U.T. PLACE Lecture 14 6/2/1974

Four Languages of Psychological Explanation 1

The Schools of Psychology

From its inception as an independent academic discipline nearly a century ago, Psychology has been divided amongst a number of mutually antipathetic 'schools of thought', Structuralists, Funtionalists, Act Psychologists, Behaviourists, Gestalt Psychologists, Freudians, Jungians, Adderians, Tolmanians, Hullians, Skinnerians, Lewinians, Hebbians, Kleinians, Rogerians, Information theorists, Ergonomists, Existential and Humanistic psychologists, to mention some of the more outstanding of them.

The existence of these divergent orientations has long been taken as evidence of the immaturity of empirical psychology as a scientific discipline. Comparisons with some of the older natural sciences have suggested that scientific maturity is associated with the gradual elimination of competing schools of thought and the adoption of an agreed subject matter, an agreed methodology and a theoretical framework which though subject to more or less revolutionary changes from time to time (4), nevertheless commands the support of the vast majority of recognised professionals in the field at any one period. In Psychology, it is alleged there is little evidence that this process has even begun; and some commentators (8) have even wondered whether the whole enterprise may not ultimately prove to be a dead end, a pseudoscience like Phrenology which will eventually disappear, its subject matter being taken over by more respectable scientific disciplines like neurology and physiology.

This pessimistic view of the scientific status of psychology, in my opinion ignores the very substantial progress that has been achieved over the years in reaching agreement on many of the fundamental issues which divided psychologists in the past. For one thing the nature of the subject matter of psychology which was an issue both between the Structural Psychology of Wundt and the Act Psychology of Brentano and between both of these groups and Behaviourists, is no longer a serious bone of contention amongst Psychologists. Psychologists today are virtually unanimous in holding that the primary, if not the only subject matter of Psychology is the behaviour of human beings and the behaviour of other organisms in so far as it obeys the same laws and principles as does human behaviour. Moreover with only a few dissentient voices amongst the existentialists, humanist and psychotherapeutically orientated groups, a very substantial measure of agreement has been reached amongst psychologists on issues of methodology, techniques of measurement, the principles of experimental design and the statistical evaluation of experimental and other kinds of data. It is only by and large in the area of theory, on the question of the concepts and conceptual system which should be employed in psychology, both for descriptive and explanatory purposes, that major differences of approach are still apparent. It is only in this area of theory that no substantial progress towards the development of a common viewpoint seems to have been made. Moreover, despite the eclipse of certain theoretical positions like those of Gestalt psychology, and the theories of Tolman, Hull and Lewin, whose popularity declined rapidly after the death of their authors and the corresponding rise since World War II of conceptual systems based on cybernetics, information theory and existentialist philosophy, the overall picture, apart from a general blurring of the edges between the different positions, and an increased tendency towards theoretical eclecticism amongst a majority of practising psychologists, has changed very little in this respect over the past fifty years.

When we compare this lack of progress towards the unification psychological theory with the degree of unanimity that has been achieved on the problems of methodology and the nature and scope of psychology's subject matter, we are led to wonder whether perhaps the goal of unified psychological theory may not be chimera, a goal which is in principle incapable of being realised. May it not be that in Psychology we need and are always going to need, different conceptual systems, different theoretical languages for different theoretical and explanatory purposes? This is the possibility which I want to explore in this and the following lecture.

Feigl's three languages of psychology

To my knowledge, the suggestion that Psychology contains and necessarily contains, three distinct conceptual systems or 'languages' based on the different kinds of evidence or data which the

psychologist has to take into consideration rather than on the idiosyncracies of different theoreticians was first put forward by Herbert Feigl in a paper entitled 'The mind-body problem in the development of Logical Empiricism' published in the Revue Internationale de Philosophie for 1950 and reprinted in Feigl and Brodbeck's Readings in the Philosophy of Science in 1953 (1a). Feigl states his view in that paper as follows:

> "Relative to the 'molar' (or macro-) account given by behavioural psychology, the neurophysiological account is a micro-description of the very same events and processes. The pictorial connotation of the two accounts are of course different, since the images attaching to the behavioristic terms represent stimulus-response situations, while images connected with the neurophysiological language are apt to represent observations of nervous tissues. The notoriously greatest difficulty however arises here from the pictorial connotations of the mentalistic terms that owe their introduction to a third avenue of approach to the same processes - introspection. The qualities of direct awareness, the facts of stimuli and responses, the directly observable data of the neurophysiologists are of course not to be identified with one another ... But we contend that the designata of the mentalist language are identical with the descripta of the behavioristic language, and that both are identical with the designata of the neurophysiological language. Utilizing the distinction suggested before, we may say that the factual reference of some of the terms in each of these different languages (or vocabularies) may be the same while only evidential bases differ". (Feigl and Brodbeck, p.623).

What Feigl seems to be saying in this passage is that there are three distinct conceptual systems or languages within the domain of psychology (a) the language of stimulus-response behaviorism (b) the language of neurophysiology and (c) the mentalist language of ordinary discourse. Each of these languages has a different evidential basis. In the case of the language of S-R Behaviourism the evidential basis consists in objective observations of the relationship between sensory input or stimuli and behavioural output or responses. In the case of the neurophysiological language it consists in observations of such things as the electrical potentials recorded from individual neurons or more globally from different anatomical locations within the central nervous system and the effect on such electrical activity and on the organism's behaviour of stimulating or damaging the nervous system in various ways. In the case of the mentalistic language of ordinary discourse the evidential basis is introspection.

Feigl appears to hold that, although the propositions expressed in these different languages have different evidential bases, the actual processes and events to which they refer or, to use Feigl's language, which they designate or describe, are the same. What is not at all clear however, is which of the terms in these different languages have the same 'factual reference'. He denies that "the qualities of direct awareness, the facts of stimuli and responses and the directly observable data of the neurophysiologist" can be identified with one another. These presumably, are what he takes to constitute the evidential data of the different languages; but except in the neurophysiological case where there is a meaningful distinction to be drawn between the things which the neurophysiologist directly observes like marks left on paper by the pens of an E.E.G. machine and the interpretation of this data in terms of electrical activity within the brain, we are given no clue as to how to differentiate the terms used to describe the empirical data, which is allegedly different in the three cases, from the terms used to describe what is actually going on, which is allegedly the same in all three cases. Indeed in the case of the behaviourist language, at the least in the form in which it has been developed by Skinner (10), the facts of stimuli and responses constitute both the evidential basis and the factual reference of all the terms comprising the language, since there is nothing in this language that refers to anything that is not capable of being directly observed. We should remember however, that in the late 1940's when this paper of Feigl's was written, Hull was still alive and his version of stimulus-response behaviourism (3) was far more influential than that of Skinner. Now Hull's stimulus-response language, unlike Skinners (10) contains a number of concepts, such as his own 'fractional anticipatory goal reaction (rg)' (3) or Osgood's (5) representational mediating process (rm => sm) which stand for hypothetical unobserved events intervening between objectively observable stimuli and objectively observable responses and whose factual reference might quite plausibly be identified both with introspective mental events on the one hand and with neurophysiological events in the brain on the other. It is perhaps no coincidence therefore, that when Feigl came to write his next paper on this topic 'The "mental" and the "physical"', which appeared in Volume II of the Minnesota Studies in the Philosophy of Science in 1958 (1b), in which he

specifies the terms in these different languages which he thinks have a common factual reference, Hull was dead, Skinner's star was in the ascendant and all reference to stimulus-response behaviorist language as the third component of Feigl's original triangle of languages disappears, leaving only the 'raw feels of experience' and the corresponding brain states or brain events as the concepts with an identical factual reference.

Incommensurability in the explanation of behaviour

But the fact that in its Skinnerian form the S-R behaviorist language no longer contains any reference to events intervening between the objectively observable inputs and objectively observable outputs does not make it any the less effective as a conceptual tool in the analysis, description and explanation of the behaviour of organisms. We still have three alternative languages apparently competing for the right to explain the objectively observable facts of behaviour, each with its own distinctive evidential basis, each constituting what Kuhn (4) and Feyerabend (2) have called mutually 'incommensurable paradigms'. As Kuhn puts it "the proponents of competing paradigms are always at least slightly at cross purposes. Neither side will grant all the non-empirical assumptions that the other needs in order to make its case. Like Proust and Bertholler arguing about the composition of chemical compounds, they are bound partly to talk through each other. Though each may hope to convert the other to his way of seeing his science and its problems, neither may hope to prove his case. The competition of paradigms is not the sort of battle that can be resolved by proofs" (4 p. 148).

In the case of the kinds of incommensurable scientific paradigms or languages discussed by Kuhn, the problem of conflicting paradigms is resolved in the course of scientific progress either by one paradigm gradually displacing the other within the scientific community or by the adoption of a new paradigm which is equally incommensurable with the other two, but which has the advantage of incorporating within a single coherent frame of reference the different 'evidential bases', as Feigl calls them, around which the two pre-existing paradigms were constructed. In my view however, there is reason to think that no such resolution of the conflict between these three incommensurable paradigms of behavioural explanation is to be expected, not because the evidential bases of the different languages are different (for there are many examples in science of concepts and theories such as those of heat and electricity to mention but two which have come to depend on a variety of different evidential bases), but because each of them has a distinctive and irreplaceable explanatory function to perform.

The evidential basis of mentalist language

However before proceeding to a discussion of the different explanatory functions of the three different languages of behavioural explanation distinguished by Feigl something needs to be said of correcting the account which he gives of the evidential basis of the mentalist language of ordinary discourse. In speaking in his 1950 paper (1a) of "the qualities of direct awareness" and "introspection" and in his 1958 paper (1b) of "the raw feels in experience" as the evidential basis of the mentalistic language, Feigl is falling in with the traditional view of the introspective psychologists of the 19th century who believed that all mental concepts refer to features of the introspectible private experience of the human subject. In the light of the considerations presented by Wittgenstein (13) and Ryle (9) this view of the nature of mental concepts in general is no longer tenable. It is true as I would hold, that there <u>are</u> mental concepts, such as the concept of 'private experience' itself, which <u>do</u> refer to introspectible private experiences of the human subject, but this is not true, either of the majority of mental concepts, nor in particular of those concepts like 'believing', 'wanting' which, as we saw in the previous section of the course, are most closely and directly implicated in mentalist explanations of behaviour. When for example, we explain the fact that someone greeted a total stranger in the street by saying that he mistook him for someone he knew, what explains his behaviour is his belief that the stranger he saw was his friend, not the visual experience that he had when he looked at him. The resemblance between his current visual experience and the visual experience he normally has when looking at his friend no doubt explains his acquiring the belief that it is his friend that he sees; but it is the belief not the experience <u>per se</u> which explains what he does (6).

But Feigl's account of the mentalist language is not only misleading in so far, as it takes 'private experience' rather than mental dispositions like 'knowing', 'believing', 'wanting' and 'intending' as the central concepts in the mentalist language considered as a conceptual system used in explanation of behaviour, it is

also misleading in so far as it implies that introspection is the only, or even the most important evidential basis for the assertion of proposition expressed in the mentalistic language. Whatever may be true of the concept of 'private experience', the evidential basis for assertions about what a man knows, believes, wants or intends, as we saw in the last lecture, consists partly in what he does, in the sense of the changes he brings about in his environment and partly in what he says. Moreover the things that he says which provide evidence of what he knows, believes or wants are not in any intelligible sense reports that he makes on the basis of introspective observation of his own mental states and processes. As we saw last time, they are either statements which he makes, not so much about himself, as about the environmental situation in which he finds himself and the probable consequences of different contingencies and courses of action, or requests and commands that he makes in order to secure the compliance of others.

The Explanation of facts and the explanation of phenomena

In discussing the explanatory function of dispositional concepts in Lecture 6-1, I drew a distinction between explanations that are give of particular facts and explanations of recurring phenomena. I argued that in explaining particular states of affairs and particular occurrences we subsume the particular fact under some law or dispositional statement which describes the phenomenon of which the particular fact in question is an instance. I also argued that in order to explain a recurring phenomenon as opposed to the particular facts of which it is an instance, we regularly look for a micro-reductive explanation in terms of the properties and inter-relationships between the elements of which the substances and processes involved are composed. If this principle is applied to the problem of explaining the behaviour of organisms, it leads us to expect two distinct types of explanation and at least two distinct conceptual systems or languages associated with each type of explanation.

One type of language would be expected to consist of molar dispositional concepts, the terms of which serve to characterise the behavioural dispositions of the organism as a whole. The function of a language consisting of terms and concepts of this kind would be (a) to state, but not to explain, the laws and principles governing the behaviour both of the individual organism and of organisms in general and (b) to explain particular behavioural facts, i.e. what a particular organism did on a particular occasion, by reference to the dispositional properties of organisms in general and those peculiar to the particular organism in question.

The second type of language would be expected to consist of molecular concepts, terms which serve to characterise the relevant component parts of an organism, the dispositional properties of those parts and their causal interaction. The function of this second type of language would be to explain the laws and principles governing the behaviour of organisms in general and the individual organism in particular, as stated in terms of a molar language of the first type. It would not be part of the function of such a language to explain the particular facts of behaviour such as what a particular individual did on a particular occasion, except in so far as what he did constitutes an instance of a recurring behavioural phenomenon.

Now if we examine Feigl's three languages in terms of this distinction, it is not difficult to see that his neurophysiological language is a language of the second or molecular type whose function must therefore, be to explain but not to state, the recurring phenomena of behaviour, both those which apply to organisms in general and those which are subject to individual differences. Equally clearly the language of stimulus-response behaviourism is a language of the first or molar type whose function must be to state, but not explain, the recurring phenomena that characterise both the behaviour of organisms in general and that of particular individuals and to explain the particular actions of particular individuals on particular occasions by subsuming them under the laws and principles stating the recurring behavioural phenomena of which they constitute instances.

I have already argued in Lecture 12 that, when we use a mentalist explanation of behaviour in terms of what the agent believes and what he wants, we are characterising behavioural dispositions of a rather general kind which are peculiar to the particular individual concerned and that therefore, the function of such explanations is to explain and predict the particular actions of the individual on a particular occasion. It follows from this that in terms of the distinction between molar and molecular explanation the mentalistic language and the language of S-R behaviourism are equally molar and thus equally concerned with the explanation of particular behavioural events, in contrast to the neurophysiological language which is a

molecular language concerned with the explanation of behavioural phenomena which may be stated in terms of either of the other two languages. This means that the molecular language of neurophysiology is not in competition with either of the two molar languages, since its function is to explain what can only be stated in the molar languages, namely behavioural phenomena, and not to explain what the molar languages serve to explain, namely particular behavioural facts. On the other hand the two molar languages, the mentalist and the S-R behaviourist are in direct competition both in stating the phenomena of behaviour and in explaining particular behavioural events.

The rivalry between the supporters of molar concepts derived from the mentalist language of ordinary discourse and those of S-R behaviourism has undoubtedly been the most divisive and controversial issue in psychological theory since the language of stimuli and responses was first introduced into Psychology by Watson (11) sixty years ago. Indeed I am inclined to think that problems of incommensurability and the consequent failure of communication only arise between psychologists who think in molecular neurophysiological terms and those who think in one or other of the two molar languages in so far as the molecular theorist states the behavioural phenomena he is aiming to explain in a different molar language from that employed by the molar theorist he is talking to. In other words any problems of communication that arise between languages at the molar and molecular level of explanation are by-products of the conflict between the two rival languages at the molar level.

Two molecular languages in the explanation of behavioural phenomena

The problem of how to resolve this conflict between mentalism and S-R behaviourism will be the topic of the next lecture. I propose to conclude the present lecture by drawing attention to the existence of two distinct types of language at the molecular level of behavioural explanation, making four basic types of theoretical language used in explaining the behaviour of organisms, as against the three mentioned by Feigl. For in addition to the language of neurophysiology which describes the functioning of the central nervous system in terms of the interaction of units such as neurons and specific areas of the brain which can be distinguished anatomically, much of the theoretical work which has been done over the past quarter of a century (12) towards the explanation of behavioural phenomena in terms of the working of the central nervous system, has been in terms of machine models and schematic information flow diagrams which represent the formal relations which are presumed to hold between different parts of the central nervous system in order to account for the properties exhibited by the system as a whole.

Although those who construct such models, whether on paper or as a working system, assume that ultimately the various components which they find it necessary to postulate will be identified with particular anatomically defined structures within the central nervous system, the model as such describes a set of relationships which can have a number of different possible 'physical realisations', as Putnam (7) has called them, of which the realisation in terms of a complex system of electro-chemically interacting neurons is only one. Consequently the language in terms of which such a system is described need not overlap at any point with the language of neurophysiology proper.

There are it is true, a number of different models of this cybernetic-information flow type in existence some of which provide rival explanations of the same set of phenomena, while others provide complementary explanations of different aspects of the behavioural control process. Nevertheless there are, so far as I am aware, no serious problems of conceptual communication or incommensurability between those who subscribe to these different models. Despite differences in theoretical vocabulary, there is an important sense in which they all speak a common language. Nor apart from the difficulty which many neuro-physiologists find in thinking in these highly abstract terms is there any serious problem of incommensurability between the language of cybernetics and the language of neurophysiology.

The identity of factual reference

Finally and by way of conclusion what are we to say in the light of this analysis about Feigl's thesis concerning the identity of the factual referents of the four different language we have distinguished? In the first place we can now see quite clearly that, in so far as the molar languages of behavioural explanation serve to characterise the behavioural dispositions of the organism, the referents of propositions stated in the S-R behaviorist and mentalist languages are quite different from those expressed in the molecular languages

of cybernetics and physiology whose referents are states and processes within the brain. However the concepts employed in mentalist explanations of behaviour are not the only mental concepts in ordinary language and when we come on to discuss this problem in Section 6 of the course we shall see reasons for supposing that other mental concepts, particularly those which refer to mental processes rather than to mental states and mental dispositions, do have the same factual reference as certain, at present unspecifiable, processes in the brain.

As far as the factual reference of the cybernetic and neurophysiological languages are concerned, it is clear that in so far as the cybernetic language succeeds in referring to anything, it must refer to the same processes and relationships as are characterised in terms of the neurophysiological language, although it may happen that the same machine model which correctly describes the functional relations of units within the brain also correctly describes the relationships between unit of an entirely different composition which make up some other quite different existing system such as a computer, which happens to be isomorphic with the brain in this respect.

The really difficult question which we shall consider in the next lecture is the extent to which the two molar languages, mentalism and S-R behaviourism can be said to have the same factual reference.

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