

MOTHERS AND CHILDREN :

AN ANALYSIS OF CHANGE.

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ANALYTICAL INDEX.A sketch of the major ideas advanced in this project¹⁾.

1. page 5.

In order to reveal the essence of the phenomenon studied, it is necessary to address the fact of development or change. In the present project, the emphasis is on the social actor confronting pre-existing social forms. Within this focus, the mother-child transaction is taken as a paradigmatic case in the sense that it highlights the three "lifelines" of change; biological, psychological, and social development. The explanatory account of the possibility of change is located at the level of generative mechanisms or enabling conditions. A rational reconstructive paradigm is adopted as a framework for the methodological and theoretical enterprise occasioned by the research project.

2. page 30.

The basis for the emphasis on generative mechanisms in the explanation of human action is discussed. This entails a

1) The idea of an analytical index is taken from Feyerabend (1975). In these sketches, no reference to authors or acknowledgement of the ideas or concepts will be made. Furthermore, the sketch of the major ideas does not involve an elaboration or explanation of those ideas which will be undertaken in the body of the report.

review of a "New Paradigm" for social scientific research suggested by Harrè and Secord (1983). The rationalist assumption inherent in the focus on the rules underlying action is made explicit. Furthermore, 'following rules' is taken as essentially both a reflection of intentional human praxis (the domain of psychology), and the transactional relation of people with each other over time (the social domain). This makes it imperative to consider the mode of connection between individual and society. In order to clarify this connection, Bhaskar's (1979) ideas regarding the link between the psychological and the social are discussed in terms of his general argument regarding the possibility of naturalism.

3.

page 51.

The possibility of intrinsic and extrinsic generative mechanisms producing overt performance is discussed. With this aim in mind the work of Piaget, Pascual-Leone, (who is presented as a neo-Piagetian) and then Vygotsky and those operating within what may be regarded as a Vygotskian paradigm (Wertsch and Feuerstein), are discussed. The central point of this discussion centres around what appear to be very different positions regarding the origin and development of mind. In this regard it seems necessary to clarify the distinction between locating the object concept in the mind's

structure, and addressing the social development of the object concept or the object-in-society. A resolution between these two positions is suggested in terms of a co-ordination between the Piagetian and Vygotskian paradigms for the study and explanation of mind.

4.

page 95.

A model is presented in which the Piagetian and Vygotskian traditions are co-ordinated. The specifiable domain of application for both of these, and the link between the two traditions, are clarified within a model that extends the ideas that "individual" and "society" are essentially different kinds of things. Furthermore, the idea that society exists only by virtue of human action which always expresses or utilises pre-existing social forms is recognised in the model. The concept 'mind-culture action dialectic' emerges as an important aspect of the suggested mode of connection between individual and society. The mind-culture action dialectic emphasises "mind-ing" and "cultur(e)-ing" in a domain of action that recognises intentionality on the part of the individual and the imbeddedness of action in (social) meaning.

5.

page 119.

Urban black Zulu-speaking mother-child dyads were chosen as social-actors. As people who are increasingly

participating in a western-industrialised-urban-technological-schooled society they provide one vantage point from which to describe different moments of change. Another vantage point is obtained from expert formulations of regulatory mechanism for psychological development. Between these two possible extremes, two intermediate moments of change crystallise from an analysis of the social-actors' engagement in culturally autogenous activities. Spanning these four moments of change are two data bases: an indigenous theory of childhood; and mediational operators. Together they provide a conceptual framework for the study of change.

6.

page 147.

The vantage point provided by urban black Zulu-speaking mother-child dyads is clarified through obtaining and systematising mothers' practical reasoning about children. The triad of practical reasoning -- desire, belief and action -- was obtained in three stages. The first stage involved individual interviews and questionnaire surveys with mothers. The second stage focused on mothers' assessments of their children's developmental status. The third stage involved negotiation of actors' accounts through group interviews. In order to systematise mothers' practical reasoning about children, "thick description" was used as a means towards rationally reconstructing an indigenous theory of childhood.

This indigenous theory provides the one data base from which to formulate generative mechanisms for change.

7. page 161.

The indigenous theory of childhood emphasises the importance of example and demonstration as teaching methods, and observation and imitation as the primary modes of learning required of children. Health is an important focus in childhood and is seen as a pre-requisite for children's sustained engagement in all activities that allow for the acquisition of adult competence. The specific skills regarded as important are: to communicate needs; to be self-sufficient; to uphold authority relations; to preserve and use social knowledge; and to display responsibility to other members of the community. These skills are desired for all children and believed to be necessary for the development of competence. The final aim is for children to complete as much formal western schooling as possible.

8. page 190.

The mothers' regulation of their children during engagement in culturally autogenous activities was investigated in order to describe a process of adapting to unfamiliarity. The investigation involved obtaining and analysing video recordings of mother-child interaction during

problem solving. The analysis occurred in two phases. The first involved evaluation and quantification of micro-aspects of the instructional process, while in the second phase an ideal instructional process was constructed. This construction focused on the mediational operators that generate efficient independent problem solving skills in children. The mediational operators provide another data base from which to formulate generative mechanisms for change.

9.

page 207.

Ten mediational operators are derived from a descriptive account of the zone of proximal development. These mediational operators are illustrated with extracts from the instructional process as black urban Zulu-speaking mother-child dyads engage in culturally autogenous tasks. Each mediational operator is illustrated and discussed in terms of the development of efficient autonomous problem solving skills. As such, the mediational operators are regarded as the dynamics of the zone of proximal development or necessary components of an ideal instructional process.

10.

page 269.

The indigenous theory of childhood and the mediational operators are both necessary for an account of the possibility of change. The process of change is captured in social actors' confrontation with culturally autogenous activities. In the analysis of this process the researcher confronts the issue of the necessary conditions for change. The necessary conditions for change emphasise both intrinsic and extrinsic generative mechanisms which produce dual-directional exchange when two systems are in transaction.

11.

page 287.

The generative mechanisms for development or change are elaborated. This elaboration proceeds on the basis of the thesis that intrinsic and extrinsic generative mechanisms co-determine change. When two systems that are different in terms of their functional structures together engage in a task, an exchange system is created between the participating systems and these systems and the task. The zone of proximal development may be conceptualised as such an exchange system in which intrinsic and extrinsic generative mechanisms regulate the transaction between the participants and the task. The dynamics of the transaction are embodied in the mediational operators which impose a particular organisation

on the engagement in a task. The resolution of the possible conflict between the task inherent demands and the system resources produces change. This may be termed the generative power of transaction. Moreover, the kind of output or response of the system(s) will impose a new organisation on the task and also the system(s) engaged in it, towards a process of continuous change or development.

12.

page 315.

The project is concluded with suggestions for future research. The one aspect of this involves a possible elaboration of the 10 mediational operators formulated in this project. Another aspect is concerned with reversing the (analytical) focus in the process of change investigated in this project. Both these suggestions for future research highlight the logic of discovery discussed in the preceding chapters. In conclusion three principles towards a theory of change are formulated and discussed.

THE PROJECT EXPLAINED.

1. Introduction.
2. A conceptual framework.
3. The origin and development of mind.
4. A model for the study of individual(s)
in society.
5. A methodology outlined.

"As I get older, I get less interested in the way a thing looks, and more interested in the spirit that hides within it; so that the things I made are meant to be looked into, rather than looked at" (Sam Smith quoted in Lucie-Smith, 1980 p.74).

SECTION OVERVIEW.

The five chapters comprising the first section of this report are aimed at elucidating the research paradigm adopted in the present project. As such, each chapter forms a basis for the discussion undertaken in the rest of this report : in chapter 1 the major tenets of the project as a whole are presented; chapter 2 and 3 together form the theoretical foundation for the analysis undertaken and presented in the next section entitled "Towards a theory of change"; chapter 4 is based on the theoretical resolution achieved in the foregoing chapters and integrates this into a model for the study of individuals in society; chapter 5 deals with the methodological principles underlying the methods used in this project.

The major tenets of the project as a whole presented in chapter 1, may be summarised as follows : 1) The study of change or development is a central aspect of the process of discovering the essence of a phenomenon. 2) If the phenomenon studied is the social actor it is essential to analyse the transaction between the individual and society. 3) In order to provide an explanation of human action the generative mechanisms which produce intentional and meaningful action must be explicated. 4) Rational reconstruction as a metatheory and method would seem to provide the best alternative to a positivist paradigm for the study and explanation of human action.

Chapters 2 and 3 are not meant as "literature reviews" but should rather be seen as a sketch of the theoretical constraints within which to locate a theory of change. In terms of the present project, a theory of change refers to the explication of the mechanisms and/or processes involved in the development of "mind" and "culture". The theoretical constraints suggested emphasise the substantial contributions of Harrè and Secord (1972), Bhaskar (1979), Piaget (1977), Vygotsky (1978) and those who have continued in the Piagetian and Vygotskian traditions, such as Pascual-Leone (1979), Wertsch (In Rogoff and Wertsch, 1984), and Feuerstein (1980). This selective review of authors, excludes notable figures such as Bruner (1966, 1971, 1972, 1973), Cole (1974, 1975, 1978) and the Laboratory of Comparative Human Cognition (In Sternberg, 1982), for example. These authors explicitly or implicitly, also address the "great divide" between the Piagetian and Vygotskian paradigms. Rather than dispute the advantages and disadvantages of each paradigm in terms of arguments available from commentators who either support, reject or combine the seminal insights of Piaget and Vygotsky, the division between them is addressed directly.

In chapter 4 the theoretical underpinnings of the project as outlined in the first three chapters are integrated into a model for the study of individuals in society. This model is based on what seems a necessary distinction between an

analytic model of the society/person connection, and a model which elaborates both analytical entities and their empirical realisations for the study of individual(s) in society.

Chapter 5 concludes the first section of this report with a description of the meta-method adopted in this project. In this chapter the aim is to provide a theoretical account of the methods used in obtaining and analysing the results presented in the next section. In this chapter a methodology for the study of change is presented in terms of the question, "How is entry into pre-existing social forms possible?" In the present project, the focus is on "non-westerners'" entry into "western" social forms. However, the methodology suggested allows for an empirical investigation of the possibility of the dual-directionality of exchange between two transacting systems.

In the body of the report to follow, each chapter will start with a précis taken from the analytical index. Each idea in this précis is then used as a section heading under which the idea is elaborated and discussed.

1. INTRODUCTION.

In order to reveal the essence of the phenomenon studied, it is necessary to address the fact of development or change. In the present project, the emphasis is on the social actor confronting pre-existing social forms. Within this focus, the mother-child transaction is taken as a paradigmatic case in the sense that it highlights the three "lifelines" of change; biological, psychological, and social development. The explanatory account of the possibility of change is located at the level of generative mechanisms or enabling conditions. A rational reconstructive paradigm is adopted as a framework for the methodological and theoretical enterprise occasioned by the research project.

In this introductory chapter, the parameters of the project are outlined. The ideas introduced are presented in summary form, to be explored fully in the rest of the report. It is important to state at the outset that this project revolves around a central question, namely, "what are the generative mechanisms for change or development?"¹. This question could be stated in many different ways and some of them are made explicit in the rest of this report.

An emphasis on generative mechanisms seems to capture the essence of the search for an explanation for Monod's question,

which also seems to capture important aspects of the present project, namely, "How does it come about that Man is Man?" (Quoted in Piatelli-Palmarini, 1981). At the heart of this question is the search for an explanation of the human "mind", of which Fløistad states: "For one thing, history has taught us that the mind should not be regarded as an entity existing independently of its surroundings, of history and historical change" (1983 p.1). This brings us to another aspect of the question, "How does it come about that Man is Man?", and that is the mind's surroundings or what may be termed "culture".

The quest for an explanation of mind², culture³, and the relationship between them, characterises much of the work in the disciplinary domains falling under the rubric of "Social Sciences". In this sense, the present project addresses age old issues, but in the hope that the co-ordination of the theoretical insights of those theorists selected for discussion, and the empirical work presented, will contribute to the formulation of a psychology of change.

THE STUDY OF CHANGE OR DEVELOPMENT

It is a central tenet of the present project that change or development should not have the status of a qualifying statement or afterthought to complete a description of some aspect of reality. On the contrary, it will be argued that all things ought to be considered in "their motion, their

change, their life, their reciprocal influence on one another" (Engels, quoted in Ollman, 1976 p.56), if the essence of the "thing studied" is to be revealed. For Vygotsky this means the study of process, not product; and for him this involves "a reconstruction of each stage in the development of the process; the process must be turned back to its initial stages" (1978 p.62).

In the domain of psychology the principle of reconstructing developmental stages as a basis for an explanation of the essence of a phenomenon probably achieves clearest expression in Piaget's work. Piaget reconstructed the genesis of logico-mathematical thought with reference to both the history of the child and the growth of knowledge. In this sense, Piaget has created a theory of, and method for, the study of change. Despite apparent differences with Vygotsky regarding the origin of higher mental functions in humans, Piaget may be regarded as the greatest exponent of the developmental method advocated by Vygotsky (cf. Miller, 1984). The contributions of these two theorists will be discussed in some detail in a later chapter. In terms of the phenomenon of change or development, the present project should be seen as an attempt to pursue the study of change in the manner exemplified by Piaget and made explicit by Vygotsky in his views on methodology in the human sciences.

It is a mistake to view this focus on change or development as an interest in only dramatic or revolutionary upheavals. It should be understood rather as a view of the world and of research activity in which participants are involved primarily through their confrontation with contradictions; contradictions between the familiar and the unfamiliar or the old and the new that highlight the issue of change.

So long as we consider things as static and lifeless, each one by itself, alongside of and after each other, it is true that we do not run up against any contradiction in them. We find certain qualities which are partly common to, partly diverse from, and even contradictory to each other, but which in this case are distributed among different objects and therefore contain no contradiction ... but the position is quite different as soon as we consider things in their motion, their change, their life, their reciprocal influence on one another. Then we immediately become involved in contradictions (Engels, quoted in Ollman, 1976 p.56).

For people carrying on the ordinary business of life, solving the mystery of how change is possible is vitally important. In life, the ability to adapt and deal effectively with change is experienced as the quest for mastery and meaning. People become involved in contradictions when they are required to adapt accepted ways of being to new circumstances; when discrepancies between abilities and goals become manifest.

For the social scientist, becoming involved in contradictions implies becoming involved in an attempt to account for contradiction. This may also be stated as a need to solve the problem of how change is possible or, expressed another way, to uncover the generative mechanisms for change.

An important ramification of the focus on the generative mechanisms for change may be stated as a concern with the seeming contradiction between universal human characteristics and particular individual and group adaptations to particular space-time locations. The problems inherent in confronting this will be dealt with throughout this report. At this point it is important to underline the idea that the study of people in their surroundings brings, to the fore of necessity, the issue of development or change. This is because not only are there individual lifespan changes between birth and death, but history bears testimony to changing interests, needs, and the ways in which they can be satisfied. The fact of change or development must therefore be addressed in the explication of how it comes about that people are everywhere recognisable as such while at the same time displaying marked individual and group differences in the ways that they act.

Changes over time on both the individual and social planes pose the important question of the relationship between individual development and social history.

We still do not know whether changes in socio-historical structures or changes in the nature of social practice result only in broadened experience, acquisition of new habits and knowledge, literacy, and so forth, or whether they result in radical reorganisation of mental processes, changes at the structural level of mental activity, and the formation of new mental systems. Proof of the latter would be of fundamental significance for psychology as a science of social history (Luria, 1976 p.12).

In the above quotation the emphasis is placed on the influence of social structures on individual (mental) structures⁴. But the problem should also be understood from the opposite perspective of how mental structures may influence social structures⁵. This, of course, brings to the fore the notion of feedback mechanisms between the individual cognitive system, and the social cultural system. The force of Vygotsky's argument (1978) that the development of higher mental functions occurs first between people (on the inter-psychological plane), and then within people (on the intra-psychological plane), resides in the possibility of feedback mechanisms between individual and social structures. Such feedback within the Vygotskian model for individual development exists in the form of an adult mediator or cultural guide who, through instruction or social communication, presents to the child a particular version of a constructed reality⁶. This idea will be discussed in detail in subsequent chapters. At this stage mention must be made of the idea of internal and external constraints on change.

The adaptation of a system (be it a psychological, social or biological system) to external pressures in the form of people, things, events, and so forth, is only possible to the degree allowed by the essence⁷ of that system, and the possibilities contained in the external conditions or "environment". As regards the internal constraints of a system, if the environment should change such that people, for example, were required to act in ways inimical to their genetic endowment, one could speak of a situation in which the internal constraints imposed on action preclude adaptation. This problem is best illustrated by referring to the case of extinct animals like the dinosaur. In the case of human action, however, extinct forms are often lost in the course of history. These adaptive failures do not, like the dinosaur as a biological adaptive failure, leave a fossil record that can submit to easy reconstruction. The less obvious nature of social and psychological 'extinction' should not obscure the fact that it also provides important illustrations of the process of adaptation of a system (social and psychological) to external pressures.

As far as external conditions are concerned certain cognitive, social or biological changes may not be possible given specific external conditions: for example, developing a space technology in a pre-literate agrarian society.

The important point in this discussion is the adaptive possibilities created through transaction. When two or more systems (be they psychological, social or biological systems) are in transaction, adaptation requires feedback mechanisms and the resolution of conflict (if internal and external constraints are at odds). Change, therefore, is possible through transaction but constrained by the essential character of the system(s) or elements of the environment with which the system is in transaction. This then highlights the necessity for explicating the generative mechanisms which allow transaction and conflict, and feedback mechanisms and the resolution of conflict.

The essence of a phenomenon or the essential character of a system is on the one hand captured by the notion of generative mechanisms, and on the other hand by the notion of internal constraints placed against external constraints. Both these refer to those structures or functions or functional structures⁸ which produce "a given thing's development in all its phases and changes - from birth to death..." (Vygotsky, 1978 p.65). And this, for Vygotsky, "fundamentally means to discover its nature, its essence, for 'it is only in movement that a body shows what it is'" (Ibid.)

THE ACTOR IN SOCIETY

The Vygotskian model for development allows for an analysis of the social constraints, or those conditions

external to the individual, whereas the Piagetian model allows for an analysis of individual constraints, or those conditions internal to the individual. Vygotsky and Piaget are therefore regarded as those who have contributed substantially to the search for an explanation of 'how it comes about that Man is Man'. Their respective theories are discussed and a co-ordination or resolution between their differing emphases is presented in chapter 3.

By way of introducing Piaget's theoretical account of the epistemic subject⁹, it is important to sketch the epistemological level at which this theory should be understood. Piaget presents a kind of explanation which removes his theory from the day-to-day struggles of people meeting the demands of their world. This is neither a failing in his theoretical account, nor an aspect that needs to be redressed. It is, however, an aspect of Piaget's theoretical account of cognitive development which must be recognised if one is to resolve the apparent contradictions between his and Vygotsky's models of development. In contrast to Piaget, Vygotsky focuses specifically on "mind in society" or what may be regarded as the social actor¹⁰ - an individual who acts, and is socialised to act, in a particular socio-historical context - who must confront the available resources (both people and material means) and who must meet the demands of a reality which already exists in some form before that individual life can take its course.

An important aspect of the present project is the clarification of the conceptual terrain between the epistemic subject and the social actor. This is related to another part of this project which may be stated as a concern with the link between individual(s) and society. This concern is embodied in the term 'social actor' and involves an explication of what may be referred to as the action link between the cognitive and cultural systems. This has already been alluded to in the discussion of the possibility of a transaction between these two systems. Briefly, this action link may be conceived of as a domain of co-ordination or an interface¹¹ between the individual or psychological, and the social domains of analysis. As such, the action link could be seen as described by the term 'socio-psychological' (Bhaskar, 1979 p.45) and it emphasises the necessary link between two systems - the cognitive and cultural in the present case - which are both essentially related to human action.

Society is only present in human action, but human action always expresses and utilises some or other social form. Neither can, however, be identified with, reduced to, explained in terms of or reconstructed from the other. There is an ontological hiatus between society and people, as well as a mode of connection (viz. transformation)... (p.46).

Bhaskar criticises at some length the various models that attempt to account for the link between individuals and society, and proposes an alternative model that takes account

of the ontological hiatus between society and people. His contribution is presented in chapter 2 and elaborated in chapter 4. At this point the aim is to introduce the idea of an action link between individuals and society which forms the basis of the model adopted in the present project.

Individuals usually act within pre-existing social forms. This is as much true for the ordinary¹² individual as the scientist who also must operate within prevailing paradigms and all that these entail. (cf. Kuhn, 1972). Some rare individuals sometimes create new social forms through major breakthroughs in any of the human endeavours. Furthermore, the total force of individuals acting in a "ready made" world not only reproduces social forms but also transforms them (cf. Bhaskar, 1979). People, either individually or as a result of the totality of their action, may therefore change social forms, but in general individual life is played off against a social background which has been constructed through the totality of individuals acting throughout the history of that group and also to some degree throughout the history of mankind.

A focus on individuals acting within pre-existing social forms has at least three components: the possibility of individuals fulfilling the demands of various social forms: the possibility of social forms engaging the individual in a particular way, and the transactional link between the two systems.

Mother-child transaction is taken as paradigmatic of a link between two systems because in this transaction the mother especially, but also the child, acts as an agent of society and in this way childrearing becomes the point of fusion between the social and the self. Furthermore, the child embodies both psychological and biological growth which constrain the manner in which the transaction can take place. In focusing on mother-child transaction, the question of the mechanisms that regulate the three "lifelines of change" - social, psychological and biological - becomes paramount as do the links between them.

The study of change within these domains of enquiry could be illustrated with references to the epistemological beacons created by Marx (analysis of history), Darwin (the theory of evolution), Piaget (the development of intelligence), and Vygotsky (the study of how social processes underlie the development of higher mental functions in humans). This project stresses the importance of change as a phenomenon that demands theoretical and methodological resolution. In this regard, Marx, Darwin, Piaget, and Vygotsky represent the figureheads for a project aimed at the study of individual action in pre-existing social forms. Piaget and Vygotsky are directly addressed and a co-ordination of their apparently contradictory positions is undertaken. Marx is indirectly incorporated through a review of Vygotsky and Bhaskar's ideas

about people and society. Although Darwin is not addressed in the present project, the principles inherent in biological evolution are, however, recognised in Piaget's theory of the development of knowledge.

Having provided a context within which this project may be located, that is the study of change, it is now necessary to relate this to the more immediate issue of the empirical reality confronting the researcher. The social scientist comes into contact with people going about the business of life. The order s/he imposes on this will depend to some degree on the questions asked, and as has been stated above, the question addressed here is 'what are the generative mechanisms for change?' In terms of the empirical problem this presents, Harrè and Secord (1972) state that most generative mechanisms have to be reconstructed from a disciplined use of the imagination. Their view on the methodology this involves is presented in chapter 2.

The present focus on social actors is an attempt to confront the fact that what the researcher meets are people acting in various roles: teachers, mothers, friends, research subjects, and so forth. In this sense the empirical reality of individuals and society, or the psychological and cultural systems, are manifest in the form of people fulfilling their social obligations in terms of role exercise with whatever individual characteristics this may entail. In other words,

what one sees literally when investigating the link between individuals and society, are social actors who act within the constraints imposed from within and from without, or the internal and external constraints clarified above. What may be undertaken given these "data" depends in turn on the broader theoretical framework adopted by the researcher.

AN EXPLANATORY ACCOUNT AT THE LEVEL OF GENERATIVE MECHANISMS

Throughout this introductory chapter the notion of generative mechanisms has been mentioned. Pitching explanation at this level needs, however, some justification. Harrè and Secord (1972), and Bhaskar (1979) look to the method used in the advanced sciences for their respective proposals regarding explanation in the social sciences. Both these theorists uphold some form of naturalism; and argue that there is an essential unity in the methods employed in the 'hard' and the 'soft' sciences even though the subject matter in the physical and social sciences respectively differs markedly. An important aspect of the methodology of the advanced sciences is the use of models to capture the reconstruction of those structures, mechanisms, processes, functions, and so forth, which may be assumed to produce the non-random patterns in nature and in behaviour. (See also Bunge, 1973, for a discussion of the use of models). Such generative mechanisms are therefore formulated on the basis of observed manifest

phenomena, and are seen as explaining those phenomena. This view of what counts as an explanation of manifest patterns is contrasted by Harrè and Secord with "description" and "critical description" (p.70). The term 'description' does not need clarification, and 'critical description' for them involves a statement regarding the relationship between two sets of manifest phenomena which provides correlational data on the co-variance between two sets of variables. This kind of account may be seen in the social sciences in terms of the often described correlations between certain individual performances, say on an intelligence test, and certain cultural phenomena, say weaning practices. (See Rhys Williams, 1983 p.233-236, for a detailed list of such relationships).

The problem with both description and critical description is that neither penetrates the obvious. This, of course, does not mean that they should not be used as means of making sense of nature and behaviour. In fact, both description and critical description may be necessary stages in research even though they do not count as explanations of the observed phenomena. Vygotsky (1978) adopts a similar position as regards the explanation of higher mental functions in humans as does Piaget (1977) whose account of cognitive development is in terms of explanatory structures and functions that generate performance.

The focus on generative mechanisms places very particular demands on the analysis of empirical data. The chapter on the methodology formulated for the ~~represent~~ project addresses this issue and the research paradigm that is adopted may be broadly stated as "rational reconstruction".

A RATIONAL RECONSTRUCTIVE PARADIGM

Psychology as a discipline seems to provide more examples of major theoretical contributions (or paradigm shifts in the Kuhnian sense) within a "non-positivist" paradigm¹³ (eg. Freud, Piaget, Chomsky) than in a positivist paradigm (eg. Skinner). Furthermore, those theorists who specifically address change (eg. Marx, Darwin, Piaget, and Vygotsky) certainly also operated within a non-positivist paradigm. An explanation of why this should be so is in itself an interesting project. For the present purpose, what is important is to make explicit the central methodological principles adhered to by the above mentioned. In this regard a methodology is adopted in which the process of development is captured by two positions vis-à-vis actors' engagement in activities or tasks. The two positions are, firstly, actors' own conception of the tasks, and secondly, experts' conceptions of the tasks. These two positions are then regarded, for the purpose of an empirical investigation into the possibility of change, as two possible moments in the

process of adaptation. This will be elaborated in chapter 5. By way of introduction, it is necessary to mention that the actors (or "subjects") in the present project are urban Zulu-speaking mother-child dyads, the tasks are two puzzle-like and one three dimensional construction task and the experts are Piaget and Vygotsky and those who have continued in their theoretical traditions such as Pascual-Leone, Wertsch, and Feuerstein. The tasks were deliberately selected on the basis of their unfamiliarity to the actors and because they seem to embody the kind of learning and instruction required by formal schooling.

The argument as regards the two positions vis-à-vis actors' engagement in activities or task may be briefly stated in the following way. Were these actors to become western experts¹⁴, they too would conceptualise the tasks as these experts do. In this sense the two positions represent two developmental moments between familiarity and unfamiliarity, as regards the engagement in tasks. It should be clear that this kind of empirical investigation is explicitly bound to a process of theoretical analysis and proceeds on a rational reconstructive basis. This, however, does not preclude verification of the constructions achieved from data to theory, and great pains are taken in the chapters on methodology and method to facilitate inspection of the steps in the process of analysis in order to allow for debate and discourse about the findings.

A rational reconstructive paradigm is adopted because it seems to provide a suitable alternative to a positivist framework and because it seems to follow, at least, in the best innovative tradition in Psychology. However, it is necessary to formulate clearly the methodological principles adhered to, not only for the reason mentioned above but also to counteract recourse to "anti-empirical" moves as a reaction against empiricism. Such a reaction may deprive social scientists of the kind of evidence for their postulates or assertions that Philosophy, for example, is unable to provide (cf. Piaget, 1965).

Writing about method, Vygotsky comments as follows :

The concept of a historically based psychology is misunderstood by most researchers who study child development. For them, to study something historically means, by definition, to study some past event. Hence, they naively imagine an insurmountable barrier between historic study and the study of present-day behavioural forms. To study something historically means to study it in the process of change; that is the dialectical method's basic demand. To encompass in research the process of a given thing's development in all its phases and changes -- from birth to death -- fundamentally means to discover its nature, its essence, for 'it is only in movement that the body shows what is is'. Thus, the historical study of behaviour is not an auxiliary aspect of theoretical study, but rather forms its very base (1978 p.64).

As regards methodology in the Social Sciences in general and Psychology in particular, Harrè and Secord's (1972) "New Paradigm" (p.21) accords well with Vygotsky's ideas regarding

an appropriate methodology. Whereas Vygotsky stresses explicitly a "dialectical materialist approach" (1978 p.60), Harrè and Secord advocate a theoretical orientation in which both "models of the real processes which generate behaviour" (p.21) and people as "self-monitored rule-following" organisms (p.22) are two important aspects. In both Vygotsky's analysis of the "distinction between the phenotypic (descriptive) and genotypic (explanatory)" accounts in psychology (1978 p.62), and Harrè and Secord's focus on "the generative 'mechanisms' that give rise to behavioural phenomena" (1972 p.9), explanation is located at the level of enabling conditions or generative mechanisms.

The methodology used here may also be regarded as "historical" in the Vygotskian sense. The situation of the subjects or actors is such that they are confronted with a way of life that is in some ways unfamiliar to them but to which they can adapt. Investigating this process of adaptation affords the scientist a unique opportunity to unravel or discover the generative mechanisms that produce adaptation (cf. Bhaskar, 1979). Towards this end, the methodological principles elaborated by Harrè and Secord are important as they provide a basis from which to penetrate the rules¹⁵ by which actors abide in their engagement in activities or tasks¹⁶.

The central theme which runs throughout the works of the theorists used in the present project is a concern with the

reconstruction of those functional structures or generative mechanisms which produce manifest behavioural phenomena. It is this which seems to necessitate a rational reconstructive paradigm because the object of study is not immediately visible and must therefore be reconstructed from what is visible - human action in a social context.

NOTES : CHAPTER 1.

1. The notion of generative mechanisms is discussed in chapter 2. In brief this may be defined as structures or functions intrinsic to an object or organism which produce that object or organism's manifest forms. In terms of change or development, 'generative mechanisms' refers to the ability to adapt. 'Change' and 'development' are used interchangeably to indicate the process of unfolding greater degrees of complexity or maturity.
2. 'Mind' is used to indicate the totality of the organism's psychological power or ability to adapt to a milieu.
3. 'Culture' refers to the totality of a group's power to institute tried and tested guidelines for adaptation. 'Culture' may therefore be seen as the term for the "recipes" for living embodied in the institutions of a society. (See also Casson, 1981 for a discussion of the concept 'culture'.)

4. 'Individual (mental) structures' refers to those psychological functional structures which may be assumed to mediate between the brain and behaviour. This could also be indicated by the term 'mind'.
5. 'Social structures' are regarded as the organisation of and possibilities for institutionalising people's knowledge about their world or their recipes for living (culture).
6. That reality is constructed and not given in sense experience is a basic assumption upheld in this project and supported by most of the authors included for discussion.
7. 'Essence' is used to designate the defining characteristics of an object or organism. The essence of something is, therefore, that which makes that object or organism what it is, and behave as it does.
8. The notion, "functional structures" is taken from Pascual-Leone (1979) and is meant to convey the dynamic nature of the psychological system.

9. The 'epistemic subject', in terms of Piaget's project, may be defined as the description or explanation (cf. Vuyk, 1981) of the human potential to construct logico-mathematical knowledge and the development of the necessary structures and functions for this.
10. The term 'actor' is taken from Harrè and Secord (1972) and refers to the fact of individuals occupying different roles in society. 'Social actor' is used to stress the imbeddedness of all action - also the action related to role occupancy - in a network of social meanings.
11. The notion of an interface between two incommensurate systems refers to the domain of co-ordination between two different kinds of things in which these can be brought into relation with each other. See also Bateson (1979), Geertz (1973), and Miller (1984) for a discussion of the idea of an interface.
12. 'Ordinary' refers to people in their capacities as actors performing their daily lives. 'Expert' indicates the specialist roles which may be occupied by people such as "scientists". (See also Heelas and Locke (1981) for a discussion of ordinary and expert psychologies.)

13. The notion, 'non-positivist', is a negative designation and implies a rejection of the idea that all knowledge must be derived by the so called "scientific method". Harrè and Secord (1972), and Bhaskar (1975, 1979) discuss this and suggest another view of the methodology of the advanced sciences which is not positivist and which allows for the scientific investigation of social and psychological phenomena.

14. It is crucial to understand the argument as regards actors and experts' conceptions of engagement in activities as two positions vis-à-vis their engagement in activities. This is a conceptual move in order to investigate the empirical reality of people caught in a period of rapid social change. Urban Zulu-speaking people are caught between their own familiar "know-how" and the demands of a western society, many of which they want to fulfil such as achieving success in formal, western schooling. The argument is, therefore, not that they will or must become western experts, but that if they were to become completely familiar with western tasks then their present position and the position of western experts vis-à-vis engagement in certain tasks could be regarded as two moments in the process of adaptation.

15. The status of 'rules' as regards the analysis of action and patterns of action is discussed in chapter 2. See also Pylyshyn (1973) for an analysis of rules in terms of competence theories and the "rationalist position" inherent in a view of rules underlying competence.

16. The terms 'activities' and 'tasks' will be used interchangeably to refer to the focal point(s) of a subject's intention and action.

2. A CONCEPTUAL FRAMEWORK

The basis for the emphasis on generative mechanisms in the explanation of human action is discussed. This entails a review of a "New Paradigm" for social scientific research suggested by Harrè and Secord (1983). The rationalist assumption inherent in the focus on the rules underlying action is made explicit. Furthermore, 'following rules' is taken as essentially both a reflection of intentional human praxis (the domain of psychology), and the transactional relation of people with each other over time (the social domain). This makes it imperative to consider the mode of connection between individual and society. In order to clarify this connection, Bhaskar's (1979) ideas regarding the link between the psychological and the social are discussed in terms of his general argument regarding the possibility of naturalism.

INTRODUCTION

The major issues confronted in the present project may be regarded as central to some of the perennial debates in Psychology and the Philosophy of Science. This makes it necessary to restrict the sphere of discussion to those issues of primary importance to the present project. In so doing,

this chapter will outline the conceptual framework within which the present research was conducted.

The major question addressed has been stated above as 'What are the generative mechanisms for change?' In order to justify this particular formulation of the search for a suitable explanatory framework for human action, it is necessary to consider in some detail the notion of generative mechanisms.

GENERATIVE MECHANISMS.

Pascual-Leone (1979), drawing on Piaget's (1977) presentation of the idea of "equilibration" as a central explanatory concept in the development of intelligence, uses the term "generative constructivity" (1979 p.6) to refer to the ability of the psychological organism to undergo change. Vygotsky (1978) in his emphasis on the process of unfolding the essence of mind in society also subscribes to a view of generative mechanisms producing manifest behavioural phenomena (although he does not use this term).

The word 'generative' probably comes from Chomsky (1964), who used it in his exposition of the formal rules or procedures which characterise the implicit knowledge of the native speaker-hearer of a language. Pylyshyn (1973) refers to Chomsky's use of 'generative' in terms of the rules underlying linguistic performance as fundamentally a rationalist position. He states this as follows:

It (the rationalist thesis) claims that underlying all cognitive activity is a more perfect system than that displayed by the record of behaviour itself and furthermore that this system can be adequately characterised by a set of formal logical rules; indeed, that to understand cognition at all in the scientific sense is to describe it in terms of such a formal system (p.31).

This position is also evident in the work of Harrè and Secord (1972). They use Chomsky's notions of competence, deep structure, and rules, together with an epistemology derived from their analysis of the methodology of the advanced sciences, to present a "New Paradigm" (p.21) for what they call "social psychology" (p.1).

The notion of 'generative mechanisms' may be seen as a component of a theoretical position in which human action is viewed as a product of deeper functional structures. Such structures may be located in a biological domain of analysis but psychological theories that explain performance in terms of generative mechanisms assume that mediating between the biological system and the domain of action are certain psychological functional structures. These may be referred to as "mind" or "mental states or processes" but what is important is that the psychological is seen as irreducible to the biological substratum (cf. Bhaskar, 1979). It is, of course, also necessary to assert that this does not mean that the biological, psychological, and action or performance domains are regarded as independent of each other. Whether

there are specifiable rules which relate each of these domains to the other, as Chomsky and to some degree Harrè and Secord would have it, is not crucial to the focus on generative mechanisms. (See Searle, 1984 for a discussion of the idea of rules in Chomsky's theory of linguistic competence.) What is crucial, however, is that feedback mechanisms between these systems must be possible to allow for the interplay between human biology, psychology and action.

The domain of action is separated (analytically) from the psychological and biological, to indicate different domains of analysis rather than separate systems. In this regard human biology may be seen to cause action whereas the reasons for action may be located in the domain of Psychology (cf. Harrè and Secord, 1972; and Bhaskar, 1979). Bhaskar points out that the domain of Psychology is circumscribed both by Physiology and Sociology. This project is not concerned with the physiological constraints on action: the social constraints are, however, central to it.

When human action is considered as both intentional and meaningful it is necessary to consider the reasons for actions also in terms of the social meaning of action and its historical development. It is certainly because Vygotsky, as well as Harrè and Secord, focus on both the intentional and meaningful nature of human action that they have labelled their respective projects 'social psychology'.

The present project involves an investigation of both the psychological and sociological aspects of human action and these are elaborated in the third section of this report. At this stage it need only be stressed that the generative mechanisms for change will entail both a psychological and a social analysis of action. The project is, however, primarily within the domain of Psychology and therefore emphasises the deeper functional structures in a psychological domain of analysis.

A NEW PARADIGM FOR SOCIAL SCIENTIFIC RESEARCH

Harrè and Secord's ideas of a new paradigm for social scientific research are, of course, not very new in terms of the date of their publication. However, Psychology in general has been slow in discarding certain ideas which are taken as necessary for a sound theoretical and methodological basis. They state the general problems as follows:

For about a half century three fundamental ideas have been taken for granted as providing a sound methodological and theoretical foundation for a behavioural science. These are : a mechanistic model of man, a Humean conception of cause that places stress on external stimuli, and a related methodology based upon the logical and epistemological theories of logical positivism. The more a behavioural science has fitted itself to these conceptions, the more scientific status it has believed itself to deserve (p.29).

Harrè and Secord argue that all three of these

assumptions are mistaken. They turn to the philosophy of Kant for a different view of human behaviour and summarise their view of man by isolating three principles: 1) People are capable of intentional and goal-directed action which implies that people can and do follow plans of action 2) The explanation of people's behaviour could, and in fact should, take account of deliberate rule following, and 3) Action by its nature is psychological which precludes reducing action to physiology or physics as movement. In order to formalise their ideas about the most suitable methodology to employ given this view of man, Harrè and Secord turn to the method used in the advanced sciences. From their analyses they suggest two important methodological principles. The first involves the explanation of non-random patterns in nature or behaviour by addressing the generative mechanisms which produce such patterns. They comment about the discovery of such generative mechanisms as follows:

There is no simple route to discovering such mechanisms. Some may be simply inspected, others are only quasi-assessible. But in the first instance, our ideas of most generative mechanisms come from a disciplined use of the imagination. The use of analogy through the key concept of model is important here, for it is analogies which control the imagination so that models are plausible analogues of the unknown, causal mechanisms which produce the known non-random patterns of phenomena (p.5).

The second and related methodological principle for social psychology that Harrè and Secord adopt from the method

of the advanced sciences accords theoretical recognition to concepts such as agency, potentiality, spontaneity, and power. According to them, concepts of this nature are required to reveal the essential natures of things and people. The ascription of such concepts to people highlights the conditions that enable people to express their essence or, stated plainly, to act as people as is ordinarily understood.

Harrè and Secord's approach to psychology find clear expression in what they call "The Open Souls Doctrine" (p.105) which refers to the status given to people's own accounts of why they act in particular ways. They suggest that the things people ordinarily say about themselves and others "should be taken seriously as reports of data relevant in a science of psychology" (p.105). For them it is by obtaining a person's account of his/her feelings, plans, intentions, beliefs, reasons and so on, that the scientist can come to an understanding of the meaning of, and the rules underlying particular actions. Even though they recognise the distinction between the things people do (self-directed behaviour) and things that happen to people (forces exerted by the environment), Harrè and Secord emphasise self-directed and self-monitored behaviour. Their "Open Souls Doctrine" provides the basis for the method adopted with respect to that part of the present project concerned with an indigenous theory of childhood (see chapters 6 and 7).

The search for the generative mechanisms of intentional and meaningful behaviour is called "ethogeny" by Harrè and Secord. Within this context they suggest obtaining "the actor's own statements about why he performed the acts in question, what social meaning he gave to the actions of himself and others" (p.9). The accounts are analysed to discover the rules that may underlie the behaviour. In addition, ethogeny involves a "negotiation of accounts" and placing them into the context of "episodes". They define an episode as "any sequence of happenings in which human beings engage and which has some principle of unity. Episodes have a beginning and an end that can usually be identified" (p.10). The negotiation of accounts involves obtaining more and more information about why an actor performed certain actions, what his/her intentions were, and what the meaning of the action is taken to be. In this regard they state quite emphatically that the idea of "absolute truth" has no place in ethogeny because all accounts are revisable in principle and they question whether "perfect truth" is even viable as an ideal in psychology.

The details concerning the various kinds of episodes and suitable models for analysis lie beyond the scope of the present project. It must suffice to state in this regard that the task for the social scientist when analysing certain actions is concerned with imagining the set of rules that may

be operative given the episode or sequence of actions. It involves that which might "animate" the actors in a given situation in terms of the rules, plans, and conventions they might be following. This analytical perspective could be called, after Carnap (1967), a "rational reconstruction" of the rules, etc., that the actor is likely to be following. Pascual-Leone uses a similar term to describe his "constructive-rationalist" method of analysis. This approach to method or theory-method is also adopted in the present project and is discussed below.

Harrè and Secord provide an empirical checking procedure for rational reconstruction in the form of negotiation between all participants, including the scientist. The rational reconstruction of rules, etc., achieves its high point in what they present as "the dramaturgical standpoint" (p.205).

In taking the dramaturgical standpoint we ask ourselves how we would perceive what we are doing were we acting deliberately, and following a script as in a play. By taking the dramaturgical standpoint we are in a position to discover not only the general nature of what we are doing ... but under the guidance of that discovery to produce a commentary detailing the rules, plans, and conventions we are following and the meaning which the several parts of the performance have for us (p.208).

From this dramaturgical standpoint, Harrè and Secord attempt to confront the methodological problem of describing the rules that may underlie performance. In general their view in this regard concurs with Pylyshyn's (1973) ideas about

eliciting implicit knowledge, that is, to obtain enough relevant data from which to reconstruct the rules the actors may be following. Their suggestion for a framework for social scientific enquiry provides a way in which to view action, and from this to "discipline the imagination" towards the formulation of the rules, plans, and conventions which may underlie the manifest patterns of actions. In order to "discipline the imagination", they propose attempting to write a "script" for the performance, which would then be used as data from which to reconstruct the rules. It is therefore clear that the "data" contained in the actual performance or action are first subjected to analysis before they are admitted as further data from which to formulate the rules.

The use of second and even third order analysis to provide "data" is central to the present research paradigm and also achieves clear expression in the methodology advocated by Geertz (1983)² for anthropology.

Harrè and Secord's work seems to contain more value as a framework for the design of an appropriate methodology for social scientists concerned with action than it does as a social psychological equivalent to Chomsky's theory of linguistic competence. A basis for the formulation of a social competence theory analogous to the kind of competence theories discussed by Pylyshyn (1973) and exemplified by Chomsky is to be found in the work of Pascual-Leone (1979). This is discussed in the next chapter.

THE MODE OF CONNECTION BETWEEN INDIVIDUAL AND SOCIETY

In focusing on the rules, plans, and conventions people as actors may be following in the execution of their social roles, human action is seen both in terms of intentional and meaningful praxis. This entails both the psychological and the social domains of analysis. It is therefore necessary to analyse the transactional link between individual intentionality and the social meaning of action in order to do justice to human action as a consequence of the power of the mind embedded in the history of society.

Bhaskar (1979) focuses specifically on the mode of connection between society and people. By way of introducing his ideas, the major points in his argument regarding the possibility of naturalism are briefly presented. He argues for an account of science within which the debate surrounding the possible unity or disunity of the social versus the natural sciences can be resolved. In this regard, he states his position as follows:

... I am going to argue for a qualified anti-positivist naturalism, based on an essentially realist view of science. Such a naturalism holds that it is possible to give an account of science under which the proper and more or less specific methods of both the natural and social sciences can fall. But it does not deny that there are significant differences in these methods, grounded in real differences in their subject matters and in the relationship in which their sciences stand to them (p.3).

Bhaskar's position on science contains the important principle that the essence of science involves a movement from manifest phenomena to the generative mechanisms of such phenomena. Furthermore, the production of scientific knowledge rests on the analysis of tendencies of things, and not the conjunction of events; scientific inferences ought to be analogical and retroductive rather than only inductive and/or deductive; and that the notion of power of things is an important part of the conceptual system employed in science. It should be clear then that Bhaskar's account of science accords well with that of Harrè and Secord's position in this regard. In fact, Bhaskar's work could be seen in some ways as an extension of the principles embodied in Harrè and Secord's (1972) work.

The differences between the natural and social sciences are elucidated by Bhaskar in terms of what it is that renders "society" and "people" possible objects of scientific knowledge. In developing an answer to this question, Bhaskar makes a strong claim for an "ontological hiatus" (p.46) between society and people. This assertion is central to the mode of connection that he proposes between individuals and society. He argues that the properties which "societies" and "people" possess and which make them objects of knowledge are different. Bhaskar distinguishes four related features of "societies" as follows: an activity-concept-dependency; a space-time-dependency; the objects of social scientific

enquiry always manifesting themselves in open systems; and the social sciences being part of their own field of enquiry. The activity-concept-dependency of social structures refers to the fact that "the mechanisms at work in society exist only by virtue of their effects" (p.63). The space-time-dependency concept emphasises that because society only exists by virtue of the intentional activity of people the articulation of social structures and the knowledge of these must be dependent on space and time. That societies are open systems obviously entails that they can neither spontaneously nor experimentally display invariant empirical relations. In other words, societies, unlike the objects of natural sciences, may display qualitatively new developments which social scientific theory cannot predict and which can only be known to have occurred through knowledge of the effects of these developments and not through empirical identification independent of these effects.

The importance of this feature is stated by Bhaskar as follows:

... it is that the social sciences are denied, in principle, decisive test situations for their theories. This means that criteria for the rational development of theories in social science must be explanatory and non-predictive (p.58).

The fourth feature of "societies" that Bhaskar refers to is the fact that the social sciences are in principle part of their own explanatory theories and concepts. This implies that social scientific knowledge will be vitally affected by

other developments in society. There is, therefore, a strong link between the social conditions for the emergence of a theory, and the social scientific theory itself.

Bhaskar also suggests that in periods of rapid social change the theorist may have a good opportunity to achieve some insight into the generative mechanisms which produce manifest phenomena. Bhaskar suggests that periods of rapid social change provide a partial analogue of the closure which can be produced by experimentation in the natural sciences. This idea is crucial to the present project in terms of the social actors chosen to participate in the investigations of the possibility of change.

In considering what properties "people" may have which make them objects of knowledge, Bhaskar considers the question whether "reasons can be causes". In fact Bhaskar argues that reasons must be treated as causes if they are to have an explanatory function; if discursive thought is to be possible; and if the concept of human agency is to be retained.

For the individual domain Bhaskar highlights two important principles that are embodied in what he calls "a double decentring" (p.143). The first decentring focuses on the ontological hiatus between individuals and society. The important consequence of this decentring, according to Bhaskar is as follows:

... the category of the biological individual may be an unsuitable designator for socio-psychological and social psychological analysis. For associated with each biological individual may be a number of distinct and inconsistent social personas, some connected, and some not, to definite roles in the reproduction of society (p.143).

The second decentring entails that manifest performance and overt activity are inadequate designators for the cognitive sciences. Consistent with his emphasis on the generative mechanisms in science in general, Bhaskar advocates the necessity to achieve a reconstruction of the "deeper structures" (p.144) that produce or generate manifest performance. Flowing from the second decentring is the idea that an agent may not be aware of the "deeper structures" which produce a belief or action and also not of the possible consequences of that belief or action. This is also important for the present project. People's expressed beliefs and their observable actions directed at goals must be subjected to analysis - rational reconstruction in terms of a theoretical framework - and cannot be accepted as they stand as evidence for the "deeper structures" which may generate manifest phenomena.

Bhaskar points out that understanding the cleavage between mind and consciousness does not undermine the phenomenon of human agency. As he expresses it:

Dogs continue to bark when one understands how they do so, agents continue to act when one understands the phenomenon of agency as the effect of deeper structures (1979 p.44).

The "deeper structures" referred to in the above quotation are conceptualised (after Harrè and Secord, 1972) in the present project as intrinsic generative mechanisms. It is these intrinsic generative mechanisms that are addressed (under different labels) in the Piagetian tradition in cognitive development. Before considering the nature of intrinsic generative mechanisms in more detail, Bhaskar's proposals for a transformational model of the society/person connection is presented.

As mentioned above, Bhaskar advocates a strong ontological distinction between people and societies. He bases his argument on an analysis which shows that the properties possessed by social forms and those possessed by people are radically different. People are material objects with certain neurophysiological properties which make language and intentional action possible and both of which are necessary for the reproduction of society. Society on the other hand is necessarily unperceivable and cannot be empirically identified independent of its effects.

The model Bhaskar proposes for the society/person connection attempts to solve the problems of "voluntarism" (as embodied in a Weberian conception of the link between individual and society), and "reification" (as embodied in a Durkheimian model). Furthermore, his model attempts to avoid the error of posing a dialectical relationship between people

and society (cf. Berger and Luckman, 1972). Bhaskar argues that people and society are radically different kinds of things and therefore neither can be seen to "create" the other. He introduces his model as follows:

The model of the society/person connection I am proposing could be summarised as follows: people do not create society for it always pre-exists them and is a necessary condition for their activity. Rather, society must be regarded as an ensemble of structures, practices and conventions which individuals reproduce or transform, but which would not exist unless they did so. Society does not exist independently of human action (the error of reification). But it is not the product of it (the error of voluntarism) (1979 p.45).

The graphic representation of this model is given below in figure 1.

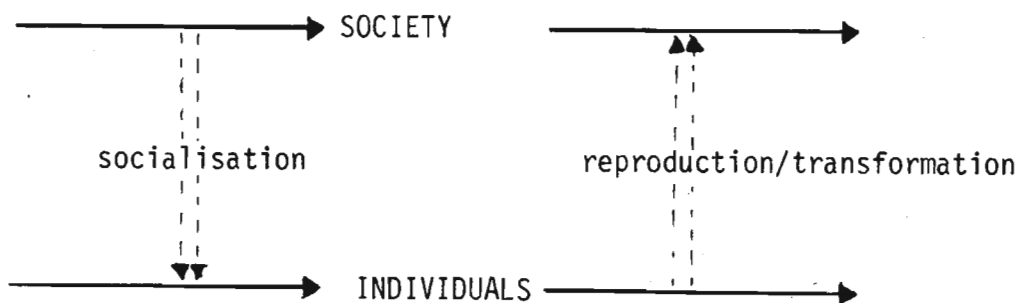


FIGURE 1 : The transformational model of the society/person connection.

(Reproduced from Bhaskar, 1979 p.46).

In chapter 4, Bhaskar's model is extended on the grounds that even though it emphasises the ontological hiatus between individuals and society, it obscures the action link between the domains of the social and the psychological. In other words, the arrows for "socialisation" and "reproduction/transformation" in Bhaskar's model are names for problems¹ and necessitate further analysis. In this regard Miller (1984) discusses a "socio-psychological model of the society/person connection" (p.13) in which he adapts Bhaskar's model "to serve as a foundation for a human science specifically directed to an understanding of change" (p.12). In Miller's model, the outstanding feature is a third dimension abstracted from the social and individual domains. This third dimension contains the roles prescribed by existing social forms and groups abstracted from the plurality of individuals. In Miller's words, this third dimension could be clarified as follows:

The third dimension concerns the relations within and between domains. It is at this level that Bhaskar's insistence that people and society could not be regarded as forming a dialectical unity, becomes significant. Theories about social forms and individual agents cannot be related directly. The dialectic resides in the process whereby an individual engages in a role prescribed by a social form or, alternatively, a social form is expressed in a group of individuals (p.14).

Miller therefore highlights the action link between the psychological and social domains of analysis. Furthermore, this third dimension, or the action link, refers to the possibility of mind-in-action and culture-in-action, and indicates the empirical reality of people acting in social groups. Both Bhaskar and Miller's models of the link between people and society are used as bases for the model proposed in the present project.

Locating the explanatory account at what may be termed the generative level of analysis places a special burden on the kind of data admitted for analysis and also the process of analysis. Having accepted that social scientists ought to focus on the generative level of analysis, it follows that it is therefore necessary to adopt a rational reconstructive paradigm. Both theories introduced in this chapter argue for a scientific activity which is concerned with the enabling conditions for manifest performance, and Harrè and Secord provide a programme for research within this paradigm. The programme for research elucidated by the latter authors specifically emphasises rules, plans, and conventions as psychological generative mechanisms, as well as ways of obtaining and describing them. In the next chapter this position is taken further to what Pascual-Leone (1979) calls a "meta-subjective" level of analysis where the object is to explicate the intrinsic and extrinsic generative mechanisms

that produce such rules, plans, and conventions that in turn underly overt performance.

The concluding notes to this chapter have outlined the conceptual framework within which the present project is located. It is now possible to turn more directly to those authors who contributed substantially to the explication of the generative mechanisms for change.

NOTES : CHAPTER 2.

1. The idea of something as a "name for a problem" is taken from Pascual-Leone's rider to the notions of "assimilation" and "accommodation" in Piaget's theory (Pers. comm. 1984).

- 2 Geertz's contribution to the methodology proposed in this project is discussed in chapter 5.

3. THE ORIGIN AND DEVELOPMENT OF MIND.

The possibility of intrinsic and extrinsic generative mechanisms producing overt performance is discussed. With this aim in mind the work of Piaget, Pascual-Leone, (who is presented as a neo-Piagetian) and then Vygotsky and those operating within what may be regarded as a Vygotskian paradigm (Wertsch and Feuerstein), are discussed. The central point of this discussion centres around what appear to be very different positions regarding the origin and development of mind. In this regard it seems necessary to clarify the distinction between locating the object concept in the mind's structure, and addressing the social development of the object concept or the object-in-society. A resolution between these two positions is suggested in terms of a co-ordination between the Piagetian and Vygotskian paradigms for the study and explanation of mind.

INTRODUCTION

In a recent edited volume on the philosophy of mind, Fløistad (1983) asks the question, "What is the human mind?"

He goes on to suggest the following in answering this question:

In view of the variety of answers given in the history of philosophy, no definite answer appears to be possible. This is however in itself a significant answer to the question (p.1).

Fløistad calls this state of affairs the "indefinite thesis" of mind, and uses this as an indication of the need to locate the human mind within social history. He therefore suggests the existence of some link between the individual and society. In this chapter the origin and development of mind is discussed in terms of the differing emphases within the Piagetian and Vygotskian paradigms. The aim is to formulate a "working thesis" of mind in reply to the "indefinite thesis" recognised in the Philosophy of Mind. Such a working thesis must allow for both the universal and particular aspects of mind and be vitally linked to the mind's surroundings in order to do justice to the phenomenon of changing conceptions of mind. This seems necessary because even though people are everywhere recognisable as such, they also display marked individual and group differences in the ways that they act. Furthermore, in linking the mind to its surroundings, recognition is given to the fact of the human ability to adapt to changing circumstances and the relation of this process of adaptation to (changing) knowledge of that ability and those circumstances.

Within Psychology it is hardly possible to address the origin and development of mind without acknowledging the profound influence of Piaget. Piaget's project could perhaps best be characterised as a concern with the explanation of the possibility of logico-mathematical knowledge. He proposed a model for this, that of "equilibration" (Piaget, 1977), in which spontaneous and scientific knowledge, as well as knowledge and biological adaptation are necessarily unified (see Vonèche, 1984 for a discussion of this point). Piaget addressed primarily the epistemic subject's potential for logico-mathematical thought (cf. Vuyk, 1981), which does not make the issue of the individual's actual social situation paramount. Expressed another way, although Piaget acknowledges the importance of social/cultural factors (cf. Piaget, 1966) his theory does not attempt to explain how these factors influence development. The theory is an attempt to explicate the psychological 'machinery' that generates performance and takes as given the fact that performance occurs within a social context.

In order to consider the mind's surroundings in terms of a social situation in which social knowledge is not adequately captured through logico-mathematical structures, we need to turn to Vygotsky. Vygotsky (1978) suggested a "Zone of Proximal Development" (p.86) between child and adult in which the adult imposes a structure on the world of stimuli for the

* child through social interaction and communication. This relationship between child and adult is seen by Vygotsky as the foundation for the development of mind and in his view mind is necessarily linked to society. This is expressed in the title given to Vygotsky's book, "Mind in Society". In Vygotsky's theory the adult's role of mediator or cultural guide attains major significance. The role of mediator could be understood in terms of a communicative setting in which the adult presents to the child a particular form of the world of objects and events. This particular form of reality is the product of a certain historico-cultural development and being part of this development the adult will, in her relationship with the child, embody such forms of adaptation as are natural in that setting. It is important to stress Vygotsky's reliance on Hegel's philosophy and Marx's social theory. In this Vygotsky attempts to formulate a psychology based on the methodological principles inherent in Marx's theory. Vygotsky's aim was to construct a theory-method in which the science of mind and the science of society is necessarily united. In his words, the aim of such a theory - method is as follows:

In order to create such an enabling theory-method in the generally accepted scientific manner, it is necessary to discover the essence of the given area of phenomena, the laws according to which they change, their qualitative and quantitative characteristics, their causes. (p.8).

According to Vygotsky this theory-method embodies the necessary elements of how science has to be built. Furthermore, Vygotsky uses the adult's mediation to the child (or the process of instruction) as the "cell" analogous to the nature of value in Marx's "Capital", to discover the way to psychology as a whole.

For Piaget, mind is the ability to develop knowledge and all knowledge develops towards logico-mathematical structures. For Vygotsky, mind is the internalisation of social relationships and social relationships are relative to time and place. Whereas Piaget focuses on the ability to construct the necessary elements of scientific knowledge, Vygotsky places higher mental functions in the context of particular forms of social knowledge. The difference between these two points of view resides in the kinds of explanations offered in their theories. Piaget's ideas regarding the human mind emphasise universal capacities of the ability to know, Vygotsky looks to real people in particular socio-historical contexts. When Piaget "fixes" knowledge in logico-mathematical thought, he makes it superfluous to consider any particular individual or group's adaptation to any particular society¹. Logico-mathematical thought as an ultimate achievement of mind brings to the fore the question of how this is possible or how it develops.

Piaget turns to the child's development in order to

capture the construction of the necessary structures of logico-mathematical thought. In using child development and the process of constructing the essential elements of scientific thought as a vehicle for the elucidation of his epistemology, Piaget is at his most creative as a methodologist. Vuyk (1981) discusses Piaget's insistence that he is neither primarily a "child psychologist" nor an "educationalist" in terms of his commitment to the presentation of a theory of knowledge. In this regard he uses "developmental psychology" as a data bases rather than a disciplinary domain to which he contributes. It is also necessary to realise, however, that this does not make Piaget primarily a "philosopher". (His disillusionment with this discipline is interesting, (cf. Piaget, 1965). I would argue that Piaget is an acute co-ordinator between the empirical reality of social actors (children in his case) and the wider theoretical and epistemological import of this.

The value in contrasting Piaget and Vygotsky resides, perhaps, in using Vygotsky's ideas about the very things Piaget neglected, ignored or undervalued, to extend Piaget's epistemology into a more focused psychology of change. Both the Piagetian and the Vygotskian paradigms seem insufficient to make sense of the complexity of people expressing both their universal human capacities and particular forms of adaptation in an ever changing world.

In Vygotsky's theory, knowledge is not "fixed" in logico-mathematical structures but tied to socio-historical processes and it is therefore necessary to ask how the mind develops within these particular constraints. This question suggests to Vygotsky the importance of a cultural guide who can convey to the child the taken-for-granted being in that world. Such a cultural guide must "socialise"² the child for the fulfilment of the social role(s) existing in that society. The available social roles and attendant knowledge need not be a reflection of logico-mathematical structures and in fact may constitute a reality very different from that which comprises western scientific idioms. The constructed realities of people are not necessarily a reflection of what the mind can produce but must also be a reflection of what is actually produced within the unique constraints of a particular eco-cultural niche.

The co-ordination of Piaget's and Vygotsky's basic postulates may add to the formulation of a "working thesis" of mind. In this regard mind is taken to be the "program" for both intentional and meaningful action. It is therefore a system which allows for goal directed praxis (intentionality) and a system which is essentially linked to surroundings or available means to allow for feedback on action (meaning³).

A working thesis of mind, furthermore, refers to the dynamic interplay of intrinsic and extrinsic generative

mechanisms. In this sense, the cognitive system (mind) develops within the particular constraints of a social context. Perhaps all minds are capable of constructing logico-mathematical thought but certainly not all minds do and this may be the most important contribution of "cross-cultural"⁴ evidence on specific forms of adaptation to specific eco-cultural niches (cf. Triandis, 1981).

INTRINSIC AND EXTRINSIC GENERATIVE MECHANISMS.

"Intrinsic generative mechanisms" refers to those functions and/or structures which are definitive in terms of the essence of something or someone (cf. Harrè and Secord, 1972). "Extrinsic generative mechanisms" refers to those conditions external to an object which may elicit or produce the manifestation of the object's⁵ essential character. Extrinsic generative mechanisms always function, therefore, in terms of a relationship between two or more things, even though such extrinsic generative mechanisms may be produced by intrinsic generative mechanisms. This may be clarified as follows: if two individuals could be said each to have certain intrinsic generative mechanisms (perhaps these are mental structures of some kind) the relationship between these two individuals may create extrinsic generative mechanisms for one or both individuals. The relationship may create enabling conditions in the sense of eliciting or producing the

manifestations of intrinsic generative mechanisms or mental structures, perhaps in the form of some intelligent behaviour. The intrinsic and extrinsic generative mechanisms are relevant in a discussion of the origin and development of mind because these are seen to explain this phenomenon. Within the Piagetian tradition intrinsic generative mechanisms are emphasised while extrinsic generative mechanisms are the point of interest in the Vygotskian theory of mind in society. Each of these theories and some that have continued in the respective traditions is discussed. The discussion attempts to highlight the way in which these theories have been used in the present project.

Piaget (1977) discusses the notion of "equilibration" as a central process and model for the development of knowledge. Central to the concept of equilibration are the regulatory mechanisms of "assimilation" and "accommodation". Equilibration for Piaget is a dynamic force that acts to produce successive states of equilibrium within the cognitive system. Each equilibrium is achieved through a balance between the processes of assimilation and accommodation. This implies that the possible conflict between the subject's "incorporation of an outside element (object, event, and so forth) into the subject's sensorimotor or conceptual scheme" (p.6) (assimilation) and the "particularities characteristic of the elements that are to be assimilated" (p.7)

(accommodation), is temporarily resolved. Piaget introduces his conceptualisation of the process of equilibration as follows:

... we do not mean we can identify a single general structure of equilibrium which can be stated once and for all, and applied to every situation and to every level ..., but rather we can observe a process (hence the term "equilibration") leading from certain states of equilibrium to others, qualitatively different, and passing through multiple 'non-balances' and equilibriums (p.3).

The force of Piaget's ideas about equilibration points to mental structures and functions (or functional structures) which generate intelligent behaviour; behaviour which increasingly with development and successive states of equilibrium reflects the necessary elements of logico-mathematical thought. It is because of this focus that it seems justifiable (and necessary) to interpret Piaget's theory of equilibration in terms of intrinsic generative mechanisms.

Piaget describes three different forms of equilibration (1977). The first refers to "the fundamental interaction of the subject and the objects, (in this) there is the equilibration between the assimilation of schemes of action and the accommodation of these to the objects" (p.9). This first form of equilibration may be regarded as that which sets the development of knowledge in motion - the initial transaction between the intrinsic generative mechanisms of the

psychological organism and the objects s/he encounters. The second form of equilibration revolves around the interactions between the subsystems or the various schemes and structures which result from the first form of equilibration. Piaget asserts that the various subsystems are generally constructed at different speeds which cause various non-balances in the cognitive system and which require resolution or higher forms of equilibrium. The third form of equilibration involves the establishment of a hierarchy of schemes and structures. This involves an ordering of subsystems in relation to the totality which includes them. The different kinds of equilibration refer therefore to three modes of development from the most basic which occurs when the subject acts on the objects in the environment, to the next mode which emphasises the interactions between the knowledge gained from the actions performed on objects, to the last mode which indicates the formation of a totality of knowledge about the world in which the various bits of information are integrated, co-ordinated and ordered in relation to each other and the whole. Piaget's comments about non-balances in the cognitive system are interesting:

It is worthwhile to note that however the non-balance arises it produces the driving force of development. Without this, knowledge remains static. But non-balance also plays a release role, since its fecundity is measured by the possibility of surmounting it, in other words, of reaching a higher equilibrium. It is therefore evident

that the real source of progress is to be sought in both the insufficiency responsible for the conflict and the improvement expressed in the equilibration (p.13).

We will have occasion to return to "however the non-balances arise" in the concluding section of this report when discussing the ideal instructional components as extrinsic generative mechanisms for cognitive development. At this stage the above quotation emphasises an important aspect of Piaget's ideas about equilibration as a model of the intrinsic generative mechanisms that promote development. These mechanisms may be understood as constituting the power of the psychological organism to act and to gain knowledge from that action, but knowledge which must nevertheless be incomplete or conflicting until the final resolution of logico-mathematical structures. In terms of the psychological organism, the knowledge (or schemes and structures) which results from action may be conceived of as bits of information about the world which must be revised, integrated and co-ordinated in terms of each other and also with reference to the totality.

Vuyk (1981) states that "If one accepts a constructivist epistemology with successive levels of equilibrium, the final question must be why this equilibration takes place. Why does the subject go to the trouble of looking for new knowledge, either his individual knowledge or scientific knowledge?" (p.70). Vuyk discusses the problem associated with answers to

the "why" of development but discusses the active nature of people and the tendency to enlarge the environment as two possible sources for an answer within the Piagetian paradigm. In the present project the burden for an explanation of the "why" of development is placed both on the nature of people, that is, their active attempts at enlarging their environment as well as on the unique social constraints within which they act. This is discussed in detail in chapter 11.

In developing an explanatory model for the question of how revision, integration and co-ordination of information about the world is possible, Piaget elaborates primarily the functioning of the cognitive system and suggests assimilation and accommodation as the workings of the process of equilibration. Piaget maintains that the subject always accommodates to a scheme of assimilation. In other words, the particularities of the object are subordinate to the knowledge the subject has at the moment of transaction. Piaget locates the object concept in the mind's structure (cf. Fabricius, 1983). This suggests that apart from the idea that knowledge of the object may best be characterised with reference to logico-mathematical laws and that these are possibly given in the nature of the human action and mind. The object is not regarded by Piaget as something which is embedded in a matrix of social meaning: meaning which is not separated from people's conceptions of objects over time but separated from

any particular child who must confront to some degree a "ready made" reality, or as Bhaskar (1979) points out, pre-existing social forms. Because Piaget sees reality as fully captured by logico-mathematical structures whose origins lie in actions performed on objects, he does not address those instances where the social knowledge of the object is not adequately conveyed through scientific knowledge.

One may capture the notion of the social reality of an object by referring to an object-in-society in contrast to Piaget's position which may be stated as an object-in-action or mind. The difference between these conceptions may be illustrated using the example of a stone.

In Piagetian terms a stone may provide a child with the opportunity to develop "empirical" knowledge of its properties and "reflective" knowledge⁶ of the actions that may be performed with stones. But the fact that a stone may be regarded as a holy shrine and should not be moved or touched is knowledge that can only be socially derived. The object-in-society is, of course, amenable to analysis in terms of logico-mathematical knowledge but conceptualising the act of knowing solely in terms of this cannot do justice to the other equally forceful analysis of the object as something impregnated with social meaning. Acknowledging both these aspects is important for an analysis of how it comes about that Man is Man.

Piaget addressed the convergence between the cognitive and biological systems but in principle the social and the cognitive could be conceptualised likewise (as is the case in Vygotsky's theory). It is therefore important to emphasise that in his theory of cognitive development Piaget does not negate social influences on cognitive development but achieves a kind of explanation in which particular socio-historical conceptions of reality are not central to the question of how logico-mathematical thought is possible. What remains to be undertaken (given Piaget's answer to this question), is a formulation of how actual knowledge (not ideal forms of knowledge), which may be at variance with scientific knowledge, is possible, given the mind's essential capacity to construct logico-mathematical structures.

In order to attend to this issue it is necessary to look at the social constraints which make up the mind's surroundings. Before turning to this, however, it is still important to take Piaget's model of equilibration to its logical conclusion.

Fabricius (1983) discusses the parallels and divergences between Piaget and Kant (1724 - 1804) through a review of the movements of rationalism, empiricism, and romanticism (p.325). This author notes that both these theorists locate the object concept in the mind's structure (p.333), and both hold the view that reality is constructed (p.334). Whereas Kant

searched for a priori elements of knowledge, Piaget incorporated into his epistemology the idea of historical change. "His (Piaget's) notions of accommodation and equilibration, which are foreign to Kant's a priori forms and categories, make Piaget's a more dynamic theory of knowledge in that it postulates mental structures which develop over time" (p.333).

Piaget's argument is that, given the mind's structure, certain forms of knowledge are possible, and these are what he refers to as logico-mathematical structures. In other words, his aim is to describe⁷ the development of those structures which make this form of knowledge possible. How successful he is in explicating the intrinsic generative mechanisms for the growth of knowledge is not an easy question to answer. What Piaget does achieve, however, is to determine a domain for Psychology which is conceptually distinct from Neuro-physiology and Sociology, even though these areas may still form an essential link to Psychology (cf. Bhaskar, 1979).

The hard core of the Piagetian research paradigm is his model of equilibration. Rowell (1983) analyses the scientific status of this model in terms of Lakatos's philosophy of science and concludes that the Piagetian programme is progressive, and that "there is good reason to continue the development of the concept of equilibration, and to anticipate

growth in its precision, testability, and explanatory power" (p.70). The model is, however, vague in terms of the psychological 'mechanisms' which produce the functioning of the psychological system.

Chief among those who have contributed to the development of the model of Equilibration must rank Pascual-Leone. Equilibration forms the point of entry for Pascual-Leone's (1979) Theory of Constructive Operators (TCO). In the TCO, equilibration is differentiated into the various "organismic functional structures which allow a human to know, to act upon and, sometimes, to change intentionally his environment" (Pascual-Leone, 1979 p.110). In his explication of Piaget's notion of "equilibration", Pascual-Leone provides an account of the process of change from Piagetian stage to stage. He discusses three general principles upon which his theory is based. These are; (1) Assimilatory Praxis; (2) Equilibration; (3) Bilevel Psychological Organisation (p.3). Each of these principles is briefly discussed.

Principle of Assimilatory Praxis.

The psychological organism is a very active instrument of praxis. The notion of an active organism is so central that a new term metasubject will be used ... to refer to the subject's psychological organism ... i.e., the silent (unconscious) organisation of functional structures or ("psychological machinery") underlying the subject's activity (p.3).

The principle of assimilatory praxis revolves around the notions of "praxis" (goal-directed activity), and "assimilation" (the "rushing-to-apply disposition") of schemes. The notion of schemes is taken from Piaget and refers to an organised set of actions which can be transferred from one situation to another. An important aspect of the scheme concept is the idea that the transfer of schemes to other situations involves the assimilation of the second situation to the first (cf. Piaget and Morf, 1958 quoted in Pascual-Leone, 1979). Pascual-Leone's extension of Piaget's ideas in this regard concerns the question of how choice among schemes is possible. In other words, given the strong assimilatory tendency of schemes, how is it possible that one or other scheme becomes dominant in a particular situation? In order to answer this question, Pascual-Leone assumes "silent resources" which determine the choice between schemes. These silent operators are "super schemes" in the sense that they operate on schemes, which are the subjective operators of the metasubject. "The subjective operators and silent operators which comprise the metasubject together construct (i.e., cause) the praxis of the subject" (1979 p.5).

Principle of Equilibration.

Pascual-Leone states that Piaget's notion of

equilibration conveys well the active and dynamic properties of the psychological organism (or the metasubject in Pascual-Leone's terms). He explicates this notion as follows:

It is an active disposition of the psychological organism to spontaneously undergo restructurations or structural changes in order to (a) maximise the internal consistency among its functional parts, (b) maximise adaptation (functional payoff) in its dealing with the environment, i.e., maximise the number of different types of situations with which the organism can successfully interact without having to learn (i.e., to change its internal structures), and (c) minimise internal complexity (organismic structural cost) in its organisation, i.e., organise its psychogenetic and operative constructive processes ... in such a manner that (a) and (b) are satisfied with a minimum of learned and innate resources (p.5).

Pascual-Leone's elaboration of the principle of equilibration is quoted at length because it provides the formal constraints for a theory of change. In other words, sub-principles (a), (b), and (c), describe the formal characteristics which must be considered in an explanation of adaptation. What is important about the principle of equilibration is that sub-principle (a) is, in the Piagetian tradition, contained in the idea of adaptation as a substantive organismic disposition which increases with development. In the TCO, sub-principles (b) and (c) are accounted for by the silent operators and subjective operators of the metasubject.

Principle of Bilevel Psychological Organisation.

The assumption of a bilevel organisation is implicit in a consideration of choice among schemes in terms of the subjective operators and the silent operators mentioned above.

This can now be clarified as follows:

The first-level or subjective system is constituted by situation-specific constructs (organismic schemes) which apply on the input to categorise and/or modify it; the second-level or silent system is constituted by situation-free metaconstructs (basic factors and basic principles) which apply on the first-level constructs (not on the input) to modify their activation weights (i.e. assimilatory strength) in accordance with organismic requirements (p.8).

The bilevel organisation is therefore a necessary assumption in order to create the possibility for choice among schemes. The silent operators serve the function of boosting subjective schemes which are appropriate to the situation. The principle of bilevel psychological organisation is, therefore, a necessary conceptual move towards explaining why particular schemes apply rather than others that are activated in the metasubject in any specific situation.

Pascual-Leone's contribution resides primarily in the explication of the functional structures and the relations between these which allow for intentional human praxis. In this regard he extends the model of equilibration towards greater precision and perhaps explanatory power (cf. Rowell 1983). However, the scope of Piaget's project is, in the

process, markedly reduced. This is not necessarily a criticism of Pascual-Leone's more psychological project (in contrast to Piaget's epistemological project); Pascual-Leone provides more directly a psychological theory of the possibility of change. In this regard he proposes that different levels of analysis are necessary in order to constitute an appropriate level for the explication of the possibility of change.

Pascual-Leone explains⁸ that five dialectical moments can be identified in a metasubjective analysis of an individual's truly novel resolution of a problem. These dialectical moments describe different levels of analysis. One level of analysis is called "Objective" and refers to a descriptive account of manifest behavioural phenomena. The next level is called "Phenomenological" and refers to an account of the experiences of the individual, from the individual's point of view, during or about the task execution. The third level is called "Subjective" and has two aspects; a structuralist aspect (e.g. Piaget's earlier work) which emphasises the organisation of schemes operating in the "machinery" of the cognitive system of the individual; and a process structural aspect (e.g. Piaget's later work) in which the emphasis is on the introduction of real time in the operation of schemes. It is the process structural aspect that introduces the necessity to assume the operation of different kinds of schemes, which

become apparent at the next level of analysis, called "Ultrasubjective". Within this level the analyst confronts the possibility of executive schemes which must operate on action schemes in order to allow the cognitive system to function independently in problem solving. It is at this point that Pascual-Leone's theory may be understood as an explication of Piaget's theory of cognitive development.

Pascual-Leone's theory addresses the problem of how it is possible for the individual to be able to act without having the appropriate action schemes and to develop the appropriate executive schemes through action (the resolution of the "learning paradox"). The fifth level of analysis is called "Metasubjective" and at this level Pascual-Leone explains the hierarchy of schemes and the psychogenic constructivity of the psychological "machinery" by suggesting silent operators that generate novel and truly novel responses (see p.77). The silent and subjective operators together represent the bi-level functional structure of the metasubject.

What has been referred to previously as intrinsic generative mechanisms can be explained with greater clarity by applying Pascual-Leone's five dialectical moments. In particular, these moments provide a framework for the "reasons as causes" approach to psychological analysis as advocated by Bhaskar (1979) and Harrè and Secord (1972). Furthermore, Pascual-Leone's model for the functional structure of the

metasubject may be adopted as a "model for a model" of both individual and social change. It is therefore important to recognise the level at which his theory should be understood if it is to be extended in the present project.

The five dialectical moments in analysis are important for the present discussion because they provide a framework for understanding the levels at which theories should be understood. In this regard, a meta-level may be suggested as an appropriate basis for the consideration of the generative mechanisms underlying overt patterns. Stated another way, whenever generative mechanisms are regarded as an important explanatory focus, it may be worthwhile to postulate a meta-level of analysis in order to explicate those functional structures which produce manifest forms. Such manifest forms may then be either individual action patterns or the institutional network of a society⁹.

It was stated above that Piaget and Vygotsky focused on different epistemological levels. This can now be clarified. The epistemic subject in Piagetian theory represents a conceptualisation of the universal human capability to adapt to changing circumstances through novel and truly novel performances. The social actor in Vygotskian theory emphasises the particular developmental trajectories created through the socio-historical constraints acting on human capabilities. Both the universal and the particular are

ultimately generated by mechanisms internal and external to the individual in social surroundings. These mechanisms are formulated here as intrinsic and extrinsic generative mechanisms. It is important to note that the social surroundings may, of course, be conceptualised as consisting of intrinsic generative mechanisms which produce the non-random patterns in the social domain of analysis. For the present project, social processes are analysed in terms of the origin and development of mind, and not included for their own sake.

An emphasis on social relations is evident in those who have followed Vygotsky's research programme (cf. Rogoff and Wertsch, 1984). Wertsch and Feuerstein (1980) were selected for discussion in this project because they both stand in the same relation to Vygotsky as Pascual-Leone does to Piaget (and Pascual-Leone was chosen because he specifically provides a theory of change). In other words, both Wertsch and Feuerstein may be regarded in terms of an attempt to explicate Vygotsky's model of development; the zone of proximal development.

From the Piagetian paradigm it is possible to present a theory of intrinsic generative mechanisms; mechanisms which may be seen to explain the phenomenon and possibility of intentional human praxis. It is therefore possible to consider the intrinsic generative mechanisms for change from a

relatively well established research programme. As has been stated repeatedly, however, the social relatedness of people, the development of social knowledge, and the fact of an individual lifespan necessarily cast into pre-existing social forms, all point to the issue of extrinsic generative mechanisms. Before turning to this, and also by way of introducing the Vygotskian paradigm, the notions of "novel", "truly novel" and "uniquely truly novel" performances are considered.

It may be argued that in order to experience an object, event, and so forth, as requiring a new solution or interaction in terms of previously learned knowledge (structures or schemes in the Piagetian sense) it is not only the power of the psychological organism which will achieve reconstruction but also the social processes surrounding the psychological organism. This is, of course, the force of Vygotsky's theory of mediation through social communication from adult to child. Although it is possible to conceive of the child as being led to experience an object in a new light because of the way the object is presented to him/her, it is still necessary to highlight the fact that in the end it is the psychological organisms which must react to the specific form of the presentation of stimuli. Expressed another way, the individual mind must construct the new knowledge required to interact with increasing sophistication to the world of objects and events.

Novel performances may be seen in the light of Piaget's description of cognitive growth in terms of solving a problem in a new way by co-ordinating existing learned or innate structures or schemes. The performance is therefore novel in terms of the new insights manifest in the actions directed at objects, events, and so forth. This suggests an integration of existing structures or schemes.

In comparison, truly novel performances are best characterised in terms of Pascual-Leone's notion of a bi-level organisation in the psychological organism which allows for a transcendence of previously learned knowledge through the "hidden interactions among situation-free organismic processes - the silent operators and basic principles" (1979 p.11). In other words, a truly novel performance represents a qualitative break from previously learned schemes or structures in the sense that the integration is the result of a higher form of abstraction than the integration underlying novel performances. In Pascual-Leone's own words, this is stated as follows:

In a truly novel performance the integration of habitual schemes occurs serendipitously, without a habitual integration-rule scheme, as a result of hidden interactions among situation-free organismic processes -- the silent operators and basic principles (1979 p.11).

The idea of the integration occurring "serendipitously"ⁱⁱ may be problematic to some because it may seem an unexplicated

moment or "accident" in the psychological processes directed at solving the unfamiliar. This "accident" should perhaps be seen as an organismic power or potentiality (cf. Harrè and Secord 1972), which is inherent in the notion of intrinsic generative mechanisms. 'Serendipitously' then means truly novel performances are possible because the intrinsic generative mechanisms have the power to achieve greater levels of abstraction than are available in the immediate data from action performed on objects, and the integration from knowledge thus gained.

At the basis of the Piagetian paradigm, and implicit in the notions of novel and truly novel performances, is the idea that child and scientist alike must construct reality from action on the world¹⁰. Despite the fact that all people must be capable of solving the problems presented through new insights if they are to survive as social actors, there does seem to be a need to distinguish between each individual's potential for novel and truly novel performances which repeat the known developmental stages in knowledge acquisition, and those rare individuals who change social forms. This latter category refers to 'uniquely truly novel performance' (Examples of such individuals need hardly be given!). These human achievements, perhaps more than those previously discussed, must be linked to specific socio-historical processes. The very problems presented to people, for example

depletion of natural resources such as crude oil, demand resolution of the unfamiliar in a way for which no clear precedent exists. Even though each child will "conserve", each individual will not discover alternative sources of energy.

The power and potentiality of the intrinsic generative mechanisms of all people must allow for adaptation. However the unique socio-historical constraints or extrinsic generative mechanisms may allow certain solutions at certain times and not others, and also by certain people and not by others. This brings us to "society" which may be conceived of as extrinsic generative mechanisms vis-à-vis individual development, and also to the idea of an object-in-society. In order to explore these ideas further we will turn to the Vygotskian paradigm in the study of mind in society.

According to Vygotsky, the origins of self-regulatory activities lie in culturally prescribed patterns of control, exercised initially from without by the mother or other significant caretakers. Gradually the child internalises these outer directed cognitive controls and learns to regulate his/her own behaviour. Vygotsky's idea of the "Zone of Proximal Development" suggests "mediation" as the mode of connection between individuals or between child and adult when considering individual development.

For Vygotsky the Zone of Proximal Development is "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (1978 p.86). This "adult guidance" is what Vygotsky refers to as mediation. He attempts to explain the development of higher mental functions by the concept of mediation. This concept of mediation stresses the historico-cultural contribution to cognitive development and emphasises the role of language in particular. In the early stages of development, Vygotsky argues, children's mental functions are shaped by their social relationships with adults. Furthermore, he emphasises the regulative role of language in social relationships. In Vygotsky's view of the development of higher mental functions in humans, language (or speech) starts as dialogue, then becomes monologue before the child eventually develops "inner speech" by internalising these outer-directed cognitive controls. The child then becomes capable of actively modifying the environment that influences him by virtue of this "inner speech" and adapts his behaviour to these modified influences. For Vygotsky, social communication provides the occasion for the point of contact between the individual and society.

Luria (1979), who continued Vygotsky's work on the influence of historico-cultural factors on the development of higher mental functions, summarises the "point of contact" as follows:

Under the influence of adult speech, the child distinguishes and fixes on behavioural goals; he rethinks relationships between things; he thinks up new forms of child-adult relations; he re-evaluates the behaviour of others and then his own; he develops new emotional responses and affective categories which through language become generalised emotions and character traits. This entire process, which is closely related to the incorporation of language into the child's mental life, results in a radical reorganisation of the thinking that provides for the reflection of reality and the very processes of human activity (Luria, 1976 p.4).

It is clear from the above quotation that Vygotsky (and Luria after him) locates the origin of higher mental functions in social processes.

An emphasis on these social processes is evident in the work of those who follow in Vygotsky's research program (cf. Rogoff and Wertsch, 1984).

For Wertsch the problem is "to understand the mechanics of the zone of proximal development" (Wertsch in Rogoff and Wertsch, 1984). In this regard he proposes three related notions, that of "situation definition", "intersubjectivity", and "semiotic mediation". Each of these notions is discussed separately.

Situation definition.

A situation definition is the way in which a setting or context is represented - that is, defined - by those operating in the setting (Ibid. p.8).

Wertsch stresses that people actively create a definition of the situation and are not merely passive recipients of another's representation of a situation. (The active role of the organism is also vital within the Piagetian paradigm). As far as his explication of the zone of proximal development goes, Wertsch asserts that "situation definition" is an important aspect and that this revolves around the adult having one way of representing objects and events and the child, another.

The fact that children and adults have different representations of a situation suggests that there are different possible definitions of the situation. Wertsch proposes task analysis to provide an account of "the steps involved in strategic, goal, directed activity" (Ibid, p.10). This task analysis should not only take account of both the child's and the adult's definition of the situation but also the possibility of a third definition representing a compromise between adult and child. Wertsch also draws attention to what he terms "situation redefinition". This involves a process whereby the child gives up his/her situation definition in favour of a qualitatively new one.

For Wertsch, change in the zone of proximal development primarily involves a shift in one's basic understanding of the objects and events in a situation. This constitutes a situation redefinition achieved through the communication between adult and child.

Intersubjectivity.

The communication between adult and child revolves around the notion of intersubjectivity discussed by Wertsch. In his words this is described as follows:

... we can say that intersubjectivity exists between two interlocutors in a task setting when they share the same situation definition and know that they share the same situation definition. At one extreme it can consist of no more than agreement on the location of concrete objects in a communication setting. At the other extreme, nearly complete intersubjectivity exist when two interlocutors represent objects and events in identical ways (p.12).

Wertsch presents the notion of "intersubjectivity" to allow for the possibility of a "negotiated intersubjectivity". In other words, in order for communication to proceed, it is necessary for the participants to have some basis for agreement and disagreement. This basis involves some kind of "intersubjectivity" and the "negotiated intersubjectivity" Wertsch refers to indicates the possibility of the adult representing the objects and events in a manner which is amenable to the child's grasp of the situation. The adult,

therefore, temporarily relinquishes her situation definition in order to make communication possible. For the child, on the other hand, the negotiated intersubjectivity may represent the occasion for a lasting situation redefinition; the child, through communication with an adult about objects and events, may come to understand these differently.

Wertsch proposes "semiotic mediation" as the concrete mechanism which makes negotiated intersubjectivity possible. This rests, for Wertsch, on the fact that intersubjectivity is often established through the use of language.

Semiotic mediation.

For Wertsch, appropriate forms of semiotic mediation are not directed at what the child actually understands, but at what the child needs to understand in order to respond appropriately to an adult directive. In this sense, semiotic mediation becomes the mechanism that makes intersubjectivity possible. Referring to Vygotsky's dictum that instruction creates a zone of proximal development, Wertsch relates this to semiotic mediation as follows:

... a particular way of talking about the objects and events in a setting automatically sets the level at which intersubjectivity is to be established. It is in this sense that speech can create, rather than merely reflect, an intersubjective situation definition (Ibid, p.14).

The three notions discussed by Wertsch are all interrelated and flow from the communication between adult and child. Consistent with Vygotsky, he therefore emphasises social communication as a vehicle for the development of knowledge. This communication is made possible by semiotic mediation and enables the establishment of intersubjectivity and, through negotiated intersubjectivity, a situation definition and re-definition. The situation definition, and possible re-definition, allows the child to establish knowledge about the world of objects and events within the form determined (at least in part) by the adult. Wertsch therefore describes the process of knowledge accretion for the child within a social setting. His focus is on the transaction between adult and child and the possibility of the child gaining new insights through this transaction. The three notions he discusses describe the transaction in terms of different "moments" within the process of communication between adult and child. As such the "mechanics of the zone of proximal development" emphasised by Wertsch seem better characterised as the dynamics of transaction produced by the intrinsic generative mechanisms of the individuals participating and the adult mediator creating extrinsic generative mechanisms as constraints for the child's developing understanding of a situation.

Even though Feuerstein does not explicitly address the zone of proximal development as discussed by Vygotsky, his work on "mediated learning experience" (1980) can be seen as a descriptive explication of the zone of proximal development. The word "descriptive" is used to capture Feuerstein's clinical insights which evolved during his work on the development of assessment techniques and an intervention programme that he describes as a "strategy for the redevelopment of cognitive structure in the retarded performer" (1980 p.1). As such his contribution achieves more status as a descriptive account of the processes of learning and learning to learn than an explanation of the possibility of cognitive modifiability. Feuerstein uses the concept of "mediated learning experience" (p.15) to indicate the process whereby the adult organises the world of stimuli for the child. In his own words, this could be defined as follows:

By mediated learning experience (MLE) we refer to the way in which stimuli emitted by the environment are transformed by a "mediating" agent, usually a parent, sibling, or other caregiver. This mediating agent, guided by his intentions, culture, and emotional investment, selects and organises the world of stimuli for the child. The mediator selects stimuli that are most appropriate and then frames, filters, and schedules them; he determines the appearance or disappearance of certain stimuli and ignores others (p.15).

Feuerstein then goes on to say that the quality of mediated learning experience (MLE) affects the cognitive

structures of the child. The child acquires behaviour patterns and learning sets which form the basis of its capacity to become modified through direct exposure to stimuli¹². Feuerstein maintains that the more and earlier an organism is subjected to MLE, the greater will be its capacity to "efficiently use and be affected by direct exposure to sources of stimuli" (p.16). The reverse of this, or the less MLE offered to the growing organism, will again lower the capacity to be affected by direct exposure to stimuli. MLE is therefore seen by Feuerstein as an important ingredient which determines differential cognitive development. It is clear from the above the extent to which Feuerstein relies on Vygotsky for his formulation of a theory of mediated learning experience. The products of a lack of mediated learning experience are captured in his concept of deficient cognitive functions. These deficient cognitive functions provide a perspective on the social processes underlying individual development.

These deficient cognitive functions "are conceived of as being a product of a lack or insufficiency of, mediated learning experience and are responsible for, and reflected in, retarded cognitive performance" (p.71). Feuerstein stresses that 'deficient' refers to those functions underlying thought and should not be confused with the operation or contents of thought.

He discusses the deficient functions at the input, elaboration, and output phases of what he refers to as the cognitive act¹¹. He also mentions affective-motivational factors that may contribute to poor performance.

In Feuerstein's elaboration of the deficient cognitive functions, he focuses primarily on the child's manner of engaging in tasks or activities. In other words, given the functions he describes, it is possible to unravel what may happen when a child confronts a task, and what may go wrong in the process of problem solving.

Feuerstein's work grew out of a practical concern with North African Jewish children whose performance on standardised conventional intelligence as well as Piagetian tasks, was well below normal. Observing these children in their daily activities, he was unable to accept that their test performance was either a true or reliable estimate of their intellectual potential. This led Feuerstein to the development of the Learning Potential Assessment Device (LPAD), a procedure to assess a child's potential for learning rather than manifest performance.

Feuerstein's work on the assessment of learning potential is not at issue here. What is interesting in terms of the present project is the group of children which stimulated his formulation of the LPAD. In this regard one could see these children as competent members in their own milieu but

"incompetent" in terms of the demands of another setting. This problem underlines an important aspect of the present project, that of the explication of the generative mechanisms for change. Children such as those with whom Feuerstein worked and any other children similarly confronted with new situations, bring the issue of the possibility of change to the fore. In other words, how do children (or adults) confronted with new circumstances solve the problem of unfamiliarity?

The general question inherent in a consideration of the social processes underlying cognitive development is therefore, how is adaptation or change possible? On a more specific level of analysis, one may also ask how best to characterise the social actor's attempts at resolving the unfamiliar. In terms of this last question, the mediational operators reconstructed from Feuerstein's descriptive explication of the zone of proximal development seem to aid substantially in the task of analysing the social actor's engagement in tasks foreign to him/her. This discussion will be extended in the next section.

CO-ORDINATION BETWEEN THE PIAGETIAN AND VYGOTSKIAN PARADIGMS

The basis for the co-ordination between the Piagetian and Vygotskian paradigms has been laid by stating that whereas Piaget addresses the epistemic subject, Vygotsky addresses the

social actor. Expressed another way, the theory of the epistemic subject's cognitive growth represents a kind of explanation which does not allow for direct comparison between the stages of the growth of knowledge as captured in the stages of cognitive development described by Piaget and actual knowledge acquired by social actors in diverse cultural settings. Vygotsky on the other hand presents a theory of how actors are socialised into a particular socio-historical milieu. In co-ordinating these two paradigms it is vital to see Piaget and Vygotsky not as competing for some 'truth' regarding the origin and development of mind but rather as contributing in different ways to a conception of people's universal and particular abilities to adapt and the manifestation of such adaptation. In this sense Piaget may be seen as providing a model for the growth of knowledge in general whereas Vygotsky presents a model for the socialisation of people into particular social forms. The question this leaves open is whether an individual who has been socialised into a particular form of reality could adapt to a changed or changing reality.

In answering this question, the work of Feuerstein achieves significance. This is so in that his programme of Instrumental Enrichment seems to hold promise for bridging the gap between different forms of adaptation. This assertion must stand as speculative until sufficient data have been

generated on actual cognitive modifications. The present project should not, however, be seen as contributing to this aim but as clarifying the notion of mediation perhaps sufficiently for projects directed at intervention in those cases where cognitive modification may be required. In attempting to clarify the notion of mediation and also the zone of proximal development, the present project comes closest to the work undertaken by Wertsch.

The co-ordination between the Piagetian and Vygotskian paradigms hinges on the question of how change is possible and sketching non-competing domains of analysis for each paradigm. In terms of the question of change, it has been argued in this chapter that the Piagetian and Vygotskian perspectives provide accounts of intrinsic and extrinsic generative mechanisms respectively for development and hence change. This resolution of the apparently contradictory positions of Piaget and Vygotsky is at the basis of the theory advanced in the final chapters of this report.

NOTES : CHAPTER 3.

1. Piaget, however, did seem to neglect drawing explicit boundaries to his project. In a sense he is responsible for the often strange ways in which his theories have been used: I refer here to certain studies attempting to teach children the knowledge and understanding Piaget claimed they did not display, and also studies where the ambiguity in his questions were removed (cf. Vuyk 1981).
2. Socialisation refers to the process whereby a child is acquainted with the demands and meaning of tasks, objects, and so forth of a given society. See also Bhaskar, 1979 for a discussion of this process.
3. The study domains of "intentionality" and "meaning" are complex and vast. This will not be covered in depth and these terms are used rather loosely as follows : 'intentionality' refers to the individual's ability to plan action; 'meaning' refers to a group's or society's conception of what action ought to entail and what it does represent.

4. The domain of "cross-cultural psychology" is problematic for a number of reasons. Primarily in that the implicit and sometimes explicit idea of comparison across cultures would seem to be insufficient in explaining people's universal and particular competencies. As a data base from which to conclude that there are marked differences in the ways people solve the problems of living, however, it is useful.

5. 'Object' is used in this project to refer to people, things, events, and tasks. The term is therefore used generally to indicate the subject's distance from the focus of his/her attention and activities.

6. Piaget (1977) describes "empirical abstraction" as the knowledge possible from "objects or observables" (p.57) and "reflective abstraction" as the driving force for seeking new states of equilibrium and the knowledge which enables "co-ordinations of actions" (p.57). Piaget states that "from the very outset (of subject's interactions with objects) there is an interaction between the observables and the co-ordinations; hence there is collaboration on every level between the empirical and reflecting abstractions, the latter, as a result, continually playing the role of the required driving force" (p.57).

7. Vuyk (1981) discusses the problem of whether Piaget's model of equilibration is a description of cognitive development or an explanation. I would argue that it is primarily descriptive and that the explanation of this model is attempted and perhaps achieved by Pascual-Leone.
8. This explanation was given to the author by Pascual-Leone (1984).
9. The explication of the generative mechanisms for patterns in society (the institutional network) is an important extension of the present project. This is planned for the near future.
10. The sensorimotor period of development described by Piaget lends itself very well to the idea of constructing reality through action. However, after this period, and with the advent of language, the child must also confront the object-in-society and this brings social knowledge, which pre-exists the child's actions, to the fore.
11. A different conception of what the "cognitive act" involves is also possible. See for example Strohm-Kitchener (1983). This debate is, however, not central to this project.

12. Feuerstein (1980) stresses two modes of interaction between child (organism) and environment. The first and most universal is direct exposure to stimuli and the second involves mediated learning. Consistent with the Vygotskian theory of development, Feuerstein stresses the latter mode of interaction.

4 : A MODEL FOR THE STUDY OF INDIVIDUAL(S) IN SOCIETY.

A model is presented in which the Piagetian and Vygotskian traditions are co-ordinated. The specifiable domain of application for both of these, and the link between the two traditions, are clarified within a model that extends the ideas that "individual" and "society" are essentially different kinds of things. Furthermore, the idea that society exists only by virtue of human action which always expresses or utilises pre-existing social forms is recognised in the model. The concept 'mind-culture action dialectic' emerges as an important aspect of the suggested mode of connection between individual and society. The mind-culture action dialectic emphasises "mind-ing" and "cultur(e)-ing" in a domain of action that recognises intentionality on the part of the individual and the imbeddedness of action in (social) meaning.

INTRODUCTION

In the present project, the study of change is addressed and linked to individual cognitive development, and the social processes underlying this.

In the context of present day South African society, the

problem of a dominant group, and various minority groups which compete for resources and recognition is paramount. This 'cultural battleground'¹ involves, among other things, the problem of preparing children for social forms to which parents may not belong or are not part of in terms of their cultural heritage. As can be expected, the field of formal education seems to carry the weight of conflicting systems of beliefs, desires, and knowledge. It is for this reason that formal western schooling and the participation in it of 'non-westerners'² is of interest. It seems to provide the possibility for an empirical study into the process of change and the possibility for a rational reconstruction of the generative mechanisms for change. Both of these would seem to be of significance. In a practical sense, being able to 'catch', as it were, a process in the act of unfolding, is a rare opportunity for the scientist. In a theoretical sense, contributing to the understanding of how people are changed, and how they effect change in their social world, would seem to be significant.

The object of study is therefore the ability of people to change, or expressed another way, the generative mechanisms for change. This formulation of the object of study necessitates clarification of the kind discussed, and is embodied in the model presented.

The study of change highlights the different "presentations"³ of the objects of study, or society and individual as in the present case. This is because different aspects of being-in-society, that is, the different roles occupied by individuals in the course of their development and the history of the society emerge in the process of change.

The individual, for example, may be regarded in terms of different performances or intelligent praxis such as in problem solving or as a 'total psychological entity' directed at participation in the totality of life, and so forth. Society may be seen as a particular group of people with discernible institutions or particular forms of knowledge, and so forth. What is important is that an individual and a society are abstractions from the fact of people carrying-on the business of life. In attending to these different presentations of individual and society, the way is paved for analysing the different developmental trajectories (biological, social and psychological) and their inter-relations. The fact of different presentations of individual and society requires explanation in terms of the interface between analytically separable domains of study, such as the psychological and the social. Such links are contained in the proposed model in the notion of an action link between the individual and society or the psychological and the social and are at the heart of the model suggested.

This action link is referred to as the mind-culture action dialectic and contains the empirical reality of people carrying on the business of life as social actors. This is clarified in the discussion of the suggested model.

Before discussing the various aspects of the model for the study of individuals in society, certain further introductory comments are necessary. Because the generative mechanisms for the non-random patterns in nature and behaviour (cf. Bhaskar, 1979) are not often immediately assessable (cf. Harrè and Secord, 1972), it is important to conceptualise these analytically. Part of the process of reconstructing the generative mechanisms must therefore involve model building of the unknown "mechanisms" which produce overt patterns (cf. Bunge, 1973).

The model presented in this chapter may be regarded as a precursor to model(s) of the intrinsic and extrinsic generative mechanisms for change (which may be constructed) : a 'precursor' in the sense that the present model highlights crucial distinctions to be made in order to construct a model of the generative mechanisms for change. Such distinctions involve different levels of analysis; the analytical entities that are imposed by either the implicit or explicit theory-method adopted; and the empirical manifestations of the object(s) of study.

The object of study may be clarified, firstly, by making explicit the level of analysis, that is, descriptive, critical descriptive or explanatory (cf. Harrè and Secord, 1972) or objective, phenomenological, subjective, ultra-subjective or meta-subjective (cf. Pascual-Leone, 1984); and secondly, by presenting the analytical entities which may be illustrated by contrasting the "epistemic subject" (Piaget) with the "social actor" (Vygotsky). The third aspect refers to the empirical manifestations of the object of study. In this regard it is necessary to distinguish clearly between what may be directly observed, such as patterns in people's behaviour, and what does not have the same empirical status but is used as a kind of summary label for what is actually observed - "culture" or "mind" for example are such labels. This alerts us to the fact that certain taken-for-granted notions may admit to more fruitful discussion if their conceptual nature is carefully considered. In accepting a concept as synonymous with the empirical manifestations of the generative mechanisms, one runs the risk of thinking of it in terms of a quantifiable variable, whereas the concept may be a label which contains some idea of their generative mechanisms together with some idea of the empirical manifestations. Both 'mind' and 'culture' are good examples to use in illustrating this problem.

A MODEL FOR THE STUDY OF INDIVIDUAL(S) IN SOCIETY

Bhaskar's model, "The transformational model of the society/person connection" (1979 p.46) discussed above is based on the following:

Society, then, provides necessary conditions for intentional human action, and intentional human action is a necessary condition for it. Society is only present in human action, but human action always expresses and utilises some or other social form. Neither can, however, be identified with, reduced to, explained in terms of or reconstructed from the other. There is an ontological hiatus between society and people, as well as a mode of connection (viz. transformation) ... (Ibid).

It is this 'mode of connection' that Miller (1984) discusses and conceptualises in the model he presents. In Miller's work, the mode of connection is elaborated in what he calls a "third dimension" (p.12) in which social forms are conceived of in terms of the relations between depersonified actors, and the individual domain conceived of in terms of the group which may be abstracted from the plurality of individuals. This third domain concerns, for Miller, "the relations within and between domains" (p.12). This third domain refers, furthermore, to the context of action in which "the four analytical categories of social, actor, individual, and group acquire a functional quality that animates the model" (p.14). The "animation" of the model refers to the following:

An individual in action is an individual actor and, similarly, social forms in action are manifest as social groups. The dialectic resides in the process whereby an individual engages in a role prescribed by a social form or, alternatively, a social form is expressed in a group comprised of individuals (p.14).

The dialectic between the social and the individual domains, and the animation of the model Miller refers to, is embodied in the notion of a mind-culture action dialectic in the present model. However, the analytical entities which seem to enter the study of the mode of connection between individual and society are regarded as social forms, roles, individual forms, and actors - all achieving empirical realisation in the mind-culture action dialectic in which social actors, either individually or in groups, participate or contribute to the processes of "mind-ing" or "cultur(e)-ing" or as Miller puts it, "as mind-in-action and "culture-in-action" (p.14). These processes of mind-ing and cultur(e)-ing rely on Bhaskar's assertion that "Society is only present in human action, but human action always expresses and utilises some or other social form" (1979 p.46). It also attempts to do away with conceiving of "mind" and "culture" as a dichotomy.

Although obviously related to both the model proposed by Bhaskar (1979) and Miller's extension of it (1984), the model proposed here differs in an essential way. The difference resides in the present aim being directed at a model which may

elucidate the study of the mode of connection between individual and society, whereas both the other models may be regarded as primarily analytical models. These analytical models conceptualise the mode of connection between the social and psychological domains without discussing the distinctions between levels of analysis, the analytical entities, and the empirical manifestations of the object of study.

The model is presented graphically in figure 2. It is organised in four sections: levels of analysis, analytical entities, empirical realisation, and the study domains of change. Each of these sections is discussed separately after figure 2.

By way of introducing the discussion of the various aspects of the proposed model, a word about the graphic representation of the link between individual(s) and society.

The 'hatched' area in figure 2 running from 'levels of analysis' through 'analytical entities' to the finer hatching representing the 'empirical realisation' of society and individual, represents the continuity of the object of study through its various conceptual and empirical manifestations.

The top and bottom lines linking 'society' and 'social history' and 'individual' and 'individual history' respectively indicates movement forward in time and this signifies a general continuity over time.

The arrows for socialisation and transformation (dotted arrows) are linking social actors in the mind-culture action dialectic to individual terms and social terms respectively. The 'backwards' movement of these arrows indicate these processes as feedback mechanisms between the domain of action and the general system (or super system) of which the biological, psychological and social are all part.

The small arrows moving from 'society' through 'social forms' and 'roles', and from 'individual' through 'individual forms' and 'actors' towards 'social actors' is intended to convey the force of the theory-method adopted in revealing these analytical entities.

In the present project 'individual history' on the bottom line is focussed on psychological development. Biological development is therefore not directly addressed and social history is addressed only in so far as this relates to psychological change.

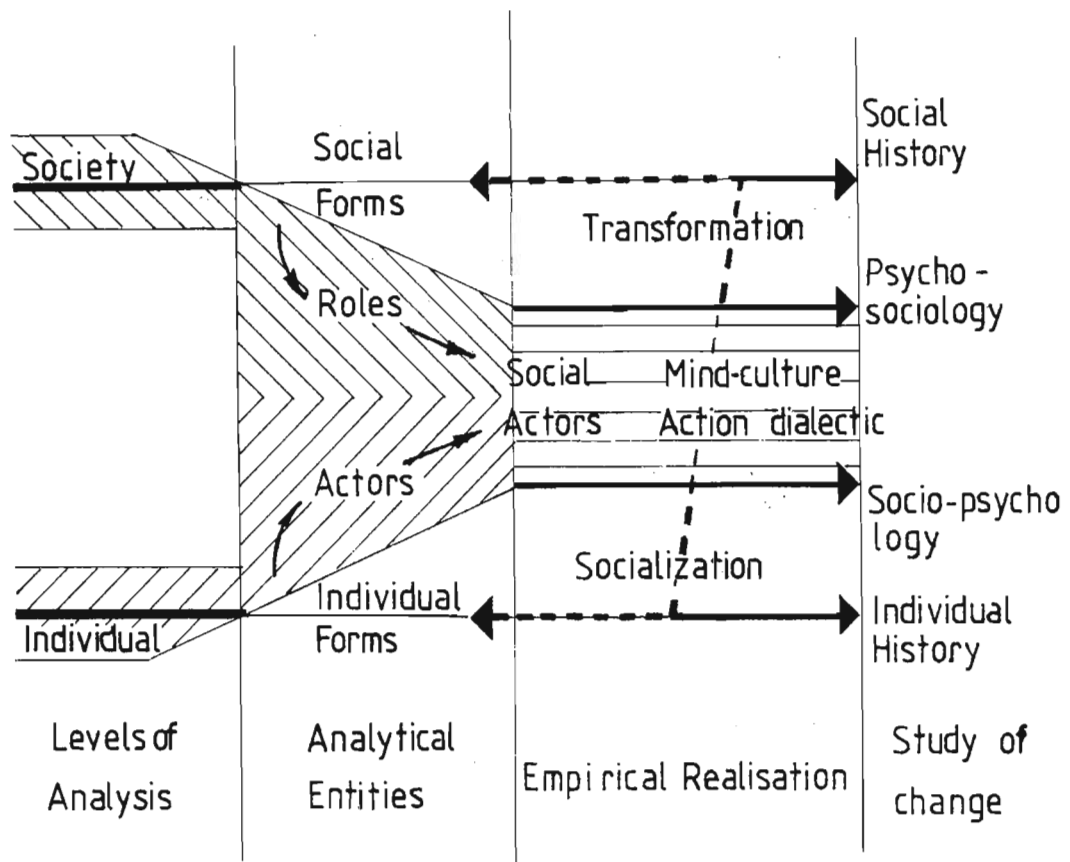


FIGURE 2 : A MODEL FOR THE STUDY OF INDIVIDUAL(S) IN SOCIETY.

LEVELS OF ANALYSIS.

In the present project explanation is pitched at the level of generative mechanisms. As far as the study of the mode of connection between individual(s) and society is concerned, the analysis involves explicating the intrinsic and extrinsic generative mechanisms for change. The Piagetian paradigm in cognitive development is taken as a sound basis for the explication of the intrinsic generative mechanisms of the development of mind. What is not addressed in the present project are the intrinsic generative mechanisms within the social and biological lifelines.

The levels of analysis possible given the concepts 'society' and 'individual' have been introduced above as descriptive, critical descriptive or explanatory on the one hand and the five epistemological levels discussed by Pascual-Leone in terms of his analysis of the generative constructivity of the psychological organism on the other hand.

Both Bhaskar (1979) and Harrè and Secord (1972) adopt a position regarding psychological explanation in which reasons are regarded as causes if (1) they are to discharge their explanatory function; (2) discursive thought is to be possible; and (3) in particular the concept of agency is to be saved (1979 p.115).

When analysing "reasons as causes" Bhaskar argues that reasons should not be reduced to physical states but should be understood as circumscribed by social conditions. The question that is left open, however, is what generates reasons within the psychological "machinery"? It is in answer to this question that Pascual-Leone's meta-subjective analysis of the functional structure of the psychological "machinery" is important. It can provide an explanation of "reasons as causes" without recourse to physicalism because the generative power of the individual is located at a level at which the particular reasons of any individual can be analysed in theoretical terms that are not dependent on those particulars. For example, an individual may have different reasons for the same action over time, or different individuals may have different reasons for the same action, but the fact remains that individuals can have reasons and these reasons are amenable to analysis in terms of causes of behaviour.

Pascual-Leone's levels of analysis presented in chapter 3 provide a conceptual framework in terms of which "agency" is not only "saved", but is also exposed as a viable object of scientific curiosity. The five epistemological levels discussed above (see p. 71) function as an analytical tool in the sense of a set of operations that the analyst/theorist can perform to bridge the gap between what Bhaskar calls the "intransitive" and "transitive" domains⁴. In terms of the

model presented in figure 2, the levels of analysis of the generative mechanisms for change are presented at an explanatory (cf. Harrè and Secord, 1972) and generative level after Pascual-Leone (1979).

ANALYTICAL ENTITIES

'Society', when transmitted as existing social forms and knowledge about the world, becomes the mind's surroundings or the social processes underlying psychological development, and these may be conceptualised in terms of the extrinsic generative mechanisms for psychological development as in the present project. Pre-existing social forms and the social processes through which these constraints are transmitted to the developing organism demands cognisance of the Vygotskian paradigm in cognitive development. In this paradigm, social processes may be regarded as the extrinsic generative mechanism of mind.

The 'individual' represents a conceptualisation of those powers of people (cf. Harrè and Secord, 1972) which enable them to act - to become actors - and is explained by the intrinsic generative mechanisms described within the Piagetian model of development.

Bhaskar states that it would indeed be surprising if individuals presented themselves, just as they stand, as objects for study (1979). The same point is made by Vygotsky

who quotes Marx's comment that "if the essence of objects coincides with the form of their outer manifestations, then every science would be superfluous" (1978 p.63). This applies to "society" as well and it is, therefore, not only important to consider what constitutes both individual and society as objects of knowledge, but also to consider which analytical entities must be confronted in order to unravel the mode of connection between the social and individual domains.

Social forms, roles, actors, and individual forms, seem to be the most crucial analytical entities entering the investigation of the ability to change within a social world. Each of these is discussed separately.

Social forms.

In the present project, social forms are considered only in as much as these are available or transmittable to the individual. "Formal western schooling" and the social forms it entails is an important aspect of the empirical focus of the present concern with the generative mechanisms for change. In this regard the actors chosen to participate in this investigation are in some ways strangers to formal western schooling⁵. They all, however, desire and strive for successful participation in this network of social forms. The question this highlights is how will these adults (as cultural guides) transmit relevant information about the social forms

associated with schooling to their children? Stated more generally, in changing societies, how is socialisation possible? This, again, may be phrased in terms of the present focus on the generative mechanisms for change. This question is addressed in detail in the following sections of this report.

Roles.

Roles or the "positioned practices" Bhaskar refers to are "the 'slots', as it were, in the social structure into which active subjects must slip in order to reproduce it" (1979 p.51).

Each new entrant into the social world - be this a child, a foreigner or a student, for example - must in some way confront the problem of filling the available "slots" for action. These slots may be conceived of in terms of the available roles in a society or the available means for action. In confronting the possibilities for participating in society, knowing what is available and what this demands from the actor, must be an important focus in the process of socialisation. Being equipped to participate in the roles in a society may involve both formal and informal tutoring, and explicit and implicit teaching or training. The important point is that it seems doubtful that each individual mind, or the mind's structure, will construct anew the particular

social roles which exist and must be engaged in, in order to act. This, therefore, seems to point to the necessity of a cultural guide (or guides) who must initiate the 'newcomer' to society.

Actors.

The analytical entity 'actor' stresses the fact of an active organism or one who will act, rather than referring to actors as in a staged play (even though this may be a good metaphor to use in considering people 'acting' in the 'drama of life'). Actors are therefore people in action. Without specifying the goal or nature of the action, 'actors' refer to the possibility of action or the human power to act. This conceptualisation of actors is analogous to Piaget's focus on the epistemic subject in that it describes the potential for intentional praxis. It is only when the potential for action is realised within a particular social milieu that the analysis shifts to the mind-culture action dialectic. In other words, when a person acts, analysis of the 'performance' must unite the psychological and the social domains. Human action is then regarded in terms of both intentional and meaningful praxis, and the epistemic subject becomes grounded in the social actor. This, of course, underlines the need to co-ordinate the Piagetian and Vygotskian paradigms in the study of mind.

Individual forms.

In the discussion of the possibility of action, and knowledge through action, the functional structures of mind are the focal point. 'Individual forms' refers to those psychological 'mechanisms' which may be assumed to generate intentional praxis. In the present project the Piagetian paradigm in which the intrinsic generative mechanisms are emphasised has been discussed. Intentional human praxis always takes place in a social context, however, and it thus becomes necessary to introduce the notion of extrinsic generative mechanisms in the study of individuals in society.

The arrows joining the various analytical entities move towards 'social actors' in the model presented in figure 2. This is to indicate that the theory-method adopted allows these analytical entities prominence in the analysis of individuals in society - social actors in the mind-culture-action dialectic.

EMPIRICAL REALISATION.

The student of either or both "society" and "individual" can only observe people in action (social actors) in a specific spatio-temporal context (mind-culture action dialectic). This implies that what is confronted are social actors carrying on the business of living. Furthermore, the domain of action represented by the concept of the

mind-culture action dialectic emphasises that it is through action and by action that the individual interfaces with society, and society with the individual. Action performs an interface function in that it expresses and utilises social forms and individual forms. At the moment of action "society" and "individual" unite in expression. The processes of "transformation" and "socialisation" (cf. Bhaskar, 1979) focus on this meeting of the two essentially different kinds of thing - "society" and "individual". In reproducing or transforming social forms, and in being socialised to act, the individual in action, must translate and exercise social and individual forms.

The mind-culture action dialectic is an explicit move away from conceiving of "mind" and "culture" as a dichotomy. In psychology, the "relationship between mind and culture" is typically depicted as a functional relationship between dependent and independent variables. The formula, $y=f(x)$, where 'y' is some psychological phenomenon (or mind), and 'x' some social phenomenon (or culture) expresses this presumed relationship. The Laboratory of Comparative Human Cognition poses the question, "How do differences in culturally organised experience affect the development of powerful and efficient problem-solving skills (intelligence)?" (Sternberg, 1982 p.642). The LCHC authors express serious doubts about what is included on each side of the equation but do not question the validity of the general formulation.

Not the least of our difficulties arises because the phenomena we seek to designate as culture and intelligence are by no means well specified. Definitions of both terms abound. Depending upon which rather poorly specified definitions of individual investigators one uses, a very wide variety of phenomena can be subsumed under both the independent and the dependent variable sides of the functional equation $I=f(C)$. Furthermore, relationships among the variables on each side of the equation are as poorly understood as the relationship between them (Ibid).

Another expression of essentially the same viewpoint regarding the relationship between psychological and social processes is contained in Jahoda's analysis of "a postulate that is presumably shared by all cross-culture workers" (Jahoda in Triadis, 1980 p.129).

Let us put forward a postulate that is presumably shared by all cross-cultural workers, and express it in a very simple-minded way. Namely, behaviour is a joint function of individual psychological processes and eco-culture: $B=f(P \times EC)$. Now it is possible to consider how the terms in this equation enter into the various approaches (Ibid).

Jahoda goes on to group together loosely the approaches of Whiting, Cole, and McClelland as concentrating "on eco-cultural influences, firstly assuming or explicitly stating that personality or cognitive processes are universal" (p.129). In these cases the equation effectively reduces to $B=f(EC)$. According to Jahoda a second approach consists of theorists such as Piaget and Witkin and the equation in this case becomes $B=f(P)$. Jahoda singles out Le Vine and Berry as

theorists whose approaches "cover both terms of the equation, attempting to cope with the interaction of persons and culture" (Ibid, 1980 p.130).

What is significant, however, is that the equation in any of the three forms depicted by Jahoda, stands apparently unquestioned. The general framework or paradigm within which all of the proceeding formulations of the relationship between mind and culture could be located is what Vygotsky refers to as the "stimulus-response framework" (1978 p.58).

The concept of a mind-culture action dialectic represents a rejection of and an alternative to the S-R framework and the functional relationship between "mind" and "culture" as depicted above. Rather, the mind-culture action dialectic is an expression of the idea that mind-in-action (mind-ing), and culture-in-action (cultur(e)-ing) each instantiates the other. With this conceptualisation, the question becomes "what are the enabling conditions for intentional and meaningful action or how is mind-ing and cultur(e)-ing possible?" In the present project these conditions are conceived of as the generative mechanisms underlying intentional and meaningful action.

STUDY DOMAINS OF CHANGE

At the core of this project is the study of change within different domains of enquiry. The epistemological beacons

created by Marx (analysis of history), Darwin (the theory of evolution), Piaget (the development of intelligence), and Vygotsky (the study of the social processes which underlie the development of higher mental functions in humans) must be repeated to stress the theoretical and methodological traditions within which the present project is conceived. In the model presented in Figure 2 above, socio-psychology and psycho-sociology are used somewhat differently from Bhaskar's ideas regarding the linking science of "socio-psychology" (1979 p.45). Transformation becomes the topic or phenomenon of interest for psycho-sociology, emphasising the possibility of individual forms constraining the way in which social forms will change. Socio-psychology refers to the reverse relationship, that is, how engagement in particular social forms constrains the development of individual forms, a domain of enquiry which is exemplified by Vygotsky's (1978) project.

The presentation of a model for the study of individuals in society focuses this introductory section in that the foundation is laid for the presentation of results in the next section.

An attempt has been made to sketch the major issues that confront the student of "mind in society". In this regard the present project attempts to explicate the possibility of both intrinsic and extrinsic generative mechanisms co-determining psychological development. Furthermore, psychological

development is regarded as one lifeline of development, history and biological evolution being the other two. These three lifelines should be understood as analytically separable while being interdependent and inseparable in the total process of adaptation - that is, adaptation of people to a world, and a world to people.

NOTES : CHAPTER 4.

1. The notion of a cultural battleground is used to indicate different cultural traditions entering the conflict between the dominant (white) group and the various (political) minority groups. For the sake of abbreviation "western" may be used for the former, and "african" for the latter groups.
2. 'Non-western' is used to emphasise the problem of entering unfamiliar western social forms from a different historical development.
3. 'Presentation' is used to designate the fact that the biological individual engages in a multiplicity of social selves (cf. Harrè and Secord, 1972) and that society is not directly perceivable (cf. Bhaskar, 1979). 'Presentation' therefore indicates a focus on the possibility of different ways in which the individual and society can become known to an observer.

4. Bhaskar discusses the necessary distinction between real objects and knowledge of such objects. The intransitive dimension refers to the real objects of scientific knowledge which are not directly accessible, and the transitive dimension which represents different layers of knowledge or changing knowledge about unchanging objects.

5. They are strangers to formal western schooling because the historical tradition which culminated in the form of education referred to, and the historical tradition to which these actors belong have only relatively recently come together.

5 : A METHODOLOGY OUTLINED.

Urban black Zulu-speaking mother-child dyads were chosen as social-actors. As people who are increasingly participating in a western-industrialised-urban-technological-schooled society they provide one vantage point from which to describe different moments of change. Another vantage point is obtained from expert formulations of regulatory mechanisms for psychological development. Between these two possible extremes, two intermediate moments of change crystallise from an analysis of the social-actors' engagement in culturally autogenous activities. Spanning these four moments of change are two data bases: an indigenous theory of childhood; and mediational operators. Together they provide a conceptual framework for the study of change.

INTRODUCTION

'Methodology' may be understood as meta-method in the sense that meta-theory refers to a theory of theories. In more formal terms, methodology is about the co-ordination of methods, where method is understood to mean the means by which information is obtained. Much of the discussion in the philosophy or history of science is about methodology in this

sense. If a researcher is working within a 'normal paradigm', it is not usually necessary to make explicit the nature of the methodology as it is this that is 'normal' or generally accepted or understood. All that is required of the researcher is to report the method used in obtaining the results. In the present project, however, the standard experimental approach that is generally accepted as sound¹ has not been employed. In fact, the subject matter of the project is not confined to the 'data' or results alone but also includes the meta-method. In other words, not only should the data be judged in terms of the methods used and the methodological principles adhered to, but the methodology should be evaluated in terms of the "data" produced. To allow for such evaluation, it is necessary to provide a full account of the methodology that underlies this research. The research paradigm is presented graphically in figure 3.

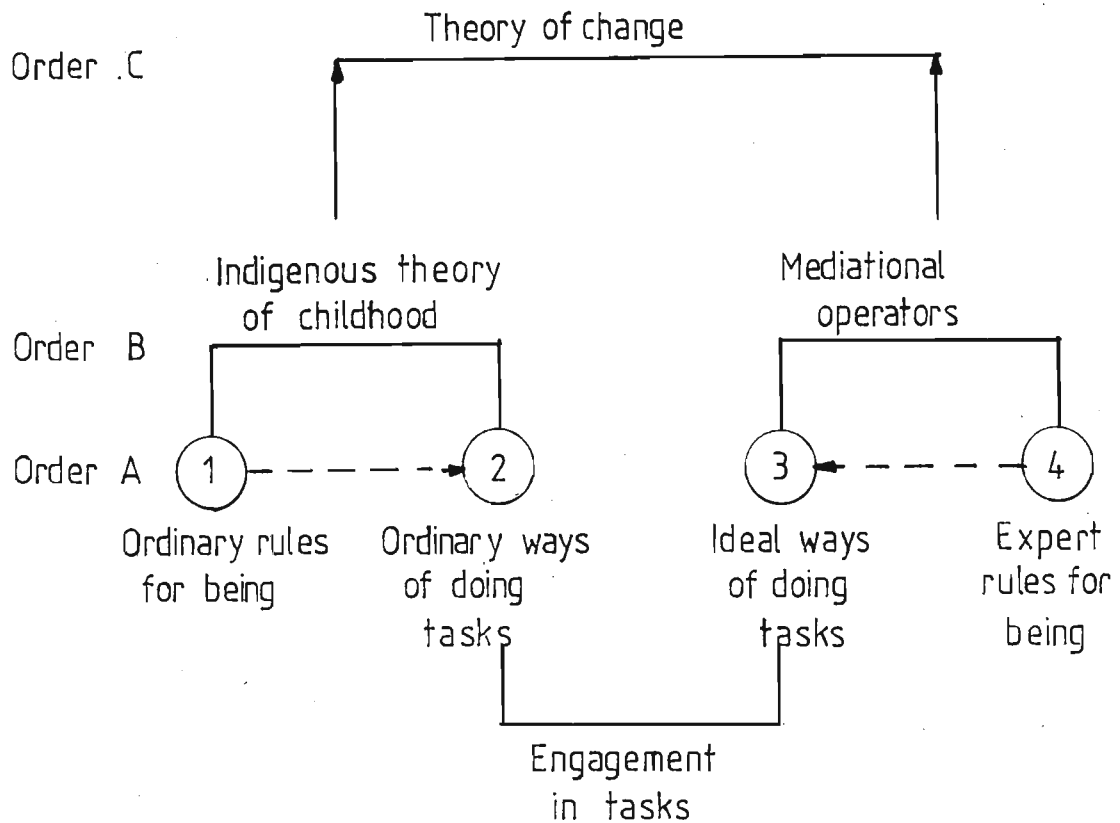


FIGURE 3 : THE STUDY OF THE POSSIBILITY OF CHANGE.

In figure 3 the study of the possibility of change is conceptualised in terms of three different orders of analysis. The most basic, order A, refers to four likely (in the sense of rational reconstruction, (see Ullmann-Margalit, 1977) moments in a chain-of-change. These four moments are, ordinary rules for being (1), ordinary ways of doing tasks (2), ideal ways of doing tasks (3) and expert rules for being (4). Between these moments are three modes of

interaction. The first two are those of ordinary and expert rules for being which makes possible certain ways of engaging in tasks (indicated by dotted arrows between 1 and 2, and 3 and 4). The third mode of interaction is somewhat different from these two, and refers to the investigation of the engagement of actors in tasks (indicated by the joining of 2 and 3 through engagement in tasks). The engagement in activities as when subjected to investigation would seem to contain elements of both ordinary and expert² rules for being and, depending on how large the discrepancy between the ordinary and expert conceptions of being, may contain relatively more elements of the one than the other. In other words, given a certain sample of action, it is possible to analyse that action both in terms of a theory of ideal performance and in terms of the expression of ordinary skill. This is, of course, to be expected if one is not to propose a complete cleavage between the performances of social actors and the theories which may be advanced to account for such action.

Posing respectively an ordinary and expert perspective on action however, has the advantage of clarifying different bodies of knowledge or data which may be used in the explanation of action. In the present project the choice of social actors to participate in this study, and the choice of theories within which to locate the possibility of intentional

and meaningful action, underline the demand for a developmental methodology which relies on different moments in the process of change or different vantage points from which to capture development.

The second order of analysis, B, refers to a reconstruction (indicated with continuous arrows going upwards) of the data contained in the first order of analysis.

The most abstract, or third order analysis, C, refers to a further reconstruction and uses the data contained in order B as a basis. This reconstruction is aimed at the formulation of principles for a psychological theory of change.

Before discussing separately each of these orders of analysis and their data some discussion of the issues addressed in the formulation of an appropriate methodology is necessary.

THE STUDY OF CHANGE

The kinds of adaptation that adults, who are an integral part of society, present to an observer are more or less consistent with the social forms the adults utilise and express. In this sense, the action of adults in a familiar society does not highlight the possible distinctions and/or discrepancies between actor, activity and social forms. This is best illustrated by an example. The fact that English speaking adults abide by grammatical rules and share linguistic conventions when conversing with each other, does

not occasion surprise at the grammatical rules or linguistic conventions they abide by. However, disrupting this flow by changing one (or more) of either actor, activity, or social form, immediately highlights these rules or conventions. An Afrikaans speaker who says "This is not pretty not" provides data from which to reconstruct both a rule in the Afrikaans language (the use of a double negative) and a rule in the English language (that it does not allow double negatives).

The illustrative case of the Afrikaans speaker could be extended further to illustrate Vygotsky's notion of "fossilised behaviour". If the Afrikaans speaker wishes to cope effectively with the English language, s/he will try to decipher the rules that underlie the use of English by listening to English speakers. One can conceive of such a person being confronted with English speakers who, when introduced to one another say, "How do you do?", without either of the parties answering the apparent question. The Afrikaans speaker might then assume that when asked a question in English by a stranger, one should repeat the question rather than answer it. In this case, what is certainly not intended as a question by English speakers may be interpreted as such by an Afrikaans speaker because of the outward form of the greeting. It would be interesting to investigate how introductions in English developed into "non-question questions". What is important about the example, however, is

that to understand this "fossilised" linguistic form it is necessary to trace its development. As Vygotsky says:

... in psychology we often meet with processes that have already died away, that is, processes that have gone through a very long stage of historical development and have become fossilised. These fossilised forms of behaviour are most easily found in the so-called automated or mechanised psychological processes which, owing to their ancient origins, are now being repeated for the millionth time and have become mechanised. They have lost their original appearance, and their outer appearance tells us nothing whatsoever about their internal nature. Their automatic character creates great difficulties for psychological analysis (1978 p.63).

In the present project the "fossilised" forms of interest are ways of engaging in tasks central to western society. In order to 'shake' these from the fabric of familiarity, actors were chosen who might not regard the tasks included as familiar. Furthermore, to explicate the generative mechanisms for change, an attempt was made to disturb the congruence between actor, activity, and social form. Urban Zulu-speaking mother-child dyads were chosen as social actors to unravel the process of change or development. The aim was not (specifically) to develop conclusions and/or generalisations about these mothers or the cultural group to which they may belong. Rather, they provided an opportunity to explicate the generative mechanisms for change. This approach necessitates a conceptual and methodological shift that may at first seem paradoxical. It is, nevertheless, a shift of great importance

for understanding the present project. Although the methodology adopted will be elaborated and justified in the pages that follow, it is important first to sketch the basic assumptions of the argument. Because these mothers and children participate increasingly in a western-schooled society while being part of another cultural tradition, their adaptation might render the "generative structures, previously opaque, more visible" (Bhaskar, 1979 p.61). This is a conceptual and methodological strategy familiar to post-Chomskian linguists and central to a developmental methodology.

THE CHAIN-OF-CHANGE

Within the basic data base (order A) information was obtained on ordinary rules for being, expert rules for being, and social actors' engagement in tasks. Each of these is discussed below.

Ordinary rules for being.

Harrè and Secord (1972) emphasise and discuss the ability of people to have plans and follow rules for action. The present use of "rules for being" applies this idea to the activity of striving for competence in a particular place and time. "Rules for being", therefore, refers to the general rules people abide by in their expression of their own particular individual humanity. Such rules are not

necessarily explicit or formalised but the thesis that is proposed is that they can be formulated through an investigation of people's practical reasoning. These rules, obtained through an analysis of practical reasoning, constitute an important source of data. Not only does an understanding of the rules that govern the actions of others render their actions rational, but it also illuminates the other's point of view or way of being and doing in the world.

Consistent with Harré and Secord's (1972) proposals for an "Open Souls Doctrine" (see p. 101), the practical reasoning of mothers is regarded as an important aspect of their notions of what it means to be human and how this is achieved. This is also regarded as a statement of what and how they have become as part of a particular historical tradition. The practical reasoning of mothers about children may, therefore, contain the "rules for being", as it were; rules which are imbedded in a particular time-space development. These "rules", furthermore, could be regarded as that which "animates" them as actors in the "drama" of the present (cf. Harré and Secord, 1972, on the dramaturgical standpoint). As social-actors their engagement in western society (as the "drama" of the present) contains both a vantage point from which to understand their activity and an analytical moment in the study of the possibility of change. Their own rules of being, therefore, provide a vantage point

from which to view their engagement in tasks and thereby permit an understanding of this engagement from within their own frame of reference. As an analytical moment in the study of the possibility of change, this vantage point is used as a developmental moment together with the three other analytical moments (2, 3, and 4 in figure 3).

Engagement in activities.

In figure 3 the two intermediate moments (2 and 3) between social actors' rules for being and expert rules for being, are concerned with engagement in activities. This may be viewed from at least two perspectives. One focuses on the engagement in activities from the point of view of the social-actors, and the other provides an ideal way of doing tasks in terms of the way an expert may view the essence of the task. Depending on the nature of the tasks selected for investigation, different views about who should be regarded as experts and who as ordinary actors are possible³. In the present project tasks which seem to reflect or embody important aspects of western culture were selected. As mentioned, the actors included are not regarded as experts at these tasks. This project deals, therefore, with urban Zulu-speaking mother-child dyads doing "our tasks" (or as Wober (1969) states, with how they do our "tricks"). This focus is central to the developmental approach adopted and the aim is

not to conclude the analysis with how they do our tricks, or how we do our tricks as Miller (1984) sees the issue, but how doing tricks is possible.

The reconstruction of what the social actors may intend in the execution of a task, given their rules for being, and given their particular ways of engaging in certain activities is not discussed here. This, however, is the crux of a project currently being undertaken as an extension of the present one, and will be discussed in chapter 12. What is of importance is that in the formulation of the mediational operators, understanding what the social-actors may be intending in terms of those actions that do not conform to the researcher's conceptions of the task, forms a necessary element in the analytical process.

Rearing children to become competent actors in western society is the 'drama' that the present project attempts to understand⁴. This 'drama' is of interest because it may provide the key to the discovery of the generative mechanisms for development.

Formal schooling is an important aspect of western society and certainly is a co-determinant of whatever it means to be "western". Formal schooling may be referred to as a "culturally autogenous activity" in terms of western history. The concept of a "culturally autogenous activity" conveys the idea that there is a distinctive or unique development of

certain activities that emerge as part of the historical development of a group in society. Problem solving activities involve the active engagement of the cognitive resources of individuals (individual forms) in activities or tasks that are socially meaningful. In other words, a culturally autogenous activity should be understood as embedded in, and part of, the historical development of a society, when the discrepancy between social forms, tasks,⁵ and individual forms is minimal.

Familiar tasks, relative social stability, and a taken-for-granted reality in which participants engage all depend on a minimum degree of discrepancy between individual and social constraints and task demands. Where a task is not embedded in the historical tradition of which the individual is part, however, the discrepancy between social forms, tasks, and individual forms will be of varying magnitudes. In such a situation we are likely to encounter unfamiliar tasks or rapid (social) change and a struggle to co-ordinate different world views. The magnitude of the discrepancy is important, as a large gap between social forms and individual forms may make it exceedingly difficult for an individual to engage meaningfully in a task in terms of its culturally autogenous demands. This point is further elaborated in chapter 10.

There are many examples of discrepancies between individual forms and social forms, such as that between a child's world and the "adult" world; the foreigner and the

"native" world; and the student and the "teacher's" world of knowledge. The discrepancy between the world of the child and the world of the adult is the paradigmatic case because the three "lifelines" of biological, psychological, and social development all converge in the development of the child. It is for this reason that a focus on mother-child interaction is of seminal interest for the study of change. (Of course, the mother-child interaction has been investigated from many different angles).

The present proposal however is that the instructional process is that part of the interaction that most clearly highlights the regulatory mechanisms that allow for development. The child's ultimate cognitive development is succinctly captured in Vygotsky's idea of the zone of proximal development. In the process of instruction the "potential development (of the child) as determined through problem solving under adult guidance" (Vygotsky, 1978 p.87) may be inferred given the kind of regulation provided. In addition, in the process of instruction, the mother's "cultural development" is revealed through the kind of regulation she provides for her child. Again this is elaborated in chapter 10.

The method used to investigate the instructional process is presented in chapter 8. At this point in the discussion it is important to establish that problem solving tasks are

culturally autogenous in the sense explained above and that under conditions of change, whether developmental (individual) or historical (social), discrepancies may arise between social and individual constraints and task demands in problem solving situations.

Expert formulations of development.

The theorists discussed in chapters 2 and 3 all emphasise the idea of regulatory or generative mechanisms as central to the explanation of manifest phenomena. In terms of the methodological principles established in the present project, it is important to elaborate on the possibility of using these expert formulations of the regulatory mechanisms that operate in cognitive development as one vantage point from which to study change.

Expert formulations of development are analogous to the "rules of being" ordinary people use in the business of life. Expert formulations are the "rules of being" which the experts in particular societies have abstracted from their analyses of various aspects of life and formalised into theories. Using these expert formulations as one vantage point, among others, from which to analyse change involves an important analytical principle. Were the ordinary actors included in this project to become western experts, they would formulate "rules of being" similar to those contained in the various theories of

cognitive development. These theories are as much a product of western culture as the latter is a product of them. This "analytical move" is part of the developmental methodology adopted and should not be seen as an empirical or evaluative assertion. The move proposes two vantage points vis-à-vis engagement in activities or tasks and is based on a distinction between how familiar the task is to those engaged in it and the task inherent demands given its culturally autogenous development.

SECOND ORDER ANALYSIS

Those data that comprise the four analytical moments in the analysis of the possibility of change in a sense represent the "field notes" of the anthropologist. These "field notes" are regarded as the "raw data" out of which the researcher constructs a theory or explanation of the phenomenon of interest. The point is that these data represent a level of analysis which could be called "raw" in the sense of being un-processed. The analyses that are performed on the data at the four analytical moments could be called after Carnap (1967) - "rational reconstruction". This may be defined as follows:

... it is a description of the essential features of situations in which such an event could occur: it is a story of how something could happen - and, when human actions are concerned, of what is the rationale of its happening that way - not of what did actually take place (Ullmann-Margalit, 1977 p.1).

As it is used here, one can say that rational reconstruction is the story of what the mothers' indigenous theory of childhood could be, as well as what could be the mediational operators. This, however, does not mean that these data bases are what Geertz calls "merely 'as if' thought experiments" :

They (anthropological writings) are, ...fictions; fictions, in the sense that they are 'something made', 'something fashioned' - the original meaning of fictiō - not that they are false, unfactual, or merely 'as if' thought experiments (1973 p.15).

The two data bases, in order B in figure 3, the indigenous theory of childhood and the mediational operators are, therefore, fashioned from the "raw data" contained in the four analytical moments. The method used in fashioning the raw data is discussed below. By interpreting the raw data as is undertaken in the second order analysis, they become fixed in a way that is explained by Geertz (1973) as follows:

... and the interpreting involved (in ethnographic description) consist in trying to rescue the "said" of such discourse (what is interpreted in ethnography) from its perishing occasions and fix it in perusable terms (p. 20, my parenthesis).

The "said" in this quotation represents the "raw data" at each of the four analytical moments represented in order A of figure 3, and "fixing" what this data says in "perusable terms" is represented by order B in figure 3 and is referred to as the "indigenous theory of childhood" on the one hand, and "mediational operators" on the other.

The research paradigm adopted necessitates making explicit the process of analysis in order to underline the rigour and care which is required by a rational reconstruction of the generative mechanisms for overt patterns of actions.

At each point of decision or moment of interpretation, the emergent idea must be pitted against what is already regarded as substantiated and this in turn against any new idea or 'bit' of data in a continuous critical examination of each element in relation to the whole, and the whole in relation to each element. As the whole or that which is taken as substantiated can change and be changed by an emergent element or new interpretation so the reverse is also true.

The process of analysis could be likened to the painting of a picture in which the aim is a reconstruction of the essence of the object under study. This essence in the present case is characterised by the generative mechanisms for change.

In the process of analysis of an element or body of data, the process proceeds between what may be termed occasions for surprise , and their resolution , and so on, until coherence is achieved in a greater form of abstraction. In the process of data analysis undertaken in the present project, the occasions for surprise arose when the mother-child dyad's engagement in activities did not conform to the often implicit assumptions of the observers. Such actions were then

scrutinised from two frameworks or bodies of knowledge, that is, from the mothers' stated beliefs, desires, and actions about childrearing, and western psychological theories of development. This scrutiny involved rationally reconstructing what may be regarded as the mother-child dyad's goals with an action given their stated reasoning about children. On the other hand the assumptions of the observers given their access to expert theories which may be regarded as providing information of an ideal transactional situation were used to reconstruct the other body of knowledge.

The process of analysis involves essentially a lengthy and deep immersion in the data and also the extensive and intensive exchange of ideas between observers about the data under scrutiny. The immersion in the data involved many hours of video tape review by the author, her supervisor, and two research assistants, the negotiation of the actors accounts in group interviews, and posing bits of information from each of these against each other in terms of the most suitable and justifiable interpretation. The exchange of ideas involved primarily the author and her supervisor and this is seen as an integral part of the process of analysis in the present case rather than as an adjunct to the recording of self evident "facts" from the mothers responses to questions and the mother-child transaction recorded on video.

The stream of occasions for surprise and the resolution of these build, as it were, a higher order of information or a more abstract rendering of the data contained in the three bodies of information, that is, actors' own accounts, actors' engagement in activities, and expert theories of development. This higher order of information may be concretised by referring to the conceptualisation of "fruit", for example, from many different instances of "apples", "oranges", and "pears". To borrow two terms from linguistics, "types" and "tokens" (cf. Lyon, 1979), the three bodies of data used in the present project may be regarded as "tokens" from the range of possible desires, beliefs, actions, and also the formalisation of these into (expert) knowledge. Furthermore, the greater form of abstraction achieved in what is termed the indigenous theory of childhood and the mediational operators may be seen as the "type" or perhaps more precisely in this case as the first approximation of the type which is conveyed more fully in the third order of analysis, that of a theory of change.

The tokens from the range of people's expression of their human conditions were carefully chosen within a developmental framework which highlights different positions within a changing society.

Further notes on the process of analysis as it relates to each study conducted in this project are conveyed in chapters 6 and 8 below.

THEORY OF CHANGE

The proposed methodology for studying change emphasises a process of reconstructing the development of manifest forms. In this regard, the social actors provide a vantage point from which to decipher what may "animate" (Harré and Secord, 1972) the actors in the drama of becoming and being competent members of western society. In the same way, expert theories of psychological development are used as another vantage point from which to view engagement in activities or tasks. The activity of interest is rearing children to be "competent" members of western society and the particular focus in this project is on formal schooling which is taken to be an integral part of what "western" society may entail⁶. In order to investigate the kinds of activities that prepare children for formal schooling three tasks were selected. The tasks require a picture or pattern to be constructed using a model to guide the construction. These tasks are discussed in chapter 8.

The assumption underlying the investigation of social actors who are not necessarily part of the same historical process of development that has given rise to the target tasks, relies on the Vygotskian (and Piagetian) notion of the developmental method. In this regard, the social actors in the present project are 'newcomers' to western society in the

sense that they confront the social forms of another construction of reality and thereby may display the dynamics of adaptation to unfamiliarity. It is their confrontation with particular "cultural fossils" or culturally autogenous tasks that provides the data with which to reconstruct the development of these social forms. Their performance on unfamiliar tasks, however, should not be interpreted as a deficiency⁷ of any kind but as a moment in the process of change. As such the particularities of the actors, and the particularities of western society are both subservient to the reconstruction of the generative mechanisms for change. Using these two vantage points from which to reconstruct the generative mechanisms for change is, therefore, a conceptual move and not an empirical generalisation. The expert formulations included are treated as data in the same way as the data obtained from the social actors. These two vantage points are used to construct a theory about change. In such a theory the idea is to provide an explanation for the kinds of activities that occur when actors engage in 'novel' tasks and the generative mechanisms that enable them to solve the mystery of the unknown. The principles for a psychological theory of change are discussed in chapter 12.

Before concluding this chapter, a word about the link suggested between the "field notes" of an anthropologist and the "raw data" of the present project is in order. This

analogy is drawn to highlight the common areas between the analysis applied on data in the present project and what Geertz calls "doing ethnography" as an anthropologist :

Doing ethnography is like trying to read (in the sense of "construct a reading of") a manuscript - foreign, faded, full of ellipses, incoherencies, suspicions, amendments, and tendentious commentaries, but written not in conventionalised graphs of sound but in the transient examples of shaped behaviour (1973 p.10).

The "thick description" Geertz describes (after Ryle) as the "intellectual effort" (p.6) required in doing ethnography, also applies to the analysis performed on the "raw data" in the present study. In this sense, the ordinary rules for being, social actors' engagement in culturally autogenous activities, and expert formulations of psychological development, all confront the researcher as bits and pieces of the mind-culture action dialectic : a puzzle consisting of people, ordinary and expert alike, playing out their roles in society.

NOTES : CHAPTER 5.

- 1 There is an increasing sense of unease about the methods employed in the social sciences in general and psychology in particular. This is expressed in terms of a dissatisfaction with both the "laboratory" as a venue for investigating human functioning (see Bronfenbrenner, 1979), and with the accepted paradigm (see Bhaskar, 1975, 1979; Harré and Secord, 1972; and Vygotsky, 1978).
- 2 Holden & West, 1983 and Ninio, 1979 provide some data on what is here termed ordinary rules for being and what they refer to as "naive" psychology. (See also Heelas & Lock, 1981).
- 3 In the final chapter of the report this point is discussed in terms of using tasks which are embedded in traditional Zulu society.
- 4 It is important to state clearly that this assertion does not imply that these people ought to or necessarily want to become "westernised". It should be understood as an analytical move and not an empirical assertion.

- 5 Engaging in a particular social form may of course be regarded as a culturally autogenous activity. However, social form and activity or task are treated separately for the purpose of analysis.

- 6 Bruner et al's (1966) analysis of the difference between in-context and out-of-context learning as an important difference between the learning which characterises that of traditional and schooled society is interesting as regards the essence of formal schooling.

- 7 It is important to state very clearly that the author believes that all people are potentially the same (see Geertz, 1973) and that all people should be considered equally effective in dealing with their own particular eco-cultural demands (see LCHC in Sternberg, 1982).

PRESENTATION OF RESULTS.

6. Method: Mothers' practical reasoning.
7. An indigenous theory of childhood.
8. Method: Mothers' regulation of children.
9. Mediational operators.

"None of us were pure enough to claim a special solution for ourselves out of 'our own human and time context'. We could none of us afford, without fatal excess of spirit, to bypass any of the stages through which life itself was forced to go" (Van Der Post, 1983 p.126)

SECTION OVERVIEW.

The presentation of results consists of four chapters. These four chapters are arranged as follows : chapter 6 contains the presentation of the method used in the investigation of mothers' practical reasoning about children, the results of which were used to reconstruct a likely indigenous theory of childhood, which is presented in chapter 7. Chapter 8 provides the method used in the study of mothers' regulation of children during engagement in problem solving tasks, the results of which were used to reconstruct the mediational operators which are crucial for the development of efficient autonomous problem solving skills in children. The mediational operators are discussed and illustrated in chapter 9.

In the investigation of mothers' practical reasoning two sets of individual interviews with mothers were used. Each set focused on different questions and used a different group of mothers. In addition, group interviews were conducted with four different groups. The total number of subjects included in the studies was 370. In general this study emphasised actors' own accounts (cf. Harrè and Secord, 1972) about their methods and aims in childrearing. The accounts obtained from the individual interviews were used as a basis for discussion in the group interviews. The information obtained from all the interviews was used to formulate an indigenous theory of childhood.

The indigenous theory of childhood is a formalisation of the body of knowledge, most of which is implicit, that the mothers included in this study use in the task of rearing children to be competent members of society. These mothers, that is, urban black Zulu-speaking mothers, are of interest because as a group they are caught in a period of rapid social change and as such they must prepare their children for engagement in a society with a socio-historical development different from their own. Their indigenous theory of childhood may reflect their own historical past and their striving for participation in those aspects of western culture which they find compelling. The indigenous theory of childhood is presented as a coherent set of beliefs, desires, and actions which may be regarded as those which animate (cf. Harrè and Secord, 1972) these mothers in their expression of the role of childrearer.

The method used in the study of mothers' regulation of their children during engagement in problem solving tasks is concerned with describing that engagement in terms of an ideal instructional process. In order to formulate an ideal instructional process the work of Wertsch and Feuerstein was used as they both have in some way refined Vygotsky's notion of a zone of proximal development. The focus of the formulated ideal instructional process is on the development of efficient independent problem solving skills in

children. The tasks selected for this study emphasise certain aspects of the kind of learning required in formal western schooling, and formal western schooling is of interest because this seems to be a crucial element of what western society may entail. The engagement in the target tasks was analysed in two stages, each contributing to the formulation of mediational operators essential in an ideal instructional process.

The mediational operators are presented as components of an ideal instructional process emphasising the demands of tasks with a culturally autogenous development in terms of western society. These mediational operators describe in effect the implicit knowledge of the competent western social actor. The tasks, society and its native members are all part of the same historical tradition. In the illustrations of the transaction between the mother and child certain aspects of the mediational operators are highlighted as it were by their omission. This has to be understood as central to the developmental methodology pursued in this project.

6 : METHOD : MOTHERS' PRACTICAL REASONING.

The vantage point provided by urban black Zulu-speaking mother-child dyads is clarified through obtaining and systematising mothers' practical reasoning about children. The triad of practical reasoning -- desire, belief, and action -- was obtained in three stages. The first stage involved individual interviews and questionnaire surveys with mothers. The second stage focused on mothers' assessment of their children's developmental status. The third stage involved negotiation of actor's accounts through group interviews. In order to systematise mothers' practical reasoning about children "thick description" was used as a means towards rationally reconstructing an indigenous theory of childhood. This indigenous theory provides one data base from which to formulate generative mechanisms for change.

INTRODUCTION.

It was stated above that the mother-child dyads provide one vantage point from which to analyse a process of change. In this chapter the method used for obtaining information

about the mothers' practical reasoning is elaborated. McGinn elaborates practical reasoning as follows:

A reason is best conceived as a desire and a belief in a certain combination. If my reason for boiling the kettle is to make tea, then I desire to make tea and I believe that boiling the kettle will contribute towards the satisfaction of that desire. From the specification of the action and the statement of my reason - 'to make tea' - you can reconstruct the desire from which I acted and the belief which guided me. To know the desire is to know the end or purpose of the action, and to know the belief is to know the means (or believed means) to its attainment. Given any two members of this triad - desire, belief, action - it is possible to infer the other, but each singly leaves the remaining two undetermined. We come to know an agent's reason in acting when we see from which desires and beliefs his action (under a certain description) may be inferred; we see which desires and beliefs the action was performed 'in the light of'. Given those desires and beliefs we appreciate why the action was, for that agent then, a reasonable thing to do: if we had his desires and beliefs we too should be disposed to act as he did, and reasonably. The components of an agent's reason can be construed as premises in a piece of practical reasoning. Practical reasoning is reasoning about what to do, and it involves taking account of one's desires and one's beliefs about certain courses of action (McGinn in Bolton, 1979 p.23).

The argument which is developed from McGinn's description of practical reasoning is that what is "a reasonable thing to do" is dependent on a group's conceptions¹ of normal development and adulthood. These conceptions are part of a constructed reality or eco-culture as it is sometimes called (see for example Jahoda in Triandis, 1980). The institution

of childrearing in a specific society with its accompanying normative system may be seen as laying down the rules for the socialisation of children. When these rules are uncovered they provide the investigator with a description of what may "animate" actors as participants in society. The purpose behind the study of mothers' practical reasoning is, therefore, to obtain these rules.

The investigation into mothers' practical reasoning about children was divided into three stages. The first stage focused on their stated desires, beliefs, and actions regarding children, and in the second stage mothers' assessment of their children's developmental status was investigated. In the second stage, the mothers were regarded as "competent interactant-cum-interpretor(s)" (Pettit in Antaki, 1981). The emphasis was on the way they interpret their transactions with their children in terms of the children's developmental status. Each of these stages and the methods employed are discussed separately below. After the initial analysis of these two stages, group interviews were conducted. These group interviews comprised stage 3.

STAGE 1.

INDIVIDUAL INTERVIEWS AND SURVEYS

A total of 305 mothers participated in this stage of the project over a period of 2,5 years. There were four phases,

namely, discussions with prominent individuals concerned with childrearing (n=38); the initial pilot work (n=207); the final pilot work (n=10); individual interviews (n=50).

Phases 1, 2 and 3, are not discussed in detail. The procedures employed have been discussed elsewhere². In discussions with prominent individuals (phase 1) information was obtained about which childrearing issues are regarded as important by township women. In obtaining this information, no standard question format or interview procedure was used. The information obtained provided the informative basis for the next phase. The initial pilot work (phase 2) used questionnaires designed to elicit data on the important issues highlighted by the previous discussions. These questionnaires used a standard set of questions with an open ended form and elicited information on the important needs of children from birth to school going age. The questionnaires were administered to two groups of women by the researcher. The information obtained was used to formulate 50 final questions for individual interviews. The interviews were conducted in Zulu by a Zulu-speaking research assistant. The final questions for an interview schedule were administered (phase 3) in order to determine possible difficulties with the language and to familiarise the research assistant with the interview schedule and procedure.

Phase (4) is now discussed in detail.

Phase 4 : Individual interviews.

Subjects.

Fifty Zulu-speaking mothers were individually interviewed on a structured interview schedule. The interview schedule is provided in appendix 1.

The mothers were asked to participate in the study by the nursing staff at a health clinic when they attended regular immunisation clinics. The only selection criteria employed were as follows:

1. Mothers born and currently living in Kwa Mashu³.
2. Mother's age (18 - 40 years).
3. Mother's with more than one child with the youngest being between 12 and 30 months of age.

A detailed description of the demographic characteristics of the mothers is provided in appendix 2.

Interview schedule.

The interview schedule contained 20 questions concerned with demographic characteristics and 50 open-ended questions designed to elicit information about mothers' desires, beliefs, and actions regarding children. The mothers' responses to these questions are summarised in appendix 3. The content of these questions centred around the following issues: mothers' conceptions of childhood, important influences on the child's development, the acquisition of knowledge, and mothers' aims in childrearing.

Procedure.

The interviews were conducted by a Zulu-speaking female research assistant. The interviews were conducted in Zulu and the replies were recorded on the interview schedule. These replies were translated into English, then translated back into Zulu by another Zulu/English bilingual, to control for the accuracy of translations. Although contact with the mothers was made at the clinic, the interviews were conducted in the mothers' homes. Each interview took approximately 1,5 hours.

Analysis: Individual interviews.

The analysis performed on the data obtained through the individual interviews were used to formulate "ordinary rules for being" (see figure 3, p. ¹²¹127). The analysis involved applying "thick description" (cf. Geertz, 1973) to the various bits of information elicited from mothers.

The mothers' responses to the questions contained in the interview schedule were grouped into 5 themes. These 5 themes were derived from a content analysis of the mothers' responses to questions, and are as follows: mothers' conceptions of childhood, important influences on the child's development, the role of the mother in child development, other directed learning, and self initiated learning.

Deriving the themes occurred in two phases:

1. The mothers' responses to questions were grouped into categories of responses and converted to percentages. Only the top third (in terms of highest percentages) of categories for each question is included in appendix 3.
2. The various categories over all questions were reviewed for common themes. These themes and the questions contributing to them are grouped together in appendix 4.

STAGE 2.

MOTHERS' ASSESSMENT OF THEIR CHILDREN'S DEVELOPMENTAL STATUS

Subjects.

A group of 20 mother-child dyads participated in this stage of the research: 10 mother-infant (12-19 months), and 10 mother-toddler (20-30 months) dyads. Subjects were selected from mothers attending a clinic in Kwa Mashu township and from houses where there were signs of infants or toddlers (e.g. nappies on the washing line). Mothers who had resided in Kwa Mashu for a period of five years or more were chosen. For a description of the demographic characteristics of this group of mothers, see appendix 6.

All infants and toddlers were of sound health and had older and/or younger siblings. The infants ranged in age from

13 to 17 months (mean age = 15,4 months) and the toddlers ranged in age from 20 to 30 months (mean age = 25,3 months). In both the infant and toddler groups, four subjects were female and six subjects were male.

Interview schedule.

The interview schedule consisted of two basic questions designed to elicit information about what the mother believes the child has learned, and what she teaches him/her. The schedule is provided in appendix 5.

The interview schedule was administered twice in order to familiarise the research assistant and the interpreter with the questions before commencing the study. The interview schedule was constructed around two major questions regarding the mothers' own infants/toddlers:

1. What has the infant or toddler learned?
2. What does the mother teach her infant or toddler?

These questions were also asked in relation to the development of the infants' or toddlers' peers. After the mothers had answered the above questions they were asked to demonstrate with their children those skills they had claimed their children were capable of performing (i.e. the skills he or she had learnt; and are being taught). During the demonstration phase, the research assistant informed the mothers that they were free to interact in any way with the

children, as was their usual practice at home. Those skills not amenable to demonstration (e.g. toilet-training) were not included. Toys and other materials were available for the mother-child dyads' use during the demonstration (see appendix 8 for a list of the materials provided).

Procedure.

Mothers satisfying the criteria listed above were approached, informed about the study, and requested to participate. The interview took place in a quiet room in the clinic building. It lasted approximately 1,5 hours. The interview was conducted in English by a research assistant and in Zulu by a Zulu-speaking interpreter. Mothers' responses were recorded in English by the research assistant and in Zulu (on a separate form) by the interpreter. In addition, the interview was tape recorded. In order to maintain consistency in the questions, probing was kept to a minimum and only employed for the purpose of clarification. Initially the mothers were placed at ease by explaining that there was no correct way of responding to the questions being asked. Mothers were told that the purpose of the interview was to obtain information about their ideas about child development. Demographic data were collected, during which time the infant or toddler was given toys to play with.

Analysis.

The mothers' responses to the questions contained in the interview schedule were grouped into 9 categories. These categories seemed to embody the criteria they use to assess their children's developmental status. These 9 categories were derived from a content analysis of the mothers' responses. The coding categories are presented in appendix 9. The mothers' responses were, furthermore, analysed in terms of the emphasis given to criteria. These were described as, major emphasis (at least 20 percent of responses in category), minor emphasis (between 15-20 percent of responses), no emphasis, and some mention (less than 15 percent but more than 0). These data are presented in appendix 7.

The criteria used by mothers to assess their children were used in conjunction with the data obtained from the first stage of this study (individual and group interviews) to construct the indigenous theory of childhood.

STAGE 3.

GROUP INTERVIEWS

Subjects.

A total of 45 Zulu-speaking women participated in 4 group interviews. These groups consisted of primary school teachers (n=10), health-clinic sisters (n=12), mothers (n=9), and post-school clerical trainees (n=14), respectively. These

social actors were asked to participate in the study by the author through personal acquaintance with at least one key figure in each group.

Interview content.

The content of the interview was determined by the issues which emerged from the analysis of the individual interview data. The information obtained from the individual interviews was used to select topics for discussion in the group-interviews.

The topics for discussion were as follows:

1. The function of play :
Is it good for a child to play, and if so, why?
2. Games played by young children:
Are there any differences between the games of township children and those in traditional Zulu society, and if so, how did/do boys/girls play?
3. The role of the parent as teacher:
What can/cannot a parent teach a child; are there any differences between the things taught to boys and girls; how do parents teach their children; after a child has learned to walk and talk freely, what must the parent then teach him/her?
4. Why are respect and obedience so important?

5. Modern urban life and its influence on traditional beliefs and values:

How is childrearing different now; what effect will it have on children now that they are allowed to mix with adults; how has entry into formal education changed people's lives, and does it create problems between parents and children if the children obtain more education than their parents; is it still important for a child to be taught good manners, and if so, what does this entail?

6. Children's curiosity:

Are children today different from previous generations; what did/do parents do about a child's curiosity?

7. Children's learning:

How do children learn all the things they need to know: are certain ages in a child's life more important for learning: are certain people more important in a child's life than others for learning: how were traditional activities such as beadwork, stickfighting, basket weaving and pottery taught?

Procedure.

The group interviews were conducted by the author in English. Translation into Zulu and or English was handled by

the group members where necessary. One session took place in a room at a school, two sessions at the clinic, and one in the training room of a career guidance centre. Each session was tape recorded and transcribed. The sessions lasted between 2 and 4 hours each.

Analysis : Group interviews.

The group interviews were used to negotiate the meaning of the mothers' replies to questions asked in the individual interviews. Furthermore, the transcripts of the group interviews provided the illustrative examples for the construction of an indigenous theory of childhood. In participating in these group interviews, and re-reading the transcripts, it was possible to discern and come to an understanding of the mothers' rules for being.

The analysis performed on the data elicited through the group interviews was therefore used to extend the information derived from the individual interviews, and together these data bases were used to construct an indigenous theory of childhood. The transcripts of the group interviews are not included for reasons of space economy but are available on request from the author.

NOTES : CHAPTER 6

- 1 The term 'group' is used to refer to what is commonly known as "a culture" or "sub-culture". 'Group' is, however, a preferred term in the present context because no conclusion is drawn about Zulu culture or township sub-culture. Rather the group of mothers used as subjects are regarded as social actors in the drama of a rapidly changing society.
- 2 These preliminary phases in eliciting information about mothers' practical reasoning are not discussed in detail because these phases are not included as data in the present project. Reports on them are, however, lodged in the Department of Psychology, University of Natal, Durban.
- 3 Kwa Mashu is a township for black residents and borders the city of Durban, South Africa.

7 : INDIGENOUS THEORY OF CHILDHOOD.

The indigenous theory of childhood emphasises the importance of example and demonstration as teaching methods, and observation and imitation as the primary modes of learning required of children. Health is an important focus in childhood and is seen as a pre-requisite for children's sustained engagement in all activities that allow for the acquisition of adult competence. The specific skills regarded as important are; to communicate needs; to be self-sufficient; to uphold authority relations; to preserve and use social knowledge; and to display responsibility to other members of the community. These skills are desired for all children and believed to be necessary for the development of competence. The final aim is for children to complete as much as possible formal western schooling.

INTRODUCTION

The indigenous theory of childhood presented in this chapter is "fashioned" (cf. Geertz, 1973) from the data obtained from two sets of individual interviews and the group interviews conducted by the author.

The aim of this chapter is not to present the mothers' responses in quantified form but to attempt a reconstruction of their responses into a coherent whole. This reconstruction involves a desire to capture the "spirit that hides within" (Smith quoted in Lucie-Smith, 1980) p.74) the mothers' replies, and also to capture the essence of what may animate them as social actors - as mothers rearing children.

The construction of the indigenous theory of childhood is an exercise in doing ethnography as described by Geertz. However, the "transient examples of shaped behaviour" he refers to (1973 p.10), were in the present project contained in the replies of mothers to specific questions. It is also important to point out that even though "thick description" was applied to these replies, the conclusions drawn from the individual interviews were subjected to the scrutiny of the group interviews. In the latter, the discussion of topics elicited from the individual interview data, explicitly used Harrè and Secord's (1972) proposals for the negotiation of the meaning of actors' accounts of behaviour.

The indigenous theory of childhood is, therefore, a reconstruction of these social actors' "rules for being": rules that are part of their process of adaptation and also part of their particular solutions to the problems encountered in the business of life.

EXAMPLE AND DEMONSTRATION AS TEACHING METHODS

Childhood is the stage of development in which incorporation into the ways of the community is paramount. This incorporation entails deliberate efforts by adults, but especially mothers and grandmothers, to teach children what is expected of them as regards duties, obligations, and rules of conduct. This teaching, therefore, emphasises what could be called moral behaviour in the sense that it is concerned with regulation of conduct. These deliberate efforts to regulate children's conduct involve primarily the expectation that children will learn correct behaviour by following the example and demonstration of adults and through punishment for wrong behaviour. One mother commented on the frequency of physical punishment and bemoaned the fact that the practice of older children teaching younger ones is no longer observed in present day township life¹.

S-A²: You know, these mothers only know 'shaya' (to smack) when the child does something wrong - its shaya, shaya shaya!

Following the example and demonstration of adults was not considered by all mothers to be the best method of teaching a child. One informant, a primary school principal, responded as follows:

S-A: I agree with them (the mothers) that the child should learn through observation. They expect the

child to learn through observation, because in the first place you don't have time with the children to go into long explanations. Some of the children are needed early in the morning and then at night (for doing chores around the house). Now they (the mothers) want to hide behind the fact that the child must learn through observation, because if the child learns through doing, they will not learn if they can't do, that is why we have all these problems (at school). Learning can't happen properly, because they don't have the vocabulary, they don't have many words because you see, the words don't appear in the community, nobody has enough words, they are no longer telling their children fables not any more, no story telling any more. Now how is the child going to be able to sit down and listen, the listening capacity, how is it going to be developed? The child is running in the street all the time. Now when is the capacity to sit down and concentrate going to develop?

Observation and imitation may have been useful means of learning in traditional society but they are not sufficient in terms of the demands of formal western schooling. The principal whose reply to the question of learning from example and demonstration is quoted above, experiences the conflict

between how children are expected to learn and the demands placed on them through school attendance. In addition, the disappearance of "story telling" from modern (township) life may aggravate a situation in which new capabilities are demanded of children in the school setting.

The mothers said that example and demonstration as teaching methods were traditionally used when imparting certain skills to children such as embroidery, beadwork, and basket weaving. However, training in these skills has virtually disappeared from the township because, as the mothers say, children no longer want to learn these skills when they go to school. Skills which are still taught, and regarded as an important part of a child's duties, primarily involve house chores.

S-A: I show her, this is the soap, then there is the dish towel - this is for washing the dishes, this is for wiping, then you watch her take all these things. Next time you teach her again to wash the dishes, then tomorrow she washes the dishes and you correct her.

Washing dishes, sweeping around the house and in the yard outside the house, and fetching water are chores taught to children with in-context demonstration as illustrated in the above extract. An important aspect of this teaching in-context is for the child to accept the instructions without question.

S-A: You just take instructions as it is. You don't have to question why. As they tell you its right, final its right, you don't have to question it.

The focus on moral behaviour involves teaching children to hold their hands in a certain way when accepting something from an adult, to address adults by their title, to kneel next to a superior such as a father when talking to him, and not to look a superior in the face when talking to him/her. As one informant commented:

S-A: In the first place an African child is not supposed to look at them (the parents), the child must look down, and if she is not looking at your mouth, how is she to know what you are saying really?

What is being said in this extract from a mother's reply is that the adult knows and the child should obey the adult's 'advice' (as it was often called by the informants), without question. Being taught by adults is, in effect, the inevitable consequence of being young among adults. The adult's responsibility in the relationship between the child and adult often centres around what may be termed the "control" of knowledge. The adult, who by definition knows, and the child, who, also by definition, does not yet know, together participate in the provision and reception of knowledge. The adult provides the child with the necessary moral guides for action rather than the means to acquire

knowledge independently. Adults seem to fulfil a role of "gatekeeper" and open the world of knowledge slowly to the child. The emphasis is on the control of knowledge rather than on the acquisition of knowledge. An inquisitive child evokes fears in the mothers interviewed; fears about his/her future as a responsible adult. Questions from children are often actively discouraged, especially those about taboo topics such as sex. The concern is that children who participate in or eavesdrop on adults' conversations will learn about things that are not considered "good" for a child to know about.

As one informant said about children who overhear adults' conversation about sex:

S-A: The children will learn sex at a very early age. Actually the young girls practice it in the room when they hear the mother talk and not realising that this can lead to pregnancy.

Example and demonstration are also recognised as potential opportunities for children to learn the "wrong things". These "wrong things" involve behaviour such as disrespect for others, drinking (of alcohol), swearing and "loose behaviour" (especially concerned with women's sexual conduct). It is a mother's duty to prevent her child from observing such behaviour and to ensure that her child will not learn these things. The burden for teaching children is

placed on the mother or mother substitute such as a grandmother. From one participant in the group interview conducted with post-school trainees, came the following response when it was suggested that township fathers seem to play a minimal role in childrearing:

S-A: I can support you on this. I am an example of what you are saying ... I said ... I can say ... to sit and talk to my father, it is just not part of your life. I could not talk face to face with him, I couldn't confront him. I used to speak to my mother, not my father.

The above response was from a young person. Most of the older women who participated in the group interviews merely laughed and shrugged away the absent or uninvolved father. to them this was a part of modern township life:

R³: ... and the role of the father?

S-A: Ha-ha-ha (great amusement).

R: (jokingly) I think the township men have a very easy time in the home.

S-A: Yes, and most of them have taken to drink (ha-ha-ha).

R: Why is that?

S-A: I think they have no responsibility, they know even if they are not at home the kids have food ... women are too clever, too strong (this said seriously).

In summary, example and demonstration as teaching methods are still regarded as primary modes for acquiring necessary knowledge. However, this belief is increasingly coming under the strain of the demands of western society, of which formal schooling is an important aspect.

The teachers included in this project, often, for example, expressed a concern about the parental disregard for other modes of teaching. The burden for teaching children is placed mainly on mothers who seem to be largely concerned with moral guides for behaviour and the practical activities associated with house chores.

OBSERVATION AND IMITATION AS MODES OF LEARNING.

Example and demonstration on the part of the adult as a teacher is complemented by observation and imitation as the primary modes of learning required of children. Whereas the adult is regarded as the teacher because s/he is an adult and part of the role of being adult is to teach; children, likewise, are expected to learn through "being there", that is participating in the social network. This belief seems to presuppose the spontaneous acquisition of knowledge through observation and imitation. For a child "being there", that is, being in the family, in the school, and in the community, is regarded as a sufficient condition for learning. This was expressed in one of the group interviews as follows:

R: ... how does a child learn about things, anything, all things?

S-A: He learns by seeing.

The twin processes of observation and imitation occur as part of the relationship between adult and child that defines a teaching situation. The teaching need not be verbal or explanatory and should not transgress the implicit code that certain things are "adult knowledge" and others "child knowledge". The lack of extensive verbal interaction between mothers and children was bemoaned by one informant:

S-A: I think some of the mothers they still don't think its important to talk to a child. You know, like asking them (the children), when the child comes home from school, "what did you do"? - things like that. They are not too important as long as the child goes to school and comes back and behaves herself, that is fine.

Through observation and imitation the child is expected to learn a great many things, but this learning takes place within socially accepted parameters. In other words, what is learned and how it is learned are regarded as very important. An inquisitive child who actively seeks information is frowned upon especially by older women who regard this as "forward", "cheeky", and "disrespectful" to adults. Such behaviour may be tolerated from an infant but the mothers expect an older

child to go about the acquisition of knowledge almost passively. The mothers expressed more anxiety about an inquisitive child and a child who will learn the "wrong things" (mainly about sex, which is an important secret between mother and child), than about a child who might learn very little.

The guided discovery of the child is closely guarded by the mother. "Why" questions are often actively discouraged and listening to conversations between adults is considered a forbidden activity for the child. The older women expressed grave concern over younger "modern" mothers (whom they held in some contempt) who allow their children to be present during adult to adult social interaction: "What will happen to these children!", they wondered aloud. Their concerns in this matter appeared to be mainly over the loss of respect for adults, as if knowing itself was a danger that might destroy the social balance between the younger and older generations.

R: Why do you think it is that parents tend not to want to talk freely to children?

S-A: Most things depend on your peer group - special things like social things (interaction with boys especially) - it is never recognised (that) the mother should tell the child about these things.

R: Why do you think this is?

S-A: Parents don't seem to act on the same level as children. The respect has to keep them very separate, you have to respect you parents and not - not be regarded as equals.

The informant did mention at a later stage in the discussion that more "modern" parents are changing in this regard, that is, that they are talking more openly with their children. However, she also had this to say about other children's reactions to a child giving some indication of having discussed something with her mother:

S-A: Of course, even if you mix with your peer group, when you say something, that your mother taught you this, and then everybody will say, "Oh!" as if you had killed somebody. So you just tend to follow the pattern (of not talking to your mother about certain topics).

The "taboo" topics between adults and children involve, as has been shown, primarily, matters such as sex, the activities of adults such as their social interaction with each other, and the concerns of adults such as money and work. Apart from taboo topics, deliberately teaching a child about things of the world or deliberately interacting with a child does not appear to be a well integrated activity of township life. As one young informant said:

S-A: Parents think what is being said by a child is not worthwhile.

All informants regarded reading, writing and arithmetic skills as important. However, the mothers' roles in teaching children these skills are not well defined. Whereas the possible precursors for reading and writing such as contact with books, paper, and pencils are not incorporated into the daily activities of children, possible precursors for arithmetical skills are in evidence.

From a very young age, children are sent to the shop to purchase household items. They are taught to count objects and to distinguish various coins in order to count the correct change. As one participant in the group interview explained:

S-A: My mother ... the shilling were consisting of four three pence pieces ... she used to tell me if I buy something for a tickey (a three pence piece), I have to give her three tickies back.

The currency has changed since this mother's childhood but the method of teaching is still the same. The in-context teaching of numeracy as associated with the use of money slightly extends the emphasis on observation and imitation as modes of learning. In general, however, learning is expected to occur in-context and primarily through observation and imitation.

The infant's ability to imitate is used by mothers as a criterion to evaluate the child's developmental progress. In this regard, the mothers "teach" infants to imitate by pulling faces at the child. When the infant responds, the mothers clap hands and praise the child. Once children pass the "baby" stage (around about 2 years of age), they are expected to imitate spontaneously and mothers no longer deliberately attempt to teach this "skill" to their children.

HEALTH

Children are loved and cherished and no marriage is considered complete without children (See Vilakazi, 1962). Despite the strong traditional taboo on illegitimacy (see Krige, 1977; Vilakazi, 1962) illegitimate children born by schoolgirls⁴ are accepted into the family with love. These children are often left in the care of the young mothers' own parents who more often than not are themselves struggling to meet their financial commitments. Love for children is mostly expressed by a concern with their health and also, but less obviously, in terms of their ultimate happiness.

The concern with health revolves around food, cleanliness, and obtaining care such as regular immunisation against disease. Mothers who consider themselves "modern" feel that it is in these areas of health that the greatest progress has been made since their own childhood:

S-A: They (the mothers) hold the clinics in great respect. They can have healthy children now because they can come to the clinics. In the older days, you see, this was impossible. Now the clinics have done an important thing.

R: So the health care today is an improvement on the past?

S-A: We don't have to look at problems all the time (the negative changes in the present compared to the past). We must look on the brighter side and now children can be healthy because they have clinics to go to.

Having enough to eat and having the "right" things to eat (meat and vegetables rather than "phutu", the porridge made from ground corn) are status symbols and a healthy child who is "fat and with bright eyes and shining hair" - to use the mothers' description, - reflects a "good" home, that is, a modern home with enough money to feed children properly. A healthy child (as described above) is regarded as a child who is progressing well. Health is a focal point in the mothers' ideas about children because it reflects on both the care they provide for their children, and the children's chances of participating in what the world might have to offer.

S-A: Something which is important is health. A healthy child will grow. What are you going to do (the

mother) when the child is sickly? How will she (the child) grow, what happens to us when we are sickly? We cannot learn the important things you need to know when you are sickly. We want to get the general knowledge and what happens when the child is sickly, she cannot learn.

A healthy child will learn (primarily through imitation and observation) and engage in the tasks set by the mother for the child.

SPECIFIC SKILLS THAT MOTHERS REGARD AS IMPORTANT

A child who can walk, talk, look after him/herself, who respects adults and obeys their commands, who preserves and uses the codes of conduct of the community, and who is responsible in the execution of his/her duties to others, will attain a "better future". The mothers fervently hope for a better future for their children, especially in terms of a good education, a secure career, and the financial rewards associated with education and career.

Gross motor milestones, especially walking, are regarded as very important. The ability to locomote freely and communicate needs together mark a baby's entry into childhood. Before these milestones, the baby is regarded more as an extension of the mother, than as a person in his/her own right. Childhood, however, is not a clearly demarcated stage

in the lifespan development of the individual. Achieving complete independence from authority figures either during the latter part of childhood or even adulthood, is not a desired goal in childrearing. In fact, the opposite impression was gained from discussions inasmuch as the individual is regarded as subservient to the group throughout his/her life. The emphasis in childrearing is, therefore, on "circumscribed independence" which is obtained in skills such as walking, talking and self help.

Acquiring the abilities of walking, talking, and self help are important aspects of rearing young children. However, because total independence does not seem to be a goal in childrearing, childhood is not regarded as a stage with a definite end. In other words, the beginning of childhood is regarded in terms of acquiring the ability to walk and talk, and the end is achieved at some point after marriage, children, and career establishment.

In order to teach a child to walk, mothers institute specific exercises for the child from as early as two weeks old. These exercises involve allowing the baby to jump on the mother's lap while holding his/her hands, digging a hole in the ground or using a cardboard box in which to put the child in an upright position to encourage the child to sit upright. Exercises for standing and walking involve placing objects out of the reach of the child, coaxing the child to move towards

the object, and pulling the child into a standing position and then letting go of his/her hands. It is interesting that mothers expend considerable effort in deliberately teaching children to achieve gross motor milestones. As far as language acquisition is concerned, the mothers believe that children learn language by imitating others who can talk. They also consider it necessary for mothers to talk to infants so that they may have someone to imitate. This more or less explicit teaching of the child as regards motor and language development, ceases between the age of 2 to 3 years after which teaching becomes implicit and is directed more at moral behaviour.

In one group discussion, when asked about the focus of teaching after walking and talking are achieved, the mothers did not respond readily. However, one mother suggested cleanliness:

R: So, after children have learned to walk freely and talk a bit, what else do mothers teach them?

S-A: Uhhmm ... yes ... using a chain (a flush toilet) and washing hands, a clean mother will teach her child "you must wash your hands after using a potty".

It was often noted by the research assistant conducting the individual interviews that the mothers were hesitant about skills other than walking, talking and self help. They regarded skills other than walking, talking and self help as important but did not spontaneously make them explicit.

Self-sufficiency, or a child who can look after him/herself, is valued and is also regarded as a necessity in the case of working parents. However, one mother blamed the "laziness of mothers" as a cause for the emphasis on self-sufficiency in young children.

S-A: They (mothers who don't work) just think, so and so (the child) "you see that you are washed" - she (the mother) is too lazy to get up and wash the child. Non-working mothers are the cause of that. Some mothers expect the 2 and 3 year old children to do everything for themselves.

As a valued competency, self-sufficiency reflects a belief that it is bad for a person's character to depend on others to do your work for you.

S-A: We have to teach them how to clean the house, iron clothes, and so on, so that they know these things by the time they grow up. They must know how to look after themselves, not to depend on a servant because those children who depend on a servant they turn out to be failures. Even if they get married they turn out to be failures because they have grown up with a servant who does everything for them.

As far as the necessity of children being self-sufficient is concerned, one informant had this to say:

S-A: It is important for a child to be able to look after himself because the mothers are usually all working now, and its quite difficult to leave a child at home which is, you know, dependent on someone else. And some children are just left at home, 6 year olds, left in the morning by their parents to see to their own food, dress themselves, lock up the house and go to school.

Related to a concern with self-sufficiency, is a focus on responsibility to others. As early as 3 years of age, a child is expected to assist in the care of younger siblings and house chores. As the child grows older, more responsibility is expected of him/her towards the family and other members of the community. Mothers often express the desire that children, once suitably educated, will follow a career that benefits the members of his/her community. The emphasis on children as responsible beings from a very young age, creates a picture of the child as a "little adult" who must know his/her duties, obligations, and the accepted rules of conduct. This "little adult" has all the necessary "equipment" of the adult, but in a germinal form, and the passage of time together with the example and demonstration of adults will add the necessary details to the basic "equipment".

Upholding authority relations, or respecting adults and obeying their commands is regarded by the mothers as very important. However, the older mothers are recognising changes in the pattern of authority relations when comparing the present with the past:

S-A: Children now haven't got respect, especially older ones.

R: At what age do children start losing respect for adults?

S-A: Even small ones, 5 years old, small ones - they just don't care. You see today's mothers is so much freer with their children. You know during olden times a child of three or four will sit with you with others (adults) and she is not allowed to move or to look straight in the mother's eyes. She (the other) would say, "Why are you looking at old people like that, go and play with the children outside - you listening to what we are conversing", but that does not happen today. We sit with the child today and even discuss our neighbours in front of them ...

R: What do you think will happen now that children listen to adult conversation?

S-A: They lose respect. This is what we see in our schools, the teacher says, "I want my homework tomorrow" and you find the children have not done

anything and if the teacher says "OK, take punishment", the children say, "You won't dare touch me, you dare, we show you" and they wait for the teacher after school and there is trouble (fighting).

R: So what is going to happen?

S-A: In the bus you find the child pushing or rushing to sit down before you and that never used to happen. The child would stand once you get in if there are no seats, the child would give her seat to you but not today. They just rush and push and sit before you, and if there is an old lady there, they don't care.

R: What is going to happen?

S-A: Children are going to revolt against their parents, against everybody, they don't care.

There is also a less obvious aspect to the upholding of authority relations, and this involves the necessary conditions for learning to take place. One informant expressed this as follows:

R: Why do you think respect is so important?

S-A: I think respect uhmmm ... modifies one to take instructions, because if you have no respect, definitely you won't take instructions.

Another informant conceded that not all the consequences

of losing respect need to be negative, but still believed that some dire consequences would result:

R: The good part of losing respect might be that students might feel free to argue with their teachers when they disagree about something.

S-A: Ah - I think it is bad to lose respect because, although it's good for the young person to argue because he or she gets more about that particular thing she is asking about, but people tend to do things on their own way, which are not good. They will find themselves in big problems, which are not easy to solve.

If the boundaries to knowledge that are laid down by authority figures are exceeded, the child will be confronted with situations she/he might not be able to handle. Upholding authority relations creates a "safe world" for children in which problems that are confronted will be familiar to adults who can guide children in solving the problems.

Children who can continue their path through time while preserving and using accepted social knowledge (or rules of conduct) are seen as being better able to serve the community and fulfil their parents' ambitions for them to be educated people with secure careers. Social knowledge is the binding force in the community and through preserving and using this, their cultural heritage can be honoured. Children must have

respect for the group's cultural heritage which is embodied in the social knowledge transmitted through institutions such as the family and church. This focus on social knowledge in childrearing emphasises once again the moral aspect of behaviour. Through western eyes, the educational toys and books, television games and micro-computers, extra lessons and a neighbourhood with space and amenities and beauty, as well as all the other influences on the modern middle class child, are sadly lacking in the environment in which the township child grows up:

S-A: Our problem is that there is no place for keeping children - our yards are very small you can't even make a swing for the children to play on or a see-saw, you haven't got a place to make it for them, so that they go out and play with other children on the streets and they become lawless and the mothers don't care about it, when they come home (from work) they have supper and they sleep. There is not time to teach the children.

The critical environment of these children is confined to a stark reality against which their relations to significant others and advancement through formal schooling, must set them onto a largely undefined but, hopefully, better path for the future.

During the group discussions, laughter was often a response to what appeared to be thorny issues: young children with more formal education than their parents; the father figure as either absent or uninvolved in childrearing; young children left without adult supervision in those cases where both parents were working away from home; and the problem of children, especially young boys, who according to the informants prefer casual labour to school. This gay laughter should, however, not be interpreted as lack of concern for children. Rather, it appears more often as a defence against the hopelessness of their situation.

FORMAL WESTERN SCHOOLING

The mothers' hope for a future for their children that will be better than their own, is based on formal western schooling. Once children enter formal schooling, mothers believe that they need not concern themselves directly with the actual school work of their children as this is seen as the responsibility of the teachers.

S-A: The parent don't want to play the role of teacher at home.

R: Why is that?

S-A: They just don't think it is important.

The parents' role in the child's education is to provide the financial resources for the child to obtain an education.

Part of the problem might be that many children in the township have as much, or even more, education as their parents, and this does cause problems:

S-A: They (older children) think, "Look, I'm more educated than you (the parent), so who do you think you are"? When you are just trying to correct them they say, "What do you know, what education do you have"? Some parents have gone to school but they cannot read, the children ask for money for books even if they don't want books, and the mother she can't even count the rands and cents. Then the children take the money for nothing.

Younger mothers who have obtained adequate schooling themselves do sometimes attempt to teach their children school related tasks such as rhymes, the alphabet, vowels, counting, and naming colours. One mother when asked what she teaches her toddler (aged 18 months) replied that she teaches her to write and demonstrated this as follows:

The mother put a pencil in the child's hand, clasped her own hand around that of the child and proceeded to draw circles on a piece of paper.

The same mother demonstrated how she teaches her child to carry something on her head as follows:

The mother put a small mug on her own head, sang a song and clapped her hands. She then placed the mug

on the child's head, holding it lightly with her own hand, and repeated the song while coaxing the child to walk with the mug on her head.

The ease with which the mother demonstrated how she teaches the child to carry something on her head and the stilted demonstration of teaching her to write may be interpreted as the difference between familiar and unfamiliar tasks. Even though the mother recognised a need to teach the child to write, the teaching strategies at her disposal for this activity seem impoverished in comparison to those available for teaching a culturally autogenous task, such as carrying a container on the head in this case.

The unfamiliarity of the demands of formal western schooling was expressed by one informant by referring to formal western schooling as being part of "white" people's history and not their own. She stated it as follows:

S-A: But also what I understand about our parents is that a parent who agrees with education, you will find that when you look back, that parent has lived sometimes with whites or maybe in the white village (residential areas for white people). You find that the parent who is not making it with education (who doesn't support the child to further her education) knows nothing about it and knows (only) that a girl must marry and have a lot of money or cows (bride price, "lobola").

The problem with parents who themselves have no or very little education is also seen in other terms than that they do not support their children in obtaining education. The primary school principal quoted before, felt that both parents and teachers need training in how to prepare children for school and also how to teach children when they are at school:

S-A: You see, because the parents and teachers have grown-up like these children, they are themselves in need of training - it is a recurring decimal, it is carrying on and on, generation after generation. The next parents and teachers are going to be worse.

R: So the parents and teachers are themselves the product of a poor education?

S-A: Yes, they are like zombies really, it is just like a person saying, you come you go, I mean they are, they have some intelligence, but they are not exposed to many things - they don't expose themselves to many things. So now the problem is going to go on and on for quite a number of years.

The extract above contains harsh words: words that could only be legitimately directed by someone at her own people. However, in terms of people confronting unfamiliar social forms, such as formal western schooling in the present project, the despair expressed by this informant is noteworthy.

NOTES : CHAPTER 7

- 1 See Krige, 1977 for an account of the traditional social system of the Zulu, in which this practice is elaborated (p.104).
- 2 'S-A' is an abbreviation for social-actor which refers to the township mothers included in this research. 'Informant' is sometimes used in the text to refer to these mothers and this to stress the anthropological nature of the enquiry.
- 3 'R' is an abbreviation for 'researcher' who is the author in all the extracts included here.
- 4 See Craig 1980, 1983^a, 1983^b.

8 : METHOD : MOTHERS' REGULATION OF CHILDREN.

The mothers' regulation of their children during engagement in culturally autogenous activities was investigated in order to describe a process of adapting to unfamiliarity. The investigation involved obtaining and analysing video recordings of mother-child interaction during problem solving. The analysis occurred in two phases. The first involved evaluation and quantification of micro-aspects of the instructional process, while in the second phase an ideal instructional process was constructed. This construction focused on the mediational operators that generate efficient independent problem solving skills in children. The mediational operators provide another data base from which to formulate generative mechanisms for change.

INTRODUCTION

According to Vygotsky (1978), the origins of self-regulatory activities lie in culturally prescribed patterns of control exercised initially from without by the mother or other significant caretakers. Gradually the child internalises these other directed cognitive controls and

learns to regulate her/his own behaviour. For Vygotsky, the development of self-regulation becomes the object of enquiry, rather than an assumed mechanism which is used to explain development. In Piaget's theory for example, self-regulation is expressed in the notion of equilibration, which, as Pascual-Leone (1980) has pointed out, remains unexplicated in Piagetian theory. Vygotsky (1978) attempts to explain the development of higher mental processes by the concept of mediation. This concept stresses the historico-cultural contribution to cognitive development and particularly emphasises the role of language. In the early stages of development the communicative aspect of the child's social relationships with adults transfers experience to the child. Wertsch (1978), after Vygotsky, claims "that adults' directives to children in problem solving situations play an important role, not only in the immediate communicative context in which they are used, but also in the long-term cognitive development of the child" (p.1)¹.

In the present study, mothers' regulation of their children during problem solving focuses on three puzzle-like tasks that embody some of the essential components of formal western schooling. These components are as follows: using a model as a source of information (this is a necessary skill in learning to read and write); integrating and co-ordinating different sources of information (this is necessary for all

forms of complex learning); and coping with an unfamiliar task under adult guidance (this is perhaps the most important characteristic of many complex tasks). The instructional process during problem solving provides the occasion for the investigation of mothers' regulation of children.

THE INSTRUCTIONAL PROCESS.

Subjects.

Thirty-three mother-child dyads participated in the study. The mothers and children are all Zulu-speaking and were born and are currently living in Kwa Mashu. The children's ages ranged from 2,6 years to 4,7 years and the mothers ages ranged from 18 to 36 years. The mothers have an average of 8,4 years of schooling. Mothers were asked to participate in the study through canvassing in the area by the research assistant and the staff of a township clinic. The only selection criteria employed were as follows:

1. Child's age (2,6 - 4,7 years).
2. Non-attendance by the child at any pre-school.
3. Mothers born and raised in the township.
4. Mothers age (18 - 40 years).

Materials.

Three problem-solving tasks were constructed. The aim was to use tasks that required adult assistance for completion

without being completely beyond the children's ability. Two puzzle-like tasks similar to those used by Wertsch (1978) were used, as well as one three-dimension block construction task involving the placement of different shaped and coloured blocks on three vertical sticks. These tasks are illustrated in figures 4, 5 and 6. A demonstration task was also used and is illustrated in figure 7. The two puzzle-like tasks and the demonstration tasks were adapted from Wertsch (1978), and the 3-dimension block construction task was designed for this study.

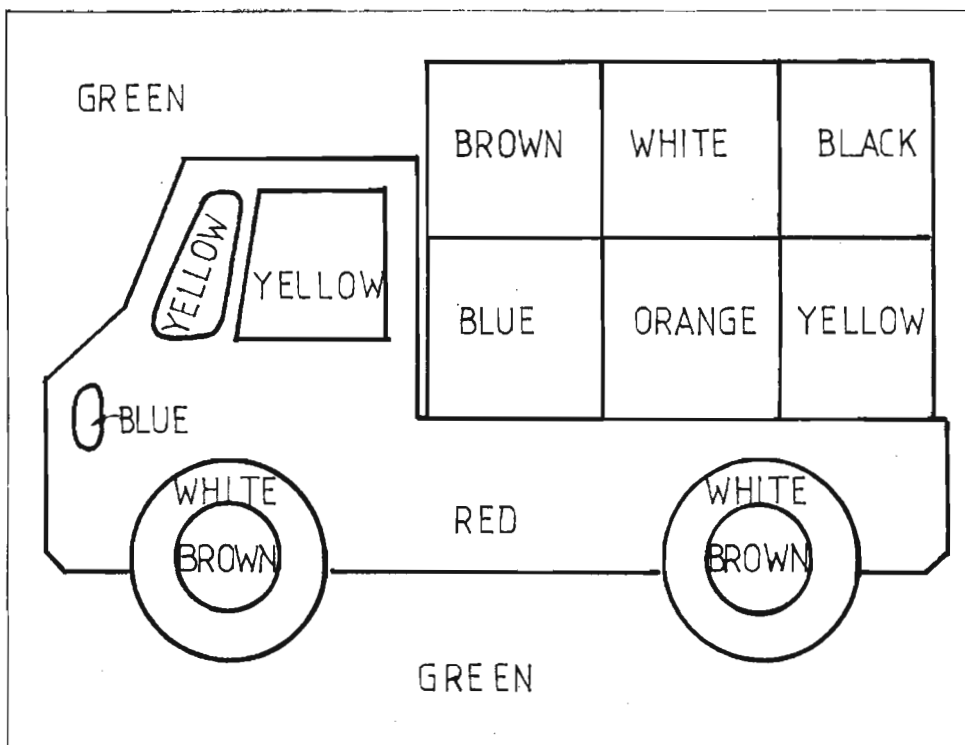


FIGURE 4 : TASK 1 TRUCK PUZZLE WITH SIMPLE CARGO

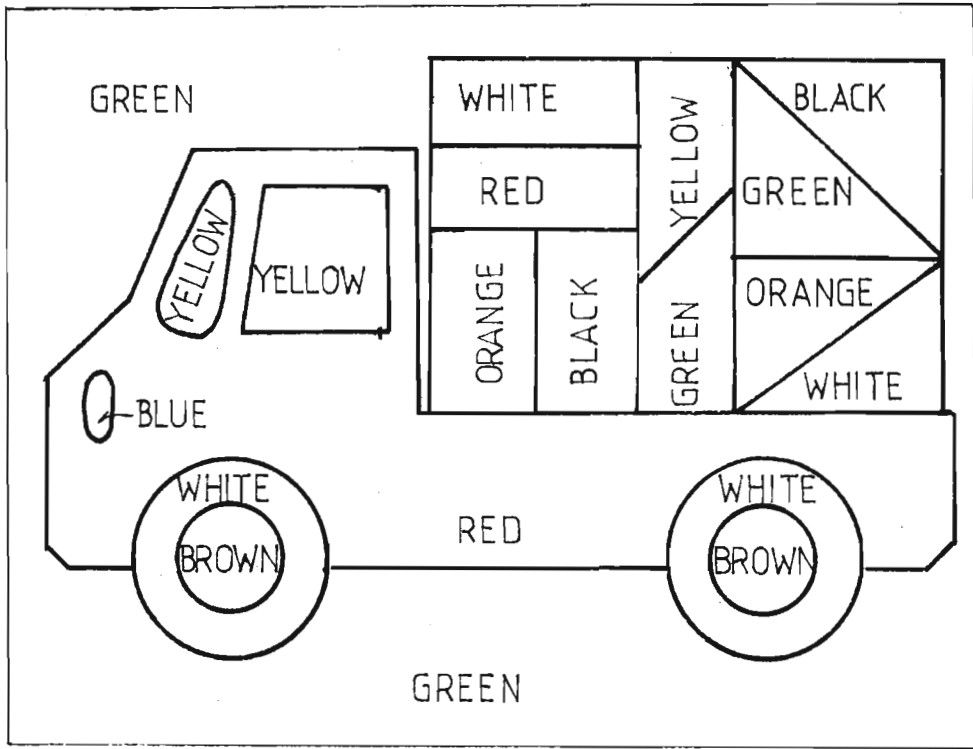


FIGURE 5 : TASK 2 TRUCK PUZZLE WITH COMPLEX CARGO

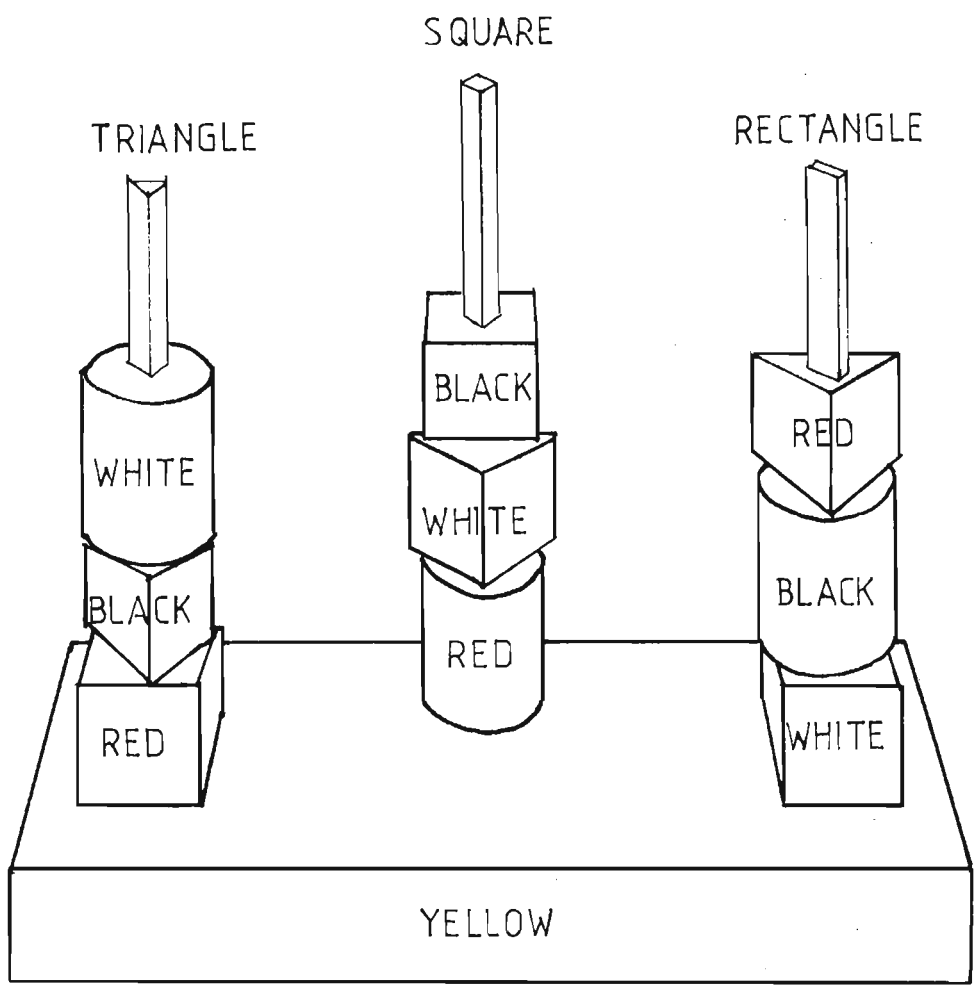


FIGURE 6 : TASK 3 BLOCK TASK

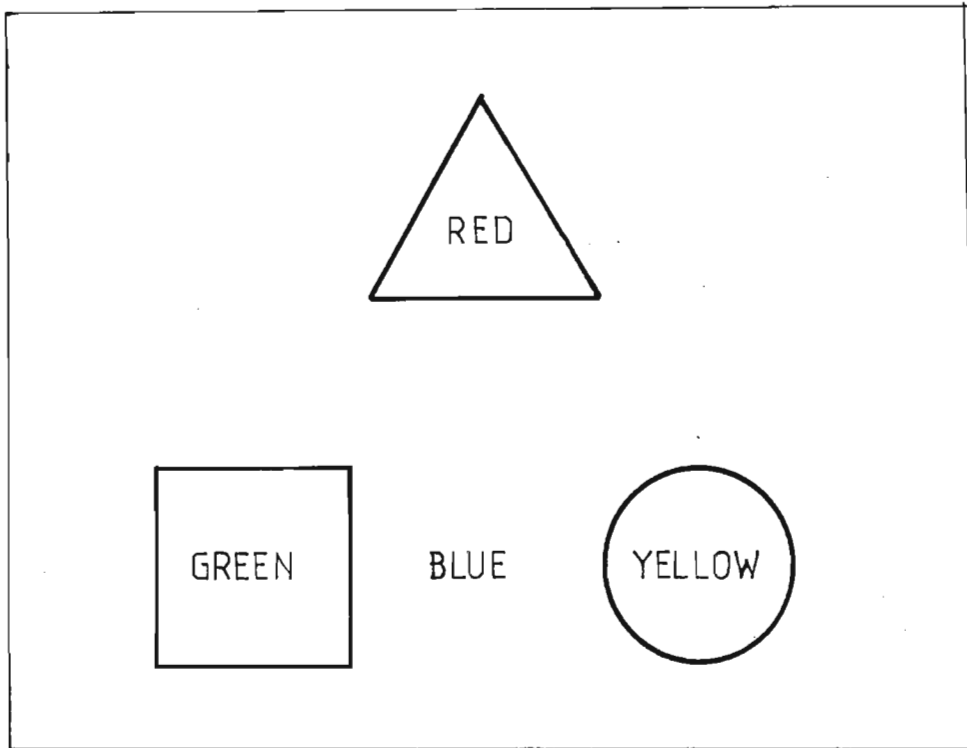


FIGURE 7 : DEMONSTRATION TASK

Procedure.

The mothers were made to feel at ease and seated at a table. They were told that the purpose of the study was to learn how mothers and children together solve puzzle-like tasks. They were also informed that the tasks were too difficult for the child to do alone and it was emphasised that the task was not a test of the child's ability. The mothers were instructed to assist their children in completing the puzzle in accordance with a model. They were told that they could provide whatever assistance they felt would be useful to the child. It was stressed that the purpose was to help the child to do the task but not to do the task for the child.

The concept of constructing an identical copy from a model was demonstrated by the research assistant and the dyads were given a demonstration task.

The task instructions were very detailed and took a total of 10 minutes for all tasks. All instructions were conveyed in Zulu, by a Zulu-speaking research assistant.

Video recording were made of all mother-child transactions for all three tasks.

Analysis.

The analysis was conducted in two phases: the first involved what could be termed "evaluation and quantification" and the second "construction of an ideal instructional process". Each phase is discussed separately.

Evaluation and Quantification.

The evaluation and quantification phase of analysis of the mother-child transactions is only briefly discussed².

These data were evaluated in terms of seven main categories as follows:

1. Execution : This category includes all behaviours involved in the selection and placement of a piece.
2. Directives : This category refers to direct instructions (usually from the mother) relating to the placement of a particular piece without any reference to the model and/or any other source of information.
3. Questions : This category refers to any question directed from one member of the dyad to the other.
4. Demonstrations : This category involves the mother actually placing the piece correctly and then removing it to allow the child to repeat her actions.
5. Mediation : This category includes attempts by the mother to refer the child to the actual model or some other relevant reference as a source of information for the selection and placement of pieces.

6. Confirmation/Negation : This category refers to the mother's confirmation or negation of the child's activity. Confirmation and negation could be verbal or non-verbal.
7. Other : This category refers to behaviours that are not related to the execution of the task such as aimless activity, chatter, and non-task activity.

The videotapes were coded using the categories described above (see also appendix 10). The actual coding procedure was to allow the tape to run for approximately three seconds. When the tape was stopped at the end of each interval, the actions of both mother and child in terms of the above categories were coded on a special form designed for this purpose. A consensus approach was employed regarding appropriate categories for each episode³. In the event of disagreement, the four researchers who coded the tapes, replayed the episode and negotiated the appropriate category until consensus was reached. There was very little disagreement across categories and when it did occur, it was usually about distinctions within categories. The proportion of responses in each of these seven behavioural categories was calculated. These results are reported in appendix 11.

Overall, this phase of the analysis may be summarised as follows:

1. The mothers mainly used a pattern of pointing and verbally directing the child to specific pieces and their correct placement.
2. When children had difficulty with the selection and/or placement of a specific piece, mothers generally executed the selection and/or placement themselves.
3. There was a virtual absence of probing questions by mothers or information-seeking questions by children during the task executions.
4. The mothers seemed to construe the goal of the task as permitting and encouraging the child to complete the task with them while they (the mothers) controlled the selection and placement of pieces. In terms of this approach, mothers provided mostly non-generalisable directives that were specific to the selection and/or placement of particular pieces.

These major trends in the mothers' instructional styles do not exhaust the variation in specific strategies used by all the mothers over all three tasks. In fact, a whole range of styles was observed, from what was defined as good mediation⁴ in the case of one mother, to a few cases where the mothers had great difficulty in executing the task themselves. At no stage in the analysis of the data was the aim to develop conclusions and/or generalisations about township mothers as

such. As has been constantly emphasised, the mothers provided an opportunity to unravel a process of problem solving.

Constructing an ideal instructional process.

It was stated above (see p. 132) that expert formulations of cognitive development provided one vantage point from which to analyse social-actors' engagement in culturally autogenous activities. In this regard, Feuerstein's (1979) descriptive explication of the zone of proximal development provided a useful tool or data base for the construction of an ideal instructional process for the specific tasks used in the present study.

As was discussed above (see p. 88), the deficient cognitive functions described by Feuerstein (1979) were used to formulate the necessary instructional dynamics for the development of efficient independent problem solving activities/abilities.

The video recordings of mother-child transaction were used as a further data base for a rational reconstruction of the processes that constitute instruction.

The first step of this construction was to select from the original video recordings those sections that illustrated the prominent trends that emerged from the evaluation and quantification phase. This compilation must be understood not as some kind of random selection of events but as data that

are theoretically derived⁵; "data" in the sense of constraints and "constraints" in the sense that the next step in the construction is data-bound or restricted (but not constricted).

The next step in the process of rationally reconstructing an ideal instructional process involved using the compiled tape as a source of data from which to extract illustrative aspects of the suggested mediational operators⁶. The transcript of the compiled tape is provided in appendix 12. Again, the selection of the illustrative aspects from the compiled tape should be understood as data that are theoretically derived.

In conclusion, it is worth noting that the suggested mediational operators are some likely components of an ideal instructional process: 'Ideal' in the sense that it seems possible that were such mediational operators present in the execution of tasks such as those included, they would provide the occasion for the development of efficient autonomous problem solving skills in the children. It is, of course, open to experimental validation whether or not the suggested mediational operators in fact produce efficient autonomous problem solving skills. However, given Vygotsky's notion of a zone of proximal development, and given Wertsch's work in this regard, it would seem justifiable to assert that the suggested mediational operators provide a sound basis from which to

work: a sound basis in the sense that the cognitive functions derived from Feuerstein's description are amenable to further experimental validation and application.

The suggestions regarding an ideal instructional process and the components thereof are intimately linked to the theories addressed in chapter 3 on the one hand, and on the other to the empirical data collected as part of this project.

NOTES : CHAPTER 8

- 1 These ideas have been integrated and discussed in terms of the theories of cognitive development presented in chapter 3 (see p. 51). Vygotsky's ideas regarding self-regulation are mentioned here by way of introducing this study.
- 2 A detailed description of the evaluation and quantification phase of analysis is available from Kok & Beinhardt (1984). It was largely because of the theoretically uninformative nature of this phase of the research that further quantitative analysis was abandoned. The present approach is an attempt to provide an alternative methodology and theory for the analysis of these data.
- 3 This consensus approach was adopted because the judgements which were made about each episode in the micro-analysis were of a qualitative nature. No "objective" or "hard" criterion could, therefore, be used to make such judgements.
- 4 In terms of these tasks, mediation refers to attempts by the mother to refer the child to the model as a means of

correctly selecting or placing a specific piece. The various kinds of mediation included simple reference to the model; specific attempts to compare aspects of the model with the task; using the model as a frame of reference to organise the execution of the task; and questions relating the model to the task. In addition, explanations that enable the child to grasp a general principle related to the task execution are included in this category. These explanations are either in-context, referring to a specific aspect of the task, or out of context referring to related previous experience.

- 5 This point is well illustrated by Medawar (1969) "Our observations no longer range over the universe of observations: they are confined to those that have bearing on the hypothesis under investigation" (p.51).

- 6 The practice of using a data source from which to extract illustrative aspects of an analysis is maintained throughout this report. Certain extracts are used from the literature to illustrate the analysis of expert theories of development. The indigenous theory of childhood was also illustrated in this way but using extracts from the group interviews and, likewise, the mediational operators are illustrated with extracts from the transcript of the compiled tape.

9. : MEDIATIONAL OPERATORS.

Ten mediational operators are derived from a descriptive account of the zone of proximal development. These mediational operators are illustrated with extracts from the instructional process as black urban Zulu-speaking mother-child dyads engage in culturally autogenous tasks. Each mediational operator is illustrated and discussed in terms of the development of efficient autonomous problem solving skills. As such, the mediational operators are regarded as the dynamics of the zone of proximal development or necessary components of an ideal instructional process.

INTRODUCTION

Vygotsky's idea that instruction will create a zone of proximal development is central to Wertsch's attempt at an explication of this zone. In this regard Wertsch uses the notions of situation definition, intersubjectivity, and semiotic mediation to refine Vygotsky's idea. Feuerstein, although not explicitly addressing Vygotsky's work, proposes deficient cognitive functions as the product of inadequate or impaired mediated learning experience. Central to these

theorists' proposals is the idea that the process of instruction is important in the child's ultimate cognitive development.

Feuerstein's description of deficient cognitive functions served as one data source from which to derive¹ the ideal adult mediational strategies which will produce in the child efficient autonomous problem solving skills. Before presenting the derivation of what may be termed mediational operators Feuerstein's description of deficient cognitive functions is presented. He lists these functions under three headings as follows:

a. Impaired cognitive functions affecting the input phase .

Blurred and sweeping perception; Unplanned, impulsive, and unsystematic exploratory behaviour; Lack of, or impaired, receptive verbal tools and concepts which affect discriminations; Lack of, or impaired, spatial orientation, including the lack of stable systems of reference which impair the organisation of space; Lack of, or impaired, temporal orientation; Lack of, or impaired, conservation of constancies (i.e., in size, shape, quantity, orientation) across variations in certain dimensions of the perceived object; Lack of, or impaired, capacity for considering two sources of information at once, reflected in dealing with data in a piecemeal fashion rather than as a unit of organised facts ...

b. Impaired cognitive functions affecting the elaboration phase.

Inadequacy in experiencing the existence of an actual problem and subsequently defining

it; Inability to select relevant as opposed to irrelevant cues in defining a problem; Lack of spontaneous comparative behaviour or limitation of its appearance to a restricted field of needs; Narrowness of the mental field; Lack of, or impaired, need for summative behaviour; Difficulties in projecting virtual relationships; Lack of orientation toward the need for logical evidence as an interactional modality with one's objectal and social environment; Lack of, or limited, interiorisation of one's behaviour; Lack of, or restricted, inferential-hypothetical thinking; Lack of, or impaired, planning behaviour; Non-elaboration of certain cognitive categories because the necessary labels either are not part of the individual's verbal inventory on the receptive level or are not mobilised at the expressive level; Episodic grasp of reality ...

c. Impaired cognitive functions affecting the output phase.

Egocentric communicational modalities; Blocking; Trial-and-error responses; Lack of, or impaired, verbal tools for communicating adequately elaborated responses; Deficiency of visual transport; Lack of, or impaired, need for precision and accuracy in communicating one's response; Impulsive acting-out behaviour, affecting the nature of the communication process (1979:73-74).

In reviewing these various functions it became apparent that they are in need of some clarification if they are to be used as a basis from which to reconstruct mediational operators as components of an ideal instructional process.

For the present investigation these deficient cognitive functions were used as a data base from which to re-construct "mediational operators". This term is meant to convey the

ideal adult mediational strategies which will produce in the child efficient autonomous problem solving skills. The mediational operators refer therefore to Vygotsky's ideas regarding the zone of proximal development and emphasise the adult mediator as an important force in the child's cognitive development.

The mediational operators suggested here are as follows: Task readiness; Gathering information; Specifying means and goals; Making the problem explicit; Attending to detail; Visual transport; Emphasising invariant aspects of the task; Dealing with different sources of information; Discovering causal relationships; and Co-ordination and integration.

In order to focus on ideal instructional components for the development of efficient autonomous problem solving skills, the clarification of Feuerstein's descriptive explication of the zone of proximal development proceeded on the basis of the following:

1. On the one hand, Feuerstein seems to emphasise ideal mediational strategies, that is, the assumption implicit in the description of the deficient cognitive functions is that they could have been rectified with adequate mediated learning experience. On the other hand, he emphasises the product of inadequate mediated learning experience (MLE), that is, deficient problem solving skills. For the present analysis the focus was on ideal mediational strategies and these were

extracted from the formulation of deficient functions. For example the mediational operator "Making the problem explicit" may be seen as a component of the instructional process which could prevent deficient strategies from developing, such as "Inadequacy in experiencing the existence of an actual problem and subsequently defining it" (Feuerstein, 1980 p.73).

2. Certain of the functions described by Feuerstein are more on the level of overt performance, that is, "Lack of spontaneous comparative behaviour or limitation of its appearance to a restricted field of needs" (Ibid.), while others are assumed in order to explain a performance problem, for example, "narrowness of mental field" (Ibid.). In the present project the focus was on the instructional process, highlighting essential components in the transaction between mother and child. "Dealing with different sources of information" may be seen as a mediational operator which, when present in an instructional process, will develop efficient strategies for problem solving.

3. There is also a degree of overlapping between the functions described by Feuerstein, for example, "Blurred and sweeping perception", "Unplanned, impulsive, and unsystematic exploratory behaviour", and "Lack of, or deficient need for, precision and accuracy in data gathering" (Ibid.). Such overlapping was dealt with in this project by using the mediational operator, "Gathering information", as a necessary aspect of the instructional process.

3. The final important criticism of the functions as described by Feuerstein refers to the hierarchy obvious in these functions. In other words a specific function such as "Blurred and sweeping perception" (Ibid.) is subsumed by the function, "Episodic grasp of reality" (p.74). Both these are related to another deficient function, "Lack of, or impaired, capacity for considering two sources of information at once, reflected in dealing with data in a piecemeal fashion rather than as a unit of organised facts" (p.73).

In the formulation of ideal mediational strategies, the mediational operators - the components of the instructional process - were organised from the most immediate and specific to the more abstract and general, that is, from 'Task readiness' to 'Co-ordinating and integrating'. These mediational operators are analysed and presented in chapter 9.

The seeming inadequacies in Feuerstein's listing of deficient cognitive functions appear outweighed by the insights to be gained from his clinical exploration of the zone of proximal development. In this regard the present project used his descriptions as data from which to reconstruct ideal adult mediational operators in terms of the development of efficient autonomous cognitive functions in children. The present formulation of mediational operators will have to be subjected to further empirical scrutiny. This is not undertaken in this project but seems a necessary extension of the work reported on in chapter 9.

The process of instruction, whether from adult to child or teacher to pupil, would seem to be the binding force between social history and individual development. Instruction is the link between the cultural solutions to the problems that occur in a particular milieu over time, and the power of the mind to construct reality.

From Piaget's project it seems possible that the developing child is able to construct a great deal of knowledge about the world for him/herself through action performed on objects, events, and so forth. However, consistent with Vygotsky's theory of "mind in society", the thesis developed in the present project is that the developing mind's potential must also be seen in terms of the social constraints which form the social actor's environment of people and things.

In this chapter the instructional process is cast in terms of mediational operators that are regarded as ideal components in an ideal instruction process. In other words, the argument is: were these mediational operators present in the instructional process between mother and child, they would provide the occasion for the development of efficient autonomous problem solving skills in the children.

The results presented in this chapter emphasise mediational operators in terms of urban Zulu-speaking mother-child dyads' engagement in culturally autogenous activities. Each mediational operator is therefore

illustrated with data obtained from actors' engagement in tasks. This engagement is not necessarily "ideal" but it provides data from which to reconstruct the possibility of change. This is discussed in detail in the next section.

1. TASK READINESS.

Before any task can become a problem solving situation for one or more participants, they must be willing and/or eager to become involved in the demands of the task. The term 'task readiness' refers to this willingness or eagerness to engage in the task.

The mothers in the present study displayed a readiness to engage, and often started with the task immediately after the instructions were conveyed by the research assistant. The children also did not show any resistance and always engaged in the task after receiving instructions from the mothers. Whereas the mothers displayed 'task readiness' in response to the instructions of the research assistant, the children responded to the mother's instructions and not those of the assistant.

The task readiness on the part of the mother-child dyad was manifested specifically in the placement of particular pieces. This is illustrated in table 1 below.

 TABLE 1: TASK READINESS.

(After instructions were given to the mother-child dyad, the mother commences task 1 as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Begin Gugu Take this one, like this one, and put it in the car (Points at model and at child's template)	(Looks at mother) (Looks at model)
One like this one, this one, take it and put it in the car. Put it in. Position it like this one in the car. (Points at piece, child's template and model)	(Follows mothers' point- ing and places piece incorrectly facing the wrong way)

Most children included in the study, like the child referred to in the extract above, continued their attempts to follow their mothers' instructions until the piece was correctly placed. The correct placement of pieces often involved the mother more directly in that the mothers often placed the pieces themselves.

As a moment in the instructional process, task readiness is a pre-condition for any further problem solving activities to occur, and for further instruction to succeed. Task readiness is important before the task commences, but also throughout the task in order to sustain the active attempts to solve problems encountered in the execution of the different facets of the task.

As a mediational operator, task readiness serves as a cue for the participants to engage and for the task to proceed.

It is an essential element for effective problem solving involving a general orientation of the child to engage in problem solving situations.

2. GATHERING INFORMATION.

For the instructional process to succeed, a focus on the necessity to gather appropriate information is important. In terms of the instructional process success must be seen as involving the mediation of the essential features of the task to the child. Appropriate information is that which leads to the resolution of a problem solving situation. This is what is intended by the term "gathering information".

In table 2 below, gathering information is illustrated by an extract from the instructional process between a mother and child who worked well together in this regard. Notice how the mother focuses the child's attention on the appropriate information and how the child follows the mother's instructions closely.

 TABLE 2: GATHERING INFORMATION.

(After having commenced with task 1, the instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Let's now put on a load. Here's the load (Indicates load on model)	(Looks at mother's actions)
Do you see it? (Indicates load)	(Looks at the model)
Take now, take the colours, take these colours and make up the load (Indicates load)	(Looks at the model)
No begin with this one (Points to model)	This one? (Pointing to piece on the model)
Yes	(Child reaches for model pieces)
Do not remove it from there, (Points at the model) Take from here (Points at the child's piece)	(Follows mother's action)
One like this (Points at the model)	(Reaches for appropriate piece)

For the mother's instructions to convey the necessary information to the child, it is necessary for her first to gather all the relevant information and, second, to convey this information to the child in a manner that s/he will understand. An ideal mother-mediator might, furthermore, be expected to involve the child in the process of pursuing such

evidence as will allow the gathering of all the necessary evidence. In table 2 above, the gathering of information is broken down into essential chunks, and the child's attention is drawn to the information through both verbal and non-verbal communication. In the next extract, "gathering information" which is unclear to the child and which fails to alert her to the essential features of the task is illustrated. In effect the instruction provided forces the child to act on incomplete information and does not establish information gathering as an important strategy for problem solving. This is illustrated in table 3 below:

 TABLE 3: ACTING ON INCOMPLETE INFORMATION.

(During the execution of task 1, the instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Now remove, remove the ones that you've put in (Looks at model)	(Picks up piece from template)
Now push that one upwards. Put that one up there, push. (Looks at model)	(Places removed piece next to template, to the left)
Take then another, take one like this one, take one like this (Points to model)	(Removes another piece from template and places it next to the other one on table to the left)
Yaa put that one next to you. (Points to piece in model)	 (Goes to take piece from model)
(Restrains child)	
Take this one No no Mapi no no take one like this. (Points to piece in model)	(Takes piece from table) (Places piece on table to the left of the template, building a "train" of blocks)
Take one like this so that we can go and watch T.V. (Points to piece on model)	(Watches mother's actions)
Now take one like this from the table. (Points to piece on model)	(Picks up piece from table)
Yaa from the table (Claps hands and smiles)	Like this?

Notice that in the above extract the mother and child are out of phase in the sense that their actions are not co-ordinated. Each is acting according to her own plan as is evident in the child's construction of a "train".

When the information that is conveyed is fragmentary and contains isolated bits of information, children are encouraged to follow blindly the instructions without having been given the opportunity to sit back, as it were, and obtain a perspective on the relationship of one bit of information to the task as a whole. In table 4 although the mother uses explicit labels to direct the child to correct piece selection and placement the information conveyed remains fragmentary.

TABLE 4: FRAGMENTARY BITS OF INFORMATION.

(The model is placed directly above child's template. The instructional process in task 1 process as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Take a black one (Looks at model)	(Child picks up piece)
There's a black one above there, up there, place it properly, push it up, don't put it flat, don't put it flat, lean it, lean it, make it stand, put it in properly (Watches child's activity).	(Places piece) (Adjusts piece and looks at mother) Pardon, like this? (Adjusts piece)
(Looks at model)	(Looks at pieces on table)
Take the orange one now, take the orange one, there it is. (Watches child's actions)	(Picks up piece and shows to mother and places it)
Now move it backwards (Watches child's actions)	(Adjusts and places correctly)
Not there, not there, move it backwards. (Looks intently at model).	(Withdraws hands from template and looks at template) Ma?

The instructions provided in the above example not only convey fragmentary bits of information, but fail to allow the child to appreciate the necessity for gathering all the information necessary for task execution.

Gathering appropriate information for the solution of a problem solving situation essentially involves discrimination between relevant and irrelevant units of information. This is illustrated in table 5 below:

TABLE 5 : DISCRIMINATION BETWEEN RELEVANT AND
IRRELEVANT UNITS OF INFORMATION.

(Towards the beginning of task 3, after the placement of the three sticks, the mothers' instructions proceed as follows:)

MOTHERCHILD

(Looks at model, takes all extra sticks out of reach of child)

(Child watches mother's actions)

Now we are going to fit in these things, do you see? We are going to choose.
(Points at model and looks at child).

(Looks at mother and nods)

(Sorts pieces on table turning blocks so that holes face upwards)

(Watches mother's actions)

We'll start this side. Do you see, this one it's black, we'll start with the black one
(Points at appropriate side of model and points to black block and looks at child)
You must choose a black one but which has a hole like this
(Points at the internal shape of the black block and then at the stick, then organises blocks on table)

(Watches mother's actions)

(Looks)

Do you see here, all these things. Then choose a black one with a hole like this, with a sharp hole.
(Turning over blocks and moving closer to child)

(Picks up piece and holds it)

Put it in here in this hole here,
(Taps appropriate stick)

(Watches mother's actions)

In this hole here
(Taps stick again)

(Looks at mirror image)
(Looks in right direction)

By removing possibly distracting stimuli (the extra sticks) and placing the blocks with internal shapes facing upwards, the mother directs the child's attention to relevant units of information. It is also noticeable how the mother increasingly refines her instructions. She starts by saying, "we are going to fit these things", and moves to, "We'll start with the black one", and then later, "a black one ... with a sharp hole". She also reacts appropriately to a mirror image orientation problem on the part of the child by continually restating throughout the task, either verbally or non-verbally or both, which side of the child's template is the relevant one at that stage of the construction.

Gathering information as a moment in the instructional process emphasises the necessity of pursuing the inherent structure of a task in order to solve the problem situation. A child that understands the necessity to pursue evidence that will reveal the structure of a task has mastered an important aspect of efficient independent problem solving. Children require appropriate strategies of information gathering in order to deal effectively with the tasks they confront.

3. SPECIFYING MEANS AND GOALS.

The means and goals of the task included in this study, may be depicted in a hierarchical manner. This is illustrated in figure 8.

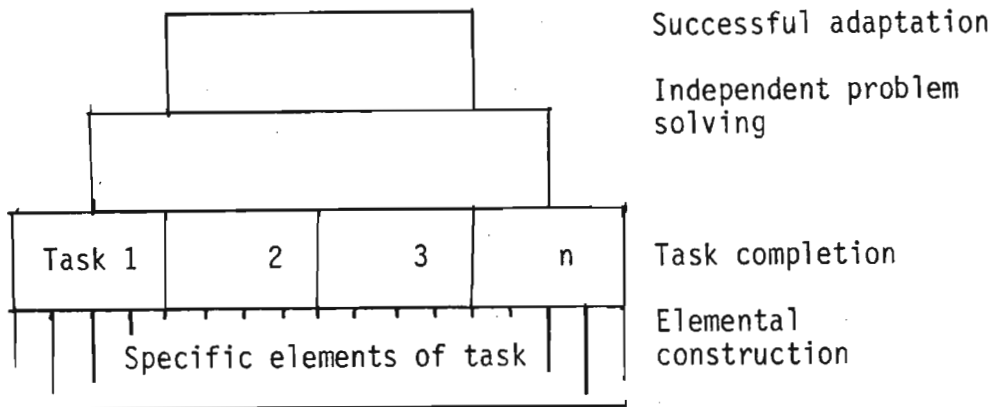


FIGURE 8 : A GOAL HIERARCHY.

Goals such as "Successful adaptation" and "Independent problem solving" may be regarded as extra-task goals. "Task completion" and "Elemental construction" are the direct task-goals. A similar means-end hierarchy may be applied to each piece or element of a task. The selection and placement of each appropriate piece in the case of the target tasks involves direct and extra-task goals. What is important is that no matter how elemental the activity, it may entail more than itself.

In terms of the instructional process, "specifying means and goals" refers to a goal hierarchy that may be implicit or explicit.

In table 6 below a lack of specifying means and goals is illustrated. In this extract, the mother only seems to have elemental construction and completion as goals, regardless of who achieves the goal (she places the piece in the end).

TABLE 6 : LACK OF SPECIFYING MEANS AND GOALS.

(During the execution of task 2, the instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Take the yellow one now. (Looks at pieces on table) That one. (Indicates piece with head movement) The yellow one like this one. The yellow one. (Watches actions) No not that one, not that one.	(Reaches for a piece and picks up incorrect piece) (Watches mother's actions) (Goes to place piece in template). (Places piece back on table) Which one?
This one, the yellow one (Points with finger to appropriate piece) (Glances at model, takes piece from child) No put it in like this. Do you see? (Places piece).	(Picks up the indicated piece and goes to place piece in template) Do I put it in like this? (Watches mother's actions) Oh.

Without specifying the goals of a task, the instructional process lacks definition or focal points. This is reflected in the extract above in the lack of co-ordination between the two participants, and in the child's difficulty in knowing

how to proceed (means) in order to reach a goal (correct placement of a piece). The instructional process furthermore does not alert the child to the necessity for checking the model as a means to achieving correct placement of a piece (a goal).

In table 7, the nature of the instructional process suggests extra task goals, that is, goals other than completing the task at hand. The mother's attention to the necessary steps towards correct selection and placement suggests implicit extra-task goals on her part.

 TABLE 7 : EXTRA TASK GOALS.

(After the sticks have been correctly placed on task 3, the task continues with the placement of blocks onto the sticks. The instructional process proceeds as follows:)

MOTHERCHILD

We are now fitting in the second one, a red one
(Pointing at red block on model)

(Looks)

Do you see the sharp hole?
(Points at top of stick and looks at child)
You should find a red one with a sharp hole.
(Indicates model and pieces on table)

(Looks and nods)

(The mother continues to direct the child's attention to essential attributes necessary for successful construction until the child finally places the piece. The mother then goes on to the next step as follows:)

We are now going to choose a white one, with a sharp hole again.
(Indicates white block and appropriate stick on model)
Then choose a round one. Do you see the round one? A round one from here.
(Indicates roundness of white block and points at pieces on table)

(Watches)

With a sharp hole, yaa

(Picks up correct piece)

If the mother's goal was merely task completion she probably would have used more direct instructions such as "Take this one and put it there" (direct verbal command

accompanied by non-verbal gestures, as was the case in table 6). However, in table 7, the instructional process highlights very clearly the necessary steps (e.g. correct selection of a piece) towards the attainment of a goal.

Related to the specification of means and goals is the importance of gathering relevant information as a means to achieve a certain goal. In table 8 the instructional process is directed to a specific attribute of a piece to achieve the goal of correct selection. In this extract the mother adapts her instruction to the child's response in order to focus her attention on a specific piece.

TABLE 8 : RELEVANT ATTRIBUTE OF A SPECIFIC PIECE.

(During the execution of task 1 the mother attempts to get the child to select a specific piece from the pieces on the table. The process proceeds as follows:)

MOTHER

(Looks at pieces on table)
Take the green one now, take
the green one.
(Watches child's actions)
No, no.

Take a green one, not that one.
There it is.
(Indicates correct piece
with head movement)
(Points with finger to
correct piece on table)
This one, not that one
(Points to child's template
and model).

CHILD

(Looks at pieces on
table)
(Picks up a piece,
picks up another piece
and shows to mother)

(Reaches for another
piece)
Where is it?

(Picks up the indicated
piece and holds in hand
while looking at own
template and model).

In the extract in table 8, a verbal label, "the green one", does not seem to evoke an appropriate response from the child and is replaced by non-verbal gestures (head movement and finger pointing).

The extract in table 9 below illustrates the correct selection and placement of a piece.

TABLE 9 : SELECTION AND PLACEMENT OF SPECIFIC PIECE.

(The mother attempts to direct the child towards the placement of a specific cargo piece in task 1 after the truck piece has been placed. The instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
(Looks at model) What? Here it is, put it in there.	(Looks at pieces on table)
(Points at model and at template) Do you see?	
What are you going to take and put in there? (Picks up piece and places it) (Adjusts window piece several times but still places incorrectly) (Looks at model)	(Looks at mother)
Now take, take this one. (Points to piece on model) (Turns a few pieces on table) (Points again to piece on model to place in template)	(Looks at mother)
Take this one and put it in there. (Restrains child's movement and points to piece in model again)	(Reaches for model) That one?
You take this one like this one and put it in there. (Adjusts piece just placed by child)	(Picks up piece and places it)
Do you see?	

In the instructional process illustrated in table 9 the mother attempts to direct the child to the correct selection and placement of a piece. After some vague prompting from the mother fails to elicit an appropriate response in the child, the mother herself picks up a piece and places it while the child looks on.

When the child reaches for the model instead of using the model as a source of information, the mother does not clarify her instruction. She fails to specify to the child the means (using the model as a source of reference) towards the attainment of a goal (correct selection and placement of a piece).

In general, these examples illustrate the various aspects of specifying means and goals as a moment in the instructional process. A child who is made aware of a means and goal hierarchy, and who is equipped with the need to seek relevant information towards achieving specified goals, can actively deal with problems that require the imposition of structure/order. Specifying means and goals as a moment in the instructional process equips the child with strategies to follow plans of action in task execution. This is an important aspect of problem solving as it allows the participants control over their goal directed activity. Specifying means and goals to a child highlights the fact that

solving problems entails an ordered sequence of events. An ability to specify and order means and goals introduces foresight and planning activity as part of the problem solving process.

4. MAKING THE PROBLEM EXPLICIT.

In order to engage effectively in a problem solving situation, the participants must be aware of the task as a problem solving situation that demands a solution. In the case of instruction from mother to child, it is necessary for the mother to make explicit to the child that the task as a whole and the different facets of the task demand specifiable responses that will solve the problem. This process is referred to as "making the problem explicit". In table 10 the instructional process focuses on the essential features of the problem that requires solution. Notice in this example how the mother specifies the appropriate responses that are necessary to fit the sticks into the template.

 TABLE 10 : AWARENESS OF PROBLEM SITUATION.

(The mother has looked at the model, the pieces on the table and the child's template. She introduces the task to the child as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Now take the stick, a stick that is sharp like this one. (Pointing at appropriate stick on the model)	(Observing mother's actions)
Choose a stick that is sharp like this one. Do you see how sharp it is? (Showing sticks, in hand, to child)	(Watching).
Put it in here. (Pointing to appropriate space in model) There you are.	(Watching where mother points and chooses a stick) (Holding stick and watching other)
Now put it in a hole that's sharp like this one. Look at the holes. Do you see the holes here? Now we are going to put it at the beginning in a hole that's sharp like this one. (Pointing at model)	(Looks at template and back at mother's actions)
Now you start over there in your things. Yaa. (Watching child's actions).	(Child places stick in template and looks back at model)

The extract in table 10 is a beautiful example of what is meant by the mediational operator, "making the problem explicit". The mother specifies clearly the nature of the

problem, that is that a stick shaped in a particular way ("sharp") should be selected in order to place it correctly in a similarly shaped hole. She directs the child's attention to the holes and emphasises that their shape is important ("a hole that's sharp") for the correct placement of the stick.

The instructional process in table 10 illustrates how necessary it is for the adult to anticipate the problems the child may encounter and how this adds to the child's awareness of the problem situation.

In table 11 the instructional process proceeds without the child being made aware of the problem situation. This extract illustrates an instructional process that contains only the bare minimum of guidance for the child.

TABLE 11 : NOT MAKING THE PROBLEM EXPLICIT.

(The instructional process proceeds in task 1 with the mother directing the child to the appropriate piece through occasional non-verbal gestures as follows:)

<u>MOTHER</u>	<u>CHILD</u>
(Mother glances at model)	(Picks up piece and shows to mother)
(Points to appropriate place in template)	And this one where should I put it in?
(Inspects placement in template, puts hand to head and glances at pieces on table)	(Places piece)
No, no take another, no no put it in there. (Hand held in mid-air)	(Picks up another piece)

continues ...

No, no. (Indicates with hand to the correct piece) (Pushes child's hand aside, checks template, glances at model)	(Tries to place piece)
	(Places piece)
No no, see, remove that one. Take it out. (Removes piece) (Looks at model)	(Watches) Put it where?
	(Goes to pick up piece)
(Restrains action) Wait. (Points to piece on table)	(Picks up indicated piece)
(Takes a piece, places it and looks at model)	Put it where? (Places piece) (Removes piece, replaces it) I'll put it here like this.
(Looks at model)	(Independently picks up another piece and holds up towards mother)
(Points to piece on table)	(Exchanges piece for piece mother indicated)
(Glances at model) (Shakes head)	Eh Mah? (Picks up another piece and shows to mother)
No.	(Replaces piece, picks up another and replaces it)
No, no.	(Picks up another piece and replaces it).

The instructional process illustrated in table 11 creates the impression that not only is the problem not made explicit to the child but the mother seems engrossed in the task rather than in providing instructions to the child. One is left wondering what the child could possibly learn in such a

situation. From the child's actions the answer seems that in the absence of an explicitly described problem, trial-and-error responses result.

Because the problem is not made explicit, the child is left without direction regarding appropriate responses.

Making the problem explicit as a moment in the instructional process serves to alert the child to the necessity to appreciate first the nature of the problem before attempting to engage in task orientated behaviour. Once a problem is adequately specified, plans or strategies may be brought to bear on its solutions.

5. ATTENDING TO DETAIL.

In order to solve a problem or engage effectively in a task, attention to detail is important. The clarity with which the details of the task are described and defined highlights the necessity to be precise. Instructions which emphasise precision are necessary for the execution of complex problems. This is referred to as attention to detail.

In table 12 below the instructional process highlights the exact detail of the piece to be selected. In this instructional process, "attending to detail" is clearly illustrated.

 TABLE 12 : ATTENDING TO DETAIL.

(During task 3 after the three sticks have been placed, the mother attempts to focus the child's attention on the specific attributes of a piece for selection. The instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
We are looking for a black one with a hole like this (Indicates correct piece)	(Looks back and forth from model to pieces on table)
A black one shaped like this. Do you see, shaped like this? (Mother indicates stick on model)	(Looks at mother's actions)
But a black one with a hole like this (Mother indicates pieces on table and points to internal shape) (Looks at child after each instruction)	
Mm mm one shaped like this, do you see how it is shaped? Like this one amongst these. (Points at model)	(Child goes to pick up a piece) This one? (Points to appropriate piece)
Yaa (looks at child's activities)	(Picks up black piece)

The instructional process illustrated above is rich in cues and explicit as regards the necessary detail for appropriate piece selection. The mother directs the child to the appropriate colour of the piece to be selected and the external and internal shapes to be attended to. ("We are looking for a black one with a hole like this"). The mother also compares the shape of the stick with the internal shape

of the block by indicating the stick with non-verbal cues and verbal cues ("But a black one with a hole like this"). The mother, furthermore, checks whether the child attends to her detailed instructions.

The following example contains an extract from an instructional process which illustrates a lack of attention to detail. In table 13 the instructional process not only provides the child with no clear detail but is also misleading.

TABLE 13 : IMPRECISE INSTRUCTIONS.

(During the execution of task 3, the mother attempts to get the child to pick up a red square block. The instruction process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Take another one again (Indicates piece with head movement) The red one, see.	(Reaches for piece on table) This one? (Looks at piece on table) I don't see. (Picks up piece) This one?
Here it is the red one, the big one. (Looks at child's piece) No, the red big one. That's the red big one. (Looks at child's piece) Here is the red big one. (Points at piece)	(Replaces stick on table) (Picks up piece indicated and places it on incorrect stick) (Places on correct stick)
Oh ya, fit it over there. Do you see? (Watches child's actions) Take another one again,	(Looks at pieces on table) Where, where is it? (Looks at mother and touches piece)
That's a good girl. (Watches child)	
No, a red big one, a red big one. (Looking at table)	A black one? (Searches table for piece) I can't see the big one
One like this one. (Points to piece on table and then to correct stick on child's template).	(Looks at pieces on table)
Looks at model You can't see it. You - don't be absurd! (Points at correct piece on table) Yes, that's the one.	I can't see it. I can't see it. (Picks up piece).

In point of fact, the red square is no "bigger" than the red triangle or cylinder. The "bigness" of the block is an imprecise definition of the critical attribute in this case, and the child's inability to "see" a big one should have alerted the mother to this fact. Furthermore, an instruction such as "take another one" does not direct the child to attend to detail.

As a moment in the instructional process attending to detail clarifies the task boundaries precisely and exactly. A child who is equipped to deal with detail can concentrate effectively on the problem situation while excluding extraneous events.

6. VISUAL TRANSPORT.

The ability to visually transport "a missing part from a given distance or by choosing the complementary missing part from a number of alternatives" (Feuerstein, 1980 p.101) is an important requirement for executing tasks such as those included in this study. Visual transport frees the individual from concrete (motor) activities and facilitates the smooth and efficient execution of a specific piece after the move has been cognitively represented.

Choosing a specific piece with an irregular shape from among the pieces on the table requires the ability to "visually transport" the missing piece. One of the window pieces (second puzzle task, figure 5 p. 195) is an irregular

shape approximating a rectangle but with unequal opposite side dimensions. In table 14 an extract from the instructional process illustrates how a mother's inability to visually transport a missing part from a number of alternatives, interferes with the instructional process.

TABLE 14 : MOTOR MANIPULATION OF A PIECE.

(During the execution of task 1, this mother continues to return to the positioning of the small window piece in the truck puzzle. The task execution proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
(Glances at model)	(Watches mother's actions)
Take this one and fit it there.	(Picks up piece)
(Points to piece on table and points to position in template where piece is to be placed)	This one?
Mm aye how are you feeling it?	(Watches mother's actions)
(Checks model and struggles to adjust window piece in child's template. Returns to model and touches it. Continues adjusting piece in template)	(Watches)
(Glances at model again. Swops piece in template for one on table and adjusts)	(Touches template)
(Tries to force it in space in template. Glances at model again)	It's a car, it's a car, it's a car, isn't it?
(Continues to adjust piece in template and glances again at model)	(Gets restless and looks away)
(Continues trying to force piece into template)	(Watches)
(Removes model window piece and inspects it and replaces it)	(Picks up piece, places and looks at mother).
(Again tries to place piece in child's template)	(Watches)
(Removes model window piece and inspects it and replaces it)	
(Again tries to place piece in child's template)	
(Leaves piece although still incorrectly positioned)	
Now take this thing and put it in here.	(Child picks up piece)
(Glances at model, points to piece on table)	
And put it in here.	
(Points to position in child's template).	(Child places piece)

The problem the mother experiences with the placement of the window piece, illustrated in the above example, is exacerbated by the fact that she becomes so engrossed in her own struggle that the child becomes almost irrelevant. The mother's verbalisations in the above extract are instances of self regulation rather than communicative transaction between her and the child. In this example an operation (or task) which is apparently unfamiliar for the mother, creates a situation in which she cannot adequately fulfil a mediating role for the child.

Visual transport as a moment in the instructional process allows the participants a "short cut". For a mother in an instructional situation the ability to visually transport missing pieces allows her to direct the child effectively to the relevant cues which will allow for the selection of the appropriate piece. For the child, visual transport is a prerequisite for dealing cognitively rather than motorically with problems.

7. EMPHASISING INVARIANT ASPECTS OF THE TASK.

Emphasising invariant aspects of the task refers to a moment in the instructional process when the task requires "perceiving the variation in given attributes as irrelevant to the identity of the object or by conceiving of the variation

as being produced by a transformation ..." (Feuerstein, 1980 p.85). In the execution of tasks in the present study, the fitting of a block (cylindrical, square and triangular) onto sticks of different shapes (triangular, square, and rectangular) necessitates an understanding of invariance across transformations. If blocks are viewed in a single dimension such that only the front facade is taken into account, problems may be experienced in selecting and placing particular pieces onto appropriate sticks. Because the pieces need to be orientated in the direction displayed on the model, and the internal shape of the block and shape of the stick constrain any movement of a block already placed on the stick, focusing on invariant attributes is important. If the instructional process does not highlight the salience of the invariant aspects of the task materials, the child may experience considerable difficulty. This is illustrated in table 15.

 TABLE 15 : DIFFICULTIES WITH INVARIANCE.

(During the execution of task 3, after the sticks have been placed, the mother attempts to force the incorrect block onto a stick. She removes it and continues as follows:)

MOTHER

Now fit this one, fit this one, do you see.
 (Points to piece on table)
 (Watches child)

(Takes over adjusting)
 (Tries to force incorrect piece onto stick)
 (Removes block)

It means that this one is not for there.
 (Stands up, matches stick against stick in model.
 Searches through sticks on table, comparing each with the one in hand)
 (Turns stick around in hand and replaces in child's template)
 There it is.

CHILD

(Watches mother's actions)

(Takes block, inspects internal dimensions and attempts to place it)
 (Adjusts piece)
 (Watches with hand in mid air)

(Watches)

The mother in the above example twice attempts to force an incorrect block onto a stick. The mother needs to stand up to view the shape of the stick from above in order to reduce distortion through transformation. The child in this case is not party to the mother's (unverbalised) discovery that the shape of the sticks determines that blocks with matching internal shapes must be selected.

A mediator who is unable to solve a problem herself and who additionally fails to make explicit the problems she experiences with a task, cannot present a child with the tools to penetrate appearances and discover the underlying order or structure in a problem situation.

As a component of the instructional process, a mediating agent can reveal a world of invariants across transformations focusing on and expressing constancies of elements across variations in some of their attributes. In order to deal effectively with problem solving situations the ability to conceptualise invariances is necessary in order to understand the world of objects, not only in terms of their dimensions of width, height, and depth, but also in terms of the less concrete aspects of tasks. Conceptualising invariances and expressing this in instruction may on a less concrete level involve the manipulation of ideas about objects.

8. DEALING WITH DIFFERENT SOURCES OF INFORMATION.

In any task which involves more than one source of information for its successful completion, it is necessary to integrate and co-ordinate the different sources of information. The instructional process should highlight the different sources of information in an explicit fashion in order to allow the child to perceive and utilise the different sources of information. Furthermore, the relationships among

the various sources of information are important and successful resolution of a problem solving situation will require their integration and co-ordination. This is referred to as "dealing with different sources of information".

In table 16 below the instructional process emphasises both the child's template and the model as two sources of information. In the extract, the mother repeatedly emphasises the relationship between the template and the model in order to get the child to use both sources of information.

TABLE 16 : DEALING WITH DIFFERENT SOURCES OF INFORMATION.

(During task 1 the mother directs the child's attention both to model and template to ensure efficient piece selection and placement. The instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Get it close to you (Moves child's template close to child on table) (Checks model)	(Picks up a piece from the table and fits it in his own template)
Uh uh, this one is not supposed to be fitted there. (Looks at model)	(Removes piece)
It's fitted in there. (Points at model)	(Looks at own template)
Look there, look look look at this car. Isn't this car the same as that one? (Points at model, then moves model across and positions it directly above child's template)	(Looks at model and reaches towards model)

continues ...

(Gestures to child's template, the model and then the pieces on the table)	
Then put it in the way it's been put in here.	(Picks up piece and places in the window space of the template)
Put in and look here and see if it looks alike. Do you see?	(Adjusting piece)
(Watches child's activities)	
Yes, turn it round again, (Watches)	(Correctly places piece)
Yes, there it is.	
You see that this car is loaded and look at this one.	(Watches mother's actions and then picks up a piece and shows to mother)
See where it is put, and put it exactly as it has been put here, so that it's the same as this one.	
(Indicates the "load" on the model)	
Uh huh.	(Holds piece in mid air)
Uh huh.	Should I put it in?

In dealing with different sources of information (the model and child's template in this case) the mother directs the child's attention to the necessity of integrating and co-ordinating cues from different sources. The extract starts with the mother checking the position of the child's template to make this source of information easily accessible. She then repeatedly points to the model and the cues to be gained from this source ("Look there, look, look, look at this car"), and stresses the purpose of the comparison between model and template ("Isn't this car the same as that one?").

In the following extract, the instructional process is directed at the different attributes of a piece (different sources of information) which are relevant in the selection of correct pieces. Two sticks have already been placed and the instructions are directed at the selection and placement of the third stick, and after this the first block. This is illustrated in table 17.

TABLE 17 : ILLUSTRATING RELATIONSHIPS.

(During task 3 the mother first emphasises the attributes of a stick to be selected and placed, and then goes on to direct the child to the selection of an appropriate block. The instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
We are now going to choose this one. Do you see how this one is shaped? (Points to model, looks at child)	(Watching mother's action and nods)
This one is like this. It has a longer side. (Points to rectangular stick on model) Now choose it from among these sticks. (Points bundle of sticks at child)	(Looks at mother's actions and nods)
Yaa (Checking child's action)	(Chooses stick and places it)
Do you see the sharp hole? (Points at top of stick and looks at child) You should now find a red block with a sharp hole (Indicates model and pieces on table).	(Looks and nods)

The mother illustrates the relationship between different sources of information - the shape of the stick, and the model in relation to the loose sticks in her hand. When she directs the child's attention to the selection of a red block with a triangular hole she points to the shape of the stick and emphasises this in relation to the colour of a hole in the block ("You should now find a red block with a sharp hole").

Furthermore, she uses verbal labels which the child can understand ("... it has a longer side", rather than rectangular shape and "sharp" rather than triangle block). The emphasis of her instructions is, however, to a large degree on non-verbal illustrations rather than verbal labels to express relationships.

The instructional process illustrated below in table 18 is an example of an inadequate expression of relationships. The mother uses gestures to illustrate how to fit two triangular pieces together to make a square and this seems to create confusion in the child. The child's question, "How is it?", and her unsuccessful attempts to interpret the gestures indicate an instructional process which does not express relationships adequately.

TABLE 18 : EXPRESSING RELATIONSHIPS.

(During task 2 the mother attempts to convey the relationship between two triangular pieces which make up a square in the corner of the cargo section. She instructs the child as follows:)

MOTHER

Take that green one.
(Indicates piece on table with head movement)
No take that green one.
(Points to appropriate piece)
(Nods at model)
No take that green one. That black one.
(Points to piece on table)
Take out that green one.
Make it sharp at the corner.
(Watches child's actions)
Put that one correctly then make that one sharp, not like that.
(Watches child's actions)

Put it in like this.
(Demonstrates an oblique line with right hand on table)
Yes like this car
(Points at model)
You want to know how to put it, uh, huh, put it in then and make it look like in this car.
(Goes to adjust piece in child's template)
This should be in the corner.
It should be in the corner like this. Do you see?

CHILD

(Picks up green piece and places it in template)
(Removes green piece and picks up indicated black piece and places it)
(Looks at model)
(Adjusts piece in template)
Where?
(Picks up black piece in template, show to mother)
Adjusts black piece in Template while holding the green piece in free hand)
(Continues adjusting piece)
But how then?

(Watches mother's actions)
(Points at model and looks at model)
Here?
(Looks at model)
How is it?
(Watches mother's actions)

The above extract contains a number of illustrations of problems with expressing relationships. In order to fit the green and black triangular pieces together so that they make up a square, the mother at first directs the child in a confusing way to both pieces ("No take that green one. That black one"), then says, "Make it sharp at the corner" in an attempt to get the child to fit them together. The gestures the mother resorts to after failed verbal instructions are also unsuccessful.

In the case of one mother-child dyad, the mother expresses the relationship between the two triangular pieces which make up a square by saying "fit the two long sides together". In this way the child was easily able to understand what was required. The problems experienced by the mother in the above extract (table 18) could have been solved in a similar way.

In the tasks used in the present study the various sources of information are the model, the pieces on the table, the child's template, the instructions, the research assistant, and the mother and child. Depending on the specific stage of execution, certain of these sources of information become more salient. The mothers typically use the model as a reference point for themselves in order to direct the child either verbally, non-verbally, or both, in the selection and placement of specific pieces. For the child, the pieces on the table, his/her own copy and primarily

the mother's directives, are most often used as sources of information. This is illustrated in table 19 below.

TABLE 19 : VARIOUS SOURCES OF INFORMATION.

(During the execution of task 3, the mother directs the child to the final stick to be placed before focusing on the blocks. The instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
(Looks back and forth from model to pieces on table)	(Looks at pieces on table)
Again take this one and put it in there.	
(Points to stick on table)	(Picks up stick)
And put it in there.	
(Points to appropriate hole on template)	(Places incorrectly)
Here put it in here.	(Replaces stick correctly)
(Points again to correct hole)	(Reaches for piece on table)
(Restrains hand)	(Looks at pieces on table)
Wait	(Watches)
(Looks at model then at child's template)	(Watches)
Take this one and put it in there.	
(Points to pieces on table, glances at model, points to appropriate position in template)	
(Restrains hand and looks at model)	(Picks up piece and attempts to place it)
Yaa	This one?
	(Places piece)

In this extract the mother uses the model as a point of reference for herself, and the child uses the mother's directives as a source of information. The child in the absence of adequate instruction, and without using the model

as a source of information, often fails to select the appropriate piece.

Dealing with different sources of information as a moment in the instructional process requires that the participants integrate various sources of information in order to solve the problem at hand. A child equipped to deal with different sources of information will relate bits of information, and different tasks to each other, and specific tasks to more general principles.

9. DISCOVERING CAUSAL RELATIONSHIPS.

In order for the participants in a problem solving situation to deal effectively with the task demands and to produce appropriate actions, an appreciation of the possible effects of actions on objects, or objects on objects, is important. This allows the participants to understand the possible consequences of actions and emphasises causal relationships. A child engaging in a task must be made aware of the possibility that her/his actions will have consequences and that this is an integral part of the problem solving situation. This aspect of mediation is referred to as "discovering causal relationships".

In the extract in table 20, the instructional process centres around discovering causal relationships. Notice how the mother forces the child to attend to the appropriate place

in order to find the correct information, and also how the instructions contain an "if then" conditional.

TABLE 20 : DISCOVERING CAUSAL RELATIONSHIPS.

(During task 3, after the three sticks have already been placed, the instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Look here now. Do you see how these things have been done? (Points at model)	(Looks at model)
Now take the drum. (Points at piece on model)	(Picks up piece and measures it against the stick and puts it down)
Start. Look, look here, look here, we are starting with this one, we are starting with this one. Now look which one fits in here. (Watches actions of the child)	(Looks at model, picks up piece from table) Is it this one?
Yes. Start with this one. (Taps appropriate stick on model and watches child's actions)	(Fits piece onto indicated stick)

(Further on in the instructional process the mother gives an "if then" conditional as follows:)	
Don't touch it or else it will move. (Watches actions)	(Continues to adjust block onto incorrect stick)
Does that one fit? Do not force it if it does not fit. (Watches actions of child)	Does it fit? (Removes piece)

The opposite of discovering causal relationships may be regarded as trial-and-error or random behaviour. An

instructional process that fails to mediate the essential features of the task to the child may encourage random activity on the part of the child. In the following extract the child appears to engage in activity independently of the instruction. This is illustrated in table 21 below.

TABLE 21 : RANDOM ACTIVITY.

(During tasks the mother directs her instructions at the selection and placement of cargo pieces as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Put it in, put it up there (Looks at model) Uh huh, good	(Fiddles with piece in template) (Picks up and places two more pieces)
Take another one now. (Looks back and forth from model to template) Yaa (Watches child's actions) Now fit that one in the hole, fit in the hole, that one Muntu. There, no no not there in the hole. Fit in the hole, yaa. (Watches)	(Picks up another piece and holds in mid air) This one? (Places piece on template) (Pushes line of cargo pieces across template)
Push it now, push it so it gets into the hole push that one. Push the one like this, push the one like this. Do you see, push it. (Points to model) (Restrains child and indicates template with head movement)	(Goes to take piece from model) (Pushes entire template) (Hammers pieces in model with flat hand)

The extract in table 21 illustrates a mother and child both apparently engaged in a task. However, their activities are out of phase with each other's, with the mother's constant verbalisations seemingly unable to direct the child's actions successfully. In fact the child takes certain directives "literally", ("Push it now, push it so it gets into the hole push that one") and responds by pushing the entire template. The lack of adequate instructions must create a situation in which a child who is eager to engage in the task will engage in random activity as illustrated in table 21.

Discovering causal relationships involves the active engagement of the participants. In table 22 below, the mother seems to discourage initiative in the child. This may inhibit the discovery of causal relationships. Notice how the mother tends to execute the placement of pieces herself while providing what may be regarded as "pseudo instructions".

 TABLE 22 : DISCOURAGING INITIATIVE.

(In the execution of task 3 the mother is engaged in the placement of the final stick before the selection and placement of appropriate blocks. The instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Now fit in the stick. (Fits the stick into child's template)	(Watches)
And then search here and then look for one like this (Looks for piece on the table, checks model and returns to search table)	(Watches)
And put it in here. (Goes to place piece on stick)	
Wait, wait, wait (Looks at model and retrieves piece from child)	(Attempts to take piece out of mother's hand)
Yaa, wait no wait (Takes block from child again and goes to place on stick)	(Takes piece and attempts to place on stick) (Removes block from stick)
Yaa.	(Attempts to engage)
Wait, now wait (Restrains child's actions)	(Reaches for piece on table)
We put it in here, which should fit in here, do you see this one, do you see, put it in there (Points to appropriate block, to model and to child's stick)	May I put it in?
(Inspects placed piece glances at model)	(Picks up piece and places it) (Independently picks up new piece)
Then fit it in like this (Watches)	(Looks at model)
Yaa.	(Places piece)

The instructional process illustrated in table 22 seems to discourage initiative in the child. Not only does the

mother select and place most pieces herself but she actually restrains the child - either physically or verbally ("Wait, now wait").

Discovering causal relationships as a moment in the instructional process engages the child in the process of problem solving, and emphasises the need to consider acts and objects, and acts on objects, in terms of causal relationships. A child equipped with the means to discover causal relationships is able to appreciate his/her active role in the production of effects and consequences.

10. CO-ORDINATION AND INTEGRATION.

As a mediational operator co-ordination and integration refers to any act which emphasises the synthesis between various bits of information and the order inherent in the task as a whole. This is illustrated by way of examples below.

Co-ordination and integration may, however, also be regarded as a "super-ordinate" aspect of the total instructional process of which the ten mediational operators are all necessary components. Co-ordination and integration as a super-ordinate aspect of instruction or the successful outcome of the application of the mediational operators, are not addressed here but refer to Piaget's notions of assimilation and accommodation as aspects of adaptation. This again is implicit in Feuerstein's notion that adequate

mediated learning experience will be a major force in the development of efficient independent problem solving.

A short extract from the instructional process is used, in table 23, to illustrate the synthesis between a bit of information and the task as a whole. In the example this synthesis is achieved by naming a small piece of the puzzle (headlights/torch) and the puzzle as a whole (car).

TABLE 23 : AN ACT OF SYNTHESIS.

(Task 1 commences with the placement of the body of the truck. The instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
Put it in nicely and make it lean against here. Fit it and make it lean against here. Fit it on like in the car. (Taps the model)	(Watches the mother's action and looks at template)
Do you see where the headlights are? (Points at headlights on model)	(Glances at model, nods, looks at template and adjusts piece)
Fit in the torch like this side. (Points at model)	(Looks back and forth between model and template).

Notice that in the above extract it is not the verbal labels as such ("car", "headlight", "torch") that provide the synthesis but the manner in which the verbal labels integrate particular aspects of the task with the task as a whole, and locate the task within the broader experience of the child.

By imposing order on the materials, the mother in the next extract allows the child to appreciate the order inherent in the task structure. This is illustrated in table 24 below.

TABLE 24 : IMPOSING ORDER ON THE TASK.

(During the execution of task 3 the mother directs the child to the correct placement of the last stick before commencing with the selection of appropriate blocks. The instructional process proceeds as follows:)

MOTHER

Lets fit it here. Do you see the hole I'm pointing at? We will put it in there. Put it in there, put in in.
(Points at appropriate position on model)

Here in this hole, this one. Do you see the hole I'm pointing at? Now put it in there.
(Points at same position in template)

(Looks at model, takes all extra sticks out of reach of child)

Now we are going to fit in these things. Do you see? We are going to choose.
(Points at model and looks at child)

(Sorts pieces on table turning blocks so that holes face upwards)

CHILD

(Tentatively places stick in wrong hole)

(Child removes piece and looks at model, nods and then places piece in correct hole)

(Child watches mother's actions)

(Looks at mother and nods)

(Watches mother's actions)

In the above extract, the instructional process emphasises the need to distinguish between various sources of information - the appropriate side of the model, the appropriate position on the template, and the hole in which the stick is to be placed. In imposing order on the task, the mother allows the child to place the piece in the correct hole. The mother also removes distracting cues from the task at hand (the extra sticks) and then proceeds to the next step in execution. She specifies the order in the process ("Now we are going to fit in these things") and then underlines this "We are going to choose"). When the mother sorts the pieces by turning the blocks so that the holes are visible she anticipates problems which may arise and imposes this order on the task.

Contrary to the two extracts above, the instructional process illustrated below in table 25 fails to alert the child to the process of comparing different bits of information in order to solve a problem. Comparison is an important aspect of co-ordination and integration because it provides the basis on which to synthesise information.

 TABLE 25 : MOTHER'S COMPARISON OF ELEMENTS.

(The mother in task 3 selects a stick for placement and proceeds to place a block on this stick. No other elements has been placed. The instructional process proceeds as follows:)

<u>MOTHER</u>	<u>CHILD</u>
(Picks up different sticks and checks their shape, chooses a stick)	(Tries to grab stick from mother)
(Takes stick from child, glances at model and places it)	(Looks at pieces on table and picks one up)
(Looks at model and takes piece away from child)	(Watches)
Do you see? Look for one like this one.	
(Picks up piece and places it)	(Tries to take piece from mother)
Wait, wait, wait, wait.	
You don't know what you are doing.	
(Restrains child and tries to force incorrect block onto stick)	(Goes to take piece again)
(Removes block and stick and searches through sticks on table again, inspecting their internal dimension)	(Watches mother's actions)
(Replaces the stick)	
(Hands a block to child)	

The mother experiences difficulty selecting an appropriate stick and attempts to order the materials for herself.

The child's eagerness to engage in the task is not utilised and the possibility of allowing the child to appreciate the relationship between a stick with a specific shape and a coloured block with both an external and internal

shape, is lost. Furthermore, the workings of the mother's mind remain obscure to the child if s/he is prevented from participating in the mother's actions and the mother is silent about either the process of, or her conclusions from, her comparison of various elements of the task.

Co-ordination and integration as a moment in the instructional process achieves a synthesis between the various elements of a task, or bits of information, or different tasks. In this synthesis, different elements are ordered. A child who is able to co-ordinate and integrate information is equipped with an essential tool for efficient independent problem solving.

AN IDEAL INSTRUCTIONAL PROCESS.

The mediational operators described and illustrated above are regarded as "ideal" components in an "ideal" instructional process. This does not mean that such ideal components or a process are empirical realities of the "western" world. What is suggested, however, is that given school-like tasks and the apparent demands of a task with a culturally autogenous development in terms of western culture such as the target tasks of this study, certain components of the instructional process seem crucial. The components discussed above are therefore presented as important in an instructional process aimed at the development of efficient autonomous problem solving skills in children.

The fact that certain mediational operators are illustrated by way of emphasising their non-occurrence or inadequate expression must be seen as a deliberate and necessary aspect of the methodology adopted. In this sense, the reader is reminded of the example of the Afrikaans speaker using a double negative (p. 124). In observing people who are not part of a specific historical tradition engaged in tasks which are part of that tradition, the scientist must confront, and attempt to make explicit, the rules and forms which are embedded in that task and the social forms surrounding it.

The social actors included in this project were deliberately chosen because it is reasonable to expect that they may have difficulties with the kind of instruction required by the target tasks. The fact however, that they also provided illustrations for adequate to good expression of the mediational operators provides data from which to conclude that these mothers are able to "decipher" the demands of these unfamiliar tasks.

The notion of a chain-of-change represented by the mothers' rules for being, their taken-for-granted ways of doing tasks, ideal ways of doing tasks, and expert formulations of psychological development, is discussed in detail in chapter 10.

NOTES : CHAPTER 9

1. The other data sources were the theories reviewed in chapters 2 and 3 and the empirical data reported in the present chapter. For a general discussion of the methodological principles adhered to in the analysis of the data see chapters 5 and 8.

THE PROJECT CONCLUDED.

10. Moments of change.
11. The generative mechanisms for change.
12. Conclusion.

"Tracing the rise of modern conceptions of the individual, it is clear that, given the broad cultural history of mankind, we are idiosyncratic. Given the anthropological task of writing about human nature, a starting point must be that our self knowledge, the very terms in which we picture ourselves, may be very odd; of necessity the knowledge we formulate about "the other" is bound to be refracted through the knowledge we have built to define ourselves" (Crick, 1982 p.293).

SECTION OVERVIEW.

In this final section of the report the aim is to emphasise the formulation of the generative mechanisms for change in terms of the theories addressed and the data obtained. In chapter 10 of this section, an account of the possibility of change is discussed with reference to the data contained in each moment in the suggested chain-of-change. In chapter 11 the generative mechanisms for change are presented in terms of the problem of solving the unfamiliar demands of tasks. The concluding chapter highlights the necessary principles of a socio-psychological theory of change.

The data contained in each moment in the chain-of-change presented in chapter 5 above, refer to three possible sources of information from which to construct a theoretical model of how people achieve a resolution between familiar tasks and associated knowledge, and unfamiliar tasks and whatever they may entail. The three sources of information are in the present project concerned with social actors' rules for being, their engagement in tasks, and the expert theories of psychological development discussed in chapter 3. From these sources of information two further data bases were extracted, namely, an indigenous theory of childhood and mediational operators. Together these two data bases comprise the foundation on which to construct a socio-psychological theory of change.

In chapter 11, the generative mechanisms for change are discussed in terms of the exchange system created between two participants engaged in a task. The central idea that "culture" in the act of transmission provides the "newcomer" with ready-made solutions is elaborated. This idea revolves around the assumption that whatever may be regarded as intrinsic to a system (social or individual - knowledge or schemes and structures) must confront and be confronted by, whatever may be regarded as extrinsic to the system. Both what is intrinsic and what is extrinsic to the system together constitute the developmental trajectories which could be characterised as the processes of socialising the individual mind and reproducing, and/or transforming, any particular society.

The concluding chapter of this report discusses some desirable extensions of the present project. The suggested future research is aimed at elaborating the proposed mediational operators and reversing the analytical focus of the data contained in the chain-of-change. The latter suggestion is concerned with the assessment of the methodology used and focuses on the dual directionality of exchange possible when two systems are in transaction. Furthermore, the report is concluded with suggestions for principles to consider in the formulation of a socio-psychological theory of change.

10. : MOMENTS OF CHANGE.

The indigenous theory of childhood and the mediational operators are both necessary for an account of the possibility of change. The process of change is captured in social actors' confrontation with culturally autogenous activities. In the analysis of this process the researcher confronts the issue of the necessary conditions for change. The necessary conditions for change emphasise both intrinsic and extrinsic generative mechanisms which produce dual-directional exchange when two systems are in transaction.

INTRODUCTION.

The results presented in the previous section may be summarised as a likely indigenous theory, given the mothers' replies to various questions, and possible mediational operators, given the nature of the target tasks and their imbeddedness in 'western' ideas and ideals. 'Likely' and 'possible' are stressed to indicate the fact that these two data bases were derived and are therefore of a different order than the actual replies to questions or actions displayed during task execution.

The indigenous theory of childhood is a conceptualisation of what may "animate" (cf. Harrè and Secord, 1972) the mothers in their expressions of the role of childrearer. The mothers in fulfilling their role of childrearer are sometimes faced with what may be perhaps sometimes conflicting aims of rearing their children to be competent members of their culture (whatever this may mean to them), and competent members of western society (whatever this may entail). This situation provides a unique opportunity for investigating the emergence of new competences and new childrearing ideologies. Such new desires, beliefs and actions as may be unfolding are not only of interest in themselves. They are also of interest as they provide an empirical basis for the reconstruction of the generative mechanisms for change.

The indigenous theory of childhood is an attempt to describe what may be involved for these mothers in rearing their children to be competent members of the world as they interpret it: a view of the world which is probably rooted in their own cultural tradition and aimed at successful participation in those aspects of western culture that they, for whatever reasons find compelling.

The mediational operators are those aspects of the instructional process which seem to be demanded by the tasks if the aim is the development of efficient autonomous problem solving skills in the children. The tasks were selected on

the basis of their likely embodiment of the kind of learning required in formal western schooling. Formal schooling seems to be a central or defining feature of western society. The target tasks, the focus on schooling, and the social actors included in this project are all essential elements in investigating change through juxtaposing existing knowledge about a known reality with the unfamiliar tasks of an unknown reality. This is not only the developmental method's basic demand but also a crucial methodological move for the reconstruction of the generative mechanisms for change.

If people can engage in unfamiliar tasks at all, and if they can resolve the unfamiliarity, then surely there is evidence for certain psychological and/or social mechanisms responsible for the production of this adaptation.

In the present chapter the moments of change in the process of resolving unfamiliarity are discussed in terms of the results presented above.

AN ACCOUNT OF THE POSSIBILITY OF CHANGE

The four analytical moments discussed above (see p. 121) could be depicted as a likely chain-of-change. In terms of the data reported above in chapters 7 and 9, this chain-of-change may be understood as follows:

1. Mothers have desires, beliefs, and actions regarding children which can be conceptualised as their "rules for being"¹.

2. The fact that mother-child dyads are able to engage in an unfamiliar² activity is understandable and may be critically described in terms of their "rules for being".
3. The instructional process which obtains between mother and child can be interpreted as the instantiation of various mediational operators³.
4. Expert formulations of cognitive development, such as the theories discussed in chapter 3, are a source of abstracted or ideal "rules for being" that are imbedded in the historical development of western society.

The chain-of-change described by these four moments in the analysis of the data must be seen in terms of a developmental perspective (cf. Vygotsky, 1978). Moreover, these four moments in the chain-of-change are used to fashion (cf. Geertz, 1973) within a rational reconstructive paradigm the indigenous theory of childhood, and the mediational operators. Both data bases reveal the possibility of change. Again, the use of rational reconstruction must be seen as a way in to the discovery of generative mechanisms which are not immediately accessible to an observer. In this process the scientist has to use some means towards a disciplined exercise of the imagination (cf. Harré and Secord, 1972, and Bhaskar, 1979). In the present project this is achieved by using the data to constrain the imagination in constructing an

explanation of the generative mechanisms that produce the activities embodied in the four moments depicted in the chain-of-change.

Before addressing the generative mechanisms for change, the results presented in chapters 7 and 9 are discussed in terms of the process of resolving unfamiliarity.

The mothers included in the present investigation fulfil their roles as childrearsers with 'know-how' which has developed through their own cultural past to a present in which they are newcomers to western society. Their entry into this constructed reality brings them into contact with social forms with which they are not familiar. The case of the mothers' desire for their children to complete as much formal western schooling as possible is particularly illuminating. They desire entry into, and successful participation in, this institution yet have not incorporated into their childrearing a concordant support system in order to achieve this goal. For example, preparing pre-school children for school by teaching them school related tasks, or helping school children with homework, or encouraging verbal interaction, do not emerge as powerful forces in the indigenous theory of childhood.

It seems that in some cases the intruding culture, or the new social forms that confront people, provide actors with goals, but without the accompanying beliefs, desires, and

actions that would render acquisition of these goals immediately accessible. Furthermore, judging from the mothers' regulation of their children during the problem solving situation, they seem to have goals different from those required by the formal school system out of which puzzle tasks of this nature emerge. To be sure, the puzzle-like tasks included in the study are unfamiliar tasks to many of the mothers. Unfamiliarity, however, becomes a question rather than an answer in the very situations where it is offered as 'explanation'.

Historically speaking it might be possible to find the first set of reasons for a culturally autogenous activity such as open fires and carrying children on the back out of harm's way (cf. Le Vine, 1976). With time, however, this simply becomes 'the way things are done'. In the case of formal western schooling, children are subjected to a variety of tasks which to an outsider might appear absurd; this too, is 'the way things are done'. For the non-western mother, entry for the child into the social forms underlying formal western schooling is complicated by the fact that meanings are obscured and reasons are unintelligible because, as Vygotsky points out, outward appearances conceal the internal nature or processes that 'silently' underpin manifest performance.

Social actors are mostly unaware of the hidden curriculum of everyday tasks. The ability to locomote freely, to communicate needs, to be self sufficient, to uphold authority

relations, to preserve and use social knowledge, and to display responsibility to other members of the community - or whatever else is required for adult competence in terms of the mothers' indigenous theory of childhood - carry with them a host of opportunities for learning the skills and abilities required in that society. When the forces of change replace the goals implicit in these valued competencies in the domain of being, then these steps towards adulthood may become heavy baggage that impedes entry into the future. On the other hand, sometimes the forces of history displace traditional tasks such as agriculture, animal husbandry, weaving and beadwork. These activities are examples of competencies rarely encountered in the townships today.

The point is not that specific skills are lost but that the opportunities for learning which these tasks embody are also lost. This does not mean that a vacuum is created but it does suggest a disruption. Whichever way change affects people, altering their circumstances such that conventional patterns of behaviour become inappropriate or even impossible in terms of new goals or providing them with new goals such that conventional patterns of behaviour become devalued, it will at some point in the course of history require a break with the past. Such breaks are much like the paradigm shifts that occur in the arts and sciences.

The mothers in this investigation generally expressed beliefs like the following: a child ought to be taught to hold

the hands in a certain way when accepting something from another; a child ought to address others by their title; ought to kneel when talking to an adult and ought not to look superiors in the eye when talking to them. These beliefs may not, of course, penetrate the domain of action with the same force as expressed in beliefs. It is suggested, however, that these beliefs are an important data base from which to reconstruct the conditions for change. It may be the case that such beliefs and practices are actually antagonistic to teaching children to seek independently for information. In the problem solving situation, the children's extreme passivity and obedience seem in line with the mothers' beliefs about how a child ought to behave. Yet this behaviour does not seem to foster the acquisition of the kind of knowledge formal western schooling is designed to impart. By placing learning in the classroom, remote from life, schooling diminishes the contextual learning to which Cole (1974) and Bruner (1973) refer and which these mothers endorse with their views on teaching by example and demonstration, and learning through observation and imitation. It is important to recognise that schooling will probably be an important force in forging new conceptions of children.

Ogbu (1981) argues that "Individual parents do not invent new ways to raise their children, nor do they invent new competencies to transmit to their children" (p. 420). If this

were true, however, people would forever be locked in static mind-culture states. For social change to occur, new ways of raising children and new competencies must be transmitted, whether by individuals or other agencies.

At a superficial level the results reported above are an indication of what the mother-child dyads were or were not doing in terms of western ideals. In these terms, observing another culture perform poorly on some taken-for-granted part of western reality is as old as psychology (cf. Cole, 1974) and has led to insoluble debates about comparability and equivalence (see Triandis et al, 1980) across cultures. Mothers and children in the present study, however, were chosen specifically because it was reasonable to assume that they would have difficulties with tasks such as those included in this study. The choice was reasonable because many township people are caught in a situation of rapid social change where socio-political forces have ruptured their easy transition from the past to the future. Their past was part of a well integrated and ordered traditional Zulu culture (cf. Krige, 1977), whereas their future requires some resolution between their cultural past, their present goals, and their confrontation with western social forms.

On a less superficial level, the question addressed concerns the generative mechanisms for change. In other words, the problem to be confronted is to establish what

factors in the social or psychological domains of analysis will produce adaptation.

When evaluating the kinds of ways different groups have developed to deal with problems of survival, "all cultures have to be considered equally effective" (LCHC in Sternberg, 1982 p.710). This, of course, is not only reasonable but also the only way to evaluate different kinds of intelligence. However, ignoring the conflict between different realities is like ignoring the very basis for development. As the individual develops through the stages of resolution between the familiar and the unfamiliar, so all adaptation and survival must confront the unfamiliar in order to survive.

When evaluation of different kinds of intelligence is suspended, what remains is to explain why people are the way they are and how change is possible. Before presenting an account of how change is possible, or how the move from unfamiliarity to familiarity is possible, some attention to the necessary conditions for change is needed.

THE NECESSARY CONDITIONS FOR CHANGE

In terms of the data presented above, the question about the necessary conditions for change is concerned with the issue of 'non-western' actors' ability to become familiar with western social forms. It is concerned with Ogbu's problem regarding the invention of new ways to rear children and new competencies to transmit to children.

The necessary conditions for change must account for the possibility of agents or agencies (e.g. parents or the school) producing novel rearing techniques that also incorporate new competencies. To put this more directly, the issue of interest is how will these actors come to have an indigenous theory of childhood consistent with (but not necessarily the same as) expert theories of development if the focus is on becoming familiar with western social forms? Here, 'familiar' is used in the sense of being able to utilise and express these social forms without strain or conflict. Also, how will these mothers come to provide instruction to their children that displays the mediational operators as suggested above? Of course, once the indigenous theory is consistent with the expert theories of a society (and those which best seem to capture the essence of that society), appropriate mediational operators will follow.

It is in this sense that the empirical work undertaken in the present project may be seen as extending the possible theoretical resolution between the Piagetian and Vygotskian paradigms as elaborated in chapter 3. The data bases labelled, "the indigenous theory of childhood", and "the mediational operators" captures those sources of knowledge which may be regarded as co-existing in this society. They co-exist in the sense that when individuals engage in certain tasks or activities it is possible to understand and analyse

that engagement in terms of either of these two possible sources of knowledge. Furthermore, the social actors themselves may rely - consciously or unconsciously - on either body of knowledge in planning a task such as rearing a child or instructing a child in a task. It is also for this reason that the mothers included in this investigation are interesting. To a large degree they have still escaped the 'expert theories' of psychological development through popular magazines and the media in general. In this sense their indigenous theories of childhood may be regarded as closer to their own 'lessons from life' than western middle class mothers might be (the latter being influenced to a large degree by what the 'experts' have to say about childrearing, for example).

It is, of course, also the case that such 'expert theories' and their translation or transmission are essential elements of what it may mean to a westerner to be a competent human being. The point is, however, that the mothers included in this project act on a knowledge base in terms of childrearing which is to a large extent unformalised and not contained in 'expert' theories. It is also for this reason that the indigenous theory could not merely be obtained from literature on the subject.

The indigenous theory of childhood and the mediational operators may be regarded as two sources of data which may be

re-investigated at some future date. This re-investigation may then provide further evidence of the process of adaptation to unfamiliarity. If the transforming force of township culture has had any effect on the process of instruction, this may be evident in the theories advanced to account for development. In this way another set of changes in what may be regarded as mediational operators, or aspects of an ideal instructional process, will be apparent. In addition, if the mothers included, or others like them, show evidence of changes in their indigenous theories of childhood more consistent with western theories of development, one may regard this as an indication of the force of western ideas and ideals on mothers' conceptions of what it means to be a competent individual.

Throughout the project the force of western social forms and culturally autogenous activities (embedded in western culture) has been emphasised. This emphasis describes one possible direction of change within the chain-of-change conception elaborated above. In a society such as contemporary South Africa, however, it is not only of theoretical importance to consider the possibility of another direction of change, but also a firm practical possibility that the force of change does and will occur from township culture to western culture. This could be stated as the transforming force of township culture on western forms.

Without entering into details, art forms such as music, the plastic arts, and drama, show marked evidence of this transforming force. It is a theoretical necessity to consider the transforming force of township culture on western culture because in recognising the generative power of transaction, as expressed through the dynamics embodied in Vygotsky's notion of the zone of proximal development, and accepting the modes of connection between individual and society, as discussed above (see p. 95), dual directionality of exchange is an issue of fundamental importance. In terms of different systems in transaction, the mother and child in the study of mothers' regulation of children are an example of two transacting systems. In this case, 'system' refers to their respective psychological systems as explicated (for example) by Pascual-Leone (1979). In general, psychological systems may be regarded as constituting intrinsic enabling conditions or generative mechanisms as the essence of human (individual) forms. These systems in transaction (mother and child) may be characterised as unequally weighted in terms of the child's ability to transform the adult's psychological system (cf. Wertsch in Rogoff and Wertsch, 1984). In other words, when the adult and child are in transaction, as in the study of mothers' regulation of children during problem solving, the emphasis is on the mother socialising the child into a particular world view which focuses on a specific way of

engaging in the task and a particular conception of the task (or "situation definition" in Wertsch's terms). In the process of transaction the child's own intrinsic generative mechanisms constrain the kind of mediation possible and this, in turn, may have a transforming effect on the transaction. This is discussed in detail in chapter 11 below.

When the theoretical account is removed from the particulars of the tasks included in this project and those on which Wertsch based his discussion of the zone of proximal development, it is possible to extend the analysis. The extension involves an analysis of the link between two systems in which the one system functions in a position of unfamiliarity in the sense of being regulated by another system which functions in a position of familiarity. The latter may be characterised as an 'adapted' system and the former as an 'adapting' system⁶. The adapted system may serve as a guide in a world of which the adapting system is not yet an integral part. In terms of the domain of enquiry confronted in the present project, township culture could be viewed as an adapting system vis-à-vis western social forms⁴. In this sense, the mothers included as actors do 'double duty' as socialisers of their children and as actors in the larger drama of the meeting between township culture and western culture.

This meeting between two historical traditions as individuals engage in their roles (social actors) in the mind-culture action dialectic, highlights the possibility of dual directionality of exchange in the sense that township individual and social forms may become westernised, and western individual and social forms may become 'africanised'⁵. Stated differently, the adapting system will transform the adapted system even though the latter will also socialise the adapting system. In this regard, the essence of one system (e.g. informal education as part of a traditional culture) which implies a network of individual and social forms, and formal western education as part of another heritage (also with a network of individual and social forms) may come into conflict when social actors from the one tradition engage in the demands of the other. In the present project, the analytical focus is on becoming familiar with western social forms (i.e. becoming a so-called 'expert') but the theoretical implications and aim of the project are focused on the process and possibility of change and the dual directionality of exchange between two transacting systems.

NOTES : CHAPTER 10.

1. "Rules for being" encompasses what may be the central thrust for all action.
2. The ability to engage in an unfamiliar activity is a puzzle that requires explanation. This is well illustrated in Pascual-Leone's theory regarding the 'mystery' concerning the child's ability to move from Piagetian stage to stage and in so doing confront the unfamiliar at each stage. Providing an explanation for the ability to engage in an unfamiliar activity lies at the basis for explicating the possibility of change.
3. The instructional process which obtained between the social-actors did, on the whole, conform more closely to moments 1 and 2, rather than 3. This is not only understandable given the deliberate selection of unfamiliar tasks, but is also investigated further in terms of the 'indigenous' mediational operators that could be described at moment 2 from the data used (see p. 121).

4. It is of paramount importance that it should be understood that the movement is to a position of familiarity as regards the world in which the 'adapted system' is imbedded and not to an inferior designation of people in relation to other people. In the project planned as an extension of the present research, western mothers are analysed as the 'adapting system' in relation to the (indigenous) expert, theories which are taken as the 'adapted system' (see p. 321).
5. 'Africanised' is used as a substitution for 'townshipised' partly for linguistic reasons but also to emphasise the wider political implications of one possible direction of change.
6. The terms 'adapted' and 'adapting' are meant to convey crucial moments in the process of continuous change. An adapted system is one in which there is relative congruence between system resources and external demands, while an adapting system displays various degrees of marked imbalance between internal or system capacities and external demands.

11. : GENERATIVE MECHANISMS.

The generative mechanisms for development or change are elaborated. This elaboration proceeds on the basis of the thesis that intrinsic and extrinsic generative mechanisms co-determine change. When two systems that are different in terms of their functional structures together engage in a task, an exchange system is created between the participating systems and these systems and the task. The zone of proximal development may be conceptualised as such an exchange system in which intrinsic and extrinsic generative mechanisms regulate the transaction between the participants and the task. The dynamics of the transaction are embodied in the mediational operators which impose a particular organisation on the engagement in a task. The resolution of the possible conflict between the task inherent demands and the system resources produces change. This may be termed the generative power of transaction. Moreover, the kind of output or response of the system(s) will impose a new organisation on the task and also the system(s) engaged in it, towards a process of continuous change or development.

INTRODUCTION

'What are the generative mechanisms for change or

development?' is given in the introductory chapter of this report as the central question addressed. In developing an answer to this question a resolution or co-ordination between the Piagetian and Vygotskian paradigms in the study of psychological development is suggested in chapter 3 above. This co-ordination forms the basis for the explication of the intrinsic and extrinsic generative mechanisms which are regarded as co-determining change or development. In this chapter this explication is undertaken with special reference to the exchange system created between on the one hand the two participants engaged in a task, and on the other the task and any one or both of the participants¹. Before addressing the notions of intrinsic and extrinsic generative mechanisms further, a word about 'change or development'.

So far in this report 'change' and 'development' have been used interchangeably to refer to both individual (psychological) and collective (social) processes of unfolding greater degrees of complexity or maturity. It is, however, important to clarify the relationship between these two lifelines of change in order to discuss the theoretical and empirical data in terms of the generative mechanisms for change.

The theoretical data presented in chapters 2 and 3 provide an explanatory framework which emphasises the discovery of the generative mechanisms which produce patterns

in behaviour. Such generative mechanisms are regarded in the present context as the psychological and social 'mechanisms' which produce patterns in what may be termed individual cognitive changes (which is captured in the Piagetian paradigm), and social changes (which is captured in Marx's analysis of history)². Vygotsky in addressing the social processes underlying the development of mind crosses the cleavage between cognitive and social change and presents a model of development which emphasises the historical rootedness of mind in social action and communication. The cultural guide or mediator which in Vygotsky's theory creates the interpsychological processes from which the intrapsychological processes will develop is the link between individual cognitive development and socio-historical change.

The empirical data presented in chapters 7 and 9 reflect two kinds of adaptive processes: children who adapt to whatever reality the mothers construct for and mediate to them; and mothers who have adapted to a known reality and who are also in the process of adapting to an unfamiliar reality. These different processes of adaptation may be termed individual cognitive changes as displayed by the children during the execution of the tasks under adult guidance, and also those displayed by the mothers while meeting the culturally autogenous demands of the selected tasks. At the same time other changes are also occurring that are

'extrinsic' to the individuals in the sense that they are the outcome or product of the transformations imposed by the participating individuals. These changes include re-definitions of the task, re-structuring of the instructional process, and re-interpretation of the role of teaching or teacher. The latter process of adaptation is perhaps less obvious but nevertheless an important consequence of those patterns of behaviour captured empirically. Expressed another way, in the process of engaging in an unfamiliar task, the actions of the participants that transform the unfamiliar into the familiar also transform the meaning of the task or the shared knowledge about the task on the basis of which action proceeds. The object (or task) demands engagement in terms of its own social meaning or culturally autogenous development and the actors participate in terms of their own social and psychological development. From action a dialectic emerges between actor and task, between one historical tradition and another from which a new synthesis must emerge which cuts deep into both individual and social change.

The cultural guide or mediator that Vygotsky proposes as an interface between the social and psychological is in the present case an adult who must discover the hidden curriculum of another construction of reality. When referring therefore to adapted and adapting systems it should be understood that

in terms of the social actors included in this project, the mothers are both adapted and adapting. The mothers are adapting systems in terms of the demands of western culture which for the purpose of an empirical investigation is focused on certain school-like tasks. The mothers are, however, also adapted systems as regards their positions of familiarity vis-à-vis their cultural development³. The children are adapting systems in terms of whatever construction of reality is mediated to them.

When addressing the question of the generative mechanisms for change, it should be understood that the answer will be at the intersection, or better, at the interface between social and psychological development. The link between the social and psychological has been conceptualised in chapter 4 as the mind-culture action dialectic which refers to the domain of action in which social actors fulfil their roles and engage in tasks - some familiar and others unfamiliar. The fact that people do engage in available roles and tasks and do resolve the problems of unfamiliarity is the primary empirical datum that lies behind change, both social and psychological. The problem is to go beyond a description of change and to provide an explanation of its genesis.

In confronting black urban Zulu-speaking mothers with unfamiliar tasks their roles as cultural guides in their engagement in the tasks are subjected to a strain between

taken-for-granted actions embedded in familiar problem solving situations and the demands of an unfamiliar task. As a childrearer or cultural guide in a known reality she knows a great deal of importance for the child's adaptation to that familiar world. But as someone engaged in an unfamiliar task as part of an unfamiliar historical tradition she has to 'make do' with what she knows best while attempting to adapt (herself) to the demands of the task. The mother in this situation must, through her resolution of this strain between the known and the unknown, provide the child with the learning experience necessary to adapt successfully⁴. It is in this regard that Wertsch and Feuerstein's work on explicating and/or providing a descriptive account of the zone of proximal development achieves significance. The explication of the zone of proximal development may provide a basis for understanding what must obtain in the instructional process or the process of mediation in order for the adapting system to develop efficient autonomous problem solving skills or abilities. The present project attempts to extend this basis for understanding through the presentation of the mediational operators and also goes further than Wertsch and Feuerstein in that it undertakes an explanation of the generative power of transaction.

The generative power of transaction may be seen in terms of the possibility of feedback between two systems and the

dialectic between the internal and external constraints of a system (this has been discussed in chapter 1). Both the notions of 'feedback' and 'internal and external constraints' emphasise the adaptive possibilities created through transaction. As has been stated before, change is possible through transaction but is constrained by the essential character of the system(s) or elements of the environment with which the system is in transaction. This highlights the necessity for explicating the generative mechanisms that allow for the possibility of transaction and feedback mechanisms that enable the resolution of conflict. It is to the task of explicating the generative mechanisms for change and therefore also the generative power of transaction that we turn in this chapter.

AN EXCHANGE SYSTEM BETWEEN TWO PARTICIPATING SYSTEMS

In focusing on the mother-child dyad, differences in performance of the participants may be, and often are, understood only in terms of complexity. The mother's adapted cognitive system is regarded as complex in terms of the kinds of problems that can be dealt with and also the manner in which the problem is resolved. The fact that the mother-child dyad has been used as a paradigmatic case for the investigation of change, for the reasons given above (see p. 16), should, however, not obscure the fact that

differences may exist between systems on other criteria and also that differences need not be evaluated in terms of a negative or weak pole versus a positive or strong pole. The point is that the strength or weakness of one system relative to another depends on the context or task confronted. For example, there are situations in which children's less developed cognitive resources may be better suited to a task such as acquiring language compared with adults learning foreign languages. Extending this example further, it seems reasonable to suggest that if adults take careful note of how children go about language acquisition (or how the child is socialised into a linguistic community) this may enable adults to understand better what the task involves. The importance of this discussion for the present project is to emphasise the degree of fit between system resources and the task. It was often noted in the study on mothers' regulation of children during problem solving (see chapter 9) that the children engaged in the tasks with an 'openness' which allowed the task to dictate action. In other words, the children's adapting cognitive systems were in a sense better suited to the unfamiliar tasks they encountered. The mothers had to overcome that knowledge about tasks that was 'overlearned' before they could allow the specific tasks they encountered to dictate appropriate action. This may be understood as a conflict between the mothers' adapted systems (in terms of a

known reality) and their adapting systems (in terms of the unfamiliar tasks). In this regard Wertsch's comments on situation definition are interesting. The adult may not change her definition of a familiar task when attempting to find a shared definition of the situation but will change her definition of the situation when engaged in an unfamiliar task.

When focusing on the degree of fit between task and system resources, it is also possible to conceive of situations in which the child may change the adult's definition of the situation in a permanent way as the process of engagement in an unfamiliar task will change both child and adult's definition of the situation.

When systems engage in an activity their performance will be relative to the nature of the activity. Furthermore, it is important to consider the power of the adapting system to transform the adapted system in order to do justice to the possibility of transaction stimulating both socialisation and reproduction/transformation (cf. Bhaskar, 1979) as two aspects of change. Again, language provides a good example. 'American-English', 'South African-English', or even the special flavour of fluent second language users, bear testimony to the fact of transformation from one system (English) to another (the emergent language) as a result of the resources inherent in both systems.

This is the force of the discussion in the previous chapter on the transforming effect of township culture on western culture. The tasks included in this project were intended to capture an important aspect of schooling; the ability to derive information independently of adult instruction using an external model. In the meeting of township and western cultural forms schooling is a powerful force for change. As a socialising agent schooling meets the demands of western society and may produce changes in the cultural traditions of those who participate in the formal school system. But the cultural forms that the participants bring into the school system may in turn change that system and transform the nature of its supporting roles and tasks.

The exchange system created between two transacting systems is what Vygotsky captures in his notion of the zone of proximal development. He recognises the need to explicate the zone of proximal development, a project that is addressed in Rogoff and Wertsch (1984), and that is also of central concern in the present project.

THE DYNAMICS OF THE ZONE OF PROXIMAL DEVELOPMENT

In the present project, 10 mediational operators are identified as the dynamics of the zone of proximal development. 'Dynamics' is stressed because the view is that these mediational operators constitute the workings of the

generative power of transaction as captured in the notion of the zone of proximal development. Wertsch (in Rogoff and Wertsch 1984) proposes what he calls the "mechanics of the zone of proximal development". Drawing a distinction between 'dynamics' and 'mechanics' serves to illustrate the idea inherent in using Pascual-Leone's "model for a model" of change. The idea is that there may be a functional structure for social processes analogous to the functional structure of the metasubject proposed by Pascual-Leone. It is beyond the scope of the present project to develop the idea of a functional structure for social processes. It is however important to clarify the distinction between the zone of proximal development, the generative power of transaction, and generative mechanisms.

The zone of proximal development is a zone in the sense of a region defined by some limits at each end - what the child is capable of and what the child can do with adult help. These are the boundaries or limits of the zone of proximal development in Vygotsky's terms. This is a description of the zone of proximal development in the sense in which Vygotsky uses the term 'description' - that is, of the 'outer form' of something. This notion could be explicated within the general rational reconstructive paradigm adopted by asking how this is possible, or how mediation serves to extend the child's level of functioning. In order to answer this question, the

generative power of transaction must be considered in theoretical terms that are not dependent on the particulars of the transaction⁵. In general terms, what is required is an explanation of how the generative power of transaction is possible, or, in other words, an explanation of the dynamics that regulate the transacting systems that co-determine change in the zone of proximal development. In order to unravel a possible answer to this question it is necessary to consider the resolution of the unfamiliar in terms of both intrinsic generative mechanisms and extrinsic generative mechanisms. In this regard, Pascual-Leone's neo-Piagetian theory addresses explicitly the first, whereas Vygotsky's theory presents the possibility for unravelling the second. The task is therefore to provide a theoretical basis for explicating the generative power of transaction in terms of both intrinsic and extrinsic generative mechanisms. In order to make this clearer, consider the manner in which a system could confront a problem. It could do so in a non-conflicting or conflicting manner in terms of the discrepancy or similarity between the problem and system resources. Each of these is discussed separately.

Non-conflicting confrontation between problem and system-resources.

An unfamiliar problem may be confronted without attempting to resolve the unfamiliarity but by attempting

to change the task or problem in order to make it consistent with existing schemes, habits, knowledge or system resources. This can be illustrated by assuming that the mothers were treating the puzzle-like tasks as if they were beadwork tasks (or some other familiar task) and proceeding with their execution as they would if they were performing a familiar task. Treating a task or problem in a non-conflicting way could also be illustrated by referring to a pre-operational child (in Piagetian theory) treating similar water levels in two unequal containers as if the similar water levels indicated equal quantities of water.

It is in this sense that the mother or adapted system as mediator achieves importance. The "nonbalances" in the cognitive system to which Piaget refers may be produced by a mediator emphasising discrepancies between task demands and system resources which may activate the psychological mechanisms in the case of a child to achieve a higher equilibrium (cf. Piaget, 1977). If the mediator, however, presents the task in a non-conflicting manner, the nonbalances may not arise and resolution may, in some way, be impeded. It is in this sense that Feuerstein's work has significance in that it describes the results of a lack of mediated learning experience.

Conflicting confrontation between problem and system resources.

An unfamiliar problem or task may also be confronted by attempting to highlight and resolve the conflict between the demands of the task and the system's understanding of the task. In this case the role of the mediator may be that of presenting the elements of a task in a conflicting way in order to emphasise the discrepancies between the task and its demands in terms of its own socio-historical development, and the system resources (schemes/structures/knowledge) for dealing with the task.

An unfamiliar problem may thus be confronted through exercising the system resources in order to resolve the unfamiliarity. This may be illustrated by referring to the Piagetian explanation of change in which the role of mediator is not addressed. In this regard a resolution of unfamiliarity may be either a novel response (i.e. involving the re-combination of existing schemes in a new way), as is emphasised in Piaget's theoretical account of change, or a truly novel response (i.e. when the scheme system transcends its own schemes "serendipitously" through the exercise of the silent resources) as is elaborated by Pascual-Leone. A uniquely truly novel response to the conflict between task demands and system resources also may occur as was discussed previously (in chapter 3).

In the present project the source of experiencing a problem in either a conflicting or non-conflicting way is addressed⁶ in terms of the role of a mediator who presents tasks in a conflicting or non-conflicting way. The role of the mediator may be somewhat different, in each of the two possible ways of resolving unfamiliarity, that is, in either a conflicting or non-conflicting way. These two major ways of resolving problem situations may be understood in terms of 'moments of resolving unfamiliarity'. A task or problem may be unfamiliar in the following senses:

1. It has never been confronted but could be dealt with by changing the task-inherent structure to become consistent with existing schemes/knowledge.
2. It has never been confronted but could be resolved through recombining existing schemes/knowledge in a novel application.
3. It has never been confronted but could be resolved through the creative force of the silent operators in a truly novel or uniquely truly novel application.

In the case of the adult-child problem solving dyad, the "level at which intersubjectivity is to be established" (Wertsch in Rogoff et al, 1984 p.14) could be characterised by reference to these three moments of unfamiliarity.

The problem in the case of a mediator who may be regarded as both an adapted and an adapting system is, however, more complex. The level at which intersubjectivity is to be established will not be determined solely through the discrepancies between the adult and child's understanding of the task. In other words, when the mediator must also adapt to the demands of the task she may be in a position of a dual 'learner-teacher'. She 'learns' from the task through her own actions (much as Piaget describes the construction of knowledge in the case of a child learning through action), and 'teaches' from a position of familiarity vis-à-vis familiar tasks. In other words, the mothers (as examples of individual cognitive systems) may not have encountered puzzles of this nature before but may have, for instance, threaded beads so that they now treat the situation as they would a 'bead-threading situation'. This is an example of a moment 1 resolution of unfamiliarity. The child who has not encountered either a bead-threading situation or the puzzle-like tasks is then exposed to an inadequate mediated learning situation: inadequate in terms of the task inherent demands. But as has been stated in the introduction to this chapter, the child will adapt to that reality to which s/he is exposed.

In moments 2 and 3 above the mother and child confront an unfamiliar task but are made aware of the necessity to adapt

to the task-inherent demands. Moments 2 and 3 respectively refer to two levels of adaptation where the task is solved through either a novel response (involving the re-combination of existing schemes in a new way), or a truly novel response (where the scheme system transcends its own schemes towards adaptation) or a uniquely truly novel response (where the resolution may change existing social forms).

The issue of how a system is made aware of the discrepancies between existing schemes, knowledge, or known actions and the demands of a task is the crucial one. It refers to what is here termed the generative power of transaction and it is important to understand this transaction as possible both between people and people, and people and objects. Expressed another way, the task or object or problem solving situation dictates its own resolution and thereby provides the basis for change through action on it. This transaction between object and person is, of course, central to Piaget's theory of cognitive development. The transaction between object and person may be characterised as the basis for the development of the object-in-action or mind (see chapter 3). The transaction between people is emphasised by Vygotsky for whom change or development is primarily a function of interpsychological processes. A mediator who functions as an adapted system can convey to the child or adapting system knowledge of the object-in-society. But, when

the mediator is also an adapting system in terms of an unfamiliar task, what she cannot convey is the culturally autogenous development of the object as an object-in-society. It is in this latter regard that the empirical data presented above are interesting. What was most apparent is that the task is construed or understood differently by the mothers and the researchers. Of course the difference is not in gross terms such as placing the pieces in appropriate positions but in the hidden curriculum of the broader meaning of the task as a microcosm of school learning. The indigenous theory of childhood did, however, provide us with some ideas about the mothers' hidden curriculum or the network of meanings within which they contextualised the tasks.

In terms of the data presented in the study of mothers' regulation of children reported above, the mothers rarely demanded resolution of the kind described in moments 2 and 3. Their process of instruction kept the task primarily within non-conflicting parameters as depicted in moment 1. Because the instructional process did not delineate contradictions between the child's scheme-system and the demands of the task as a culturally autogenous object-in-society, the children were not encouraged to exercise their organismic powers to change in a manner which would promote the development of novel or truly novel schemes. In terms of Pascual-Leone's theory, a non-conflicting instructional process would promote

the learning of what he calls LC structures (content and context bound scheme structures) as opposed to LM structures (executive routines or scheme structures embodying rules or general procedures). These latter LM structures are necessary in the resolution of unfamiliarity as it is precisely these general structures that determine what is familiar or unfamiliar.

The role of a mediator in determining the course of development is also central to Wertsch's discussion of the zone of proximal development. In this regard Wertsch states the following:

His (Vygotsky's) emphasis on the interpsychological origins of intrapsychological functioning means that the potential level in the zone of proximal development cannot be conceptualised, let alone measured, solely in terms of an individual's ability. This is the force of Vygotsky's dictum that "instruction creates a zone of proximal development" (1956, p.459; emphasis added). This dictum points to the fact that, even though it is possible to characterise an individual in terms of his or her potential to enter into a certain level of interpsychological functioning, this potential guarantees almost nothing about the level of interpsychological functioning that will actually come into existence in instructional interaction (Rogoff and Wertsch, 1984 p.12).

The individual's potential may be characterised by referring to the Piagetian paradigm and the possibility of novel and/or truly novel resolution of unfamiliarity. The level of interpsychological functioning referred to in the above quotation seems to indicate the taken-for-granted

knowledge and/or action patterns developed over time in a particular cultural tradition. The mother or mediator will do what seems natural to her; that is to say she will, in the instructional process, use what she knows about the world and the task at hand. This is the impetus behind socialising children into familiar social forms or tasks. In a situation of conflict between different realities or in the meeting of different cultural traditions the tasks which will be confronted may bring their own demands or their own history of being objects-in-society. These demands may function as mediators in the sense of presenting the system (cognitive or social) with the occasion for resolving the non-balances which may arise. Although the mothers tended to present the problem in non-conflicting ways to their children there were instances in which they provided mediation of a kind that is characteristic of moments 2 and 3 in the resolution of unfamiliarity. This indicates that adaptation is certainly occurring and that as the mediators participate increasingly in the forms of western society, such as schooling, their instructional styles will adapt to meet the demands of these social forms.

The transaction between mother and child, and between western and township culture, as well as the changes that result in either or both participants provides instances of the generative power of transaction.

The above conceptualisation of adaptation through transaction emphasises both the intrinsic and extrinsic enabling conditions that together produce the dynamics of the zone of proximal development. The kind of resolution of the unfamiliar that occurs within the constraints of this zone is a function of the dynamics, that regulate the exchange generated by the transacting participants.

The 10 mediational operators suggested above are proposed as a set of ideal dynamic principles; ideal in the sense that they will promote the development of efficient independent problem solving skills. In other words, were these 10 mediational operators present in an instructional process between mother and child, they would function as the dynamics of a zone of proximal development that would produce adaptation to the tasks in terms of the meaning of the tasks within their broader cultural context. These dynamics would generate sufficient conflict between the child's perception of the task and the task inherent demands to stimulate the intrinsic generative mechanism to construct novel and truly novel responses. The extent to which these mediational operators served to regulate the instructional process between the mothers and children in the present study is an index of the occurrence of novel and truly novel resolutions to the tasks.

When a specific group of people such as the mothers in this investigation is caught in a period of rapid social change, they themselves may not be able to transcend the chasm between their individual or social scheme-systems⁷ and the actions and understanding demanded by unfamiliar tasks. The mediating role in this case must therefore be fulfilled by agencies or agent(s) outside their scheme-systems (actors such as teachers, or agencies such as formal western schooling or objects such as the puzzle-like tasks, for example). In other words, to change and overcome the unfamiliar in a manner which could be designated as novel, truly novel or uniquely truly novel, a group in a period of transition must become aware of the conflict between existing schemes, habits, or knowledge and those demanded by new problems. To unlock a state of being towards becoming, the social actor or social group needs a link with the new (such as schooling) which creates the parameters for change. The link that mediates between systems provides a trigger for the mutual interaction of the intrinsic and extrinsic generative mechanisms.

In Pascual-Leone's (1979) model of the functional structure of the metasubject the path of stimuli from input to eventual output is described solely in terms of the functioning of various functional structures (silent and subjective operators). The suggestion here is that this explains the possibility of individual development but ignores

the generative power of transaction. Where this is concerned the thesis is that intrinsic and extrinsic enabling conditions co-determine the production of novel, truly novel and uniquely truly novel responses.

The mediating agent (or agency) organises the world of stimuli or the universe of contact. This organisation imposed at the input level may predetermine the kind of output because it allows the system contact with a specific set of stimuli rather than conceiving of the input as important only in terms of the "psychophysical properties of the stimulus" (Pascual-Leone, 1979 p.20). Furthermore, the kind of mediation provided will determine, at certain choice points, the kind of schemes, in the repertoire of schemes of the metasubject, which will be activated. The mediation will in effect contribute to the determination of the "path" (Ibid, 1979 p.30) of activation, and the silent operator(s) engaged. These choice points are the input (as has been discussed), the schemes which are activated, and thus the schemes boosted for the final output (cf. Pascual-Leone, 1979).

In the case of intrinsic generative mechanisms operating on pre-existing social forms (the case of transformation), the world of stimuli could be transformed in any of the 3 moments of resolving unfamiliarity discussed above. In this case the co-determining effect of the intrinsic and extrinsic generative mechanisms requires explication in the same manner as is undertaken here in terms of the path of stimuli through

the intrinsic generative mechanisms. This is not discussed in the present project but is seen as an important aspect of the future research that is planned as an extension of it.

It is therefore possible to suggest that the one direction of change (socialisation) may be explained by the force of the extrinsic generative mechanisms on intrinsic generative mechanisms through the process of mediation, and the other direction of change (transformation) by the force of the intrinsic generative mechanisms on extrinsic generative mechanisms through the process of acting on pre-existing social forms. Both socialisation and transformation constitute the generative power of transaction and each may be considered a moment in the continuous process of change.

A PROCESS OF CONTINUOUS CHANGE

In the present project the central idea about change is that it is continuous because incomplete socialisation leads to transformation, which can also only be incomplete, and so on, towards the infinite spiral of mind, and society, and mind in society. Whatever the internal mechanics of a system - the neo-Piagetian explication of the metasubject is taken as a model of such internal mechanics - they will respond to changes produced from without but within limits imposed by their own functional structure. What this means is that a system will only change within the constraints of the essence of that system, and that a system will produce changes only to

the extent possible given certain external constraints. In terms of the individual this means that the mind or psychological resources (individual forms) can be socialised only to the degree possible given the essence of the individual or the nature of individual forms. The individual, in turn with his/her individual forms can transform a situation only within the limits imposed by external forms. It is in this sense that socialisation and transformation must always be incomplete at any given moment, and therefore continuous.

The generative power of transaction produces change or development within the boundaries imposed by sets of intrinsic and extrinsic constraints. In these terms the zone of proximal development as a region defined by some limits at each end may be understood as defining a dynamic interface between mind and culture. The boundaries of the zone of proximal development may be understood as mind and culture in action. Change that is generated within the zone of proximal development is a function of both psychological and social generative mechanisms. The mind-culture action dialectic is the workshop of history where the past is transformed into the future through the generative power of transaction.

NOTES : CHAPTER 11.

- 1 'Participants' may also be understood as 'systems', that is, cognitive system in the case of individuals. 'Systems' is the preferred term for social and biological collective elements engaged in action.
- 2 As has been stated in chapter 1, Marx's analysis of history is not directly incorporated into this project. It is, however, indirectly incorporated through the theories of Vygotsky (1978) and Bhaskar (1979).
- 3 It is, of course, the case that what is here termed two positions of familiarity in terms of two cultural traditions should not be regarded as two completely separated traditions. In the mind-culture action dialectic which flows through the history of the South African society much and frequent mixing of these traditions has and still does occur. Two traditions are emphasised to indicate that in some respect the engagement of social actors in specific social forms (e.g. formal schooling) may represent a discontinuity in terms of their cultural tradition.

- 4 The task which faces all childrearsers is characterised by the problem of an unknown future. However, in periods of relative stability and therefore a slow process of social change the future is at best continuous with the social terms of the present. It is possibly for this reason that periods of rapid social change afford the scientist a unique opportunity (cf. Bhaskar, 1979): rapid social change makes the problem of solving unfamiliarity that much more acute.

- 5 The particulars of the transaction in the present case involves the selected tasks and social actors. Without focusing merely on these particulars the question addressed is how any transaction may produce change.

- 6 The source refers to someone or something which will emphasise or produce the discrepancies between system resources and the task confronted. In Piaget's model of equilibration the origin of imbalances in the cognitive system between the functions of assimilation and accommodation is not addressed (cf. Piaget, 1977). Vygotsky's model of development, however, makes the development of self-regulation the object of study and thereby specifically focuses on the source or origin of

the development of mind. See also chapter 3 for a discussion of the relationship between the Piagetian and Vygotskian model of development in this regard.

- 7 In this regard Ogbu (1981) is correct in his assertion that parents do not invent new strategies for rearing children or new competences to impart to children. What he does not recognise, however, is that "new strategies and competences" will be invented and will become part of the know-how of parents whether by the activities engaged in or agents and agencies outside their scheme or knowledge system.

12. THE PROJECT CONCLUDED.

The project is concluded with suggestions for future research. The one aspect of this involves a possible elaboration of the 10 mediational operators formulated in this project. Another aspect is concerned with reversing the (analytical) focus in the process of change investigated in this project. Both these suggestions for future research highlight the logic of discovery discussed in the preceding chapters. In conclusion three principles towards a theory of change are formulated and discussed.

INTRODUCTION

As has been stated above, a central tenet of the present project is that change or development should not have the status of a qualifying statement or an afterthought. It is now possible to reaffirm this view particularly with reference to Vygotsky's (1978) ideas. A focus on process in which a manifest phenomenon is turned back through its stages of development to its source, is not only possible but desirable if the essence of the event studied is to be revealed. This

approach is possible within a rational reconstructive paradigm as elaborated in chapter 5 and is particularly appropriate in a society in which there are shifting faces of reality. 'Shifting faces of reality' are evident to an outsider or an observer in the discrepancies between individual and social forms. These discrepancies may arise when actors from one socio-historical tradition engage in tasks or activities that are embedded in different socio-historical contexts. It is also desirable to reveal the source of change because, in a theoretical account of phenomena, it is paramount to explain rather than merely describe or even critically describe the phenomena under study. The present project pitches explanation at a generative level of analysis and focuses on the explication of those mechanisms which may be assumed to produce manifest forms or patterns in behaviour (cf. Bhaskar, 1979; Harré and Secord, 1972; and Vygotsky, 1978). Pascual-Leone's model of the functional structure of the psychological organism may be used as a model for a model in the attempt to conceptualise the workings of the extrinsic generative mechanism (his model providing a model of the intrinsic generative mechanism of the psychological organism).

The model Pascual-Leone (1979) proposes for the generative constructivity of the psychological organism seems to embody the principles for a model of social change (and also possibly for biological change). The principle of a

system (cognitive, social or biological) with a bi-level or multi-level organisation in which there are both content free silent resources and a context bound set of operators (subjective operators in Pascual-Leone's terms) seems appropriate for an analysis of all three lifelines of change. In terms of a social system, one level or the social forms are embodied in the institutional network of a society which establishes constraints for action. At the level of social action that has been referred to as the mind-culture action dialectic the focus is on social actors acting within certain social constraints. In addition the number of distinct social roles in a society could be regarded as a potential empirical measure of the complexity of a society analogous to the 'M' resource of the metasubject (cf. Pascual-Leone, 1979). This report is not the place to discuss the full ramifications of this idea (see Craig and Miller, in preparation). Suffice it to mention that it may contribute to a better understanding of Vygotsky's (1978) ideas regarding the correspondence between social and individual forms. Suggesting a formal equivalence between the functional structure of the psychological and social 'machinery' (and also, in principle, the biological 'machinery') provides a theoretical paradigm for the analysis of the possibility of change. By way of example, change at an individual level of analysis (for instance the development of formal operations in Piaget's theory) and the development of

logico-mathematical thought (as a socio-historical form) may both be viewed as representations of the same formal theoretical phenomenon; one on an individual and the other on a social plane of analysis.

Where the generative mechanisms for change are concerned, the theoretical paradigm for the analysis of change is crucially dependent on the three principles embodied in Pascual-Leone's theory of construction operators (see p. 69). With regard to his theory it is important to state that using his 'model for a model' seems to make sense of the idea and fact of change as it occurs in all three of the "lifelines". The idea is to focus on the principles for change that are common to biological, psychological and social development and not to allow the particulars of each domain to obscure this view.

Before concluding with a summary of the principles towards a theory of change that have been variously elaborated in the preceding chapters, some ideas for future research are discussed.

FUTURE RESEARCH

The most important aspect of future research involves the notion of a 'chain-of-change' as elaborated above and the methodological and theoretical implications of this conception.

The processes involved in becoming mind, becoming society, and becoming mind in society depend vitally on intrinsic and extrinsic enabling conditions which co-determine the possibilities and actualities of intentional human behaviour which, in principle, is embedded in society (cf. Bhaskar, 1979). This assertion entails conceiving of 'becoming mind' in terms of the generative mechanisms which produce adaptation to a social world.

The theoretical problem is to co-ordinate what appear to be two incommensurate domains. In this sense, the principle for the convergence of two domains is embodied in Piaget's epistemology and is expressed in his idea regarding "equilibration" as a model for development. The explication of the possibility of change or equilibration is well illustrated in Pascual-Leone's (1979) functional structure of the metasubject. His model of the 'mechanism' that produces change at the metasubjective level of analysis, could serve as a 'model for a model' for all change as has been elaborated above.

Pascual-Leone's (1979) work represents an application of the principles of model building discussed by Bunge (1973) and is consistent with the role of models in science elaborated by, among others, Bhaskar (1979) and Harré and Secord (1972)¹. Although in principle it is possible to discuss the link between individual and society given Piaget's notion of

"equilibration", this is not explicated within the Piagetian tradition. This link between individuals and society or psychology and history forms the substance of the present project and relies on Vygotsky's notion of the zone of proximal development and its elaboration by Wertsch (Rogoff and Wertsch, 1984) and Feuerstein (1979) who both attempt to explicate the dynamics of transaction that may stimulate or produce cognitive development.

The theoretical contribution of the present project resides in the concept of the dual-directionality of exchange between two transacting systems. In this context both socialisation and transformation can be analysed within a generative level of analysis. Explanation of the generative power of transaction as opposed to description, requires analysis at a generative level.

Conceptualising socialisation and transformation as the two aspects of the dual-directionality of exchange between two transacting systems renders the 'chain-of-change' model used in the present project applicable to other analytical contexts. On the one hand, different moments in the process could result in different data bases and, therefore, extend or modify the principles that constitute the theory of change that is presented below. On the other hand, the analysis may be reversed to reveal the nature of 'indigenous' mediational operators. These two aspects of the theory are now elaborated.

Different analytical moments.

It is conceivable that social actors and experts other than those used in the present project could provide interesting data on change. For example other groups in terms of culture or class and different expert theories on cognitive development may produce different data on change. What is planned is to use social actors from different groups² but to retain the tasks included in the study of mothers' regulation of children in order to extend the suggested 10 mediational operators that are presently described.

Reversing the analytical focus.

Because the present empirical focus is on rearing children to be competent members of western society, as a means of explicating the process of change the emphasis has been on tasks with a culturally autogenous development in terms of western society. Following the logic of discovery as elaborated in chapter 5 and the idea of dual directionality of exchange between two transacting systems it is important to reverse the analytical focus in terms of the two extreme analytical moments (see figure 3). This will entail using tasks that are part of the social actors' cultural tradition and projecting them as the experts in this regard. For example, beadwork and/or weaving are suitable tasks for social actors in traditional rural South African societies and most

mothers will be expert at this activity. The question would then be, if middle-class-western-urban mothers were to become experts at regulating children in the execution of these tasks (beadwork and/or weaving): what would this activity entail in terms of their rules for being, and in terms of the experts' rules for being (which in this case would be the traditional rural mothers)? The methods used in the present project and discussed above in chapters 6 and 8 will again be used but the data bases will be the reverse of those indicated in figure 3 above. That is, an indigenous theory will be extracted from middle-class-western-urban mothers, and the expert formulations will be extracted from the traditional experts. This would allow for an assessment of the methodology outlined in chapter 5, and may add to the understanding of change.

A project that is currently underway is concerned with the same data bases used here although the analysis is focused on the mediational operators which can be discerned from the social actors' engagement in the tasks given their indigenous theory. Here the explanation is directed at understanding their way of doing tasks as indicated in figure 3 in moment 2 p. 121) from their rules of being or moment 1. This project is a precursor for work that is planned in terms of reversing the analytical focus.

PRINCIPLES TOWARDS A THEORY OF CHANGE

The generative mechanisms discussed above in chapter 11 essentially describe the elements of the principles which are elaborated here. These principles provide a foundation towards a theory of change from a position that does justice to both intrinsic and extrinsic generative mechanisms. The principles are as follows:

1. An analysis of intentionality and meaning at a generative level provide a framework for the study of change.
2. The notion of the generative power of transaction is necessary to account for the fact of change.
3. The discovery of mediational operators which may produce novel, truly novel and perhaps uniquely truly novel responses to unfamiliarity, is possible.

Each of these principles is discussed separately below.

Intentionality and meaning at a generative level.

The purpose of this discussion is not to enter the debates about intentionality and meaning³. Rather, the suggestion is that if the notions of intentionality and meaning are grounded at a generative level attention can be directed towards the possibility of change or the generative constructivity of systems. This focus provides a framework for the study of change in which the construction of reality is both a social and an individual enterprise, with each

vitaly interdependent on the other and contained in a process that continues through time. It is, of course, not suggested that the debates surrounding intentionality and meaning are unimportant. However, the theoretical position advocated is that intrinsic generative mechanisms, as expressed within the Piagetian paradigm for example, should be interpreted as an explication of the possibility and fact of human intentionality. Likewise, extrinsic enabling conditions, as embodied in the Vygotskian paradigm, could be conceptualised as explicating the possibility and fact of meaning as grounded in social life/society. Once intentionality and meaning are thus located within a generative level of analysis, it is possible to suggest that the mediational operators described above provide the engagement in tasks with meaning. Stated differently it can be said that mediational operators allow for the possibility of meaning beyond or in addition to the movements involved in any action or the acts that comprise an activity. In this sense, the three "mechanisms" suggested by Wertsch namely "situation definition", "intersubjectivity", and "semiotic mediation" attain an added theoretical significance. This resides in the idea that at a generative level of analysis the mediational operators can be said to determine, in part, the output or response of a system. In this sense 'meaning' (or the definition of the situation in Wertsch's terms) is a function of the dynamics of the zone of

proximal development as made possible (or determined) by extrinsic generative mechanisms operating on intrinsic generative mechanisms and vice versa.

It is important to recognise that extrinsic generative mechanisms are not only dependent on the transaction of individuals, but will in turn determine the transaction and future transaction with the world. This status of individuals in the analysis of change is, of course, recognised by Bhaskar in the mode of connection he proposes between individuals and society. He fails, however, to do justice to the possibility of socialisation and transformation in terms of possible psychological 'mechanisms' that produce change. Perhaps the reason for this is that Bhaskar uses Freud's theory of mind in which to ground the domain of psychology rather than the Piagetian paradigm as does the present project. To this end explicating generative mechanisms that produce change provides an explanation of the moments in resolving unfamiliarity as discussed above (see p. 301).

In order to link the individual and society or any two systems in transaction the currents of change must be explained in terms of the conditions that enable both socialisation and transformation to occur.

The generative power of transaction.

Natural selection without a genetic variation, cognitive

development without different definitions of a situation, and history without contradiction, do not only seem impossible but also substantiate the notion of the generative power of transaction. In other words, for evolution, development, and history to occur, systems have to be co-ordinated with other systems in an environment or super-system. It is in this sense that Harré and Secord's "New paradigm" may be understood.

The first shift in their paradigm involves "... passing from a philosopher's conception of how science ought to be to the use of the methods which are actually employed in the advanced sciences"⁴. They go on as follows:

The second shift concerns the nature of the entities that are being studied and their mode of connection. Conceiving of human beings as people, and their mode of action as social beings to be self-monitored rule-following, means that very different models of the processes which generate social behaviour must be used. One important feature of such models will be that they must contain some form of 'feedback', by which the various orders of monitoring of performance can be achieved. The mathematics of the New Paradigm will then be Systems Theory, and statistics will be used as in the advanced sciences, not as an exploratory tool, but as part of the theory of error (1972 p.21).

The ramifications of the ideas expressed in the above quotation have been addressed throughout this report. At this juncture, however, what is pertinent is the idea that some form of feedback is necessary in the models that explicate social behaviour. A theory of the "generative power of

transaction" is an attempt to provide an explanation of how feedback is possible. In other words, it is an attempt to explicate the arrows that feature prominently in various models that relate social and individual forms/processes⁵. The "arrow problem" in models⁶, depicting a relationship between individual forms and social forms (variously expressed or labelled), exists because some phenomenon akin to the generative power of transaction is recognised as necessary but without an explanatory framework geared for generative or enabling conditions.

The importance of feedback between systems is well stated and elaborated by Bateson (1979) in his discussion of the necessary unity between mind and nature. In Bateson's analysis of this unity he refers to the two great stochastic processes, learning and evolution. In each of these processes, and between them, feedback provides the impetus for continuous change.

The idea and importance of feedback between systems is also inherent in Vygotsky's notion of the zone of proximal development. An explanatory account of the zone of proximal development allows for an explication of the dynamics of feedback in terms of extrinsic and intrinsic generative mechanisms co-determining the fact of change.

The discovery of mediational operators.

Problem solving is an essential means towards survival, and any specific form of problem solving can illuminate social and individual forms of adaptation. Luria (1976) begins his book on cognitive development with these words:

It seems surprising that the science of psychology has avoided the idea that mental processes are social and historical in origin, or that important manifestations of human consciousness have been directly shaped by the basic practices of human activity and the actual forms of culture (p3).

Luria recognised and utilised a given situation of rapid, socio-cultural change to investigate and illustrate the socio-historical shaping of mental processes. Likewise, the current situation prevailing in the township is a fleeting moment in social time which can be used to investigate the ontogenesis of higher mental functions. The mediational operators suggested above may be understood as the dynamics of the generative power of transaction. What is crucial in the present proposals is the idea that extrinsic and intrinsic generative mechanisms co-determine change or development.

For the learner of new ways, the guidance of another (person or object) provides the conditions for novel and truly novel and perhaps also uniquely truly novel resolution of the unfamiliar. In this conceptualisation the zone of proximal development becomes a zone in which two systems are co-ordinated such that the one system (e.g. the child) is able

to benefit from the other system (e.g. the mother). When the mother is confronted with a shifting face of reality, as occurs in periods of rapid social change, she may however be unable to function as an effective mediator to the child. The zone of proximal development may then become a 'zone of restricted development' in which the mother may create a cultural void by ceasing to function as a mediator (cf. Feuerstein, 1979), or she may provide the child with a construction of reality that may be antagonistic to the acquisition of new goals or competencies and performances. It is precisely in this apparent stalemate situation that the greatest promise for a truly liberating psychology of change lies. In this regard, what have been referred to above as the twin aspects of change - "socialisation" and "transformation" - seem to provide a foundation for analysing change, not only in terms of an adapted system socialising another, but also to provide for the possibility of the "transformation" of that adapted system by an adapting system.

The three moments in the resolution of unfamiliarity depicted above and the resultant adaptation may provide a framework within which to analyse both socialisation and transformation. The force of the suggested mediational operators in determining a specific kind of development or transaction with the world may, furthermore, highlight the dynamics of transaction when two systems meet.

The mind-culture action dialectic becomes, in these terms, the stage on which possible conflict may arise between different traditions or different definitions of a situation. As such, the mind-culture action dialectic is a conglomeration of various objects-in-society and objects-in-action or mind competing for acceptance as the most appropriate conceptualisations of what is to be regarded as "reality". In these situations where conflicting realities meet, the development of mind in society must be seen as a criss-crossing of different developmental trajectories or lifelines of development. The process of instruction transmits one possible view of the world, and the mind's structure resolves this in any of the ways discussed in terms of the different moments of resolving unfamiliarity.

CONCLUSION.

The developmental method adopted in the present study was applied within a rational reconstructive paradigm and provided the basis for a construction of a chain-of-change. This embodies a generative account of the possibility and fact of change. In this respect, the discovery of mediational operators that may produce novel, truly novel, and uniquely truly novel resolutions of the unfamiliar, emerge as a result of the particular methodology employed and the particular conditions that prevail in this society.

Bhaskar (1979) illustrates the relation between social scientific theories and developments in society as follows:

Thus it is surely no accident that Marxism was born in the 1840s or stunted under the combined effects of Stalinism, on the one hand, and Fascism, the Cold War and the 1945-70 boom, on the other, or that sociology, in the narrow sense, was the fruit of the two decades before the First World War (p.61).

A similar idea is expressed by Foucault (1970):

There can be no doubt, certainly, that the historical emergence of each one of the human sciences was occasioned by a particular problem, a requirement, an obstacle of a theoretical or practical order: the new norms imposed by industrial society upon individuals were certainly necessary before psychology ... and the threats that, since the French Revolution, have weighed so heavily on the social balances, and even the equilibrium established by the bourgeoisie, were no doubt also necessary before a reflection of the sociological type could appear (p.345).

These two quotations also provide 'data' on the basis of which it is reasonable to assert that developments in South African society place social scientists in a unique position vis-à-vis the development of a social scientific theory of change.

NOTES : CHAPTER 12.

- 1 Other authors discussing this are Feyerabend (1975) and Medawar (1972).
- 2 The city of Durban in which the study was conducted has a multi-cultural population that also cuts across socio-economic divisions and is therefore an ideal location for research of this nature.
- 3 See for example Searle (1984) and Lyons (1977).
- 4 A similar point is made by Bhaskar (1979) and is discussed above (see p. 41).
- 5 This is similar to the shift that accelerated interest in cognition by attempting to understand the nature of the "dash" in S-R terms.
- 6 See Jahoda, (1982) for a discussion of models of this kind and for examples of what is here referred to as the "arrow problem".

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