we can look in a bit more detail at some of the **fundamental aspects** of **Positivist, Interpretivist and Realist methodologies**.

As I have tried to suggest, "Positivism" - like "Interpretivism" and "Realism" - is fundamentally an **ideology**.

By this I mean it involves a **closely-related set of dependent values** which are **used** by a researcher to **guide the way data is collected and knowledge produced**.

In this respect, each of the above are **ideologies** because they involve a clearly-defined "**world view**" concerning the way it is considered "right and proper" to study the world, collect data about that world and so forth.

Each of the above are also **methodologies**; that is, they "tell" the researcher **how to go about producing valid knowledge** (what **methods** to employ, for example, in order to produce **valid** forms of knowledge).

We can perhaps understand this more easily if we now look briefly at the **ideological principles** that **underpin** each of these **methodologies**...

A. Positivism: Interconnected principles...

Principle 1:

Valid knowledge can only be produced on the basis of **direct observation** that involves the ability to **measure** and **record** something. "**Observation**", in this sense, means only accepting **empirical evidence** (evidence that can be produced through our senses - sight, smell, touch, taste, hearing) as **valid** evidence. Thus, things that cannot be seen, tested or measured (such as people's thoughts) cannot, by definition, be accepted as valid evidence and knowledge.

Principle 2:

From the above, the **task of science** is seen to be that of attempting to **isolate, analyse** and **understand** the **causes** of human **behaviour** (to establish "**cause-and-effect**" relationships that are **true for all time** - "**laws**").

As we have seen earlier, the basis for this idea is that people do not behave randomly; behaviour is caused by something (social structural pressures) and if we can understand these causes then we can explain and predict human behaviour.

Principle 3:

Since this version of science is concerned only with **what is** - rather than what we might think, believe, want or hope - it follows that a **scientist** must be **personally objective** and **value free** in their work.

The **methods** used should **not** be **dependant** upon the **subjective interpretations** of a **researcher** and **research** should be **capable** of exact **replication** (as a means of checking for error, falsifying a theory and so forth).

B. Interpretivism: Interconnected principles...

Principle 1:

The **social world** is seen to be **produced** and **reproduced** on a **daily** basis by people going about their lives. Thus, **things that hold true for now** (this minute, today, next week...) in our society **may not hold true in the future** or in another society. In this respect, the **social world** has **no "external features"** or **"social structures"** in the **sense** that this idea is understood by **positivist** and **Realist** scientists. The **social world** is simply **experienced "as if"** our behaviour were **constrained** by **forces external** to us as individuals - in effect **"social structures"** are considered to be little more than **"elaborate fictions"** we use to explain and justify our behaviour to both ourselves and others.

Principle 2:

From the above we can see that the fact that people **actively** (if not always consciously or deliberately) **create their world** means that the attempt to establish **"cause and effect" relationships / laws** is **theoretically misguided**. If people's behaviour is conditioned by the way they personally **interpret** their world (and no two interpretations can ever be exactly the same), it follows logically that **"simple" causal relationships** will be **impossible to establish empirically** - primarily because the conditions under which a relationship is theoretically established will have changed by the time that we have established such a relationship...

Principle 3:

In this respect, the social world is understood ("**interpreted**") by **different people** in **different situations** in **different ways** (something you interpret as a "problem", for example, may not be seen by me as a problem).

Thus, **everything** in the social world is seen to be **relative** to everything else; logically, **nothing** can ever be **wholly true** and **nothing** can ever be **wholly false**. The **theories** we create to explain the relationships we observe are, on this basis, simply one more **elaborate fiction** we construct in an attempt to convince ourselves and each other that we can understand and control the worlds through which we move.

In order for a **scientist** to **understand social behaviour**, therefore, they have of necessity to **understand** how people (individually and collectively) **experience** and **interpret** their world (the meanings individuals give to things, the beliefs they hold and so forth).

Thus, the **methods** that can be employed in this task (**observation** and **interpretation**) have to reflect the fact that people consciously and unconsciously construct their own sense of "social reality".

C. Realism: Interconnected principles...

Principle 1:

Like Positivism, Realist science accepts that **social structures** have some **form of independent existence** which is **experienced** as "external" to us as individuals. These **structures** act upon us - **pressurising** and **constraining** our behaviour - and, for this reason, the study of **social structures** is considered to be of **primary importance** for Realist science.

On the other hand, **like Interpretivism, Realism** accepts that **what we believe to be real** will have **important consequences for our behaviour**. Thus, those **things** we **believe** to be **real** are **experienced** by us as **real**. If, for example, I believe myself to be middle class (my subjective belief), whilst every indicator we can use to define social class holds that I am working class (my objective class position), then this will have important consequences for my personal behaviour.

Unlike Positivism, however, **Realist** science argues that **social structures** are themselves the **product** of **specific social relationships**; they are created not just by people, but by **powerful groups** (or **classes**) pursuing their own particular interests at the expense of less powerful social groups / classes.

Unlike Interpretivism, social structures are seen, as I've noted, to have an **objective existence** over and above the people who create them - and such **structures cannot be easily changed**. When we enter into a relationship with someone, for example, that fact changes not only the way we relate to them; it also changes our relationship with others. When I marry someone, for example, my relationship to my girlfriend is not only changed, it also changes my relationship to all other women...

As Richard **Kilminster** ("Theory" in "Developments in Sociology" edited by Michael Haralambos) notes,

"The basic drift of Realism is that the social and natural realms are real, exist independently of us and have a structure of their own, which sciences attempt to describe and explain. Unlike the positivists...the Realists claim that what we directly observe in both nature and in society is generated by hidden mechanisms which we cannot observe, but which scientists infer from observations and theoretical work. This view is opposed to forms of constructivism [Interpretivism] which state that scientific theories are simply constructions or fictions".

Principle 2:

Social structures are "real" only in their **effects** - they are **not permanent** and **unchanging** (although, as I've noted, they are very **difficult to change**). We can, therefore, only **study** them in terms of **particular sets of social relationships** that **exist at a particular time** and in a particular **place**. **Social structures**, in this respect, are simply the **product** of **underlying** - or **hidden** - **relationships**; things we **cannot see**, but which nevertheless **have some form of existence**. For example, a child's relationship with their parents involves the recognition of a "special" kind of bond, one that is different to the bond between brother and sister. We cannot "see" this bond empirically, but we know that it exists.

As human beings, we have the **ability to think**; we are **conscious** of both ourselves and our relationship to others. However, the **meaning** of any

relationship (parent - child, employer - employee, husband - wife and so forth) **depends** upon the **social context** within which it exists and by which it is **supported**. A relationship cannot have a social meaning without this supporting structure or framework of ideas.

Although **people** (because of their ability to be aware of a social context to their behaviour) ultimately **create social structures** (or "**frameworks of social relationships** that have a **meaning** to people), we have to be aware that the **structures** we create **reflect back** upon our **behaviour**. Thus, the **social context** of our behaviour clearly **affects** the **range and choice** of behaviour that we adopt.

Realism, therefore, **resolves** the "**positivist - anti-positivist**" conundrum by arguing that the **task of science** is to "**deconstruct**" **social structures** and, by so doing, to expose their underlying (hidden or non-empirical) basis.

Principle 3:

From the above, it is evident that all **knowledge** about the world is considered by **Realist scientists** to be **ideological**. What we "know" (or think we know) is simply the product of particular forms of social (structural) relationships that have an "objective" form of existence (one that is, independent of individual consciousness) . If we accept this idea, the **task of science** is to **demonstrate how** we can construct a form of human society based upon **moral** (ideological) principles that is the fairest, most egalitarian way of organizing our social existence.

Question:

To which basic sociological perspectives do you think the ideological and methodological principles of Positivism, Interpretivism and Realism are most likely to appeal:

_____ is most likely to appeal to Structural Functionalists.

Briefly explain why you think this is most likely to be the case.

_____ is most likely to appeal to Interactionists.

Briefly explain why you think this is most likely to be the case.

_____ is most likely to appeal to Conflict Theorists.

Briefly explain why you think this is most likely to be the case.

Do Natural Scientists Do What They Claim To Do?

If we leave aside, for the moment, the question of how it is (methodologically) permissible to study the social world (we will look at this in greater detail when we consider subjectivity, objectivity and value-free Sociology), another **question** arises which, thus far, has been taken for granted, namely, we have merely **assumed** that **Natural scientists** simply follow the **methodological principles** they have elaborated over the years.

- We have **assumed** that **Natural scientists** actually **employ** the **methodological principles** they propound as being the basis for the scientific study of the natural world. The **question** we now have to turn to, therefore, is one of **how closely scientists adhere to the methodological principles** they have established as the basis of "scientific practice".

As I have stressed, **Natural scientists** (like any other branch of knowledge production) are engaged in an **ideological struggle** that relates to the **validity** of the **knowledge** we are able to produce about the world.

In the **past**, for example, a "**scientific ideology**" has been in more-or-less open **conflict** with "**religious ideologies**" concerning the nature of knowledge. Whilst this conflict in present day society is not as fierce as it once was, it still, nevertheless, exists.

As we have seen, one element in the **ideological armoury** of **Natural scientists** is a **methodology** that stresses such things as:

Personal objectivity,
The rigorous testing of knowledge and
The attempt to falsify - rather than simply confirm - knowledge

Ideologically, this **methodology** is a **powerful** weapon precisely because "**scientists**" have **no personal axe to grind** - they are simply **seekers after the truth** (however unpalatable - personally and / or socially - this may prove to be). In this respect, **Natural scientists** have to be **objective** about their work; if they allow **personal values** to intrude, then this **automatically disqualifies** the knowledge they produce from being "**scientific**".

"**Objectivity**" is, therefore, a **powerful ideological weapon** for the **Natural scientist** since, unlike the producers of "non-scientific" forms of knowledge the **scientist** claims to have **no "vested interest"** in the knowledge they produce. This clearly **differentiates** the **scientist** from such people as:

Religious leaders - the Church has a "vested interest" in the existence of God.

Marxist Sociologists - they have a "vested interest" in demonstrating the validity of Marx's basic ideas.

Conservative Sociologists - they have a "vested interest" in producing knowledge that serves to support and strengthen the existing economic and political status quo.

As should be apparent, in the above terms this argument has an element of truth, since we can clearly show how various "non-scientific" (that is, non-Natural scientific) forms of knowledge production are built upon the foundations of various "vested interests". However, this is not the whole story, since it is evident that, in the above, we are doing a couple of questionable things:

- a. We are **taking for granted** the idea that there is a **single definition** of "**science**" (the one employed by Natural scientists).
- b. We are **failing to question** the rather cosy **assumption** that **Natural scientists** are "**objective**" in their work.

In this section, therefore, we can usefully explore the second of these ideas and discuss some of the ways in which we can subject this idea to closer scrutiny...

We can begin by noting a significant distinction made by **Kaplan** ("The Conduct of Inquiry", 1964), namely that of the difference between:

- a. **Reconstructed logic** and
- b. **Logic-in-use**,

when we are talking about the way in which knowledge is produced.

- A "**reconstructed logic**" consists of the **methodology** a **scientist claims to use** in their work.

This involves claims about **how particular methods** are **used / applied**, the way various scientific **procedures** and **rules** of **evidence** are **followed** and so forth.

- A "**logic-in-use**", on the other hand, consists of the things that a **scientist actually does** in the course of their research (which, as you might suspect, **may be quite different** to the things that they **claim to do...**).

In essence, **Kaplan** raises the question of the **relationship** between **what people say they do** and **what they actually do** in the course of their research. If there is a discrepancy between the two, we need to know this because it will have important ideological and methodological ramifications.

Question:

Why might it be significant if Natural scientists do not always do what they claim to do in their research?

It's important here to note that **Kaplan** is **not suggesting** **Natural scientists** simply "**make-up**" knowledge **or that they consciously cheat by falsifying their data** (although this does, on occasions, happen).

One of the great **strengths** of the **Natural scientific claim to objectivity**, for example, is the fact that their **work is open to scrutiny and re-testing** ("**replication**") by other scientists (remember **Merton's** conception of a "**scientific ethos**"?) and it seems evident that a scientist who sets-out to cheat stands a good chance of being exposed as a fraud...

However, **Kaplan** is suggesting that **the nature of the subject matter of the Natural sciences** makes it **easier** for the **scientist** to **make day-to-day decisions** - about **what they are seeing** and the **knowledge they are producing**, for example - in **highly subjective ways** (albeit that this may be done **unconsciously**).

As **Gilbert and Mulkay** ("Contexts of Scientific Discourse", 1980) have shown, the **practical problems** faced by the Natural scientist in the "real world" of highly complex research **involves** the scientist in **highly subjective choices** of interpretation...

- In **your Sociology course** you will encounter the idea of **reconstructed logic** and **logic-in-use** when you start to complete your **project research** (although you may not have been aware of it). In your project you are asked by the examiner to detail the **methodology** used in the selection of methods, the verification and validation of knowledge and the like. For most of you, this section will effectively consist of a "**reconstructed logic**" in which you will detail for the examiner **your accurate sampling procedure, how and why you chose to use particular methods**, the **careful way** you validated and verified knowledge and so forth.

While you no-doubt **started your research with the best of intentions** and with **basic methodological principles in mind** (most of **you will not have set-out to cheat**), the **reality** of your research activity will probably be quite different.

For example, your **methodology** will detail the **careful selection and representativeness of your sample**, whilst the **reality** will probably be that **not enough people replied to your questionnaire** (so you were "**forced**" to ask a few friends, neighbours and casual acquaintances to fill-in a few more. If, of course, you don't have any friends, live in the middle of a field and don't talk to casual acquaintances, there's always the old standby of filling-in the questions yourself, using a variety of coloured pens...).

On the other hand, you may have attempted to test a particular hypothesis and, in the course of your analysis of interview results, the majority of your respondents seem to confirm the hypothesis - but a couple of interviews also point to the possible falsity of the hypothesis. What do you do?

Maybe you attempt to incorporate their views into your research - which may mean having to start again or to carefully review everything you've done...

Or perhaps you decide to marginalize the responses that don't seem to fit neatly with your overall findings by attempting to rationalise (or "explain away") "deviant responses":

This respondent wasn't very co-operative...

They didn't take my questions seriously...

Thinking about it now, I'm pretty sure they were deliberately trying to give me misleading information...

I may have influenced their responses to my questions in some way...

I think I probably misinterpreted their answer - what they really meant was...

Or, perhaps you decide (for the best of reasons) that the "**deviant responses**" were not actually worth considering and the interview is conveniently **discarded** or "**lost on the bus**" (after all, **who will ever know that it existed...**).

All scientists are faced with these types of choices in their day-to-day research and, since scientists rarely, if ever, conduct research for their personal satisfaction (it's costly and time-consuming), the **social context** in which they work is significant. This is mainly because they are **subjected to pressure** to produce not only results on time (as with your project), but also to produce the "right" results:

- A drug that works.
- A missile that does what it is supposed to do.
- An engine design that meets the requirements of an employer's claim of increased fuel efficiency.

In general, the **higher the (economic and political) stakes** involved, the **greater the temptation to interpret "deviant results"** in ways that **favour the outcome you want, expect or need**.

- In terms of **your project**, what's at stake may be the difference between an average and a very good mark (you only have so much time to do the damned thing and it would be ridiculous to start all over again just because some idiot wouldn't co-operate...).
- In terms of scientists working for large pharmaceutical corporations - where reputations, incomes and future employment prospects are at stake - the "social pressures" are far, far, greater.

What happens, for **example**, if the drug you have developed works perfectly 99.9% of the time - yet it doesn't seem to work in 0.1% of the cases you test? Do you dismiss the 0.1% as the result of chance, error and so forth - or do you start all over again, explain to your employer that you've wasted a few million pounds and you need another few million in order to carry-on your research?

This may seem **trivial** (and possibly unreal) but it does start to **illustrate** some of the ideas that we will develop in the next set of Notes when we consider "**science as ideology**" in more detail.

To complete this section, we can **develop the distinction** between "**reconstructed logic**" and "**logic-in-use**" by looking a little more closely at the **relationship** between the **methodology** and **subject matter** of **Natural science**. In this respect, what I want to do now is to look at the idea of a "**Natural scientific methodology**" considered as **ideology**.

At a very simple level, the **methodology** of the **Natural sciences** is a very **plausible, powerful, ideology** precisely because it seems to **work**. In short, it is **plausible** because it "**delivers the goods**" in terms of **valid, verifiable, knowledge** that has a great deal of what **Keat and Urry** ("Social Theory As Science") call "**instrumental utility**". In basic terms, they mean by this knowledge that has an everyday usefulness.

The methodology of the Natural sciences not only "works", therefore, it is also **seen to work** in everyday life in terms of our everyday experiences - the "**proof**" that Natural science works confronts us everyday...

However, whilst this "test of proof" is clearly important in everyday life, for our (sociological) purposes we have to adopt a slightly more **questioning** tone and to help us do this we need to pose the following question:

"Do the Natural sciences produce valid, verifiable, knowledge because of:

- a. The **nature of the methodology scientists' employ** or
- b. The **nature of the subject matter they study?**"

This is an important question for a number of reasons:

1. Does the **subject matter** of the **Natural sciences** make it **easy** for the scientist to produce **valid, verifiable, knowledge**?
2. **If** the nature of the **subject matter** proves to be of **primary significance**, what **implications** does this have for **Natural and Social scientific methodologies**?
3. Does the adoption of a particular methodology in itself **guarantee** the production of **valid knowledge**?

In effect, what we are asking here is of major importance for both the Social and Natural sciences because:

- a. **If** it is something about the **subject matter** of Natural science (its **lack of consciousness**) that allows such scientists to apply a particular methodology in the certainty of being able to produce valid knowledge **then**,
- b. It will **not be possible** for **Sociology** (or any social science) to be "**scientific**" in terms of the way in which we can understand this idea in relation to "sciences" such as physics and chemistry, for example.

However, if it is the **methodology itself** which constitutes the essence of science then it should be **possible for any scientist** - Natural or Social - **to produce scientific knowledge** regardless of the specific subject matter which is being studied. We can start to explore this idea in the following way:

A **major advantage** enjoyed by Natural scientists over their social scientific counterparts is, as I have suggested earlier, the fact that the former's subject matter does not have consciousness. In short, it does not have a "mind of its own". In this respect, it is because natural phenomena do not have consciousness that their "behaviour" is precisely **predictable** and this "natural regularity" allows Natural scientists to develop laws - the idea that under the same conditions and with the same cause something will always behave in a certain way).

In some important respects, therefore, **natural laws exist independently of human consciousness** and can, of course, be simply "**discovered**" (either through rigorous scientific research or, indeed, "by accident"). The concept that we use to express this idea of producing knowledge by discovery is that of "**heurism**" (which, fact fans, literally means "**by discovery**"). A **classic example** in this respect might be the discovery of **penicillin**, a drug whose existence was discovered "by accident" when a lab technician failed to clear away the results of an experiment that had "gone mouldy". Sir Alexander Fleming analysed this mould and, eventually, came up with the discovery of penicillin.

To recap, as we have seen, one of the great advantages enjoyed by Natural scientists over Social scientists is the fact that their object of study does not have consciousness:

The moon does not decide it will no-longer obey gravity.

Rocks do not suddenly decide to get up and walk away.

Gases do not decide that they would rather not be experimented upon.

We can briefly note, in this context, that for one branch of sociological methodology (**Interpretivism**) one of the significant advantages enjoyed by the sociologist is that he or she shares something with their object of study (namely consciousness) and, they argue, this is a significant methodological advantage that should be exploited.

Question:

In what ways might a sociologist be able to exploit this advantage in relation to the study of human social groups?

Summary

1. The concept of "science" means the attempt to produce reliable, valid, knowledge. In this sense, "science" is an ideology.
2. Science is a methodology (a way of producing knowledge). It is not knowledge itself.
3. There are three basic forms of methodology used in the Natural and Social sciences:
 - a. Positivism (characteristic of 19th century Natural and Social science).
 - b. Realism. (characteristic of 20th century Natural and Social science).
 - c. Interpretivism (characteristic of 20th century Social science).
4. Within Sociology, each of the above can be very **loosely associated** (for our **academic convenience**) with three different perspectives.
 - a. Positivism and Structural Functionalism.
 - b. Realism and Marxist Conflict theory.
 - c. Interpretivism and Interactionism.
5. Positivist and Realist methodologies focus mainly on the way in which human behaviour is shaped by social structures. Interpretivism focuses mainly on the way in which human beings interpret the social world.
6. Historically, Positivism has been associated with the methodology of the Natural sciences (physics, chemistry and the like). It was initially adopted by 19th century Sociologists (such as Comte and Spencer) as the best possible means of producing reliable, valid, objective, knowledge about the social world.
7. Throughout the 20th century, both Natural science and Sociology have increasingly adopted either a Realist or an Interpretivist methodology.
8. Positivism focuses upon empirical evidence (the evidence of our senses); the emphasis here is placed upon observable evidence.
9. Realism focuses upon both the observable and the non-observable concepts and structures that are considered to underpin and shape the observable world (both natural and social).
10. Interpretivism focuses on the way in which people interpret their social relationships. It attempts to understand the meanings that people give to their social relationships.
11. All sociological methodologies seek to explain the patterns of behaviour that produce regularities in human behaviour. Each differs in the way that it seeks to explain the basis of these patterns of behaviour.
12. One of the main differences between Interpretivism and other methodologies is the importance placed upon the concept of human consciousness (the ability of people to think and shape their world).
13. Positivism emphasises the need for objectivity and value-freedom in the study of the social world.

14. Realism emphasises the need for objectivity (but not necessarily value-freedom) in the study of the social world.

15. Interpretivism emphasises the need for a "subjective understanding" of the way in which people actively construct the social world on a day-to-day basis ("subjectivity" in this instance meaning the ability to empathize with other human beings).

16. Kaplan argues that, in the Natural sciences, there tends to be a clear difference between reconstructed logics (the methodological principles that scientists claim to follow in their work) and logics-in-use (the methodological principles that scientists actually use in their work).

17. An important consideration in the ability of Natural scientists to produce reliable, valid, knowledge that has predictive ability is the fact that their subject matter does not have consciousness. This means that they are able to study the world with a greater degree of precision than is possible in the social sciences.