MAKING SENSE OF PIAGET

By Christine Atkinson

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The Philosophical Roots

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TO ADRIAN

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Preface

This book is intended to introduce students of child development to the underlying philosophical orientation of Piaget's theory. Without some grasp of this the theory cannot properly be understood. The book does not presuppose a previous knowledge of philosophy but aims to introduce the central issues in simple terms which will help the reader to see what is at issue.

If I have succeeded to any extent in these aims the credit is due to my husband, Adrian Atkinson, who is a severe critic of any kind of jargon or academic pretension. His gift for cutting through the peripheral details to the central issues was invaluable in keeping me on the central path. His overwhelmingly positive support and encouragement ensured that the book was finally completed.

The final draft of the book was written while I was on sabbatical leave at the University of California, San Diego. I have to thank my colleagues at the University of Aston, Graham Shute and Alan Foster, for making that possible by taking over my teaching duties for the year. In San Diego, I benefited from the environment of the UCSD philosophy department, in particular from discussion with Dr Avrum Stroll and his graduate students.

My gratitude must also go to Dr David Meister who by his pertinent questions forced me to clarify my own aims in writing the book and helped to structure the argument more systematically.

My debt to Professor David Hamlyn will be clear to anyone familiar with his work. He gave me the initial stimulus to follow through my earlier work on Piaget and has continued to be a source of help and encouragement.

Many of the themes in this book have been tried out on several generations of students at Aston. I have benefited from their comments and criticism and thank them for their forebearance.

I owe a longstanding debt of gratitude to my friend, Michael Partridge of the University of Aberdeen. It was he who taught me always to look beneath the surface of things to the philosophical issues and perplexities underneath. I hope that his influence shows throughout the book.

Finally, I thank my children, Ana and Charlie. They have shown great patience throughout the days of writing and their manifest complexity and individuality have reaffirmed my belief that understanding children is more difficult and more exciting than even Piaget supposed.

Introduction

VIEWPOINT OF THIS BOOK

Piaget has been publishing work on child development since 1920. In all that time he has never abandoned his original theoretical framework for the understanding of human development. This framework insists that intelligence is essentially a biological phenomenon; its development is best understood as the development of a sophisticated and highly successful adaptation device. This device enables human beings to organise and structure their experience according to concepts and ideas which eventually form the complex system of objective human knowledge.

Piaget is considered by Anglo-American psychologists and educationalists to be an empirical psychologist. His theory is seen as an empirical theory making testable predictions about how children learn. Most of the critical comment on Piaget's theory has been made by psychologists who have tried to replicate Piaget's experiments or who have made similar observations and done similar experiments. (Overviews of replications of Piaget's experiments can be found in Modgil and Modgil, 1976, vol.I.) As with most empirical theories, this has led to some revision and refinement of the original claims. But in the main, the central principles of the theory have withstood these tests even though many of the details have been altered.

However, there is a different but equally legitimate and fruitful way to approach Piaget's work. Although Piaget has not objected to the label of 'psychologist', he has always called himself a 'genetic epistemologist'. By this he means that his main concern is to explicate and account

for the nature of human knowledge. Epistemology, in this sense, has traditionally been thought of as the territory of the philosopher rather than the psychologist. Psychologists can legitimately interest themselves in individual differences between learners and even attempt to develop a general learning theory. But the nature of knowledge, general questions about its source, origin and justification have always been considered the subject matter of philosophy.

This is more than a quibble about the boundaries of two jealously guarded disciplines. Psychology claims to be an empirical science. Psychologists make careful observations, perform experiments and claim to discover things (from empirical data) about the real world of people. Philosophers, on the other hand, do not have any special observation techniques; they do not perform experiments and they do not claim to discover hitherto unsuspected facts about the real world. They claim only to bring out logical and conceptual connections between ideas and beliefs by a priori analysis of those ideas and beliefs.

Piaget, surprisingly, is claiming that his apparently empirical discoveries based on apparently empirical data can illuminate questions about the nature of knowledge. These questions have traditionally been considered to be philosophical questions which can be illuminated, if at all, only through a priori philosophical analysis.

Piaget's theory can legitimately be considered in two ways. First of all it can be considered as an empirical theory. From this viewpoint we can ask: Are Piaget's experiments repeatable? Are his results reliable? Secondly, Piaget himself makes claims about the relevance of his theory to philosophical questions about the nature of knowledge. In view of these claims we can ask: Is Piaget's theory acceptable as a philosophical view about the nature and origin of human knowledge?

At first sight this question might not seem to hold much interest for the empirical psychologist intent to refute or confirm Piaget's theory by empirical means. But this question must be relevant. Philosophy is about coherent thinking and any theory which makes philosophical claims that are unacceptable is making claims that are in some way incoherent. Incoherence is unacceptable, as even the most hard-headed of empiricists must agree, at the heart of any theory.

In Piaget's work, the theory is what connects all the detailed observations together and justifies the interpretation of the empirical data. This would, of course, be true of any scientific theory. If the theory itself is unacceptable either because it can be shown empirically that it does not fit the facts or because it can be shown a priori to be incoherent, then the observations become no more than a string of unconnected facts and the interpretation of the data is no longer justified. If the theory were shown to be incoherent the empirical tests would no longer be relevant to either establishing or refuting it. The observed facts themselves might still stand. Whether they did or not would depend on the degree of interpretation that was required for their description. But testing the reliability of the facts would no longer be a relevant test of the theory itself.

In this book, Piaget's theory will be considered from the point of view of its coherence and philosophical adequacy, not from the point of view of its empirical testability. The scrutiny of a theory for coherence, conceptual clarity and philosophical adequacy is logically prior to its testing for empirical reliability. This is so because the description of the empirical facts relies to a greater or lesser extent on the interpretation of data afforded by the theory itself. In some theories the interpretative element might be minimised but in Piaget's theory it is paramount.

CRITICISMS OF PIAGET'S THEORY

In his autobiography (Boring, 1952), Piaget claims that he could see indications of the idea that was to predominate his intellectual work for the rest of his life in the very earliest things that he wrote. This predominant idea was that intelligence is essentially a biological phenomenon, and that its development and nature can only be properly understood in a biological context. This idea, as Piaget understands it, leads firstly to his claim that empirical facts and empirical investigations are relevant to the establishment of philosophical conclusions. Secondly, it leads to his claim that psychology can provide a causal explanation for the direction and sequence of human intellectual development. This causal explanation, for Piaget, would not be different in kind from the causal explanations advanced by biologists for the direction and sequence of physical development.

Recent work in both philosophy and psychology has called into question both of these claims of Piaget's. Some philosophers regard Piaget's contention that empirical facts are relevant to philosophical conclusions as a gross confusion (see Hamlyn, 1971).

On the other hand, some psychologists argue that explanation of human development in terms of logical structures, developed through a process of equilibration cannot provide a psychological explanation (see Bruner et al., 1966; Feldman and Toulmin, 1976).

Piaget's theory, then, has not met with the acclaim that initially greeted his empirical studies of children. Recently, within the last five years or so, there has been increasing criticism of Piaget's empirical work, questioning not only his way of achieving his results but also his highly interpretative presentation of them. (See Brown and DesForges, 1979; Donaldson, 1978; Siegel and Brainerd, 1978.) In the face of this criticism, Piaget consistently maintained that his critics did not pay sufficient attention to or did not sufficiently understand his theory. In the early 1960s, in the foreword which he wrote to Flavell's treatment of his work (Flavell, 1963), Piaget complained that too much attention had been paid to the details of the empirical studies at the expense of the theoretical concepts. And as recently as 1976, in her foreword to a book of critical studies (Modgil and Modgil, 1976), Inhelder had the following to say: 'We are somewhat disturbed by the fact that the replication of our experiments does not always show sufficient understanding of Piagetian theory on the part of the authors of these new works.' These comments show the importance that Piaget attaches to his theory. In his view his experiments must be understood within the framework of the overarching theory. Otherwise, the results will be misinterpreted.

Negative results obtained from the attempted replication of one or another of Piaget's empirical studies do not seem to carry much weight with Piaget. A serious criticism of Piaget's claim that sensori-motor activity must precede concrete operational ability was made by N. Jordan. Jordan met a person in her early forties who had normal, adult intellectual capacities but who had the body of a neonate. Since she had been unable to use her body from birth, she could never have engaged in sensori-motor activity and yet she was able to engage in not only concrete operational but also abstract operational thought. In answer to Jordan's query, H. Sinclair replied on Piaget's behalf:

> Cases such as you quote are not at all exceptional and do not constitute counter examples to his (Piaget's) theory. In fact, 'sensori-motor activity' has to be taken in a very general sense, and does not necessarily imply using your hands, running around, etc. ... It implies that activities are assimilated and accommodated, and this is the case with any child that lives since it has to eat and drink (involving assimilation and accommodation - and drinks and eats very different things, and adjusts the movements according to the substance) and since it has perceptual activity.

Piaget brushes off, then, what would appear to be a serious criticism of one of his major claims. His view is that 'sensori-motor' activity need not be interpreted so as to include the things that he usually talks about in his descriptions, reaching and grasping, eye-hand co-ordination and the like. All that is essential to the concept of sensori-motor activity is that there should be some accommodations and assimilations. Other negative results discovered by other empirical observations (Bryant, 1974; Burton and Radford, 1978) are discounted on the grounds that the details of the theory are relatively unimportant. Piaget is not surprised that they might not be correct. But still he maintains the theoretical framework will stand. It is the main principles of the theory which he regards as unshakable.

Piaget's theory is extraordinarily complex. There are two main reasons for this. The first is that some of his concepts are difficult in themselves. He has been elaborating his theory for over sixty years and in that time some of the concepts have changed their meaning and their emphasis. The second reason is the interrelatedness of the theory and its all-embracing nature. The major explanatory concepts of the theory depend on each other for their meaning. A 'valid' structure, for example, is equilibrated. Equilibration implies a balance between accommodation and assimilation. But this balance is assessed by considering the organisational properties of the structure which make it 'valid'. None of the concepts can be understood in isolation from each other. Piaget often distorts these concepts or makes them vacuous by trying to use them to account for all and every aspect of human knowledge. The reply to Jordan's criticism quoted above is an example of this.

The theory, then, because of its complexity and abstract nature, is not easy to comprehend. But given this, is Piaget justified in claiming that he is so rarely understood?

Why do his critics fail to pay sufficient attention to his theory?

Piaget is led by his concern with philosophy to embed his cognitive developmental theory in a philosophical theory about the nature of human knowledge and the human mind. Because Piaget's philosophical roots lie in the European rationalism of the late nineteenth and early twentieth century, this philosophical theory turns out to be essentially rationalist. His Anglo-American critics among both philosophers and psychologists, do not share this background. On the contrary, their philosophical roots lie in empiricism or the later philosophy of Wittgenstein.

This means that the differences between Piaget and his critics cannot be settled in terms of considerations relevant only to developmental psychology. Their differences are philosophical. This may help to explain Piaget's curious imperviousness to criticism of the details of his investigations. He regards the details as fairly unimportant. What is significant for him is the overarching theory. And to understand and criticise this requires that one go into much broader issues concerning the nature of human knowledge and understanding than his empiricist critics have thought necessary.

It is perhaps this which Piaget has picked on when he has accused his critics of failing to properly understand his theory. Coming from a different philosophical tradition, they bring to Piaget's theory fundamentally different ways of viewing the nature of psychological explanation and the nature of human knowledge.

RELATION BETWEEN PHILOSOPHY AND PSYCHOLOGY

Piaget's attitude towards philosophy and philosophising is ambivalent. On the one hand he recognises the importance of philosophical questions and their relevance to the study of the human mind. But on the other hand, his continental European background leads him to identify philosophising with speculative metaphysics. Consequently, while recognising the importance of the philosopher's questions, he is led to scorn both their methods and their answers. He complains that while metaphysical speculation can turn up some interesting views, it cannot lead to the rational 'solution' of problems since 'value and commitment' are inextricably mixed with the theorising and it is impossible to obtain an objective viewpoint (Piaget, 1970, p.13). He

believes that his own theory which he characterises as 'constructive' and 'epigenetic' is both scientific and can solve philosophical problems.

To many philosophers and psychologists educated in the tradition of philosophical analysis, this looks like a confusion. In the main, British and American philosophers and psychologists make a sharp distinction between analytic and synthetic truths. And they would maintain that it is the philosopher's job to seek analytic and conceptual truths and the scientist's job to seek empirical truths. A related distinction is made by Karl Popper between justification and discovery. This discovery of knowledge he claims can be the subject of psychological investigation. But the justification of knowledge is a logical matter. How a child learns that 2 + 2 = 4 might be a subject for psychological investigation but the truth of the proposition that 2 + 2 = 4 is a matter for logical or mathematical justification. No amount of psychological evidence can establish whether or not 2 + 2 = 4, so psychology is irrelevant to questions of justification.

If these arguments can be accepted it would imply that Piaget's theory of genetic epistemology (if it is said to rest on empirical evidence and to involve reference to the psychological or mental states of individuals) could have nothing to say to traditional, philosophical epistemology. It would, in fact, be entirely misconceived.

However, we can look at Piaget's theory in another way. If he does have a genuine philosophical alternative to empiricism, rationalism and so on, then we can question the status of the so-called empirical facts that are supposed to support it. One can, that is, question whether genetic psychology is a genuinely empirical undertaking. It could be the case that what Piaget is doing is what Popper would accept as genuine epistemology, that is, he is exploring logical and conceptual relations between theories, propositions, concepts and so on. It is this second view which seems to capture more of the spirit of Piaget's investigations than the former suggestion that his whole undertaking is misconceived. But it does have serious consequences for the scientific status of Piaget's theory. If it is the case that Piaget's theory is a blend of the empirical and the conceptual then the conceptual side of the theory will have a degree of certainty and necessity not shared by the empirical investigations. Piaget's claim that the invariant order of the stages of development is necessary does not help his claim that his

theory has empirical significance. Popper has shown that it is a serious mistake to regard the certainty of a theory as an indication of its scientific value (Popper, 1959). Showing that the relationship between the stages is one of logical implication and so a necessary relationship makes experimental work unnecessary; a theory based on logical or conceptual relationships is bound to be confirmed for there is no possibility of falsification. Piaget's theory is not a better theory simply because it asserts that the order of appearance of the stages is a logically necessary rather than an empirical matter. The necessity of the order of the stages cannot depend on any empirical facts since these cannot, by definition, be necessary. It must depend either on the defining of the higher stages to include the lower stages. Or else it must depend on the overarching theory of the determinants of development. Piaget's theory uses both these reasons in claiming that the sequence of stages is necessary.

QUESTIONS THAT CONCERN PIAGET

Piaget distinguishes three stages of psychological research. The first aims to establish general laws, and the second and third are concerned with causal explanation. He denies that an explanation can be reached simply by generalising from data. He says that a law does not explain anything since all that it does is to verify the generality of a factual relationship. The elements of a causal explanation are the deduction of one law from another and the positing of a substrate 'either actual or "model", concrete or abstract' (Piaget, 1968, p.161). This substrate is presumed to support the formal deduction of one law from another and to 'represent' its various connections. Piaget says that a causal explanation is not appropriate in mathematics. Although one is not simply confined to generalising from laws but can show how one law is deduced from another, there is no necessity to search for a substrate which will provide the reality underlying the logical deduction, since the only relations relevant to mathematics are deductive relations. The psychologist, on the other hand, is searching for causal explanations, so he needs to supply some real or concrete substrate.

Piaget is hoping to furnish some kind of causal explanation of the emergence of different forms of thought. He is not trying simply to generalise from his data but to provide a theoretical framework within which he can account for the emergence of these forms of thought. He wants to explain

why it is that understanding develops in the way that it does; why it is possible to talk of stages of development and what this signifies for the nature of human knowledge. In discussing the development of elementary logical and mathematical concepts he insists that a psychological explanation is a causal one. He says:

> So, it is clear that a psychology of behaviour thus forced to place itself in a genetic perspective, finds itself for this reason faced with problems of causal explanation. For example, how can we explain that these sensori-motor displacements lead to a structure involving a direct combination of displacements (AB & BC & AC if ABC is not a straight line), an inverse composition (return) and an associative one (detour)? Is this structure innate? (We have just seen that it is not). And if it is not can it be assimilated in a simple summation of physical experiences or does it result from a progressive equilibrium of sensori-motor co-ordination? Why is this structure, once acquired through actions, not immediately imposed on the thought of the child as soon as the latter is capable of imagining displacements? How is it reconstructed at the level of thought and why does this reconstruction not require an elaboration of the most elementary intuitions? ... etc. (Beth and Piaget, 1966, p.158)

These are the kinds of problems that Piaget is wanting to explain in causal terms. They are questions concerning the acceptance of norms by the child. We can see, given a mathematical proof, why one proposition follows from another. What Piaget is interested in is how children come to see this. That it is mathematically correct is not in dispute. The psychological problem as Piaget sees it is how we come to see the correctness of a mathematical proof and be convinced by it. On his own view of the nature of causal explanation he must show:

(a) That the facts he wants to account for are general;
(b) That they can be formally deduced from each other and;
(c) That there is a substrate, actual or model, concrete or abstract, which provides the underlying reality of the logical deduction.

PIAGET'S TWO KINDS OF EXPLANATION

Piaget uses two different kinds of explanation of the general facts that he discovers: an explanation in terms of the biological model of assimilation and accommodation and an explanation in terms of a probabilistic, structural

model. This is what one would expect given his views on the nature of causal explanations. The structural model is offered to show that the facts to be explained can be formally deduced from each other. The biological model provides the substrate, the underlying reality of the logical model. He does not himself distinguish these explanations as alternatives. He seems to think that he is offering one explanation of the facts and that the structural and biological are different facets of one explanation and add up to a composite view of the development of intelligence. When he can show that the formal relations between laws follow the actual temporal relations between events then he achieves his ideal explanation.

Apart from the requirement that any causal explanation should have a formal and a 'real' aspect, Piaget has several other reasons for offering explanations in terms of a biological and a structural model. He has, as he explains in his autobiography, been directed by the single idea that biological and intellectual functioning are not different in kind, that intellectual abilities are simply another 'biological device' for adapting to the environment. Since he sees logic as the essence of intellectual functioning he naturally tries to show how a biological explanation can be offered for the emergence of logic. However, the nature of logic raises questions of truth and validity. Although Piaget has little to say about truth, he offers his structural model as a counterpart to his biological model. The first is an explanation of the emergence of logical thought, the second is offered as an explanation, or at least explication, of its validity.

It is at this point that Piaget and his critics fail to understand each other. The critics argue that validity requires a formal or logical justification and a psychological explanation of it is simply irrelevant. Conversely, to offer as a psychological explanation some sort of formal justification is simply inadequate. Piaget, who thinks that the valid logical structures grow out of the equilibrated action systems of the sensori-motor period and are consequently representations of reality, makes no such sharp distinction between formal justification and psychological explanation. The failure in communication between these two views on the nature of psychological explanation arises from different philosophical assumptions about the nature of reality and the relation between knowledge and reality. Consequently, to understand this disagreement it is necessary to understand something of the different philosophical traditions.