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THE CONCEPT OF CONTRADICTION IN
THE STUDY OF COGNITIVE DEVELOPMENT

LINDA KATHRYN HORT

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Linda K. Hort

Linda K. Hort

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ABSTRACT

In the psychology of cognitive development contradiction has been studied for two reasons. The first is that contradiction has been hypothesised to play a causal role in cognitive development. The second is that progress in children's understanding of contradiction exemplifies the development of their logical thinking.

This thesis examines children's responses to contradiction from both these viewpoints.

The thesis is divided into three parts.

In Part 1 the hypothesis that contradiction plays a causal role in development is examined. Following a discussion of the literature (Chapter 1), the definitions of the terms used in the thesis are introduced (Chapter 2). In this chapter three different situations in which contradictions can be presented are distinguished. These are: 1) a contradiction between two internally represented beliefs, 2) a contradiction between an internally represented belief and an external source of information, and 3) a contradiction between two external sources of information. Part 1 of the thesis is concerned only with situations 1 and 2.

In Chapter 3, Experiment 1 is described. In this experiment children aged from 5 to 11 years were presented with tasks exemplifying situation 1 and situation 2 contradictions. The experiment found that children's reactions to contradiction varied according to the type of situation used to present the contradiction. The experimental findings also raised a problem with the situation 1 method of presenting a contradiction.

Experiment 2 was therefore conducted with a small sample of 5 and 6 year old children as a methodological exercise to test the validity of this method of presenting contradictions to children (Chapter 4). It was concluded that this situation does not provide clear data on the children's reactions to contradiction because conclusions drawn from its use are highly dependant on the inferences made by the experimenter.

In the third experiment, 5, 7, 9 and 11 year old children were presented with a contradiction using the situation 2 method of presentation (Chapter 5). From this experiment it was concluded that children are undisturbed by contradictions and simply assume that either their belief or the external source of information is incorrect. They consequently eliminate the contradiction.

In Chapter 6 the evidence from the first three experiments is reviewed and integrated and it is concluded that there is no evidence to show that contradiction plays a causal role in cognitive development.

In Part 2 of the thesis the understanding of contradiction as an example of logical thinking is examined. Chapter 7 presents a review of the literature showing that there is some debate concerning the age at which children recognise and understand a contradiction in the situation 3 defined in Chapter 2 (a contradiction between two external sources of information). An experiment is then described (Chapter 8) in which 5 and 6 year old children were presented with a logical contradiction in a verbal form. It was found that 6 year old children could recognise the contradiction. This age is considerably lower than that found by several studies in the literature. One of these studies was then partially replicated (Chapter 9) with children of 5 to 11 years of age and it was found that children needed to be

appreciably older than 6 years of age before recognising a contradiction. An apparent discrepancy between the findings of Experiment 5 and Experiment 4 therefore required explanation which is provided in Part 3 of the thesis.

In Part 3 of the thesis the evidence from Parts 1 and 2 is integrated, and it is suggested that the use of the concept of "contradiction" to unify the situations used in experimentation, and the children's behaviours in these situations, is dysfunctional rather than functional. An alternative explanation is suggested, which is that two mechanisms are operating when the child reacts to a "contradiction". These are a test for consistency and a formal understanding of logic, including logical contradiction. The test for consistency is suggested to derive from the concept of identity and the formal understanding of logical contradiction from the development of formal operational thinking. Chapters 10 and 11 develop and illustrate these suggestions. It is finally proposed that the ideas presented in the final chapters provide one point of departure for future work in this area.

INTRODUCTION

In the study of cognitive development in recent years one of the most interesting questions has been: what are the mechanisms of the process of cognitive development? There are no clear answers to this question. One strong candidate for the answer to this question, however, is the mechanism of the resolution of contradiction. This is clearly expressed in a passage by Furth (1972). When commenting on a paper given by Piaget at a symposium Furth said:

It makes sense to us to postulate that a child develops because he finds contradiction in his experience. The child encounters one viewpoint implied in one situation and a seemingly contrary viewpoint in another situation, so he has to coordinate these two views and in doing so grows mentally. (Furth, 1972, p. 26).

While the concept of contradiction and the processes for the resolution of contradiction have produced such interest in the last few years, the concept has not been defined by the researchers and theorists using it. In addition a host of different experimental situations have been used in investigating the effect of encountering contradictions on cognitive development.

Further, when reviewing the literature involving the concept of contradiction it becomes clear that contradiction is being studied for two quite different reasons. The first, as has already been mentioned, is that the resolution of contradiction has been hypothesised to play a causal role in cognitive development. The second is that contradiction is a logical concept. The study of the development of the child's comprehension of contradiction, then, is the study of the development of the understanding of a particular logical concept. The study of the development of the understanding of logical

concepts in general has been undertaken in other studies including, for example, studies of the child's understanding of the sixteen binary operations (Ward & Pearson, 1973), and of the axioms of the concrete operational groupings (Osherson, 1974, 1976; Langford, 1979). This research has also included some studies of the child's understanding of contradiction (Collis, 1975; Dixon, 1949; Osherson & Markman, 1975).

The questions raised by these two approaches to the child's reaction to contradictions are interrelated. It is difficult to accept that encountering a contradiction can play a causal role in cognitive development if young children cannot recognise contradictory statements or situations. However, the approaches used in studying the two questions have been quite different. The researchers studying the causal role of contradiction have used concrete situations to confront their subjects with contradictions. The researchers studying the development of logical thought have required their subjects to respond to contradictory symbolic communications. Implicitly the definition of contradiction used by each group of researchers has been different.

This thesis will begin by addressing the questions of the role of encountering contradictions in causal development. In doing this the terms used will be defined, and the experimental situations used will be examined. After the conclusions concerning the causal role of contradiction in cognitive development have been drawn, a second group of studies will examine the child's understanding of contradiction as a logical concept.

This thesis will conclude with an integration of the two groups of studies to indicate the effect of encountering contradictions upon cognitive development and to suggest the direction for further research in this area of cognitive development.