

Positivism and the Methodology of the Social Sciences

Positivist methodology

Historically, the term *positivism* was first used by Auguste Comte (1798-1857). The philosophy of positivism is characterized by a belief that the scientific method will solve every possible problem of interpretation of reality, in so far as a solution is possible. This requires the application of the *scientific method* to every class of observable events. Science aims at laws of causation. The paradigm is Newton's law of universal gravitation – a single generalization explaining the relationship between one variable and another. Such simple causal laws are sought in every branch of science, from physics to sociology.

In regard to the social sciences, positivists maintain that the social sciences (psychology, sociology, economics...) are strict sciences that follow the same methodology as the natural sciences (physics, chemistry, biology ...). Furthermore, they maintain that the strict application of the scientific methodology to social sciences will enable ever increasing general laws to be developed.

Comte believed that application of the scientific method to the facts of the historical development of societies had enabled him to discover a general law that all societies pass through three stages of development – firstly, the theological stage, in which events are explained in terms of the actions of gods; secondly, the metaphysical stage, in which events are explained in terms of abstract forces, such as nature; thirdly, the positive stage, in which events are explained by scientific laws arrived at rationally through the application of the scientific method.

There is a debate within the philosophy of science as to what is the underlying model of how scientific generalizations are arrived at. Inductivists believe that scientific laws are generalizations of repeated patterns in observed events; those who apply the hypothetical-deductive model of science believe that scientists begin with hypotheses that are then tested against reality through experiment.

Positivism is associated with both interpretations of the scientific method. Inductivism is associated with philosophical thinking about science during the C19th, and “deductivism” with the C20th. In other words, inductivism is now a largely discredited model of the scientific model, and the hypothetical-deductive model is now largely the accepted underlying model of the scientific method. C19th philosophers tend to assume the inductivist model, whereas C20th philosophers tend to assume the hypothetical-deductive model. However, since the 1930s there have also developed further skeptical approaches to science that argue that the underlying assumption of positivism, that there is just one true science, and that in the long-run



every scientific law shall be uniquely determined by the evidence, is false. This skeptical attack is prominent in the work of Kuhn, *The Logic of Scientific Revolutions*.

Positivist methodology in application to the social sciences

The assumption is that the social sciences are sciences just like the natural sciences; therefore, the processes of gathering evidence must be similar. Firstly, *social facts* must be gathered. This means that there is a belief in the existence of social facts. Such facts will be expressed as quantities. They are entities capable of quantifiable, mathematical description. Hence, secondly, social facts can be described statistically. They provide the raw data for appropriate statistical analysis. Thus, thirdly, in the process of developing a scientific law, the statistical data must be analysed for correlations and tests of difference. Correlations and tests of difference are mathematical statements of the likelihood of one event being accompanied by another. For example, that people who smoke are more likely to die of lung cancer than people who do not smoke. In the scientific method, correlations do not establish a causal law. A causal law is only established by the scientific method strictly when it can be shown that changes in one variable (the independent variable) bring about changes in another variable (the dependent variable). Thus, at the fourth stage, a true experiment should be conducted in which manipulation of the independent variable is shown to produce changes in the dependent variable. At this fourth stage, a hypothesis is either falsified or confirmed by experiment, and, if confirmed, passes as a general law.

Inductivists would argue that the confirmation of a law is by the process of induction of repeated observations. However, as indicated above, it is probably best to regard inductivism as a naïve 19th century philosophy of science, and to accept that, regardless of the skeptical questions associated with scientific methodology, that the process of confirmation of a law is through the process of testing a hypothesis by experiments in which the independent variable is manipulated and the dependent variable is observed.

Application of this final stage within the field of the social sciences may be practically impossible or ethically undesirable. For example, it is not ethically desirable to test the thesis, advanced by Durkheim, that being a protestant increases your likelihood of committing suicide! Therefore, if the scientific method is to be applied to the social sciences, an alternative to the use of true experiment must be discovered. Durkheim advances a process of *multivariate analysis* in this context. A given social phenomenon, for example, the suicide rate, may be the product of several causal factors. The technique of multivariate analysis is to apply advanced statistical analysis to data in order to isolate the effect of a single variable on the outcome. Advocates of multivariate analysis believe that a successful analysis can establish a causal law, but it is not clear at the philosophical level whether multivariate analysis can do anything more than provide more evidence of correlations. So it is possible



that the practical and ethical limitations on the application of true experiment to a social context will prevent a truly positive science of society from emerging.

So there is a dispute as to whether the positivist programme in regard to the social sciences can actually be completed.

The methodology of Durkheim

We may take the work of Durkheim as an example of the impact of positivist methodology on the approach of sociologists. Durkheim seeks to introduce the scientific method into the study of society and morality; hence sociology and ethics shall be empirical sciences. In his first work, *The Division of Labour*, Durkheim introduces his method, which is “an attempt to treat the facts of moral life according to the method of the positive sciences.” His method is illustrated by his thinking about ethics.

Only the German moralists consider moral phenomena as facts which are empirical and at the same time *sui generis*. Ethics is not an applied or derivative science, but an autonomous one. It has its own subject-matter, which it studies in the same way as the physicist studies physical facts, and the biologist studies biological facts; and it employs the same method. The facts with which it deals are mores, customs, positive legal prescriptions, and economic phenomena in so far as these become the object of legal provisions; it observes these, analyses them, compares them, and thus progressively moves towards the laws which explain them. No doubt it is related to psychology, since moral facts have their location within the heart of the personality of the individual; but they are distinct from psychic facts, if only by their imperative character. In addition, they are related to all other social facts, but are not to be confused with them. Ethics is not a consequence of, and as if a corollary of, sociology, but is a social science by the side of and amidst the others.¹

His wish to introduce the scientific method into sociology is further illustrated by the following.

The first step of the sociologist ... must be to define the things he treats, in order that his subject-matter may be clearly known. This is the first and most indispensable condition of all proof and verification. A theory can really be tested only if we are able to recognize the facts of which it is intended to give an account.²

¹ Emil Durkheim: *La science positive de la morale en Allemagne* – 1887 – translated by Anthony Giddens, *Emil Durkheim: Selected Writings*, Cambridge University Press, 1972.

² Emil Durkheim: *Les règles de la méthode sociologique*, 1895



How then is this method to be applied in practice?

... social facts are capable of objective representation to the degree that they are completely detached from the individual facts expressing them. ... *When, then, the sociologist undertakes the investigation of a given order of social facts, he must endeavour to consider them from an aspect that is isolated from their individual manifestations.* It is this principle that we have applied in studying the diverse forms of social solidarity and their evolution, through the medium of the legal structure which expresses them. In the same way, an attempt to distinguish and classify the different types of family on the basis of the literary descriptions given us by travelers and sometimes historians is exposed to the danger of confusing the most diverse forms and relating together the most dissimilar types. If, by contrast, the legal structure of the family and, more specifically, the right of succession, are taken as the basis of classification, these are objective criteria which, while not infallible, will prevent many errors.

Thus, if Durkheim was to develop a theory of the family he would not use “subjective” material as his starting point. The debate in C19th British literature over the role of women in marriage would not constitute evidence for Durkheim. He would use only material that may be regarded as independent of the attitudes of the observer, which the writings of novelists evidently are not. So this passage, and the others, represent Durkheim’s positivist approach to sociology.

Of course, it is a debatable point as to whether he succeeded in his own terms, and whether his theory of the evolution of the conscience collective from a state of “mechanical” solidarity to one of “organic” solidarity is based upon *social facts* that are objective, quantifiable and independent of observer bias. A charge against Durkheim, or any positivist sociologist for that matter, is that they unconsciously introduce their own value judgements into their work, and that their methodology makes them blind to this process. It is a moot, philosophical question as to whether fact and value, positive and normative statements, can be separated in the study of the social sciences.

The fact/value gap

The fact/value gap was advanced initially by Hume in his *Treatise*. The fact/value gap simply asserts that one cannot argue from a factual statement to an ethical statement, without the addition of some purely ethical premise. Arguments which appear to do so are either fallacies, or tacitly assume an ethical first premise. It is also called the is/ought distinction, since statements of fact use the term “is” in them, whereas statements of value use the term “ought”. An example of a factual statement might be, “For pre-Christian people thunder *is* a manifestation of the wrath of God.” An example of an ethical statement might be, “We *ought* to apply the positive method



in establishing truth and knowledge.” If you accept Hume’s point about the fact/value gap, then you accept that it is not possible to deduce the second statement from statements of fact.

Statements of fact, or statements of causal laws and theories based on fact, are also called *positive* statements. Statements of value, expressions of attitude are called *normative* statements. The relationship between positive and normative statements in the social sciences is debatable.

It is part of the positivist cannon that fact and value in science should be sharply distinguished, and social science should proceed solely on the basis of fact. In practice, however, adherents of positivism frequently step over the line between fact and value, and assert, possibly unconsciously, that certain normative statements are derived from positive statements. For example, in the work of Comte, there is an implied inference from his law of evolution (the general law that societies pass through three stages of cultural development described above) to his normative stance that man *ought* to think positively. He implies that it is the duty of the sociologist to encourage the transition of society to the *highest* stage of development, the positive one. This line of argument (which is a fallacy according to the fact/value gap) runs through C19th sociology. There is an implied inference in the work of Marx from “The overthrow of the bourgeoisie is inevitable” to “it is the duty of every man to do their utmost to bring about the overthrow of the bourgeoisie”.

Regarding the relationship between positive and normative statements a number of positions are possible.

1. It is possible to argue that positive (fact) and normative (value) statements in the social sciences can be both theoretically and practically separated, and that social science should separate them and make only positive statements.
2. It is possible to argue that whilst positive and normative statements can in theory be separated, it is in practice difficult to do so, and that, therefore, each sociologist *ought* to make his normative attitudes clear in his work both in order to avoid unconscious bias in his work, and also to alert his reader to his attitudes, so that the reader is able to make his own judgements.
3. It is possible to argue that fact and value cannot be separated in the domain of the social sciences, that the subject matter of social science, human beings, their social institutions and their interactions, is *not* comprised of *social facts*. It is possible to maintain that whilst it is true that in the natural sciences a distinction between fact and value can be maintained, that this is not true of social sciences. In this case, the social sciences cannot be science in the way that the natural sciences are.



4. In addition to this third position, it is possible to argue that even for the natural sciences *facts* do not exist independently of interpretation. This is a philosophy of science known as *instrumentalism*. Furthermore, one could also argue that even for the natural sciences interpretations do not exist independently of the values that scientists place upon them.

Positions (1) and (2) represent positivist or neo-positivist positions. Position (1) is adopted by Durkheim. We now proceed to illustrate how position (2) is adopted by Weber.

Weber

Weber employs a hypothetical-deductive model of science. This is illustrated by his theory of types.

... we adopt the kind of scientific procedure which involves the construction of *types*, we can investigate and make fully comprehensible all those irrational, affectively determined, patterns of meaning which influence action, by representing them as 'deviations' from a pure type of action as it would be if it proceeded in a rationally purposive way.³

An example of a *type* in economic theory would be the theory that businessmen are motivated by profit. A type of individual is postulated, the entrepreneur, whose rational aim is to maximize profits. This is the *norm* of business decision-making. Actual decision-making may be evaluated by means of comparison against this norm. Hence, Weber writes

... Examples of such ideal-typical constructions would be the concepts and 'laws' formulated in pure economic theory. They describe the way a determinate type of human action *would* proceed, *if* the agent were acting in a fully rational way in furtherance of his purposes, undisturbed by errors or emotional impulses and *if*, furthermore, it were quite definitely intended to achieve one and only one goal (an economic one).

Weber refused to accept that there is no difference between the natural and the social sciences. However, he did not think that this meant that the scientific method could not be applied to the social sciences. Nonetheless, he also refused to accept the idea that sociological laws could be derived that are similar to the laws of classical mechanics.

³Max Weber, *The Nature of Social Action*, 1922 Translated by E. Matthews in *Max Weber: Selections in Translation*, Cambridge University Press, 1978



‘Sociology’ is a word which is used in many different senses. In the sense adopted here, it means the science whose object is to interpret the meaning of social action and thereby give a causal explanation of the way in which the action proceeds and the effects which it produces.⁴

The difference between social science and natural science is that the subject matter of social science is “the meaning of social action” and this makes the laws of social science different in kind from the laws of natural science.

Weber accepts that it is possible to distinguish “socially demonstrable or empirically observable facts and, on the other, the value judgments which are derived from practical standards”⁵. However, he believed that the academic sociologist should be concerned with both. He rejects the idea that sociologists should seek to study social facts objectively and independently of value judgments. He argues that sociologists should make their value judgments clear, illustrating his point as follows.

Among those scholars who did not believe they ought to renounce the making of practical value-judgments in their empirical discussions, it was precisely the most passionate (such as Treitschke and, in his own way, Mommsen) who were the most tolerable. For precisely because of the force of passion in their words, the hearer was at least put in a position to allow, for his own part, for the way in which the subjectivity of the teacher’s value-judgment introduced a possible element of distortion into his statements and so to do for himself what the teacher, because of his emotions, remained incapable of doing.⁶

Interpretative approach

Qualitative data is non-numerical data. It is usually suffused with subjective elements, that is, expressions of personal thought and feeling in relation to a topic; qualitative data is very often emotionally rich, containing numerous reflections of the writer’s attitude. For example, George Orwell’s description of poverty in his autobiographical account *Down and Under in Paris and London*.

The question is, to what extent should sociologists make use of qualitative data.

According to the interpretative approach the subject matter of sociology is social action. To understand social action the sociologist must interpret the meanings and motives of the actors. For this purpose, qualitative data is preferable.

³ Max Weber, *The Nature of Social Action*, 1922 Translated by E. Matthews in *Max Weber: Selections in Translation*, Cambridge University Press, 1978

⁵ Max Weber, *Value-judgements in Social Science*, 1913

⁶ Max Weber, *Value-judgements in Social Science*, 1913



There are two kinds of interpretative sociologist – those who accept that whilst the social facts on which their work is qualitative in nature, nonetheless, causal explanations are possible. This point of view is called *symbolic interactionism*. On the other hand, there are those who reject both the positivist interpretation of sociology and the idea that sociology can arrive at causal explanations.

Symbolic interactionism is exemplified by the work of Herbert Blumer. He argues that in order to understand a social phenomenon a method of immersion in the social milieu of that phenomenon must be pursued. The researcher must “take the role of the acting unit whose behaviour he is studying”.

Thus, sociologists who adopt the interpretative approach go one stage further than Weber in the rejection of positive methodology. They argue that the scientific method cannot be applied to sociology, that attitudes and values are inextricably interwoven with social reality, and that social reality can only be studied as a manifestation of such attitudes. Whilst quantitative data may or may not be rejected by such sociologists, their preference is for qualitative data. Within the interpretative school there are those who accept that causal explanations are possible, the symbolic interactionists, and those who reject causal explanations whatsoever, the phenomenologists.

The scientific method and research in the social sciences

It is usual for the positivist to assume that once the existence of social facts has been accepted, then the scientific method and statistical methods for the validation of hypotheses can be applied. Hence, positivists assume that there are no problems of a technical kind that would cause a line of demarcation between the natural and social sciences. However, here we will consider arguments that the methods of statistics when applied to social facts (assuming they exist) cannot establish general laws, and hence that the social sciences cannot be sciences in the same way that the natural sciences are.

A true experiment attempts to discover a relationship between two features of the world. For example, how the period of a pendulum changes as we alter the length of the pendulum. The two features of the world that are under investigation are called *variables*. A change in one variable is thought to cause a change in the other variable. For example, increasing the length of a pendulum increases the period. The relationship between the two variables should be quantified to provide a mathematical description of how one is affected by the other.

The variable that causes the change is called the *independent variable* and the variable that changes as a result of changes in the independent variable is called the *dependent variable*.



In a *true experiment* the experimenter attempts to control everything that is happening to the independent variable and the environment. Only the independent variable is changed. The experimenter manipulates the independent variable and observes changes in the dependent variable as a result.

Prior to the experiment being conducted a hypothesis is proposed linking the independent and dependent variables together. A hypothesis is needed because at any one time there never is just one explanation for why something occurs, and consequently the experiment tests a hypothesis and has the affect of confirming it, or ruling it out, at least in an unmodified form. Once a hypothesis is accepted as being true, it is regarded as a *law of nature*. Laws are combined into *theories*, and theories then suggest further relationships between observable quantities, thus leading to the formation of new hypotheses.

The need for control in an experiment is essential, for otherwise it would not be possible to eliminate the possibility that the other variables are causing the observed changes in the dependent variable. Other variables representing uncontrolled features of the world that bring about changes in the observed dependent variable are called *confounding variables*. Experimental technique is the endeavour to bring the influence of confounding variables to zero.

Yet we can never be sure that confounding variables have not had an influence. Yet, whilst the possibility of error can never be eliminated, we do agree that some experiments are more precisely conducted than others. Clumsy reading of instruments is just a recipe for the influence of confounding variables – systematic or random bad experimental technique is a source of confounding variables.

But the theoretic possibility of error increases as we progress from the natural sciences into the social sciences, and it is possible to argue that at some stage a “line” is passed beyond which experimentation in the social sciences is incapable of leading to natural laws in the way that the natural sciences do.

There are three confounding variables in particular that lead to problems within the domain of the social sciences. These are (a) statistical variation within groups; (b) experimental effects; (c) artificiality.

(a) Statistical variation within groups

When we are experimenting with electrons it is reasonable (though not actually provable) to assume that all electrons have the same properties – they do not vary from one electron to another, and no electron is different in respect of its behaviour from any other. Armed with this assumption we conclude that the location, for example, of an experiment on an electron does not influence the outcome – an electron from Bradford is like an electron from Manchester.



However, in the social sciences we cannot make this assumption, because the objects under investigation are people, and there are enormous differences between people. For this reason, an experiment on a single participant cannot really provide conclusive evidence for any theory, since there must always be the assumption that the participant is representative of the population as a whole.

Experimenters try to get around the problem of variation between groups by sampling and the theory of probability that accompanies it.

Suppose, for example, I am conducting an experiment in Town *A*. I select participants by choosing people at random who are on a street. Most people in the town are normal, but there are some abnormal people whose performance on the experiment will be different from the normal people. If I stop only one person, I cannot be very sure that the person is not one of the abnormal people; however, the larger the sample size the less likely it is that *all* of the participants in the sample will be abnormal. By taking samples and averages of the results I reduce the impact of individually unusual and abnormal results.

The use of statistics in this way may go some way towards answering the problem of variation of individuals in experiments in the social sciences. However, one consequence of this discussion is that we have to recognize that in point-of-fact no experiment in psychology is a *true* experiment. Every investigation is at best a *quasi-experiment*. In a quasi experiment there is control and manipulation of the independent variable but the sample is not truly random. It is impossible to construct in practice any experiment in the social sciences that would involve a truly random sample. The subjects are always preselected in some way. People in Edinburgh may just be different from people in Liverpool.

(b) Experimenter effects

Experimenter effects occur when the subject modifies his or her behaviour simply because they are being experimented on. This occurs because the subject is a human agent. People behave differently from mere physical things. They have motives, reasons, purposes and so forth. Their action is voluntary. Sometimes when people guess the hypothesis of an experiment they change their behaviour to make the hypothesis appear to be true.

Experimenters try to reduce the influence of experimenter effect by putting barriers between themselves and the subject. For example, an investigator may form the hypothesis and select the method, but an experimenter may conduct the experiment unaware of what the hypothesis is.

Again, good technique may go a long way towards increasing the confidence in the outcome of the experiment, but there is no getting away from the fact



that in every experiment in the social sciences there is a relationship between the experimenter who proposes the hypothesis and the participants. Whatever precautions are taken this relationship is never wholly eliminated, so the influence of the experimenter on the experiment can never wholly be discounted.

(c) Artificiality

The laboratory environment is artificial. Simply by being in a laboratory the subject will modify his or her behaviour in some way. Testing obedience or conformity in a laboratory is obviously artificial. Norms are learnt over a long period of socialization, and in the laboratory it is never possible to replicate this process of learning. The contextual clues are missing. When you obey your boss, and do what other colleagues are doing, you are acting in a situation that you have become familiar with over a period of time. You know what to expect.

One way to get around the problem of artificiality is to conduct a *field experiment* – that is, to experiment in the natural environment. But in that case, the problem of confounding variables increases. In a natural environment it is impossible to control all the variables, and the variation among individuals becomes even more of a problem.

To illustrate this, imagine an experiment to discover the relationship between a teaching programme and learning. Two schools are selected – into one we introduce the teaching programme (we call that the *experimental condition*) and we leave the other as it is (the *control condition*). We then measure learning in some way over a period of time – for example, by regular tests.

The sample groups vary hugely in their composition. Two adjacent schools have nonetheless different catchment areas, and you never could guarantee uniformity in the quality or motivation of the staff. Students begin moving in and out of the different schools and leave to go to entirely different places.

Experimenter effect comes in. Whether you tell the subjects or not about the programme, pretty soon people will realize there is a difference in the teaching methods and they work out which method is supposed to be better. They modify their behaviour accordingly. The students with the new methods feel more motivated to succeed. In fact, the effect of experimentation on motivation has been widely observed.

Thus, the move from the laboratory to the field makes the problems of variation and experimenter effect more acute. Experimenters in the social sciences are in a double bind – if they opt for the laboratory they sacrifice naturalness; if they opt for the field they sacrifice control.



Thus the scientific method cannot be applied rigorously to the social sciences, and for this reason, none of the social sciences can be regarded as science in the true sense. However, it is a debatable point whether the methodology of multivariate analysis can circumvent these technical difficulties in the social sciences.

