THE COGNITION OF AGENCY IN THE YOUNG CHILD

by

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I hereby certify that the work reported in this thesis is my own.

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Abstract

It is argued that much of the work on cognitive and communicative development within the first two years of life, and particularly work concerned with the transition to the use of speech, relies upon a concept of agency, both as a general notion and as a semantic category 'used' by children, with no clear definition of what this entails. This thesis attempts to derive a theoretically rigorous and useful notion of agency and proceeds to describe within its terms the developing child's cognition.

It rests upon the assumption - explicitly stated and justified - that the child should best be seen as the active constructor of his knowledge, intelligently directing his search for new knowledge as a means to achieving active mastery of his environment. There follows an account of the kinds of knowledge which together constitute the concept agency; contingency-detection and the derivation of rules, on the one hand, and the development of intentional structures, on the other, are identified as necessary conditions for cognition. A privileged role is ascribed to (non-verbal) communicative development within this process, mutual, cooperative activity being seen as integral to becoming an agent.

From a detailed discussion of the theoretical and methodological paradigms used to study communicative development it is concluded that an adapted speech act approach is most useful. Non-intrusive observation of mother-child pairs is used as a source of data, which emphasizes the derivation of methods for evaluating and classifying data. Following Myers (1980) a procedure is developed for the identification of communicative

/ intentions.

intentions. An adaptation of this is used to identify intentions expressed within solitary activity. Criteria for the description of a third kind of activity, interpersonal routines, are given.

On the basis of regular, filmed observations of one child a process model for the developing cognition of agency is constructed, between the ages of 8 and 22 months. The model is then tested against five other children, observed for three months each, who together span this age-range. From the model it is concluded that the cognition of agency depends upon fulfillment of five conditions. The major source of variability between children appears to be mothering style, for which a dimension is proposed. Finally an adaptive model is presented, showing the effects of mothering styles corresponding to the two ends of this dimension upon the child's use of his cognition. The child's concept of agency does not develop suddenly. Its status as a concept depends fundamentally upon his capacity to derive rules about the way his world is, and thus effectively to act and to communicate.

The theory and methodology are examined and four specific proposals for further work are made.

Introduction

0.1 Explanation in Psychology

It is generally accepted that the aim of psychological theory is to achieve an explanation of the processes of human behaviour. It is less generally accepted that an adequate explanation of behaviour may also have to take account of certain processes which are not in any strict sense behavioural, that is mental states and mental events. Inevitably theories in Psychology hinge crucially upon the conception of man implicit in them, or to put it another way, the conception of man held by individual theorists constrains the form of theory which they see as constituting an adequate explanation of human psychological and behavioural processes. This is not to deny that different forms of theory should be justified by rational argument, that is by arguments of formal logic, but equally it must be remembered that science exists within an ever-changing socio-cultural context and the kinds of theory generally accepted at one time may be seen as inadequate or misdirected at another. Further, our understanding of the physical world continues to grow and to provide ideas and conceptual tools which can be translated and adopted by the still very young behavioural sciences. Dalenoort (1972) has recently provided us with an account of the ways in which technological advance has provided models for psychology.

There has been in recent years a protracted and sometimes bitter dispute between two fundamentally different visions of man, the processes of his behaviour, and the terms of reference within which these should be described. Taylor (1964) summarises this dispute as follows:

> It is often said that human behaviour, or for that matter the behaviour of animals or even living organisms in general, is in some way fundamentally different from the processes in nature which are studied by the natural sciences. It is sometimes said that the behaviour of human beings and animals shows a purposiveness which is not found elsewhere in nature, or that it has

> an intrinsic 'meaning' which natural processes do not. Or it is said that the behaviour of animate organisms exhibits an order which cannot be accounted for by the 'blind accident' of processes in nature. Or again, to draw the circle somewhat narrower, it is said of human beings and some animals that they are conscious of and direct their behaviour in a way which finds no analogue in inanimate nature, or that, specifically in an account of human affairs, concepts like 'significance' and 'value' play a uniquely important part which is denied them in natural science.
>
> Against this view stands the opinion of many others, in particular of many students of the sciences of human behaviour, that there is no difference in principle between the behaviour of animate organisms and any other processes in nature, that the former can be accounted for in the same way as the latter, by laws relating physical events, and that the introduction of such notions as 'purpose' and 'mind' can only serve to obscure and confuse. (Taylor, 1964:3)

There can be no doubt that this dispute remains unresolved. Whether this uncertainty is a reason for or a consequence of the fact that 'the sciences of man are in their infancy' is for Taylor an open question; but it is an important question because upon it turns the question of whether it is to theory or to empirical data, respectively, that we should look for a resolution of the dispute. Taylor goes on:

> In fact there has never been agreement among philosophers or other students as to what is at stake here, that is, on the meaning of the claim that human behaviour is purposive, or, what is the same thing, on what the relevant evidence is which would decide it. As a matter of fact, it is not even generally agreed that it is a matter of finding evidence in the first place, for some thinkers hold that the issue is not in any sense an empirical one, but rather that it can be decided simply by logical argument. (ibid.;5)

It is not the aim of this thesis to attempt to resolve the conflict between 'mechanistic' and 'teleological' explanations of human behaviour. Inevitably however this work must represent some modifications of one or other of these positions, and it behoves the present author at least to attempt a justification of the stance taken.

In their book 'Human Action and its Psychological Investigation' (1977) Gauld and Shotter argue that a

'mechanistic system', that is a hypothetical organism which simply responds to incoming stimuli, cannot be seen as an adequate model of man. They insist rather that the approach of psychology must be 'hermeneutical', assigning meanings to actions as 'pieces of behaviour which we bring about rather than find our limbs executing'. Their hermeneutical explanation is essentially similar to the 'teleological' explanation invoked by Taylor, that is both constitute what may be called 'explanation by purpose'. In such explanation human actions and the actions of certain other animate beings are explained not in terms of other unconnected antecedent conditions, as is the case in the behaviourist paradigm, but in terms of the order which these actions produce. To explain an action by purpose is to explain by the goal aimed at, for the sake of which the action is performed. Traditionally such forms of explanation have been criticised as meaningless and empirically empty, and by their very nature, impossible to confirm. To an extent this point has to be admitted. We may rely once more on Taylor's formulation:

> In fact, the only empirical evidence for the operation of the purpose is the behaviour which its operation is used to explain. There is thus no conceivable evidence which could falsify a hypothesis of this kind because whenever the behaviour is emitted the purpose responsible is ex hypothesi assumed to have been operating. And at the same time we would never be able to predict behaviour with the aid of such a hypothesis...If 'x' is the behaviour and P is the Purpose considered as a separate entity which is the cause or antecedent of x ... (and if) x having a value of x_1 is due to P having the value P_1, and if the only evidence for P_1 is the occurrence of x_1 then we have no way of knowing beforehand what the value of x will be. (Taylor, 1964;7)

There are, however, other justifications for adopting explanations by purpose and these consist in demonstrating that alternative forms of explanation, although apparently more parsimonious, are inadequate, and that explanation by purpose has considerable heuristic value. It is to the former that we now turn.

0.2 Critique of Reductionism

It might be argued that it is not of paramount importance to choose between alternative kinds of explanation; that, since the debate between opposing schools of thought continues, it is sufficient for any student of human behaviour or action merely to work within one paradigm while allowing that others can also make valuable contributions to our understanding. Unfortunately this is not so. The behaviourists recognise the necessity to avoid reference to such ideas as intention and awareness, and, when faced with unpredictable relationships between learning history and post-learning behaviour, or in cases of what might be called orientation learning where no finite list of directions can express what is learned, they choose instead to talk in terms of such things as 'conditional cues', relative stimuli, sensory integration, acquired drives, and so on. Similarly, in the case of explanation by purpose, it is essential to show that the agent's intentions, that is his reasons for acting in a particular way, are not superfluous but are an essential part of the explanation of such actions. It therefore becomes necessary both to select one paradigm in preference to others and to attempt to justify such a selection by pointing to the shortcomings of other approaches. Many writers have offered criticisms of reductionism. This section aims to draw attention to the principal arguments of some such criticisms.

Broadly, the object of these remarks is those approaches to human psychology which take as their unit of analysis something other than the acting subject in relation with other similarly acting subjects. Gauld and Shotter (1977) describe such approaches as 'mechanistic', while Fodor (1968, 1976) distinguishes between 'logical behaviourism' and 'physiological reductionism'. As Beloff (1973) points out, most such approaches are traceable from Descartes who formulated the notion of the 'reflex' to support his theory that animals were nothing more than natural automata

whose behaviour was governed by a strictly mechanical cause-effect relationship. But for Descartes man was able to influence the workings of his nervous system and override its reflexive nature because he possessed a soul. Beloff goes on:

> Descartes' successors, however, uninhibited by this dualist metaphysic, welcomed the concept of reflex action precisely because it promised to reveal man, no less than other animals, as a machine. (Beloff, 1973;130)

It is Fodor's contention, and that of Bannister and Fransella (1971), that such a view of man is logically unsound, and it is Gauld and Shotter's argument that this view is unsound in observable fact.

The case which Gauld and Shotter make can be stated quite briefly. They point out that the limits of mechanistic theories in general are determined by the ultimate theoretical constraints upon the capabilities of the 'generalised machine', and,

> If it can be shown that a human agent can do things which it is in principle impossible for a generalised machine to do, it will a fortiori have been shown that mechanistic explanation in psychology, at least as that sort of explanation has generally been conceived, breaks down at a certain point. (Gauld and Shotter, 1977;17)

To put this another way, any system whose behaviour could not be fully represented on a generalised machine would be a system whose behaviour is not fully describable in terms of causal laws. They then point out that,

> Gödel (1931) proved that within the system of elementary arithmetic we can show to be true certain theorems whose truth cannot be arrived at by algorithmic methods from the basic axioms of the system. From this it follows that if you embodied the axioms and rules of the system in a generalised machine it would be unable to generate these particular theorems. However, human mathematicians can show them to be true by invoking a metasystem, a system which takes the original system as its subject matter...(T)his shows that human beings can do something which machines cannot do...men will always be one jump ahead of the machines. (Gauld and Shotter, 1977;19)

For a machine realistically to be said to simulate human action that machine would have to be able to understand

what it is doing, or be so programmed as to duplicate the behavioural capacities of a concept- or rule-possessing human being. Gauld and Shotter argue that even on the most minimal definition of 'concept-possession', that is of concepts which are stimulus-neutral (Watson, 1958), a mechanistic approach fails because it is impossible to analyse possession of these in terms amenable to embodiment in a machine table.

The case made by Bannister and Fransella (1971) can be put very simply. Behaviourism, they say, claims to take as its subject matter only those phenomena about people which may by direct observation be said to exist, that is overt behaviour. But it is impossible to talk about events at all unless one does so under some description, and this is as true of those sorts of events which we call human behaviour as it is of any other sorts of events:

> Immediately we label it, assess it, or even select it by pointing to it, we have placed a construction upon it ... True, 'behavioural' terms are terms at a low level of abstraction, but they are still terms at a level of abstraction. And, of course, concepts such as stimulus, response, reward, punishment, drive, negative and positive reinforcement are all concepts at an enormously high level of abstraction, certainly at as high a level of abstraction as concepts like 'mind'. (Bannister and Fransella, 1971;46)

Certainly this is not an argument against behaviourism as an approach to the study of human psychology but it is an argument against the case which behaviourists commonly try to make, that their approach is in some sense more scientific and 'harder' than other, mentalist, approaches. Fodor adopts a much stronger line and seeks to show not only that behaviourism does not constitute a harder approach but also that the claim that it does so contains an inherent logical inconsistency. This line of argument occurs chiefly in two books, 1968 and 1976. It will suffice here merely to present his conclusion:

> ... Even if the behaviourists were right in supposing that logically necessary and sufficient conditions for behaviour being of a certain kind can be given (just) in terms of stimulus and response variables, that fact

> would not in the least prejudice the mentalists' claim that the causation of behaviour is determined by, and explicable in terms of, the organisms internal states. So far as I know, the philosophical school of 'logical' behaviourism offers not a shadow of an argument for believing that this claim is false. And the failure of behaviouristic psychology to provide even a first approximation to a plausible theory of cognition suggests that the mentalists' claim may very well be true. (Fodor, 1976;8)

Below (Section 0.2) there follows an account of one particular manifestation of the behaviourist/mentalist dispute - the argument about the framework appropriate for the study of language-learning and language-usage - but there is another kind of reductionism which must first be discussed, and this is that branch of psychology which seeks to explain in terms of neurological events. This discussion aims to bring out two key points concerning physiological reductionism; the first is the belief that all the organismic causes of behaviour, or action, are physiological does not commit one to the belief that psychology is reducible to physiology. The second, complementary, point is that arguing against the reducibility of psychology to physiology, or, what is the same thing, arguing for some kind of mentalism, does not commit one to a dualist position.[1] To put this another way, it is both possible and coherent to talk in terms of a materialistic mentalism.

It is the assumption of neurophysiology that the study of the neurological organisation of the central nervous system will tell us everything there is to know about the way the brain works. To some extent this seems to be a good assumption. The work of Sperry, Hubel and Wiesel, Campbell et al., Trevarthen and others has discovered a great deal about visual pathways, and has given us a good idea of the ways in which those aspects of objects which are visible are projected in the brain. We are still, however, very far from achieving an adequate theory of perception within

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[1] The dualist conception is not consistent with the rationale of contemporary developmental psychology which assumes that an infant's behaviour can provide direct evidence about the nature of his cognition (see Chapter 1).

this tradition. There is, in other words, no guarantee that physiology does or could supply the appropriate vocabulary for the construction of psychological theories. Even if parsimony requires that we confine our paradigm to encompass only those (conceivable) mental events which are physiological it does not follow that descriptions of such events in physiological terms can answer all those questions which psychology might pose; one cannot a priori assume any simple correspondence between form and function. Fodor summarises the argument like this:

> It is entirely possible that the nervous system of higher organisms characteristically achieves a given psychological end by a wide variety of neurological means. It is also possible that given neurological structures subserve many different psychological functions at different times, depending upon the character of the activities in which the organism is engaged. In either event, the attempt to pair neurological structures with psychological functions could expect only limited success. (Fodor, 1976;17)

And,

> If it turns out that the functional decomposition of the nervous system corresponds precisely to its neurological (anatomical, biochemical, physical) decomposition, then there are only epistemological reasons for studying the former instead of the latter. But suppose that there is no such correspondence? Suppose the functional organisation of the nervous system cross-cuts its neurological organisation. Then the existence of psychology depends not upon the fact that neurons are so depressingly small, but rather on the fact that neurology does not posit the kinds of things that psychology requires. (ibid;24)

It remains to be seen whether an ideally completed science of physiology would be able to answer even those kinds of questions which psychologists presently ask. There seems to be no self-evident ontological argument available to suggest it will be able to do so. The existence of a vigorously pursued and frequently successful neurophysiological approach to the study of psychology does not therefore constitute grounds for opposing the development of a mentalist, or teleological, or hermeneutical approach, as recommended by, for example, Fodor or Gauld and Shotter. Before going on to discuss one strand within such an approach,

the concept of Agency, it is worthwhile looking in more detail at one particular manifest_ation of the behaviourist/mentalist dispute, and that is the argument as to which approach is adequate and appropriate to the study of language-learning and language-usage, since this thesis aims to contribute to our understanding of the processes involved in the acquisition of language by young children.

Skinner's book, Verbal Behaviour (1957), was the first major attempt by a behaviourist to tackle the problem of linguistic behaviour and treat it under a functional analysis, that is an analysis which seeks to specify the controlling input and elicitatory variables. In his review of the book Chomsky (1959) comments:

> What is so surprising is the particular limitations he has imposed on the way in which the observables of behaviour are to be studied, and, above all, the particularly simple nature of the 'function' which, he claims, describes the causation of behaviour. One would naturally expect that prediction of the behaviour of a complex organism (or machine) would require, in addition to information about external stimulation, knowledge of the internal structure of the organism, the ways in which it processes input information and organises its own behaviour. These characteristics of the organism are in general a complicated product of inborn structure, the genetically determined course of maturation, and past experience. (Chomsky, 1959;27).

It would not be appropriate here specifically to discuss Chomsky's own thesis of language structure and man's linguistic competence; we aim, rather, to bring out the main <u>kinds</u> of criticism which Chomsky makes of Skinner's extreme behaviourist analysis. Chomsky's own position is briefly discussed in a later section, (2.2).

The force of Chomsky's attack on Skinner seems to rest on an argument involving three stages. Its conclusion, which appears in a different form in his book Syntactic Structures (1957), is that a theory of the environmental causation of verbalisations - in the sense in which a behaviourist would construe such a theory - does not constitute a theory of language. The steps of the argument which lead to this conclusion are roughly as follows:-

1. Verbal utterances do, presumably, have causes, but these do not reside exclusively in the external environment.

In trying to assess what might have been responsible for making someone say something which he did say, in addition to 'environmental variables' we must consider, inter alia, his knowledge about the conventions of his language, his personal system of beliefs and values, and his reasons for producing an utterance. The importance of these factors, Chomsky argues, is apparent, whereas:

> The claim that careful arrangement of contingencies of reinforcement by the verbal community is a necessary condition for language learning...is based not on actual observation, but on analogies to laboratory study of lower organisms, (Chomsky, 1959;39)

And,

> Lashley recognises, as anyone must who seriously considers the data, that the composition and production of an utterance is not simply a matter of stringing together a sequence of responses under the control of outside stimulation and intraverbal association, and that the syntactic organisation of an utterance is not something directly represented in any simple way in the physical structure of the utterance itself. A variety of observations leads (Lashley) to conclude that syntactic structure is 'a generalised pattern imposed on the specific acts as they occur' and that 'a consideration of the structure of the sentence and other motor sequences will show...that there are, behind the overtly expressed sequences, a multiplicity of integrative processes which can only be inferred from the final results of their activity'. (ibid;55)

2. If the production of an utterance involves the interaction of many complex variables whose workings we can only infer, then the theoretically interesting properties of a corpus of utterances, and of the occurence of any particular linguistic structures will not be revealed by a classification of such utterances and structures according to the environmental conditions with which they are associated. There is no reason to believe that a taxonomy of this kind would succeed in more than a minimal sense, though, equally, a sufficiently elaborated psychology might succeed in identifying the necessary and sufficient conditions for the production of verbal utterances. But it does not follow from the latter that an analysis which groups together those

utterances which have in common certain elicitatory stimuli will also turn out to have grouped together those utterances which have common referents. In other words, the supposition that verbal productions refer in some sense to the stimuli which elicit them is false. The utterances a given stimulus elicits may be arbitrarily heterogeneous depending upon the internal state of the person on whom the stimulus acts.

3. If 1 and 2 are true, then a functional analysis will not group together those structures which have semantically interesting properties such as coreferentiality. Furthermore, even were it to do so this would be theoretically irrelevant because the factors governing the referential use of language do not include the criterion that co-referring utterances should have common elicitatory stimuli.

In summary, Chomsky seems to agree with Skinner that verbal behaviour is indeed caused -that is it should, at least in principle, be possible to discover the mechanisms which govern verbal behaviour - but he does not accept that verbal productions are also (therefore) <u>responses</u>; he argues that learning a language does not consist in learning S-R connections, and consequently that no useful insights into the use of language <u>can</u> be provided by a classification of utterances according to the stimuli presumed to elicit them. We might support this view with a general comment from Beloff:

> Behaviouristics incorporates within itself certain indubitable truths (the principles of association and hedonism) on which it has imposed a more dubious theoretical superstructure. ... The besetting weakness of the behaviourist approach has been its rash assumption that these two principles provide an adequate basis for a comprehensive psychology. (Beloff, 1973;154)

This section has attempted to present some reasons for believing that a behaviouristic approach, specifically to the problem of how young children go about learning the language of their community, cannot be expected to provide either a useful framework or an adequate theory. It has

further attempted to show that while neurophysiology provides a strong and coherent approach within its own terms we cannot necessarily expect it to provide answers to the kinds of questions in which psychologists are interested. Having said this, it is important to bear in mind two caveats. First, to deny behaviourism is not to deny the importance of the principles of association learning, or even of operant conditioning. Piaget (1951) attempted to assess the role of learning and imitation in early cognitive development, and this topic continues to exercise students both of general psychology (for example, Bandura & Walters, 1963) and of developmental psycholinguistics (e.g. Rodgon, 1976). Second, the claim that neither behaviourism nor physiological reductionism is able to provide an adequate framework for a general psychology or for developmental psycholinguistics, and the consequent necessity to rely on some kind of mentalistic explanation, should not be taken to imply a 'dualist metaphysic'. The fact that we do not know the material mechanisms which correspond to those mental states which we might describe as 'having a belief, desire or intention' does not commit us to invoking 'immaterial' factors. The principle of parsimony, if nothing else, requires that we should assume that mental states and mental events are caused. A more elaborated science of neurophysiology would be necessary to specify these mechanisms, but, as Fodor points out, the fact that neurophysiology may not (ever) explicate such mechanisms does not, and could not, constitute proof that they are not 'real'. That is to say, the argument in favour of what the present author has chosen to call 'materialistic mentalism' must remain, at least for the time being, a teleological one.

The only grounds on which such kinds of explanation are defensible are those of their heuristic value; if 'explanation by purpose' offers a worthwhile approach it will enable us to make more sense of the sorts of events which we are observing. This discussion must of necessity be left to the Conclusion (Section 6.2). What we must now

do is try to define more closely the terms and ideas with which we shall be working.

0.3 Towards a Concept of Agency

The idea for this thesis grew out of a dissatisfaction with the ways in which the notion of semantic relations, derived from formal linguistics (e.g. Fillmore, 1968), tended to be applied by psycholinguists to the first verbalisations of young children. The reasons for this dissatisfaction are more fully discussed elsewhere (Sections 2.2 and 2.5) but we may briefly touch on them here. They fall into two types. First, that in order to be able legitimately to apply, even an adaptation of, some analytic system, based on a corpus of utterances produced by adults, to the utterances of young children it is necessary to demonstrate that these children use the elements of the system in something like the same way as that in which they are used by adults. Not only is this not usually done but there are also suggestions in the literature that children's use of language corresponds only very poorly with adults' use. (See, for example, Halliday's (1975) different 'grammars' for Nigel at different ages, or Brown's (1973) stages of language acquisition, and Bowerman (1973). Second, it is not clear in quite what sense it is psychologically meaningful to say that a child has <u>mastered</u> or <u>acquired</u> any particular 'semantic category' which he is presumed to have used. Each category is assumed to be unitary, that is it is defined under a single set of criteria, while at the same time the child's grasp of a category is described as developing gradually. How then is one presumed use of a category by a child at one age equivalent to his use of the 'same' category at another age, and, especially, in what sense is it equivalent to an adult's use of that category? Further, if the assignation of an utterance to a particular

category rests only on an adult's conception of how that utterance might be interpreted as appropriate in some context there can be no guarantee that an analysis in terms of adult-like semantic categories does not obscure some more useful 'child-centred' approach, or even that the child is cognitively capable of encoding the presumed category. Sheridan (1975) points out that language is our most valuable tool. Its manipulation relies upon the ability to grasp and relate the semantic categories represented in it. Any account of early language must therefore also be a psychological theory; it must base itself in the development of the cognitive pre-requisites for understanding semantic relations.

These criticisms do not by any means apply equally to the many systems of semantic categories which have been used by psycho-linguists in studying child language, but one concept to which they do seem to apply quite generally is that of Agency. Agency is a central notion in case grammars, and is one whose study can help greatly in assessing the child's knowledge of language structure, but it is also fundamental to the development of communication, both verbal and non-verbal, between a child and his mother. Until quite recently semantic, syntactic, cognitive and communicative types of approach to language development were viewed as alternatives, and each tended to concentrate on just one aspect of a child's verbal productions, ignoring up to 50% of his output (Rodgon, 1976). Rodgon, Brown (1973), Nelson (1974) and Bates (1976), among others, have each attempted a more synthetic approach, drawing on data and ideas from all these perspectives. Bates, in particular, relates contributions from Speech Act theory, from Piagetian developmental psychology, from linguistics and from social psychology. This attempt is entirely well-founded; it is only by collating and relating concepts from all sources that a comprehensive developmental psychology can ever be achieved, for the ways in which, for example, language and cognition correspond are not readily apparent. As Beilin

points out:

> The conception of the relationship between cognition, logic and language that seems most consistent with the data is one that posits an abstract cognitive system of structures whose basic relations and functions are realized in systems of thought (logical and otherwise) and in language, each system with properties independent of the other. The fundamental relations, then, between these systems are not direct but are mediated through a common abstract system of relations and structures. (Beilin, 1975;361-2).

Bates draws heavily on Piaget's (1953) analysis of the course of cognitive development within the sensori-motor period, specifically associating the development of performative frame-works into which words are subsequently slotted with sensori-motor sub-stage V, the beginnings of the capacity for tool-use, and sub-stage VI, the ability to symbolise. There is a number of respects in which this synthesis is unsatisfactory, both as regards Piagetian theory and in Bates' interpretation of it - as we shall see later in Sections 2.4 and 2.5 - but Piaget's approach has offered insights to the study of development which are invaluable.

Piagetian theory[1] is both a cognitive theory and an epistemological one; it is a theory both of what is known and of the mechanisms by which knowledge and understanding are achieved. As a cognitive theory it is a theory of the organisation of knowledge and cognitive processes in structures which develop, from birth to adolescence, through a series of stages. The structures in which different aspects of thought are represented within any one stage are of a similar kind and together constitute a mode of cognitive functioning. There are four major stages during development, each of which is characterised by the particular mode of functioning governing thought within it. These are the sensori-motor, pre-operational, concrete operational and formal operational stages; it is the first two of these with which we shall chiefly be concerned. A cognitive structure consists of a number of co-ordinated schemata, each of which

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[1]Sources: Flavell, 1963; Piaget, 1951, 1953, 1954, 1971.

represents a 'unit' of knowledge. In the course of development schemata become elaborated, broadened and modified to take account of new information through a process which Piaget calls accommodation (see below). Inevitably the experience of the child will result from time to time in some schemata becoming more refined than others within a particular structure, leading to apparent inconsistencies in the level of the child's understanding from one task, or area of knowledge, to another. These inconsistencies are known as horizontal décalages.

> The concept of horizontal décalage represents the fact that, whereas it may be useful to think of an individual as being generally characterized by a given cognitive structure (or 'mode of functioning') he will not necessarily be able to perform within that structure for all tasks. (Flavell, 1963;238).

When the child moves from one mode of functioning to another, with a corresponding reorganisation of cognitive structure, he may still be observed to deal with the same task in a similar way. These uniformities of behaviour across different stages are known as vertical décalages.[1] Piaget's theory, therefore, describes the way in which knowledge is cognitively represented throughout development and it attempts to account for both the heterogeneities in cognitive structure within each stage and the homogeneities in function across different stages.

As an epistemological theory the Piagetian corpus involves principally the notions of assimilation, accommodation and equilibration. The child is seen as an agent, actively constructing and determining his knowledge of the world. He governs and directs his activity in the world, his search for new knowledge, on the basis of his existing knowledge. In the course of his acting on the world the

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[1] Vertical décalages are therefore phenomena occurring in development; they are not, as Bates (1976;69) seems to suggest, processes of development. She also (1976;87) uses the phrase 'accommodative schemes', describing as structure a concept which Piaget uses as a process notion. It is unclear whether these confusions are only terminological.

child is exposed to new relationships and contingencies existing within it. In order to take advantage of these, that is to assimilate them into his existing system of schemata, the child must accommodate such schemata as are affected. Assimilation and accommodation are thus two aspects of the same process. Different kinds of activity do, however, involve different proportions of them. Play, for example, is described as mainly assimilatory, since it involves the application of existing schemata to new activities; it is not the construction of new knowledge but the determination of the range of application of old knowledge, and the 'exercise of activities for the mere pleasure of mastering them' (Piaget, 1951;89). The notion of equilibration is a complex one. It has two components; the process of equilibration itself, and the discontinuous states of equilibrium to which this process leads. The process operates continually and is homogeneous throughout development, but the equilibrium states achieved are not stable, nor are they necessarily equivalent; some states are 'better equilibrated' than others. A state of equilibrium exists when all of the child's schemata are (ideally) coherently integrated at the same level of functioning. The assimilation-accommodation process, resulting from the child's activity in the world, serves continually to disturb potential equilibrium states through the selective modification of schemata and equilibration functions to restore congruence. The model is thus an essentially dynamic one.

We shall refer to ideas and concepts from the Piagetian corpus in later discussions, but what chiefly concerns us here is the nature of the role ascribed to the developing child. The child is seen as constructing his knowledge of the world on the basis of his interáctions with it; any experience he has which results in learning involves an interaction between his existing structures and some phenomenon of the world, mediated through his action. In one sense this means that what he is able to learn is prescribed by what he already knows; within any one stage, only those

phenomena which can be represented in the same terms as those phenomena which are already represented can be assimilated.[1] But in another sense it means that the child determines his own search for knowledge - he 'knows what he wants to know' - and the sorts of things he wants to know about are those which will allow him better to direct his own activity.

This conception of the nature of knowing and of action is central to the philosophy of John Macmurray. In the Introduction to 'The Self As Agent' he writes:

> Most of our knowledge, and all our primary knowledge, arises as an aspect of activities which have practical, not theoretical objectives; and ... it is this knowledge, itself an aspect of action, to which all reflective theory must refer. (Macmurray, 1957;12)

And in Chapter One:

> It is characteristic of Man that he solves his practical problems by taking thought; and all his theoretical activities have their origins, at least, in his practical requirements. (These activities) also find their meaning and their significance in the practical field ... Activities of ours which are purely theoretical, if this means that they have no reference to our practical life, must be purely imaginary - exercises of phantasy which are not even illusory unless we relate them to the practical world through some misplaced belief. The truth or falsity of the theoretical is to be found solely in its reference to the practical. (ibid; 21-2)

Macmurray posits this as a reason for pursuing an inquiry into the analysis and interpretation of common experience, but if he is right that 'the function of a philosophical form is to exhibit the unity of human experience' and if 'the form of the personal is the emergent problem of contemporary philosophy' then his thesis must be taken seriously and its implications explored by psychologists. It is therefore necessary to examine Macmurray's account to see whether it might assist us in arriving at some concept of Agency useful to the study of child development.

What Macmurray is concerned to do is both to show that

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[1] Representation is discussed in Section 1.2.

even the most adequate of modern philosophies - the Critical Philosophy of Kant - fails, because its major premiss is contradicted by its conclusion, and to argue that only an approach which treats thought as a subsidiary, negative aspect of action can allow for the possibility of our knowledge of one another and, by extension, of common experience. Let us briefly look at these in turn.

Knowledge, Kant argues, is the product of a synthetic process which consists in combining the elements of experience in a form not itself given by experience. If this is so then the knowledge we construct of the world can only be an (imperfect) model of the world; we can never know the world as it is in itself, independently of our ways of apprehending it. This is Kant's 'denial of knowledge' and herein lies the basis of the distinction between the phenomenal and noumenal worlds. The argument goes on, thought and knowledge are only possible through the observance of rules. We may call these 'rules of logic', that is rules which describe how we are to think, or 'rules of thinking', rules which describe what constitutes the process of thought. In either case thinking according to rules, or Reason, serves to guide our search for knowledge. If it is a faculty of rules, and not of cognition, reason itself must be served by action for it is only through action that understanding of the world, that is the formation of rules about the world, can be achieved. Without rules and concepts - a framework within which experience may be construed - no experience is possible. In action we presuppose that we determine the world by our actions and we derive rules about the world on the basis of our perception of the effects of such actions. Reason must therefore be primarily practical. (Note the similarity of this argument with that of Piaget.) The problem, as Macmurray points out, is that Kant's argument was based on the premiss of the 'cogito', that thought is primary and that reason is abstract and theoretical.

Besides the problem of formal coherence the Critical Philosophy is inadequate and this again is due to the fact that it takes the 'Cogito' as its starting point and centre of reference. Its inadequacy lies in the fact

that by assuming that thought is individual the system excludes the possibility of our understanding one another. If thought is essentially private, and if thought is the contrary of action, then thinking about another person can never constitute understanding of him. Fundamentally the problem lies in the dualism between theory and practice, or thought and action, or again Subject and Agent, which is instituted by making the 'I think' the primary postulate. What we need, Macmurray argues, is a philosophy which can account for the full concrete activity of the mind and the body together, a philosophy of action:

> (Linguistic philosophy) substitutes for the 'I think', the 'I say', and thought becomes that aspect of speech which makes it intelligible - its logical structure. Speech is public. It is at once thought and action ... as a result it establishes communication, and introduces the 'you' as the correlative of the 'I'. For if the 'I think' logically excludes the second person, the 'I say' makes the second person a logical necessity. The 'I say' is logically incomplete. To complete it we must formulate it as follows: 'I say to you; and I await your response'. Thus the problem of the form of the personal emerges as the problem of the form of communication. (Macmurray, 1957;74)

Macmurray therefore rejects Kant's premiss of the primacy of thought, claiming that this is contradicted by the conclusion that reason is primarily practical. Only a philosophy of action can be adequate, since it is only action that involves the 'full, concrete activity of the mind and body, the Self'. Our central concern therefore becomes not the study of thinking but the study of doing, and it becomes a concern with the study of selves acting in relation with one another rather than with the study of individual subjects.

The implications of the above are that if we are to provide an adequate account of the processes of human action and interaction we must do so within the framework of an approach which assigns a central role to the notions of the Self and Agency, and that it is to communication, construed as the exchange of information and the negotiation of relations between persons, that our efforts would best be

directed. Recent work by Trevarthen and others (Trevarthen et al 1975-9) seems to support this view, but as was pointed out above (pages 13 - 14) developmental psycholinguists have not always ensured that their treatment of communication is as defensible in psychological terms as it is in the terms of linguistics. The present author therefore proposes to examine the notion of Agency as a conceptual tool providing a framework for the description of the behaviour of young children and their mothers, and as a category in case grammars. These are directed to an attempt to describe the developing cognition of Agency in young children, and to an examination of the justifications for the claim that the child is able to encode the semantic category 'Agent' in his early linguistic utterances. Any account of knowledge of this kind is necessarily an account of the interpersonal and, it will be argued, requires an approach somewhat different to that of most of Psychology which takes as its object of study the individual Subject.

> Only someone who is a participant in (the) hermeneutical circle (the whole complex of a person's conceptual systems and psychological make-up) can understand the meaning of (an) agent's actions, for that meaning is given by the agent's own conceptual and psychological systems, and cannot be adequately captured within any other systems. And it is impossible for anyone to come to share the agent's own conceptual and psychological systems by applying the methods of natural science to his behaviour, by observing that behaviour in a detached fashion and trying to frame laws setting forth or explaining physical regularities detectable in it. The possession of concepts and conceptual systems, of intentions, desires, beliefs, etc. does not manifest itself in any physically specifiable regularities in behaviour. (Gauld and Shotter, 1977;9)

0.4 Introduction Summary and Plan for Part I

In this introduction I have tried to argue that both logical behaviourism and physiological reductionism (Fodor, 1968) are inadequate to the explanation of human behaviour. I have presented in detail one argument supporting their

rejection; Chomsky's (1959) reply to Skinner's attempt to account for the learning and use of language from a behaviourist perspective (1957). I have then drawn on the work of Piaget and of Macmurray (1957) in order to outline the sort of approach I believe to be necessary for an investigation of the concept agency.

Chapter One is devoted to the derivation and explication of a notion of agency which is both coherent and adequate in itself and which can meaningfully be related with what is known of the young child's cognitive abilities. To this latter end a discussion is included - Section 1.2 - on the nature of cognitive representation and the form which the young child's cognition - including his cognition of agency - should be seen as taking.

Chapter Two carries the analysis forward, applying the central notions of intentionality and contingency to communicative behaviour and then deriving a framework, by reference to other theories of communication, within which the child's communicative activity and the cognition upon which it depends may be examined. Two other types of activity are identified as worthy of investigation; these are interpersonal routines and solitary activity. (Chapter Three describes the methods by which these three types of activity will be studied.)

My reasons for devoting a substantial part of this thesis to theoretical and methodological considerations are basically two. First, the blossoming of research on early communicative development and the borrowing of terms and ideas from related fields has led, I believe, to the inappropriate use and incoherent relation of some of these ideas. Some notion of agency, for example, is appealed to by many writers, but it has been explicitly defined and examined by only a few. The form of exposition followed here seemed to me the best way to make clear the assumptions upon which this work rests and the meanings of the terms used. For this reason also there is no literature survey

as such, but relevant work is referred to or reviewed at the point at which the discussion touches upon it most closely.

The second reason is more specific. In previous presentations by Myers (1979a, 1980) of a version of the procedure here described for the identification of a child's communicative intentions that procedure was criticised as behaviouristic. It is my purpose to demonstrate that this view is unfounded; that while the insistence on triad sequences of action in which the moves of mother and child are contingent upon each other and explicable by reference to one another is superficially of a behaviourist kind, the conception of the child underlying this procedure and the putative nature of his learning and knowing, and of his acting and communicating, deny any such affinity. Once again the best way to clarify this issue seemed to be a careful derivation of theoretical perspective and of the methodology appropriate to it.

PART ONE

Chapter One: Defining Agency

1.1 Some Previous Work

If the approach outlined above is reasonable the problem with which developmental psychologists are faced is that of describing how an apparently almost completely helpless neonate develops, or is changed, within a very short time, into a person, who is capable, within limits, of carrying out rule-governed mental operations, who can conceive and execute meaningful action, and who can interact and communicate with other similarly able persons. Since the neural mechanisms upon which these faculties depend are not, and may never be (see pages 7-8), accessible to us, all the developmental psychologist can do is to observe and describe the unfolding or development in the infant of these abilities to intend, to act and to communicate, and then to isolate and assess some of the more important influences on that development. What <u>are</u> available to us, however, are not just the unfolding or development of particular concepts, or of intentions of a particular kind, but the nascent processes of becoming intentional, and of becoming able to comprehend and to follow rules for action and for communication, both verbal and non-verbal. It was argued in the Introduction that an analysis in terms of Agency may shed light on these processes. Although Agency is a notion appealed to by many writers and students of child development comparatively few studies have set out specifically to examine the child's understanding of it, or of the factors which might be thought to comprise it. Most of those which have been carried out have involved observation of or experimentation with mother-infant pairs; I propose to leave the discussion of these until a later section (2.5). The discussion in this section will focus on two of these studies which have attempted to assess the comprehension of the individual child in isolation.

Golinkoff (1975) claims to have developed a methodology

'which permits a non-linguistic perceptual translation of action role concepts. The concepts of agent and recipient were operationalised by presenting action sequences on motion picture films in the serial presentation habituation paradigm and observing infants' visual responses' (1975;183). Forty eight male infants between the ages of 14 and 18 months and between 20 and 24 months were used. All the infants were presented with two films, one involving two actors, a man and a woman, and the other an actor and an object, a man and a table. Each film portrayed four different events. The first (the Standard condition) showed the man pushing the woman (or the table) from left to right. The second (Position Direction Reversal) showed the man pushing the woman (or the table) from right to left. In the third (Action Role Reversal by Position) the woman (or the table) pushed the man from left to right, and in the fourth (Action Role Reversal by Direction) the woman (or the table) pushed the man from right to left. Each of these events, which lasted approximately six seconds, was repeated to give six successive re-enactments in a block of trials. The Standard block was repeated before each of the three experimental blocks, making six blocks of trials per film, or a total per film of thirty-six scenes eighteen of which were identical. Of the total of eight different events the two which involved the table pushing the man are described as 'anomalous' or 'maximally different from the standard event'. The main experimental hypothesis was that, if the infants have expectations about action role relationships then, these anomalous events would be 'greeted with increased attention and surprise'; scenes representing violations of the typical behaviour of animate and inanimate things should be looked at most.

As might be expected Golinkoff's results show a progressive habituation of the infants to the Standard blocks in both films. They also show that the infants spent less time watching those scenes in which the table pushed the man than they did watching those in which the woman pushed

the man. In fact the two blocks of anomalous events received the least attention of all the experimental trials. Because the habituation effect to the Standard blocks was greater in the Man-Table film than in the Man-Woman film, the difference between the patterns of looking at the standard vs the experimental blocks are larger in the Man-Table film, but this merely obscures the issue. For if the classification of those events in which the table pushes the man as anomalous represents a classification meaningful in terms of what the child knows, then the standard scenes presented immediately prior to an anomalous event, and the amount of time spent watching such standard scenes, should be irrelevant to his reactions to anomalous events, provided also that 'amount of looking' is a good measure of his perception of anomaly. If we accept Golinkoff's methodology, then, since the two anomalous events received the least attention of all the experimental trials, we are forced to conclude that infants, even at the age of two years, understand little or nothing about the action role distinctions between persons and inanimate objects. There is an extraordinary volume of work which suggests this is not the case (see Section 2.5). It is worthwhile to point out here that all of the infants in this study were over the age at which the infants in the study by Greenfield and Smith (1976) are claimed first to have encoded the semantic category Agent in their single-word speech. If there is any basis to the current assumption that the semantic and cognitive underpinnings of language develop prior to the syntactic and phonological systems (Bates, 1976; Brown, 1973; Edwards, 1973; Greenfield and Smith, 1976; Macnamara, 1972), a view apparently held by Golinkoff herself, then the appropriateness of her methodology to the study of infants' understanding of semantic relations must be seriously questioned.[1] We shall return to this point in a moment.

Central to the notion of Agency is the idea of voluntary

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[1] The question of what might constitute 'understanding' for an infant is discussed in the next section.

or intentional action. Only an agent is capable of such action. Other classes of action, or, more precisely, of movement, are involuntary movements and object-like movements, both of which are non-intentional. A number of researchers have investigated in the laboratory the ability of children to distinguish between intentional and accidental action sequences, and have generally concluded (e.g. Berndt and Berndt, 1975; King, 1971) that it is not until they are five or six years of age that children are able to do so reliably. Smith (1978) argued that these studies had overlooked the complexity of the distinction between voluntary and involuntary action, and that one must also take into account the effects of such actions. It is often, he claims, by our perception of the reactions of a person to the effects and consequences of his actions that we are able to judge whether or not those effects were intended; this in turn provides us with evidence as to whether or not the action itself was intentional.

Smith's subjects were four-, five- and six-year old children, and adults. He presented them with two series of video-tape films of a single young woman. In the first series she performed four Voluntary, four Involuntary and four Object-like movements. In the second series she performed the same action eight times, watching what she was doing in four of them and not watching in the other four. Two of the four actions within each of these five types had desirable effects and the other two had undesirable effects; in other words, of the total of twenty actions, ten had desirable effects and ten had undesirable effects. The subjects were interviewed individually. After each sequence they were asked questions of the form: 'Was she trying to do X?', 'Did she want to do X?', designed to reveal whether or not the subject had interpreted the young woman's actions as intentional or unintentional; for all questions an affirmative answer implied the attribution of intention.

The results are interesting. The responses to questions involving the verb 'try' closely parallel the results for

questions involving the verb 'want', which Smith takes as indicating that: ...'both words tapped the same conceptual referent.' Certainly the subjects seem to have interpreted the words similarly at all ages. More interestingly, all of the subjects judged the young woman's voluntary actions as intentional, whereas only the four-year olds, and to a lesser extent the five-year olds, answered in the affirmative a significant number of those questions relating to her involuntary and object-like movements. Smith concludes that his results show '...clear age differences in the ability to recognise intentional action. The four-year olds tended to regard all acts/movements as intentional.' (1978; 740). There are several reasons for doubting such a conclusion. First, the questions are not counterbalanced, in the sense that an affirmative answer always implied the attribution of intention to the action being judged. This could easily have been avoided by including questions of the form: 'Did she do X by mistake?'. A consequence of the lack of counterbalancing is that if the children did not understand a question and simply concurred with the experimenter they will be presumed to have judged the action referred to as intentional. This is likely to happen more often for the younger than for the older children. Second, some of the questions themselves are anomalous. One scene showed the young woman tripping on the edge of a rug while walking across the floor, and falling into a chair. One of the questions asked was: 'Was she trying to trip?'. If the children understood the question, and the meaning of the word trip, they would know also that to trip is not something one usually tries to do. The less sophisticated younger children are likely to have been less able to cope with such anomaly and will have tended to agree with the experimenter, that is to reply in the affirmative. Third, the task for the subjects in this experiment is not that of interpreting in an everyday situation the behaviour of another person which may have consequences for the interpreter - which is something we do automatically and which

is clearly something that young children must also be able to do - but that of answering questions requiring a conscious verbal evaluation of the activity of a single person seen on video-tape film. The adult subjects in the study were far from being 100% correct in their judgements (the very notion of correctness assumes that the young woman's actions were always unambiguous), and it is noteworthy that the transition for the children occurs at about the age at which formal schooling begins. It may in fact be that the difference between the four-year olds and the six-year olds lies more in the degree to which they are accustomed to answering formal questions from adults than in their understanding of the actions they have observed. In the course of routine interactions we do not stop to reflect upon whether each movement we observe is or is not intentional. We do make such judgements, and act upon them, but these judgements tend to be neither conscious nor verbally mediated. While it is interesting that six-year old children are better able to answer questions concerning the intentionality of the actions of a young woman on film than are four-year olds this cannot be taken as indicating that four-year olds are unable to distinguish between voluntary and involuntary action. In Section 2.5 we shall consider a number of studies which suggest that even very young infants are able to take account, to an extent, of the intention structure of a co-interactant.

Although dealing with children quite different in age these studies by Golinkoff (1975) and Smith (1978) are similar in that they adopt a methodology for testing the child's understanding of presenting material on film to subjects taken individually. This practice seems to have two major shortcomings. The first is that it seeks to investigate an area of human competence which finds its normal expression, and its usefulness, in the context of mutual action and goal-directed behaviour under conditions in which these are effectively prevented. The second is that it produces results which quite clearly underestimate the child's abil-

ities as evidenced by studies using different methodologies. Since our ability to interpret the behaviour of others, and to adjust our own behaviour accordingly, depends upon and is useful in social situations where the effects and consequences of such behaviour are salient for us, it would seem appropriate to study the developing understanding and interpretive abilities of young children in situations where these factors may operate rather than in isolation where even the possibility of such salience is denied. Donaldson (1978) argues strongly that meaningfulness in the child's terms is perhaps the most important principle of all to be observed by developmental psychologists. The attempt to study inherently social abilities and capacities in isolation clearly violates this principle.

So far in this discussion the words understanding, comprehension and knowledge have been applied rather loosely to infants and young children. Before proceeding further we must try to clarify what might constitute 'understanding' in a pre-verbal or minimally verbal child, and make some attempt to assess the 'conceptual status' of a child at this stage in respect of the nature of his grasp of semantic relations and action roles. This is the subject of the next section.

1.2 Some General Comments on Representation

There is a danger, in talking of the achievement by the infant of an 'understanding' of a semantic category or relation, or of the infant's 'knowledge' of certain facts about his physical and social worlds, of implying that the terms 'understanding' and 'knowledge' as applied to children carry the same connotations as when applied to adults. The ways in which knowledge is represented by adults are by no means clearly understood, and the question of whether the principal mechanism is that of imagery or of some kind of

linguistic coding is far from resolution. Given this uncertainty it is impossible to say how similar, both in form and in capacities, the representational system possessed by youngsters in middle childhood is, in fact, to the representational system typical of adulthood. The authenticity of Piaget's concrete and formal operational stages have been seriously challenged, for example by Wason (1969). What does seem fairly certain is that the ways in which knowledge is represented in infancy differ markedly and in more than one respect from the ways in which it is represented in adulthood. We do not know whether the lack of a formal language denies to the child any capacity for 'reflective abstraction' or the possibility of 'linguistic coding' - there may be a 'language of thought' (Fodor, 1976) - but if these are available to infants they must have quite different characteristics to their counterparts in adult thought. Given this we must try to clarify what the terms understanding and knowledge are to be taken as meaning when applied to infants. It would be inappropriate here to present an account of the several controversies concerning 'the nature of representation'; it is, in any case, beyond the scope of this thesis. However, all theories of development presuppose, or at least set certain constraints upon, the kinds of representational systems with which they would be compatible. Some writers, such as Piaget or Fodor, have made explicit statements of their views on epistemology while others have not. It seems necessary to consider here the kinds of representation which the infant's, or the minimally verbal child's, putative understanding of Agency might entail, in order to arrive at some working definition of that 'understanding'. First we must look at what it is the child has to understand.

Broadly, the problem for the developing child is that of acquiring a culture in order to integrate himself, or to become integrated, into the social world into which he has been born. (Richards, 1974). As Gauld and Shotter (1977) point out:

> A child who acquires a culture has not merely acquired 'solutions', developed over long periods of time, to the problems involved in satisfying his biological drives, he has acquired a whole framework of thought, feeling, perception and action, a reality he shares with others. (1977;73)

The problems with which the child is faced are not those of discovering his biological drives and of finding his own solutions to them, while at the same time learning a set of rules for social and communicative behaviour, but those of learning what count as problems to those in his culture, and what count as solutions to them; learning, for example, that a referential language exists at all, as well as learning how it is used. And learning how to use a language is not simply learning a symbolic means of communicating what one already knows, it involves learning the types of concepts and categories which are permitted by the form of that language; it involves learning the nature of the reality within which problems and the solutions to them appear to the members of that culture or language-using community. It is difficult for adults, as competent and practised users of a language, to conceive of a perspective on reality different to that which their language permits. If this were not so, reliable communication through the use of their language would be impossible; in particular, referring expressions would be different in meaning for all speakers of the language. Furthermore, these differences in meaning would be inaccessible to any of the speakers of the language. Fodor (1976) maintains:

> Verbal communication is possible because, when U is a token of a linguistic type in a language L (understood by the speaker S and by any other suitably situated L speaker), the production/perception of U can effect a certain kind of correspondence between the mental states of the speaker and the hearer. (1976;103)

Such a correspondence could only be achieved if the speaker and hearer construe their reality in similar terms, that is if the speaker and hearer share in common the concepts and categories realizable through their language, and agree about the kinds of computational operations which can

be carried out in terms of them. It follows that any theory of communication must be embedded in a theory of cognition, and in particular that a theory of language development must intrinsically be part of a theory of cognitive development. Whether the emphasis adopted by the student of language development be on the syntactic, semantic or pragmatic aspects of language his theory or model must be congruent with some superordinate theory of development as a whole. And the question to which that theory must address itself is, How does the infant come to perceive the world, and to act in the world, on the same terms as do those around him?; how does he become a 'competent member of a social community'? (Richards, 1974). It is the knowledge allowing such competence which must be handled by the child's cognitive systems.

Just as verbal communication is a means of effecting a 'correspondence between the mental states of the speaker and hearer' (Fodor, 1976) so linguistic development depends, in part, upon the socialization of thought. Later in childhood language becomes, 'an important instrument of socialization, ... allowing the efficient transmission of cultural norms, of presenting absent realities, of allowing quick and abstract thought, and of facilitating the definition and communication of subjective experience' (Ryan, 1974), but this would be impossible unless the infant had already learned the rules for thinking upon which the competent use of his language depends. We shall return to this topic of the 'cognitive underpinnings of language' in Section 2.4. The immediate question concerning us is the form of the system in and through which the 'social construction of reality, or socialization of thought, might occur prior to the appearance of language', as the child begins to acquire his culture. What are the theoretical options on the form of this system?

We have already briefly discussed Piaget's theory of knowledge (Pages 15 - 17). For Piaget facts about the world are represented through schemata organized into a cognitive

structure which is relatively homogeneous during any one stage of development. The mode of cognitive functioning characteristic of the sensori-motor stage, which lasts from birth until approximately 18 months when language appears, involves thinking which is non-discursive. Sensori-motor schemas are imagistic in that they are simple, discrete representations of relationships existing between the child and his world; these schemas are the joint outcomes of perception and action and as such allow for no separation of thought (which consists only of these schemas) and action. It is conflict between these schemas which, through reflective abstraction, results in the formation of higher order rules or more abstract schemata. However, it is difficult to see how such conflict could be perceived unless, attendant to the capacity to form schemas, there exists some (rule-governed) system in terms of which sensori-motor schemas are to be compared. This requirement is precisely analogous to the argument presented by Gauld and Shotter against the ability of a generalised machine to form concepts (see pages 5 - 6); it is a point we shall return to in a moment.

Bruner's theory of early cognitive development mirrors Piaget both in its appeal to stage-like progressions in the mode of functioning and in its suggestion as to the characteristic nature of these stages. For Bruner cognitive development <u>is</u> the development of different ways of representing the world; the earliest representations are Enactive, that is indissociably involved with action, these are gradually replaced by Iconic representations, in which thoughts still resemble the things they are thoughts about, and finally by Symbolic representations, in which there may be arbitrarily little resemblance between the vehicle of thought and its object. (Bruner, 1973). In the theories of both Piaget and Bruner the child gradually comes to separate thought from action in his schemas, and his concepts of objects and events in the world become independent of the actions by which they are realised; they become freed from

the contexts in which they are formed. The acquisition of language, involving the conventional use of arbitrary signs, is seen as emerging from these developments.

There is little doubt that the notion of the schema, as a unit of knowledge of some form, is one of the most powerful descriptive tools presently available to us. Further, the idea that the nature of the schemas characteristic of different modes of cognitive functioning changes qualitatively in an ordered way in the direction of increased abstraction and generality is an intuitively appealing one. However, while we may accept that we can do no more at present than attribute the motivation for development to a 'desire for active mastery' (Donaldson, 1978), a problem remains concerning the mechanisms whereby schemas at any level may be compared and abstracted from. One solution, implicit in the definition of schema offered by Neisser (1976), is to associate with each schema a set of rules governing its range of application and disallowing any overlap with the range of application of another schema:

> A schema is that portion of the entire perceptual cycle which is internal to the perceiver, modifiable by experience, and somehow specific to what is being perceived. The schema accepts information as it becomes available at sensory surfaces and is changed by that information; it directs movements and exploratory activities that make more information available, by which it is further modified ... It is some active array of physiological structures and processes; not a centre in the brain, but an entire system that includes receptors and afferents and feed-forward units and efferents. (Neisser 1976;54 my emphasis)

This logically requires, and Neisser goes on to say it, that the infant must possess, prior to and independent of experience, some (discursive) system for ordering the information which experience affords:

> What babies do know, I believe, is how to find out about their environment, and how to organise the information they obtain so it can help them obtain more. (ibid.;63)

Our model of the infant's representation system must be broad enough to capture both these aspects of knowledge; the knowledge of information about the world, constituted

in schemas, and the knowledge governing the organization and inter-relation of this information, in a rule-system of some kind. The early forms of representation described by Piaget and Bruner do not seem adequate to capture both of these aspects. Fodor claims:

> What is conspicuously lacking in the Piagetian version is a theory that explains how the organism manages to differentiate its schemata in the right direction ... Piaget's views preclude his presenting such a theory since, on the one hand, he wants the characteristic difference between levels of equilibration (i.e. between stages of development) to consist in the expressive power of the 'logics' they invoke, and, on the other, he wants the mechanism of equilibration to be learning; ... these two desiderata cannot be simultaneously satisfied. (Fodor, 1976;91)

What Fodor goes on to argue is that, while it is altogether possible that some of the child's early knowledge can be described in terms of sensori-motor or enactive schemas, such schemas cannot constitute the whole of his knowledge; schemas must be organized within a structured internal code which shares many of the characteristics of a natural language.

A rather different solution is offered by Bower (1979). He describes an experiment which demonstrates, he claims, that what the child must represent on the basis of his perception of some event is a rather abstract, general description of that event. This information is transferable to other, broadly similar events. Only after repeated exposure to a particular event does the child's representation of that event become specific and non-transferable. The fact that the ability to transfer is lost suggests both that the form of the infant's representation moves from the general to the specific, and that the infant cannot retain both an abstract and a specific (schematized) solution to the same problem. Bower is claiming then that thinking progresses from the formation of abstract representations to the formation of specific representations which, ostensibly at least, disposes of the problem of how information might later be abstracted from initially highly specific schemas.

He does however explicitly allow the existence of rules governing the organization of these representations, be they abstract or specific. It could be suggested that what he is really describing is the process of schema-formation, and that the early, abstract form is simply an imperfectly-formed variety; its ability to transfer lies in its indefiniteness. However that may be, it is clear that for Bower also schematic knowledge cannot be the child's only cognitive faculty.

Fodor's book The Language of Thought (1976) is, in part, an attempt to argue that the possession of a discursive representational system is an intrinsic part of being human. One of the things which all humans do is form concepts, and, he argues, simple learning cannot adequately account for this process. For concept-formation involves generating hypotheses and testing them against experience, which requires both a source of inductive hypotheses and some form of confirmation metric existing prior to that which is learned. This is just as true of infants as it is of adults; if there is a means by which the infant can compare and integrate discrete schemas this faculty must be rule-governed, and these rules must be represented in some way independently of the iconic or imagistic representations upon which they operate. Infantile thinking cannot only consist in the capacity to form S-R representations, it must also be a faculty for the derivation of rules:

> Even if Bruner is right and the vehicles of reference are different for adults and children, the mechanisms of reference - whatever they are - must be pretty much the same for both. (Fodor, 1976;184)

We may note in passing that Fodor is arguing that Chomsky's advocacy of a Language Acquisition Device must be broadly correct but that, since learning a natural language is a matter of hypothesis formation and confirmation, and since it is therefore impossible to learn a language whose terms express semantic properties not expressed by the terms of some language (of thought) you are already able to use, the LAD must in fact form part of a general cognitive

faculty. Chomsky's recent writing (e.g. Chomsky, 1976) seems to endorse this view.

We may now ask the question, What does it mean to talk in terms of the child's understanding of Agency? Adults are not ordinarily able to produce any explicit and accurate verbal definition of concepts like that of agency, yet we should not assume that they are not 'versed' in such concepts. They conduct their lives in the clear appreciation that other people have intentions, and do things related to realizing them, and that their own intentions are communicable to others - social action of all kinds depends upon just these abilities. As Smith (1978) points out, we use the effects and consequences of the actions of others in assessing whether or not these actions were intentional. And we know from our own experience what it means to do something on purpose or by accident. I hope to demonstrate that infants, also, behave in ways which demonstrate that they know the difference between something done on purpose and something done by mistake, both in their own behaviour and in the behaviour of others. They know the difference because, in Donaldson's (1978) phrase, it makes 'human sense'. If Fodor is right and it is true that systems of representation differ between infancy and adulthood in the form and complexity of their 'vehicles' rather than in their nature and discursive mode of operation, then the principal difference between the 'understanding' of infants and adults resides not in whether or not concepts can be inspected, manipulated and abstracted from but rather in the complexity of these concepts and the form in which they are available for inspection, manipulation and abstraction. There may very well be qualitative differences between the kinds of concepts in which children of different ages are able to deal; this would not at all prejudice the claim that the rules and constraints governing their operation remain broadly similar - are, in fact, an inevitable function of the structure of the human nervous system itself. If, as seems likely, such qualitative differences do exist, then,

in addition to the fact that infants are unable to communicate their thoughts to others - or presumably to themselves - in words, that which their thoughts are about must also be different; their knowledge and understanding must be different, in ways which are probably systematic but about which we as yet know relatively little. I accordingly propose to use the term Cognition to describe the infant's conceptual knowledge. Cognition should be taken as meaning: knowledge, in some form indefinitely similar to that characteristic of adulthood, of some group of facts about the world which may or may not coincide with a grouping of facts, that is a concept, typical of adult thinking. In attempting to describe the child's cognition of Agency we shall inevitably be comparing the infant's cognition with that of adults; hopefully this is a lesser evil than comparing their understanding, which term usually implies reflective awareness.

1.3 Two Kinds of Agent

It was pointed out in the Introduction that linguists such as Fillmore (1968) and Chafe (1970), in trying to arrive at semantically based analyses of language, have drawn upon the notion of Agency as one of the components in their case-grammars. In studying the development of the ability to communicate and to use language in young children some psychologists (such as Greenfield and Smith, 1976; Bates, 1976) have used case-grammars as the foundation of their approach; I have briefly mentioned some of the reasons for caution in such a procedure (see pages 13 - 14). I have also attempted to argue that, nevertheless, Agency is central to the study of communication, when this is construed as the exchange of information and the negotiation of relations between persons, and indeed that the study of agency is the most promising line for such an inquiry. Communication in

its broadest sense includes the 'kinesics' and 'bodily communication' studied by Birdwhistell (1970) and by Argyle (1975) and his co-workers as well as formally linguistic communication. Only a synthetic approach, drawing on data and ideas from all fields of communication, seems adequate for the study of communicative development. The potential for inroads in both the study of social competence and, specifically, the study of language development afforded by semantic categories and relations seems to me indisputable. In Section 1.1 it was argued that certain methodologies and experimental techniques are inappropriate to the study of the child's cognition of agency, and that the procedures used should be those most conducive to the demonstration of his ability by the child; those which maximize the information he can give us as to the state of his cognition, involving, I have argued, situations and events which are meaningful and salient for him. The rest of this chapter and the whole of the next are devoted to an attempt to 'unpack' and operationalize this abstract concept, Agency. In the interests of continuity the relevant literature is discussed in appropriate sections rather than en masse. To alter slightly Fillmore's (1968) definition, an agent could be described as 'the typically animate instigator of the action identified by the perceiver'.[1] This description, although it obscures the fact that in everyday life we do not usually consciously identify or perceive most of the actions of those around us, does at least capture the facts that actions of our own are to be included as well as those of others and that it is through their actions that we judge the aims, goals and intentions of other persons. Immediately therefore, we must distinguish between our cognition of ourselves as agents, which we know directly, and our cognition

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[1] This definition should not be taken as implying that no event can be an action, that is be performed by an agent, unless it is independently witnessed, since a) the agent is necessarily his own witness, and b) it is impossible ever to identify an unwitnessed action.

of others as agents, which we know only indirectly, perhaps by induction from our knowledge of ourselves - but this is to anticipate; let us first look at each of these more closely and then consider how they might arise and develop.

Cognition of one's own agency consists in the ability to do things for oneself, to develop goals and the strategies for achieving them. It involves learning about and exploiting the contingent relationships that exist between actions of our own and events in the world; it depends upon the derivation of rules about the way the world is ordered. It also involves our ability to conceive and execute goal-directed strategies or ordered series of actions: it depends upon the development of intentional structures. In short it consists in learning what sorts of things it is possible to do and how it is possible to do them. One of the things involved in these processes is the discovery that quite often other people can help us to do, or can do for us, things which we are unable to do ourselves. Learning how to enlist the help of others, then, is part of what discovering our own agency involves. But enlisting the help of others must involve our cognition of <u>their</u> agency: it depends upon our recognition that they too are capable of achieving reliable effects through their actions in the world, (and even that their abilities may exceed our own) and that they are capable of comprehending our attempts to communicate our wishes. Now neither of these cognitions seems logically prior to the other and one could not a priori say that the child must master the one before the other. For just as it would be possible to argue that only after he had learned through his own experience that it is possible to <u>act</u> in the world could the child possibly conceive of others as acting also, so we could argue that it is only through the attentions and responses of others that the infant ever reaches the stage of being able to act independently of them; that, initially at least, the situations engineered by others constitute the infant's only experience of contingent relationships in the world, and without which he would neither

survive nor develop. Good arguments could be made in favour of both of these hypotheses, but these arguments could not be such as to exclude the alternative hypothesis. Because the child is learning simultaneously about his own agency and that of others it seems probable that experience of these two kinds is mutually beneficial and that each provides 'building-blocks' for the other. Certainly, an apprehension of contingencies and the ability to intend are involved in both cases. In the child's terms there may be little difference between using an adult to achieve a desired end and using another object, for example to bring a desired object within reach. Bates (1976) considers the possibility that adults are initially perceived simply as rather complicated mechanical objects, while Piaget's notion of Animism, on the other hand, refers to the attribution by the child of animate (human-like) qualities to ordinary toys. However this may be, 'self-as-agent' and 'other-as-agent' are logically separable and, since children engage in solitary activity and they engage in mutual, co-operative activity with others, and since the nature of these episodes differs, it seems sensible to deal separately with the evidence afforded by each. The next three sections are given over to an attempted analysis of agency, and to discussion of what appear to be the common factors in the cognition of agency, that is Contingency and Intentionality.

Two caveats are in order at this stage. First, the distinction between self-as-agent and other-as-agent is a methodological one and may not constitute a real distinction in the terms of the child's cognition. Indeed if learning of each kind really is mutually beneficial then the distinction is <u>only</u> a methodological one, and its validity or usefulness must be examined afterwards. Second, the evidence of Piaget and others shows clearly that children do not always succeed in integrating schemas derived in different circumstances or situations and, therefore, evidence as to the child's cognition in one sphere of activity cannot constitute counter-evidence as to his cognition in any other

sphere of activity. There can be no requirement that the child's apparent abilities should 'make sense' in the terms of adult thinking. Bower's (1974) account of the development of the object-concept is one example of a 'counter-intuitive' theory.

1.4 The Components of Agency

Macmurray (1957) argues that only a 'philosophy of action' can be adequate to take account of the full concrete activity of the mind and the body together (see pages 18 -20). The objectives of all our primary knowledge are, he claims, practical ones, and it is 'this knowledge, itself an aspect of action, to which all reflective theory must refer' (op. cit.; 12). In the present context, this view of knowledge and of action requires that for a child to act as an agent he must 'know' **how** to do so; his cognition of self-as-agent is evidenced by the extent of his ability to do (at least some of) the **things** that agents can do. And we, as adult observers and interactors, can assess the state of his cognition in different circumstances on the basis of those actions he performs or attempts to perform. We are able to do so because:

> We do not need to refer to generalisations (about how people usually act) in order to understand their actions, nor does it seem that in most cases reference to the generalisation adds anything to our understanding of the actions. We 'understand' why people who have intentions do what they believe most likely to fulfill those intentions because we know 'from the inside' that this is part of what is involved in having an intention. And there is no other way of knowing what is involved in having an intention. ... One's understanding of intentions depends upon one's capacity to intend and not upon the observation of numerous examples of intending. (Gauld and Shotter, 1977;87)

Similarly to the extent to which the infant behaves towards others, and especially towards his mother, as if they were agents he must 'know' that others besides himself

are able reliably to cause effects in the world; his cognition of other-as-agent is manifest in his ability to communicate and engage in co-operative activity with others.[1]

In the previous section I suggested that the cognition of agency, or, what is the same thing, the ability to perform actions in the world, depends primarily upon two things: the derivation of rules about the way the world is ordered, and the development of intentional structures. These, respectively, provide the mechanism and the motive for the execution of meaningful action, and I take it that these requirements are similar in principle regardless of whether the agent in question is acting independently or in concert with others. When others are involved their behaviour becomes one aspect of the world about which a prospective agent must form rules.[2] Evidence exists which suggests that the abilities to detect contingent relationships and to set out to do so on purpose are present within a few weeks of birth (Watson, 1973). Each of these is examined in more detail below.

It is not sufficient, however, for the developing child to be endowed with a capacity and a desire to achieve mastery over his environment; the ability to become an agent. If such processes were to operate uniquely for each individual there would be no possibility of a group of individuals coming to construe the world in similar terms. In other words, there would be no possibility of the development and transmission of culture. As we argued above (pages 32-34) part of what acquiring a culture involves for the child is the

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[1] The child can of course be wrong, in adult terms, as when, for example, he treats a toy or an animal as if it were a human interactant. Being wrong on purpose, on the other hand, is a common form of play throughout childhood, and should be distinguished from 'mismatches' with adult cognition.

[2] In Chapter 4 I shall provide some evidence in support of the hypothesis that one reason for the commonly observed 'fear of strangers' in the second six months of life is that strangers violate the rules for communication and interaction which the child is deriving through contact with his mother or principal care-taker.

socialization of his thought, a process whereby he comes to adopt the framework of thought, feeling, perception and action characteristic of his culture. I now want to argue that this could only occur through communication, and, therefore, that communication, both non-verbal and verbal, enjoys a privileged role in the process of the child's developing cognition of agency. For the task facing the child is not simply that of becoming a person capable of intentional action but of becoming a person capable of actions which are intelligible and relevant to those around him. The value of culture lies in its cumulative nature and in the scale of the effects it permits us to have upon our environment, and although this requirement of conventionality at first places greater demands upon the developing child's learning ability it very soon greatly increases his scope as an agent. Learning to communicate seems to require of the child these same basic abilities, to derive rules and to encode intentions, but it adds a further dimension to his capacities; that of engaging with others in mutual, co-operative activity. The cognition of other-as-agent is, then, an integral part of what is involved in becoming a full-fledged human agent and is not simply a by-product of that development. In Chapter 2 we shall try to develop a framework within which to study the cognition of other-as-agent. We first turn to the evidence concerning the ability of infants to detect contingent relationships and to do so intentionally.

1.5 Contingency Detection in Infancy

If we are going to make the claim that the ability to detect contingent relationships is an essential pre-requisite to meaningful action, including communication and the mastery of language - since the use of language is one kind of action - then we must show that the infant is at least

minimally able to recognise and exploit the conditions which obtain within his world. If this can be shown to be so it is reasonable then to examine the development of the processes rendered possible by this faculty. If it cannot, the methodology of explanation by purpose must be abandoned as untenable. For our purposes here it will be sufficient only to demonstrate the existence of the faculty of contingency detection; I propose to leave any discussion of the specific abilities to which this faculty may lead, particularly with respect to communicative, social and linguistic development, until the next chapter, and to examine evidence only as it pertains to the existence of the rule-forming capacity itself.

Piaget has written widely on the understanding of causality by children, claiming that this understanding 'becomes objective and adequate only at the end of a long evolution whose initial phases are centred on the child's own action, while he is still unaware of the spatial and physical connections inherent in the material causal schemes'. Piaget argues that during the early period, up to about $4\frac{1}{2}$ months (sensori-motor stage III), although the child has begun to enact various schemes, that is to manipulate objects in an intelligent way to some extent, he still 'knows no other cause but his own action, and is not aware of the necessity of spatial contact'. This early notion of causality is described as 'magical-phenomenalist'; 'phenomenalist' because the contiguity of two events is sufficient to make them appear causally related, and 'magical' because it is centred on the action of the subject without consideration of the spatial connection between cause and effect'. After this time, from s-m stage IV onwards, 'the child begins to react to persons in a more and more specific manner because they behave differently from things, and because they behave according to schemes which bear some relation to the schemes of the child's own action. Sooner or later there is established a kind of causality whose source is others'. (Piaget and Inhelder, 1969;17-24) There

are two points to be made here. First, we have already discussed the distinction between cognition, as the mental process underlying action, and understanding, as used here by Piaget to mean a grasp of the mechanics of a cause-effect relation. Just as it is unnecessary for us to be aware of the precise nature of the operation of an internal combustion engine in order to be able to drive a car, so it is unnecessary for the child to be aware of the precise nature of the relation between an action and an event in order to be able to exploit that relation. The child will be unable to repair the relation should it break down, but as long as it obtains he will be able to exploit it once he has perceived that it exists. The detection of a contingent relation is, then, different from understanding the basis of that relation. Second, since in Piagetian theory knowledge develops by reflective abstraction from schemas based in perception and action, the child could not achieve an understanding of causality unless he had already perceived the existence of a number of contingent relationships. In Piaget's terms, the formation of a sensori-motor schema is, precisely, the perception of a contingent relationship between an action of the child's and some event in the world. Although we have disputed some aspects of Piagetian theory, this conception of the nature of schema-formation is one which we fully accepted. In theoretical terms then, contingency-detection is essential to cognitive development. Can we find experimental evidence to support this viewpoint?

Watson (1973) was interested in the learning abilities of young babies, and particularly in their ability to detect relationships between their own behaviour and events in the external world. He set up a number of situations for the babies he studied, and observed their discovery of the conditions he had arranged. All the relationships which Watson arranged involved movements commonly produced at random by infants such as head-turns and kicks of the feet. His work is relevant to this discussion in two ways. He showed that infants of under two months old can recognize that it is one

turn of their head to the left, for example, which was responsible for switching on a projector display, or for the sweet-tasting substance they received in their mouth. He showed that there is a large number of such simple 'links' which very young infants are able to appreciate. Watson's second point is that, almost invariably, in the process of discovering how to repeat an event which had first happened by chance, that is as a result of random movement, an infant will smile vigorously. This smiling, he claims, indicates an intellectual pleasure at having discovered something about the causal structure of the world.[1] It matters little that this relation has been created artifically by an adult and is of only a temporary nature. Watson concludes that 'the games adults play with infants are all basically contingency-detection games - between some behaviour of the child and a response (poke, tickle, 'boo') by the adult ... People become associated with the pleasure that is inherent in the game of contingency-detection'. (Watson, 1973). The implications of this conclusion are extraordinarily far-reaching.

Other researchers too have performed such experiments with results similar to those of Watson. Siqueland and Lipsitt (1966) found that babies only a few hours old could learn in about ten trials that, on hearing a buzzer, a head-turn to the left resulted in their receiving a sweet-tasting solution, while, on hearing a tone, a head-turn to the right had this result. Supporting evidence of a similar kind has been presented by Bower, Broughton and Moore (1970), Carpenter (1974), Dunkeld and Bower (1980), Uzgiris and Hunt (1975) and Wertheimer (1961), among others. Papousek (1969) discovered that infants are able to master quite complex problems if these are built up in gradual stages. Once a baby has detected a contingency he will usually stop performing, and will start again only if the contingency is changed. By allowing the infant to detect a simple action-event pairing, and by then altering the conditions so that two actions

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[1] This 'pleasure at discovery' is a point to which we shall return on page 55.

were required to produce the same event, Papousek was able to elicit fairly complex action sequences from his infants; for example, two head-turns to the right followed by two head-turns to the left. He concludes that what is important is not the actual characteristics of the event the baby is producing, nor is it the particular action or combination of actions which is required; what matters is that there be a relationship between a given behaviour and a given event in the external world. Babies will learn until they have discovered just what behaviour of theirs produces this event, which discovery results in vigorous smiling and cooing, not directed at the event in particular, but rather seeming to reflect some internal pleasure.

It would seem that infants from just a few hours of age onwards are indeed able to discover that it is possible for connections to exist between their behaviour and events in the world. On the basis of an event which is originally brought about by their random movement they will experiment until they identify just which movement is responsible. At that point, when a previously random movement comes to be performed in order to produce some event in the external world, that movement becomes an <u>action</u>. It becomes a movement performed 'on purpose' and about whose consequences its instigator has certain expectations; it becomes intentional. But we are now encroaching on the territory of the next section.

1.6 Can Infants 'Act'?

Many or all of the experiments described in the previous section could be taken as evidence of the conditionability of infants and, within the terms of operant conditioning theory, it makes perfect sense to interpret them in this way. One particular aspect of the subject's behaviour, occurring randomly under normal circumstances as part of

that subject's behavioural repertoire, is reinforced by an experimenter and achieves an enhanced frequency of production. One question which may be more difficult for a conditioning theorist to answer is why the identification of the behaviour responsible for the 'reward' should be a source of delight to the subject, though he could presumably argue that this delight simply reflects the subject's satisfaction at receiving the reward or reinforcer. However, as we have tried to argue in Section 0.2, while we may admit the value and importance of the principles of association learning and operant conditioning, a behaviouristic approach cannot be expected to provide either a useful framework or an adequate theory of the processes of human behaviour, and a broader, mentalist approach, involving reference to such notions as goal, purpose and intention, is required for the explanation of human action. Now a proponent of the behaviourist school would be entitled to ask whether, since we choose to interpret the child's ability to detect relationships between his behaviour and the receipt by him of, say, a sweet-tasting solution as evidence of his 'intentionality', and since rats in Skinner-boxes are capable of solving problems of a similar complexity, we are also suggesting that rats are similarly intentional beings. And if rats and other lower animals are to be seen as having intentions, wherein lies the particular value of this notion for the explanation of human behaviour? These are serious questions. To attempt to answer them we must try to clarify what is meant by the claim that infants are capable of <u>action</u>.

'Intention' is a notion which has puzzled philosophers for centuries and is not one which it is possible to treat both briefly and adequately. What we must rather try to do is to delimit those kinds of intention, or those interpretations of Intentionality, in which we are chiefly interested. There seem to be three rather different levels at which young children can be regarded as intentional beings; these will be briefly described.

In the first place, intentionality can be regarded as a

pure force whose expression is the continued existence of the organism; a motivation to grow and to develop, to fulfill the innate genetic, or epigenetic, potential of the organism. This kind of 'intention' must be characteristic of all living organisms; it is not an interpretation about which we shall have anything further to add. Secondly, intentionality can be contrued as the director of intelligence, that which is responsible for the desire to achieve 'active mastery' over the environment. Presumably, one way in which the organism endeavours to ensure its survival is through discovering the principles of operation of the environment in which it is to survive, insofar as it is capable of such discovery. This capacity is determined by its intelligence, its ability to derive rules capturing these principles of operation. A third kind of intention is that which is associated with particular actions, the intention to achieve some direct and fairly immediate goal.. It is this third meaning which has been used so far in this chapter in our discussion of Intentionality as the necessary corollary to contingency-detection for the performance of actions.

It seems clear that intentions of the third kind, that is intentions associated with particular actions, find their relevance within intentionality in the second sense above. To put this another way, besides achieving their immediate goals particular actions resulting in learning - assimilation and accommodation in Piaget's terms - increase the organism's cognition of its environment. An organism performs actions in order to test or modify hypotheses, in order to achieve active mastery over that environment. If this seems to attribute a great deal of 'structure' to the organism it must be pointed out that these capacities are precisely those which would be allowed by a discursive, rule-governed representational system, as discussed in Section 1.2. If the necessity of such a system is allowed, then to argue that the child's intentions are directed to achieving active mastery over his environment is to argue that intentionality is linked with intelligence; the intentions which the organ-

ism can entertain are constrained by the hypotheses and goals of which the organism is able to conceive. The organism's intentional structures are delimited by the rule-deriving capacities of its representational system. The capacities of this system are, in turn, given by the structure of the nervous system itself. Our answer to the behaviourist would, then, be as follows: Animals which have demonstrated their ability to learn associations and which are susceptible to operant conditioning must indeed be regarded as intentional in our terms, but the intentionality of different species is not therefore equivalent. Although all organisms seek to achieve mastery over their environment as a means to their survival, their capacity to do so is limited, broadly, by the structure of their nervous system, and therefore the intentional structures of which they are capable are qualitatively different. Only Man seems capable of constructing for himself codemic systems which significantly increase his ability to grasp and to order in hierarchical systems the relations which exist in his world. (See Bateson's (1973) notion of 'deutero-learning'.)

In this view, intentionality does not develop ontogenetically, but becomes realized through its expression in conceptual development; through, in man, the development of the ability to communicate and through its channelling in socially recognizable and understood ways - since other persons constitute a large and significant aspect of that environment which the child is attempting to master. Gauld and Shotter put this as follows:

> The infant's coming to act, to have concepts, frame goals and intentions and so on is not the upshot of some synthesis or compounding of behavioural elements each individually non-conceptual and non-intentional ... The development of the conceptual and the intentional can only be thought of as a process of the differentiation and unfolding of capacities in an organism which is ... inchoately proto-conceptual and proto-intentional or latently conceptual and latently intentional. (Gauld and Shotter, 1977;84)

If intentionality does not develop but achieves expression through the discovery by the child of the <u>means</u> of

achieving effects upon his environment, then the development of the ability verbally to encode communicative intentions, that is the acquisition of language, must be one aspect of the potential of the human nervous system.[1] To reiterate our point of page 38, the faculty of language acquisition must in fact form part of a general co_gnitive faculty. An examination of the notions 'communicative intention' and 'interactive act' and of how these may be studied in the young child forms part of the subject matter of the next chapter.

We have so far avoided confronting directly the question of what evidence there is for the proposition that infants can intend in the first place. What exactly would constitute evidence of this kind? In the Introduction Taylor (1964) is reported to have pointed out that there has never been agreement as to what the relevant evidence is which would decide whether or not human behaviour should be seen as purposive, and we concluded Section 0.2 by arguing that in such cases the value of a theory resides in the explanatory power which it affords. In other words, there cannot be evidence in any strictly empirical sense which would enable us to state that infants are, or are not, intentional beings, and our decision as to whether or not we should regard them as such must depend upon post-hoc explanatory adequacy rather than upon a priori logical grounds.[2] There can be no evidence other than the infant's behaviour to inform us of the kinds of things of which he is capable; he cannot inform us by any other means. The validity of regarding the infant as intentional, therefore, depends upon our being able reasonably to attribute purposefulness to some proportion of his behaviour. It depends upon whether we can reliably identify actions within behaviour much of which will be random.

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[1] Whether or not this faculty is uniquely human need not concern us here.

[2] This is not to deny that other kinds of explanation can a priori be demonstrated to be inadequate.

There are a number of criteria which can be used to assess the infant's behaviour which will be discussed in a later section (3.1), but one further point is worth making here. We must restrict our claims about the infant's capacity to intend to those intentions which are actually encoded, those which are mediated through immediate, particular and largely successful actions, since such actions are our only basis for claiming that intentions exist at all. To return to the experiments cited in the previous section, we take it that the infant's 'pleasure at discovery' of the behaviour of his responsible for the observed event is evidence of his intentions to cause that event to recur and, at the same time, to identify the behaviour of his which causes that event. The infant's reactions to his own success or failure can, I would suggest, tell us a great deal about what it is he was trying to do in performing some action. This in turn can tell us something of the possibilities and goals of which he is able to conceive. In assessing his cognition we could extrapolate from such instances to other situations of a similar complexity or logical structure but this would be ill-advised since we cannot know to what extent his cognition of any concept is integrated and coherent. It seems safer to restrict our claims about the infant's cognition to just those which are required for a full description of his identifiably intentional actions.

In this chapter I have tried to argue that the examination of the child's 'understanding' of agency through the methodology of testing subjects in isolation is unlikely to be worthwhile, and that agency is essentially an interactive notion. I have discussed the question of quite what is involved for the child in his 'cognition' of agency, and have then attempted to analyse the concept itself. Both when applied to others and to oneself, cognition of agency seems to depend upon the capacities to intend and to grasp or make sense of contingent relations in the world. Finally I have argued that the beginnings of these capacities can be demonstrated to be present, under the terms of our definitions,

in infants of just a few hours of age. The problem now becomes to describe the development or unfolding of the abilities to which these faculties lead, in particular the ability to communicate and specifically to use language. To do this we must examine rather more closely the concept of communication itself.

Chapter Two: Agency and Communication

2.1 The Application of this Analysis to Communication

One of the most ubiquitous ideas among students of child development is that infants must possess some more or less pre-determined 'intention to communicate'. This phrase is sometimes used interchangeably with the phrase 'communicative intention'. In attempting to refine a framework within which we may study the young child's developing ability to communicate I wish to argue that these phrases should be taken as referring to two quite distinct things, and that the tendency to treat them as synonymous is the source of a great deal of confusion. It disallows, in fact, the possibility of agreement among students of development as to whether the ability to communicate per se is innately given or is the result of social learning. This arises because the word 'Intention' is being used in different ways corresponding, I would suggest, to the second and third kinds described in Section 1.6. To say that children, in common with other animals, must be innately intentional, and that communicative intentions are a certain class of intentions, is not at all the same as saying that children must innately be able either to have or to express communicative intentions. It is altogether possible that children have to discover both the very possibility of communicating with others as well as the conventional means for so doing - that the ability to communicate is entirely a product of learning - but it is impossible that this should be so unless they are endowed with at least the potential for neural structures adequate to this process. I have argued that the organism's possible range of intentional structures is delimited by the rule-deriving capacities of its representational system, and that the intentional structures which develop are directed to enabling the organism to achieve active mastery over its environment. Now, other persons constitute a highly significant aspect of our environment, and the desire to communi-

cate with them, to enlist their aid and to engage in mutual, co-operative activity, must exist at the same level as the desire for active mastery; it is part of the same thing. Insofar as this desire depends upon intentionality, children must indeed possess the inborn 'intention to communicate', but this sense of that term is quite distinct from that connoted by 'communicative intention'. To clarify this distinction we may briefly anticipate a later discussion of Speech Act theory (Section 2.3). We may characterise a communicative intention as:

> A's intention, expressed in the performance of a communicative act, that B should recognise that A intends B should do or believe X;

where A and B are the addressor and addressee respectively, and X is some event. A communicative intention is therefore a specific case, inherently tied to and taking account of a certain state of affairs in the world. The expression of a communicative intention - that is, the performance of a communicative act - requires that A should employ a means recognised within a convention he shares with B. Ekman and Friesen (1969) argue that conventionality depends upon (i) agreement between the users of the system, and (ii) arbitrary coding of signifier and signified. It is clearly the case that such conventions, which include language, vary to a greater or lesser degree between constituencies of communicators, and that conventions must therefore be a product of social learning. If this is so, then the ability to express communicative intentions must equally be a product of social learning. What is not clearly established is whether the ability to 'have' communicative intentions, independently of their expression, must also be learned. Nevertheless, the child's having a communicative intention, however this may arise, is quite different from his having an intention to communicate; insofar as the intention to communicate falls within the aegis of the human capacity and desire for active mastery, whose extent and nature we can only guess at, any further discussion of this notion is beyond the competence of this thesis. In discussing the

nature of the child's cognition of agency we are, however, required to enlarge upon the possible source of his communicative intentions.

The expression of a communicative intention requires the learning of the conventional means for so doing; this chapter aims to arrive at a theoretical framework, based in the notion of agency, within which the child's cognition of other persons (who, if they communicate, must by definition be agents) as well as his cognition of the convention may be placed. These two are almost impossible to separate since, in a fundamental sense, the child's cognition of others depends upon how good he is at communicating with them. Of course the child is greatly helped by adults who, whether or not the child's early 'utterances' are communicative in the strict sense, nevertheless regard them as being so and act to fulfill the child's needs, as they perceive them, long before these needs are encoded in a form obedient to the conventions of the wider community. Joanna Ryan (1974) describes this process at the time when the first words begin to appear:

> Much of what a child utters in the early stages is difficult to understand if not unintelligible (though the) child's speech and other vocalisations take place within a context of interaction with adults who are motivated to understand the child's utterances ... Many children experience extensive verbal interchanges with their mothers. During these the mother actively picks up, interprets, comments upon, extends, repeats and sometimes misinterprets what the child has said. The grammarians' emphasis on well-formedness and semantic sense obscures the role of these interpreted exchanges in preparing the child for language use. (Ryan, 1974;199-200)

We shall argue later (2.4 and 2.5) that the grounds for language use are prepared well before the appearance of the first words, and that the ability to express communicative intentions is clearly present during pre-verbal interaction. During the pre-verbal period also, mothers attribute communicative intentions to certain of the child's behaviour; they act as if children are intentional from a very early stage, by picking up on and 'labelling' - that is, attaching a

certain significance to aspects of the child's behaviour. And this has important consequences for our discussion of the source of the child's communicative intentions.

In previous discussions of the ideas of Piaget, Macmurray and Fodor we argued that the source of the child's cognition lies in perceptuo-motor routines, called schemes, organised within a discursive system through which a process of abstraction may occur, leading to the formation of higher order schemas. We subsequently argued that, while intentionality, in some sense, must be seen as a 'given', that which the child may have intentions about depends upon the level of his cognition. Now if, as is here maintained, communicative intentions constitute one class of those intentions which are dependent upon his cognition, it follows that the child's ability to have communicative intentions, as well as his ability to express them, also depends upon his cognition; of the way the world is ordered, of what other persons are like, of the fact that communication is possible, of the sorts of things it is possible to communicate about and of the conventions of his constituency.[1] To restate this more simply, the child's having a communicative intention must be a faculty of learning. Now this is not a claim to be taken lightly since there is a mass of evidence which shows, some maintain, that the rudiments of communicative ability are present virtually at birth, ranging from the recognition of patterns roughly corresponding to the human face (Bower, 1966), to elementary 'gestures' and the existence of pre-speech mouthing movements and sensitivity to other persons (Trevarthen, 1974). Perhaps for the time being we may take these to be instances of the 'intention to communicate' and, as such, explicable in terms of the blueprint of the human nervous system. Though a pre-condition for

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[1] This constituency may initially be a very small one. Trevarthen and Hubley (1979) remark: 'Each mother-infant pair we have observed created together a unique repertoire of games. The habits of play evidently became the basis of a unique companionship in each pair'.

communicative development, this aspect is not relevant to our discussion. We are nevertheless obliged to show that it is at least reasonable to talk in terms of the child having to learn to have communicative intentions.

Almost from the moment of a child's birth his mother interprets certain of his behaviour as having meaning; it does at least have meaning for her whether or not it does for the child also. She distinguishes hunger cries and pain cries, for example, and acts so as to fulfill the child's needs as she perceives them. (See, for example, Wolff, 1966; Ricks, 1971.) We have already granted to the child the ability to construct schemas on the basis of his perception of the effects of his behaviour - that is, on the detection of a contingency between some behaviour of his and some event in the world - and we have argued (1.5) that this ability can be demonstrated soon after birth. One aspect of the child's cognition of self-as-agent could, then, consist in his gradual appreciation that he can instigate the relief of hunger or pain, and that different end-points depend upon different behaviours. Several mothers have reported to me a time, around four months, when their infants cried in their cots only to burst into smiles when the mother appeared. This may be an example of the pleasure which Watson (1973) argues that babies show upon discovering something about the causal structure of their world.[1] Such early learning experiences may be of paramount importance. Nelson (1974) argues that the kinds of meanings which the child can master and express are in part determined by the ways in which he is disposed to structure and interpret the world. And Piaget's claim is that the way the child structures the world depends crucially upon his own experience in it. It follows that the form and outcomes of early learning experiences with the mother may have important effects upon his later cognitive and communicative development. The

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[1] Or of 'play' in Piaget's (1953) sense, for the sheer 'pleasure of mastery'.

importance which Trevarthen (1977, 1979) attaches to the notion of 'intersubjectivity', and Garvey's (1974) 'formats' - habitual exchanges providing the basis for the interpretation of communicative intentions - point further to the idea that the child is dependent upon his mother in developing his communicative ability; that it is her attribution of communicative intention to his early attempts which provides the data for his learning. Donaldson (1978) points out that the child's only evidence as to whether or not his early attempts to communicate are orthodox lies in his mother's responses to such attempts. There is also the interesting fact that infants will often allow adults to 'define their intentions for them', by taking up and expanding the child's apparent meaning. Such selective 'reflecting' by the mother of the meaning which she takes the child's behaviour to have expressed would constitute a means for the child to learn what sorts of things count as communicable intentions within his constituency. Communication, even prior to language, becomes an instrument for the socialisation of thought. But the implications are larger even than this. For once the child has learned that it is possible to convey certain of his beliefs and desires within a conventional system, by virtue of occasions when such desires are ignored, refused or diverted he will learn also that communication can be used as a means for negotiating one's relations with other persons. As we shall see later this aspect of communication is important to our understanding of the child's cognition of agency.

We have now identified our problem as being to describe the development of the child's ability to express communicative intentions. (We take this to be the same thing as his 'having' such intentions; see page 54). Before going on to review some of the literature in the field of communicative and early linguistic development it may be helpful to restate the major points the discussion so far has attempted to draw out:

1. Theories in psychology tend to be of two kinds, those

which allow the existence of mental events and those which do not.

2. Theories which do not allow the existence of mental events are inadequate to account for human action.
3. Within those theories which do allow such events, knowledge and directed action are fundamental ideas.
4. The concept of agency is central to the explanation of directed action.
5. Agency is also a fundamental notion in semantic analyses of language.
6. The notion of agency can be used as a conceptual tool in studying the development of communication, which includes language acquisition.
7. We can make a theoretical distinction between the child's understanding of self-as-agent and of other-as-agent.
8. The agency of others is only salient to the child when it affects him directly and his understanding of other-as-agent cannot be studied in any other circumstances.
9. Early cognitive processes consist of schemes organised within a rule-governed, discursive system through which abstraction occurs.
10. Since we cannot know whether the pre-verbal child has any capacity for reflective awareness we should use the term Cognition to refer to his knowledge and understanding.
11. The child's cognition of self-as-agent and other-as-agent are probably inter-dependent.
12. The cognition of agency depends upon the derivation of rules about the way the world is ordered (contingency-detection and abstraction) and on the building of intentional structures.
13. The capacity to 'be intentional' must be innate, and is defined by the nature of the central nervous system, but its realisation and expression through action depend upon learning.
14. The nature of any particular intention depends upon the level of the child's cognition.

15. The 'intention to communicate' is part of innate intentionality, and is defined by the nature of the central nervous system.
16. The expression of a communicative intention requires the learning of a conventional system.
17. The nature of a communicative intention depends upon the level of the child's cognition.
18. Since the child's actions are our only basis for claiming that the child has intentions, including communicative intentions, we should restrict our claims to those intentions which are actually expressed.

2.2 Syntax or Semantics?

In a celebrated paper in Cognition, Bruner wrote in 1975:

> At the most general level, we may say that to master a language a child must acquire a complex set of broadly transferable or generative skills - perceptual, motor, conceptual, social and linguistic - which when appropriately co-ordinated yield linguistic performances that can be described (though only in a limited sense) by the linguist's rules of grammar. Such rules of grammar may bear no closer resemblance to the psychological laws of language production, comprehension and use than do the principles of optics bear to the laws of visual perception - in neither case can the one violate the other. (Bruner, 1975;256)

And again,

> The infant is not only learning ... what constitutes indicating something to another, or having something indicated to him, but he is also learning how to substitute new means for doing so in order to achieve less uncertain outcomes by the use of more ritualised techniques. When, finally, he reaches a stage at which lexical indicating is psychologically within his reach he already knows a great deal about the nature of indicative contexts and conventions for dealing with them. (ibid.;261)

In this paper Bruner reflected a changing conception of the way in which the language acquisition process should be viewed, from an emphasis on the child as constructor of the

grammatical rules of language in isolation, as it were, from his other accomplishments, to a broader, 'synthetic' view in which the child's ability to use language is seen as the product of a number of complementary and inter-related achievements. To help us to identify the sources of the ideas in this current view as are relevant to our discussion I propose to devote this section and the following two sections to a brief appraisal of the contributions made by linguists, by philosophers of language - especially with respect to Speech Act theory - and by cognitive psychologists. In Sections 2.5 and 2.6 we shall examine some recent work which builds upon these foundations, and attempt to draw together this work and our preceding discussion into a framework which we can use to study the cognition of agency prior to and into the beginnings of language use.

The impact of Chomsky's theory of transformational grammar on the study of language development lay in his assertion that the only way in which we can make sense of the child's ability to construct for himself the grammatical rules of language, in a relatively short time and on the basis of scanty and impoverished data, is to assume that the child is born with a knowledge (sic) of the highly restrictive principles of universal grammar and a predisposition to make use of them in analysing the utterances he hears about him. Chomsky argued that the language which the child hears is too incomplete, and too full of errors, distortions and hesitations to provide adequate data for language-learning in the way that an empiricist theory would require. Furthermore, an empiricist theory cannot account for the creativity - that is, the production of unlearned surface forms - which is observable in the language of very young children, nor could it account for the (likely) existence of universal grammatical features in all human languages. He was led to the conclusion that universal principles of language must reflect the structure or mode of operation of the human brain, and that it is this congruence between the principles of grammar and brain function which permits the child to develop

a creative command of his native language allowing him, very quickly, to understand and produce sentences he has never heard before. The problem for the young child was, in Chomsky's terms, that of discovering how to map his innate 'knowledge' of the deep structure of language into the surface forms recognised within his own particular language-using community, by means of the application of an ordered set of transformational rules, some of which apply cyclically. The transformational rules, by virtue of their universality, must also be innate and constitute part of the language acquisition device. The mapping process which the child must master therefore consists mainly in learning the surface structure forms characteristic of his community in time with the unfolding or maturation of his genetically-given language structures.[1] Within the transformational grammar approach two lines of work have conspired to determine the emphases adopted by students of language acquisition. These are the work of psycholinguists, submitting Chomsky's ideas to psychological scrutiny, and the challenges to standard theory from other linguists. We shall briefly examine these in turn.

The publication of Aspects of the Theory of Syntax (1965) marked the effective beginnings of the discipline called psycholinguistics, although some psychologists, notably George Miller (see, Chomsky and Miller, 1958), had been interested for some time in the implications of generative grammar for the investigation of the psychological processes underlying linguistic performance. Psycholinguists set out to test experimentally the psychological validity of the transformational processes invoked by Chomsky's standard theory, measuring, for example, the time taken by normal speakers and hearers to process linguistic structure of varying complexity. Two major reviews of work in this field (Fodor, Bever and Garrett, 1974; Clark and Clark, 1977) point to the conclusions that there is no direct link between

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[1] Sources: Allen and Van Buren, 1971; Chomsky, 1957, 1965, 1972, 1976; Lyons, 1977

transformational complexity and psychological complexity and that, for methodological reasons, it is almost impossible to separate the components of syntactic processing and semantic processing in the comprehension of sentences. During this time Chomsky himself has begun to devalue the notion of deep structure in the semantic interpretation of sentences. Where previously the interpretation was determined jointly by the deep-structure and the surface-structure, in Reflections on Language (1976) he writes: 'A suitably enriched notion of surface-structure suffices to determine the meaning of sentences under interpretive rules.' He has also begun to refer to linguistics as a branch of cognitive psychology, though insisting upon the importance of generative grammar for the investigation of the structure and predispositions of the human mind. These developments have been partly responsible for the adoption by psycholinguists of an approach involving a greater interest in semantics, and in the importance of taking into account all of the contextual and acoustic information that a hearer may use in interpreting an utterance. Yet an emphasis on the central role played by syntax dominated child language studies until the early 1970s. In 1973 Bowerman wrote:

> The form of a particular grammar is adequate only to the extent to which it accurately represents the knowledge of sentence structure available to a speaker of the language. (Bowerman, 1973;10)

Brown, Cazden and Bellugi (1969) had written:

> The most demanding form in which to pose the question of the child's knowledge of structure at any time is to ask for a generative grammar that represents his knowledge.

Bowerman's 'ideal' grammar for one of the children in her study, a 23-month old boy called Seppo, consisted of a table of 'syntactic interpretations' of his utterances and a list of the syntactic classes required to represent his speech. (See Bowerman, 1973;10Footnote.) Table 1 (below) presents a summary of the grammar for Seppo at MLU 1.42. Similarly, Braine (1971) wrote in the introduction to his survey of work on the 'acquisition of language':

> This review is concerned only with the acquisition of linguistic structure. Thus, work on child language where the concern is with social and/or intellectual development will not be reviewed.

However, within the field there were signs of a more semantically-oriented approach. Bowerman's (1973) final chapter examines the same data under a case-grammar analysis, while Bloom (1970; 1973) and Brown (1973), looking at the one-word stage before syntax, adopt a view quite different to Chomsky's.

Table One

Summary of the Grammar written for Seppo at age 23 months; MLU 1.42

Syntactic Interpretation	Construction
Subject - Verb	N + V
Verb - Object	V + N
	N + pois, 'away'
	N + kiinni, 'closed'
Subject - Object	N + N
Subject - Verb - Object	N + V + N
Noun - Locative	N + N
	N + Proloc
	Proloc + N
Modifier - Noun	N + N
	Adj + N

Syntactic classes needed: Noun, Verb, Adjective and Prolocative.
(Nouns were sub-divided according to the case notions, Animate - Inanimate, Vehicle - Nonvehicle.)

Source: Bowerman (1973)

The new emphasis on semantics sprang in part from the challenges to standard theory made by other linguists. Two of these have been the approach of 'generative semantics',

which treats the rules of the semantic component as generative in themselves rather than merely interpretive - that is, involving the assignation of a semantic representation to the output from the deep structure base-component as in Chomsky's view - and the 'case-grammar' approach advanced by Fillmore (1966, 1968, 1971). Although generative semantics is generally taken to be the more serious of these challengers (Lyons, 1977), involving as it does an overturning of Chomsky's central idea of the relation between the syntactic base-component and the semantic component which receives input from it, it is not directly relevant to our discussion. The emphasis on meaning-relations adopted by such workers as Bloom (1970; 1973), Brown (1973), Clark (1973), Halliday (1975), Schlesinger (1971) and many others involves the consideration of ideas from outwith the field of transformational grammar, or the structure of language. And there is not, as Lyons (1977) points out, any well enough developed post-Chomskyan model of generative grammar available to allow psycholinguists to choose between them, or to derive precisely formulated general psycholinguistic hypotheses. This has led, he suggests, to a flexibility in the choice of theoretical frameworks and methodologies. However, certain ideas from Fillmore's case-grammar approach have been appealed to quite directly by a number of developmental psycholinguists (for example, Bates (1976); Greenfield and Smith (1976); Rodgon (1976, 1977) and his 'case for case' merits our attention here. The semantic grammar approach has of course been hotly disputed by Chomsky on the three grounds that such grammars either do not tally with the empirical data, or they are logically inconsistent, or they are merely notational variants of the standard theory, different in expression but not in substance.

Fillmore's argument against standard theory seems to rest on three main points. First, that although syntax is a central notion, categories like 'subject' and 'object' are relatively superficial, their definition varies from language to language, and they play no part in determining the meaning

of the sentence as such. As Fillmore puts it:

> No semantically constant value is associated with the notion 'subject of' ... and no semantically relevant relations reside in the surface subject relation which are not somewhere also expressible by 'labelled' relations. ... All semantically relevant syntactic relations between noun phrases and the structures which contain them must be of the 'labelled' type. ... This eliminates the category VP and makes the relation 'subject' exclusively a surface-structure phenomenon. (Fillmore, 1968;17)

The second point is that the assumption that the case forms of nouns can be assigned in straightforward ways in the semantic component on the basis of simply defined syntactic relations - in the output from the base -component - 'seems to be based too much on the situation with English pronouns'. Fillmore is challenging the basic assumption of generative grammarians that 'case' is not present in deep structure at all, but is merely the inflexional realisation of particular syntactic relationships. His third point supports this challenge, arguing that there are many semantically relevant syntactic relationships involving nouns and noun phrases and, although these are largely covert, they are empirically discoverable and they form a specific finite set. In other words, case notions do deserve a place in the base-component of grammar. The modification of standard transformational grammar which Fillmore proposes suggests that the sentence in its basic structure consists of a proposition (P) in a certain modality (M); the proposition consists of a verb and one or more noun phrases, each associated with the verb in a particular case relationship. (See Figure 1.) The verb occupies a central, or pivotal, role in the sentence; each verb governs a set of obligatory and/or optional deep structure cases. Each case relationship may occur only once in a simple sentence. The cases:

> comprise a set of universal, presumably innate, concepts which identify certain types of judgements human beings are capable of making about the events that are going on around them, judgements about such matters as who did it, who it happened to, and what got changed. The

cases that appear to be needed include:

Agentive (A), the case of the typically animate perceived instigator of the action identified by the verb.

Instrumental (I), the case of the inanimate force or object causally involved in the action or state identified by the verb.

Dative (D), the case of the animate being affected by the state or action identified by the verb.

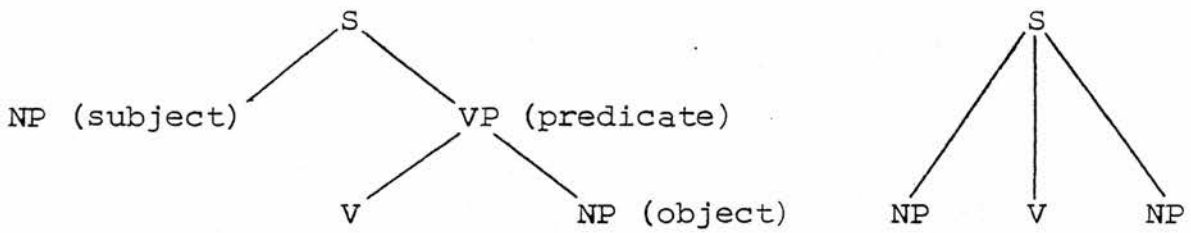
Factitive (F), the case of the object or being resulting from the action or state identified by the verb, or understood as a part of the meaning of the verb.

Objective (O), the semantically most neutral case, the case of anything representable by a noun whose role in the action or state identified by the verb is identified by the semantic interpretation of the verb itself.

(Fillmore, 1968;24-25)

Figure One

Comparison of Fillmore's suggested analysis with that of 'standard theory'.



Source: Fillmore (1968)

Most grammarians admit that notions of agency and causation are of more obvious semantic relevance than are the grammatical relations associated with the distinction between subject and predicate or between subject and object. Yet most would hesitate to agree with Fillmore that:

> If it is possible to discover a semantically justified universal syntactic theory, ... if it is possible by rules ... to make these 'semantic' deep structures into the surface forms of sentences, then it is likely that the syntactic deep structure of the type that has been made familiar from the work of Chomsky and his students is going to go the way of the phoneme. It is an artificial intermediate level between the empirically

> discoverable 'semantic deep structure' and the observationally accessible surface structure, a level the properties of which have more to do with the methodological commitments of grammarians than with the nature of human languages. (1968;88)

For there are a number of problems associated with the case-grammar approach of which the principal two are that dependency-relations appear to exist between some cases quite apart from the influence of the verb,[1] and that when it comes to classifying the totality of verbs in a language in terms of the cases which they govern, the semantic criteria which define these cases are all too often unclear or in conflict, (Lyons, 1977). Clark and Clark (1977) maintain that, although a semantic approach as applied to sentence comprehension 'exploits the real meat of a sentence' and uses the facts that listeners know that sentences should make sense and refer to their surroundings, a 'pure' semantic approach will not work. It is not enough for a listener merely to sort a sentence into its main propositions, he must also find constituents in the sentence that reflect these propositions. A semantic strategy in sentence processing must be 'checked' or backed up by a syntactic strategy. And, they ask, if this is so, what sort of strategy is applied first, and how do these strategies fit into a system of comprehension? They conclude that 'there are major issues yet to be resolved in the semantic approach' (1977;79). It appears that case-grammar can be faulted on both theoretical and psychological grounds, and it may not, therefore, constitute a viable alternative to standard theory.

On the other hand, Bowerman (1973) and Brown (1973) quickly realised that Fillmore's proposals had unique possibilities for the description of language development. For example, Bowerman noticed that all the syntactic subjects in Seppo's speech were in fact Agents and, since grammatical

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[1] For example, the occurrence of a 'benefactive' phrase in a sentence has more to do with whether the sentence contains an Agent than with independent specific properties of the verb.

subjects are not restricted to the class of semantic agents, it seemed more accurate to attribute to Seppo the semantic concept 'Agent' rather than the syntactic concept 'subject'. She also pointed out that there is no empirical justification for attributing the structure 'verb phrase', as a distinct constituent of a sentence, to a child in the one- or two-word stages, and that granting equal status to all noun phrases relative to the verb fits the developmental data much better (see Figure One). It also allows the existence of NP-NP phrases, of the kind reported by Bloom (1970), which were explicitly denied by Chomsky (1965). The difficulties which Bowerman identifies of applying the case-grammar approach are to do with the definitions of the semantic categories themselves - some of them seem 'either too abstract to apply to child language or too empty semantically to be useful' (page 211) - or to do with the account of modified nouns, or to do with the modality constituent. In these two latter cases, the case-grammar rules which apply to adult speech were 'an inaccurate representation of children's competence'. She concludes:

> The formulations of case-grammar do not provide a fully adequate account of the competence underlying children's speech production. The chief value of case-grammar for a theory of language acquisition may lie in its insistence on the grammatical significance of semantic concepts and in its rejection of certain fundamental assumptions of transformational generative grammar which seem to be inappropriate for child speech, such as the basic division between subject and predicate. (Bowerman, 1973;216)

In spite of these difficulties, Bates (1976), Greenfield and Smith (1976) and Rodgon (1976; 1977) have applied modifications of Fillmore's cases. Greenfield and Smith claim:

> Case-grammar allows one to refer to the role of a noun in a sentence without reference to other nouns in that sentence ... Case terminology is, of course, ideally suited to one-word speech in which there is no sentence to which to relate a word. To call an isolated word an Agent is reasonable, provided that an action has occurred, to call it a subject is ludicrous. (1976;16)

This confidence seems to me entirely unjustified. First, Fillmore (1968, 1971) himself admitted that nouns and noun phrases are not necessarily independent, some cases being partially governed by the occurrence in the sentence of other cases, and second, all of the cases which Fillmore identified are defined in terms of their relation to the verb. It is not true that within the terms of case-grammar it is reasonable to call an isolated word an Agent. In Fillmore's analysis there is, within the ideal sentence, a single governing element - the verb - and a set of dependent expressions whose number and semantic, or logical, type is determined by the valency of the verb. The selection of a particular verb determines to a considerable degree the grammatical structure of the sentence.

Their reason for claiming that an isolated word can reasonably be called, for example, an Agent is that Greenfield and Smith want to argue that a case-grammar approach 'opens the way to a theoretical treatment of one-word speech as structurally continuous with later grammatical development'. As we have seen, case-grammar may not, in fact, offer an appropriate analysis for language. In addition, certain modifications to the analysis are necessary in order to render it applicable to early speech. The modifications which various workers propose in applying case-grammar to the one- and two-word stages are different in detail but similar in kind. Bates (1976) regards the one-word utterances of children as representing a verbally encoded 'comment' upon an implicit topic which is available to the speaker and hearer by virtue of the context of their interaction. Greenfield and Smith use the term 'semantic function' to refer to that portion of a semantic relation or case which is verbally encoded, the remainder of the relation being expressed 'through intonation and gesture or action'.

> While both elements of a relation must, therefore, be represented in the total structure of the speech event, the child himself encodes only one element at the single-word stage. (1976;49)

Rodgon (1976) adopts a similar approach, distinguishing those utterances by the child which do express a semantic relation (holophrases) from those which do not (imitation/ repetition or naming) and relying upon the 'action-accompaniments to utterances' and the salient features of the situation in judging the nature of the relation only partially expressed in language. It is not my purpose here to question the validity of the assumption that some proportion of the child's meaning - perhaps most of it - resides in and is recoverable from the context of interaction; this is a methodological issue to which we shall return later (Section 3.1). The present point is a theoretical one. For if early language use and, by implication, the process of language development itself depend in part upon factors which are wholly extrinsic to language, then to attempt to apply notions based purely in a structural analysis of adult language is not legitimate. If, on the other hand, these notions are to be applied under different definitions and in conditions different to those in which they were derived, then they must be independently derived and defined. It must be demonstrated that these notions are psychologically valid and applicable to young children quite independently of any validity they may have in structural linguistics. There is, in these works cited, no evidence offered that these structures, the semantic relations, are being used by children in a sense co-extensive with that in which they are used by adults.[1] It is assumed that a child using a single word must be expressing one of the meanings which an adult could express by that word, implying that the child shares both the conceptual organisation and the verbal coding rules of the adult, and is using that word to express an adult-like communicative intention. Neither of these assumptions is warranted. If Piaget is at all correct then the young child's conceptual organisation is quite different to that of an adult, and,

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[1] In fact, Bowerman's report suggests that these 'meanings' are not co-extensive. (See, Bowerman 1973;211-216)

since the meanings of which a child can conceive ultimately depend upon his cognition, there need be little congruence between the communicative intentions he can attempt to encode and those intentions which are characteristically encoded by adults.

It would appear, then, that it may be difficult to support the claim that a case-grammar approach allows us to treat early speech as structurally continuous with grammatical development. On the one hand, the criteria under which case-grammar is defined cannot directly be applied before the appearance of combinatorial speech, while on the other, if these criteria are redefined to include factors extrinsic to language structure, so that case notions can be applied to children's early speech, then the validity of the claim to structural continuity is lost. I suggest that case-grammar has principally been useful to the study of language-development by virtue of its emphasis upon semantic relations. But as a structural analysis of language it concentrates upon the formal aspects at the expense of the functional, and treats language as distinct from the context in which it operates as one dimension in a richly diverse system for communication. To render the ideas of case-relations useful and appropriate to the study of communicative development, therefore, they must be defined and derived independently of their role within the structure of language. This is what I have attempted to do for the concept Agent in the Introduction and Chapter One. As we saw, this provides us with a framework somewhat broader than that allowed by Fillmore's definition of the Agentive case, as on page 71 . It is also somewhat broader than the descriptions of examples of the Agentive in single-word speech described by Greenfield and Smith (1976). (Since this and the other works cited above do, in fact, go far beyond a purely structural approach we shall defer further discussion of them until Section 2.5.) We now turn to a discussion of Speech Act theory to see to what extent it may help us in arriving at a framework for studying communicative development, on which the child's

cognition of agency in part depends.

2.3 Speech Act Theory

We opened the previous section with a passage from Bruner (1975) which argues that the child's ability to use language should be seen as the product of a number of complementary and inter-related developments. Among these is of course cognition of language structure per se. We then considered the extent to which the structural analyses of language offered by linguists may be helpful in contributing to a framework within which communicative development may be studied. We concluded that certain ideas are useful - including, the emphasis on semantic relations - but that none of these can directly be applied to early speech and that developmentalists should not concentrate on the formal aspects of language at the expense of the functional. In this section we turn to a discussion of the contribution of speech act theory to communicative development. This will entail an expansion and refinement of the notion of a communicative intention which we characterised on page 58. It was argued, in Section 2.1, that the child's having and expressing communicative intentions must be a faculty of social learning and requires, inter alia, the learning of a conventional system. I hope to show that speech act theory has significantly clarified our conception of what that system consists in, and the rules by which it works, by an explication of the necessary and sufficient conditions for the successful performance of certain speech acts, and its suggestions of the means by which a speaker's communicative intention may be inferred. In this approach the functional and pragmatic aspects of language use achieve a fuller consideration. We shall then go on to look briefly at one or two of the many studies which have attempted to trace the early development of speech acts, and we shall close the

section with an evaluation of the contribution of speech act theory to our aim of formulating a model for studying communication and assessing the child's cognition of 'other-as-agent'.

The roots of speech act theory can be traced from Wittgenstein (1953), Grice (1957) and Austin (1962) but it achieved its fullest treatment in Searle's 1969 account, which he subsequently modified (1975). Searle maintained that in the utterance of a sentence a speaker characteristically performs three types of act; he utters words (morphemes, sentences), he refers and predicates and he 'states, questions, commands, promises, etc'. These three types of act are, respectively, utterance acts, propositional acts and illocutionary acts.[1] These do not all enjoy equal status for Searle follows Frege's insistence that only in the context of a sentence do words have reference; as Searle puts it, 'propositional acts cannot occur alone; one cannot refer and predicate without also asserting, asking, promising, etc.' When a proposition is expressed it is always expressed in the performance of an illocutionary act. We may thus distinguish these two elements in the syntactic structure of the sentence - the propositional indicator and the illocutionary force indicator which shows how the proposition is to be taken. These two together constitute the speech act. Searle's point of departure with previous theory even in his 1969 account, was in the devices he recognised as relevant for indicating illocutionary force. In addition to linguistic and paralinguistic cues such as word order, stress, intonation contour, punctuation, mood of verb and the use of a performative verb, he allowed that:

> Often, in actual speech situations, the context will make it clear what the illocutionary force of the utterance is, without its being necessary to invoke the appropriate explicit illocutionary force indicator. (1969;30)

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[1] Austin (1962) claimed that there are over 1000 verbs denoting illocutionary act type in English.

Searle's account established the illocutionary act as the unit of linguistic communication, but problems remained in cases where the illocutionary act is performed non-literally. In the literal performance of an illocutionary act the structural description can be assigned straightforwardly; for example, statements, mands and questions are realised grammatically by the forms declarative, jussive[1] and interrogative respectively. But frequently in normal discourse the illocutionary act is performed non-literally, as when an interrogative form is used to express a mand. Consider the range of inflection which can be put upon the sentence, 'Do you know what time it is?' It can represent a polite form - a mand softened to an (indirect) request: 'Tell me what time it is' - or, at the other extreme, a sardonic command: 'Hurry up!'[2] What an account whose focus is primarily grammatical - even though certain intrusions of context are allowed - cannot resolve is how the addressee determines whether or not the illocutionary force intended is that which corresponds with the grammatical form used and, if not, what particular illocutionary force is intended.

Searle's (1975) solution to the problem of indirect speech acts involved a change of approach from grammar to pragmatics. At this time interest in the theoretical power of pragmatics was growing (see, for example, Lakoff, 1973; Bates, Camaioni and Volterra, 1975; Grice, 1975; Sinclair and Coulthard, 1975; Bates, 1976; Miller and Johnson-Laird, 1976). In the 1969 account the 'essential condition' could occasionally be satisfied without the use of the explicit illocutionary force indicating device for that essential condition; in the 1975 version the steps for deriving

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[1] Lyons (1977: vol 2) describes 'mands' , which include requests and commands, and the 'jussive' sentence type.

[2] The forms which will constitute acceptable realisations of any illocutionary act type will vary in quite subtle ways according to the relationship of the participants in a discourse. This is a point to which we return in Section 2.6.

illocutionary force do not include the essential condition, since it is a semantic and not a pragmatic notion. Also excluded are 'conversational postulates' of the kind proposed in the generative-semantic approach of Gordon and Lakoff (1971). The major role in Searle's scheme is ascribed to inference. Inferences about the properties of the context of utterance, shared by speaker and hearer, taken together with their knowledge of conventional linguistic usage and their shared experience of each other, will enable the participants in a discourse to assign illocutionary force to an utterance and to interpret it appropriately. Labov (1970) makes a similar point, arguing it is not so much the superficial linguistic structure of an utterance as its perceived illocutionary force which determines what can happen next in a discourse. Pragmatic inferences concerning participants' rights, obligations, attitudes, abilities and beliefs predicated in an utterance's propositional content will be made by each participant. Conditions upon these, taken together with constraints on the propositional content of utterances, constitute the necessary and sufficient conditions for participation in a discourse.

Kendon (1970), Duncan and Niederehe (1974) and others have proposed analyses of the signals by which turn-taking between the participants in a discourse is managed. By whatever means turn-taking is achieved, discourse characteristically consists in the performance of illocutionary acts by two (or more) participants who alternate in the roles of speaker and hearer. Searle (1969) suggests that, in the performance of an illocutionary act a speaker, S, intends that the hearer H, will recognise that the speaker intends some effect, Ei; the speaker performs some (verbal) act designed to express his communicative intention. We may represent this as follows:

SI (HR (SI (Ei))) ⟶ Sv, speaker verbalises.

When we turn to consider communication in the pragmatic mode, however, this formulation becomes inadequate, for we are no longer strictly tied to grammatical exchanges; in fact our

framework is broadened to include interaction on a non-verbal as well as a verbal level. Speech act theory in the pragmatic formulation suggests a means by which an addressee may infer an addressor's communicative intention whether the means employed to express this are verbal or non verbal or, as is most commonly the case, some combination of the two. Even more importantly for our purposes it suggests a way in which the developmental shift from pre-verbal to verbal communicativity may be studied. In comparing these two modes of expression we are however required to assume that the child is attempting to express similar sorts of communicative intention in his pre-verbal and in his first verbal performances since it is only if this is so that we can match the child's attempts to communicate within each system. Bates (1976) argues that this is precisely what the child is doing; in Piaget's terms he is exploring new means to achieve old ends or, in the terms of our discussion, he is exploring language as a means for expressing communicative intentions which he can already express non-verbally. Furthermore, Bates, Bruner (1975) and others have argued that the first words occur as 'vocal accompaniments to action', with the child slotting his words into previously prepared performative frameworks. Given this period of co-occurrence of the verbal and non-verbal modes it seems reasonable to suppose that we may reliably trace the nature of the child's communicative intentions through this transitional period.[1] To capture the range of the means of expression which may be used by the child we must rewrite our formulation from above as follows:

CI (MR (CI (Ei))) $\longrightarrow$ Ca

where C is the child, M is his mother - or any other interactor - and Ca is the performance by the child of some act

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[1] Dore, argues that linguistically expressed intentions are not isomorphic with prelinguistic intentions, pointing out that it would be difficult to imagine a prelinguistic form of the assertion of a proposition. In Chapter 4 we shall cite data which can be interpreted as precisely that.

expressing his communicative intention. And we must abandon our reliance upon the term speech act in favour of the communicative act performed to express a communicative intention.

This brings us to a second point. It will be seen that our notation comprises two intentions on the part of the child; the intention of some effect (Ei), and his intention that his mother will recognise this (MR (CI (Ei))). Of these, we take his communicative intention to be that which is directed to his mother while his intention of some effect represents whatever it is he hopes to achieve; enlisting her aid, for example. The capacity for each of these is based in his cognition of agency, the one primarily his cognition of other persons and the other primarily his cognition of the ways in which his world is ordered and of his place within it. This again points up the privileged status enjoyed by communication in our attempt to study the child's cognition of agency. The sorts of effect (Ei) of which the young child has been considered able to conceive are discussed in the next section when we turn to recent work upon the role of cognitive development and the cognitive bases of language use in the structuring of the child's communicative intentions. For the time being we may simply state that the sorts of effect which the child will intend or, rather, the sorts of effect about which he will attempt to communicate, take the form that M 'should do or believe X', where X is some action, event or state of affairs in the world. We may now define the child's communicative intention as:

> C's intention, expressed in the performance of a communicative act Ca, that M should recognise that C intends M should do or believe X.

Returning now to a topic touched on in Section 2.1 we can see that the way in which a mother picks up and interprets Ca is crucial to the 'meaning potential' of the child (Myers, 1979). If the mother detects and acts upon a putative communicative act of the child, which act may or may not include a vocalisation, - that is, if she recognises or attributes a communicative intention and acts so as to indicate

that she recognises or attributes such an intention - she offers confirmation to the child that he has performed a communicative act. If, moreover, she interprets his communicative intention correctly she provides evidence for the child that he has successfully employed a conventional means of expression[1] and that his intended effect (Ei) is socially meaningful. If, on the other hand, the mother misses or chooses to ignore, refuse or divert the child's attempt to perform a communicative act she denies in effect both the intention itself and the means employed for its expression. The mother's recognition, or otherwise, of the child's communicative intentions therefore becomes crucial to the child's developing cognition of both the possibility and the means of communicating with others and of the sorts of things it is possible to communicate about - it becomes crucial to the socialisation of the child's thought. But before we may continue to develop these ideas and the notion of the interactive act, in Section 2.6, we must look at some of the studies which have attempted to trace the early development of speech acts.

Miller (1970) suggests that:

> ... an appreciation of the illocutionary force of a vocalisation may be one of the first things an infant acquires. Even the early incomprehensible utterances of the infant can have the force of demands, protests, greetings, etc., as they are interpreted by adults. In such parent-child interactions, therefore, there are many opportunities for a child to form some abstract characterisation of his situation, of his own vocal comment on the situation, and of his own intentions. (1970;198)

The perspective of the pragmatic speech act approach permits one's account to include in a systematic way attitudinal factors such as hostility, affection and deference; factors of a nature which are regularly expressed by children, but for which grammar-oriented theories are unable to account (Ervin Tripp, 1974). It may well be that it is through the gradual learning of conventional means for expressing atti-

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[1] See footnote on page 60.

tudes and desires concerning things particularly salient to the child (hunger and personal contact, for example) that the child constructs the rules for linguistic expression. This broadly, is the view of Halliday (1973), that communicative functions determine the structure of language. Bruner (1975), in exploring the relation of pre-speech communication with later linguistic forms of expression, argues that aspects of the communication situation are developmental precursors to the mastery of structure. What begin as communicative routines in the demand mode become modified, through the expectancy of maternal compliance, to expressions in the request mode and subsequently, in conjunction with the appearance of joint action routines between mother and child, to the exchange and reciprocal modes, where grammar is learned as an adjunct to the management of ongoing social situations. Edwards (1973) describes this process in the case of prohibitions on objects for play. Similarly Dore (1975), Halliday (1975) and Clark (1973), among others, have shown that young children of 6-18 months can successfully express communicative intentions in the absence of a well-developed lexico-structural system. Halliday's notions of 'topic' and 'comment', like Eve Clark's 'theme' and 'rheme', correspond roughly to the reference and predication aspects of the propositional component of the speech act (Searle, 1969). In contrast to Bruner's position, in which referencing and predicating develop together, Dore (1975) sees the ability to refer as preceding the ability to predicate. He sees one-word speech as being primarily referential in nature with the expression of lexical items of predication awaiting the development of two-word or combinatorial speech. In this Dore clearly dissociates himself from the 'holophrastic' position which views single words as conveying full sentential structure (McNeill, 1970). He also disagrees with workers such as Greenfield and Smith (1976) and Bates (1976) who argue that many of the child's early words express a comment upon a topic which is implicit but 'understood' in the context of utterance; that is, they express a predicate whose Subject

(reference) is understood by the participants as the focus of their interaction. We shall discuss the implications for our framework of this disagreement in Section 2.5. For the present we shall concentrate on those writers who explicitly follow a speech act line.

Dore's approach (1973, 1974, 1975, 1977) centres on the notion of the 'primitive speech act' which, at the one-word stage, consists of a rudimentary referring expression and a primitive force indicating device. At this early stage, when intentions are beginning to 'emerge'[1] and are combined by the child with newly acquired single words, their words are, Dore argues, used exclusively to refer; and the device used to indicate the associated illocutionary force is typically an intonation pattern.[2] Thus he identifies three uses of the word mama by one child, constituting performance of three distinct primitive speech acts, 'labelling', 'requesting (answer)' and 'calling'. There are a further six PSA types performed during the one-word stage, all of which are qualitatively different to adult speech acts; they express the child's intention with respect to a concept without having a propositional structure. They contain a referring expression but no predicating expression, and that referring expression is simply the linguistic representation of a single concept. This approach, Dore argues, commits one to no claims about underlying 'knowledge' of sentence structure, semantic transitivity nor case relations in describing the child's utterances since only the two

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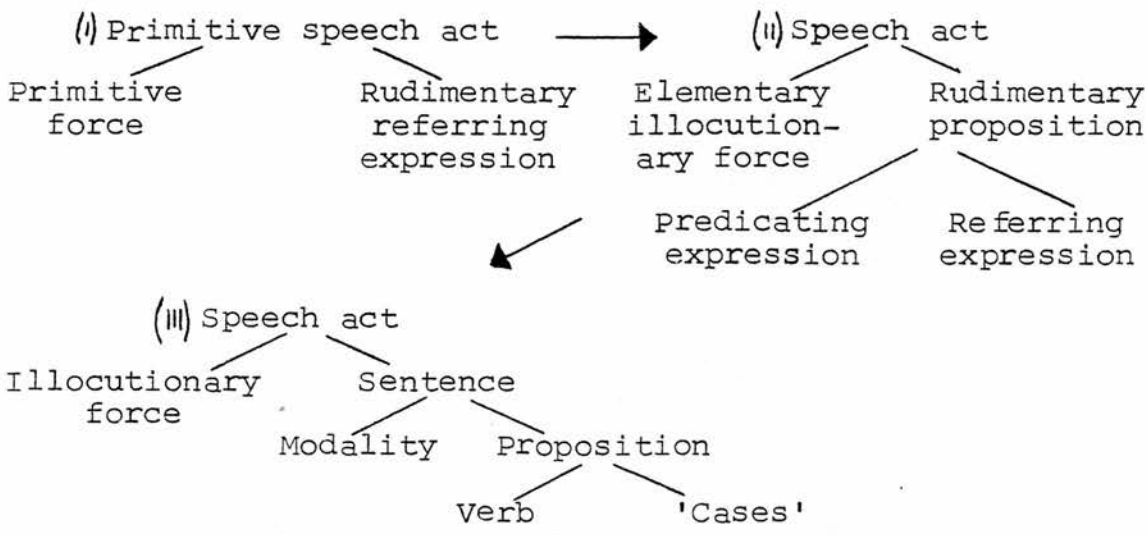
[1] 'Emergence' is to be defined as the appearance at a particular stage of an entity or ability which cannot be explained by reference to or in the terms of an earlier stage. In speech act theory the referring expression is an emergent entity, which is not determined by the child's prior experience (1975;37). There are grounds for doubting such a viewpoint. (Lyons, 1977).

[2] In passing we may note that Bloom (1970) explicitly denies the child the ability reliably to use phonological contrasts and that the utterance of words with varying intonation contours cannot therefore be taken as evidence of different underlying structures.

actual manifestations of language at this stage, namely single words and minimal prosodic patterns, are assigned linguistic status. The price which Dore pays for this independence is, however, the need to rely on the notions of emergence and 'grammaticalisation' to account for the transition to two-word or combinatorial speech and the appearance of predicating expressions. Figure Two shows the progression through which the components of the PSA are presumed to pass in the development of the speech act. But although Dore identifies the problem of how the PSA components become grammaticalised as the central one for his approach he offers only the general hypothesis that these components, themselves innately programmed to emerge at a certain point, become grammaticalised through the application by the child of inductive principles. That is to say, while referring and predicating expressions are emergent they become grammaticalised in syntactic and semantic categories according to the convention of the language community in which the child develops, through learning. While admitting that Bruner may be justified in fearing that the notions emergence and grammaticalisation 'may do no more than paper over the discontinuous course of language acquisition with some new words' (1975;284) it is worth our noting

Figure Two

The development of the speech act. From Dore (1975).



two ways in which these relate with our previous discussions. First, the possibility that certain linguistic structures, such as referring and predicating expressions, are 'emergent' is not contradicted by our contention that the ability to communicate through language depends upon the existence of, or potential for, neural structures adequate for the learning of the rules for linguistic communication. It may be that such adequacy relies on the innately determined provision of building blocks such as these. On the other hand, we may find it possible to trace the derivation of reference from prelinguistic gestures in a theoretically satisfying way, as many cognitive theorists have claimed to do, and thereby avoid an appeal to maturational factors (see, e.g. Ingram, 1971; E. Clark, 1977). If this were so parsimony would require us to adopt such a view in favour of one relying upon emergence. But further consideration of this point must await Chapter 4 when we begin to look at our data. Second, Dore's view that grammaticalisation is a learning process, such that the linguistic system (grammar) that the child acquires is a result of a general cognitive faculty to abstract out the regularities in the language of his community, is entirely consistent with our argument that the child's cognition depends upon the possession of a rule-governed discursive system through which the process of abstraction may occur. But again we must defer until Chapter 4 any attempts to answer the question of quite how grammaticalisation may occur. It is not for us a central concern.

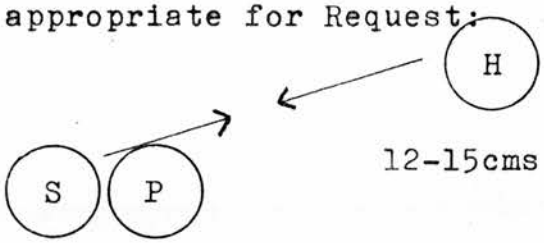
A more traditional approach is adopted by Reeder (1980) in his attempt to assess the ability of young children to discriminate the illocutionary intent of (adult) speech acts. He argues that studies such as those of Dore (1977) and Garvey (1977) rely upon the experimenter's use of linguistic-pragmatic intuitions in assessing the child's competence, rather than upon the setting up of more rigorously controlled experimental situations which will provide clear evidence of such competence. The intuitions upon which the discrim-

Illocutionary paraphrases:-

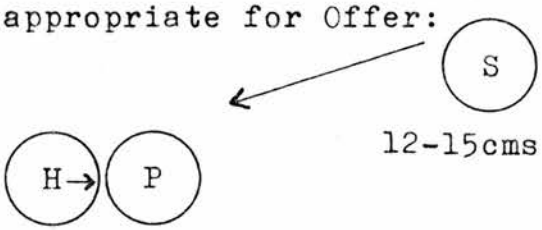
		Enquiry	Request	Offer
(a)	Do you want to do A?	+	-	-
(b)	I want you to do A	-	+	-
(c)	I'll let you do A	-	-	+

The experimental hypothesis predicted that children would use contextual cues differentially to discriminate the illocutionary force of stimulus item, (a). Thus, sentence (a) would be taken as equivalent to (b) when P was adjacent to S, but as equivalent to (c) when P was adjacent to H.

Constructed context, appropriate for Request:



Constructed context, appropriate for Offer:



The discrimination task

The stimulus item was presented by tape-recorder. The two response alternatives were on tape-loops, each controlled by a separate button. The subject was asked 'Find which button says what the teacher said'. Pointing and/or verbal indications by the child served as raw responses.

ination of illocutionary intent depends should be explicated by the study rather than employed in its methodology.

Reeder sought to avoid this problem by devising triads of 'illocutionary paraphrases' - sentences which are syntactically and semantically dissimilar but which are equivalent in illocutionary force within a given context. Context can then be treated as the independent variable. By offering one of the sentences in a particular context as a stimulus item you can develop pragmatic hypotheses as to which of the other two, as response alternatives, will be chosen as having the same meaning as the stimulus sentence in that context.

The experiment set out to discover whether children of $2\frac{1}{2}$-3 years of age can employ contextual cues in order to distinguish requests from offers and whether this ability improves with age. The materials used were playthings (P) and figures representing a teacher (S) and boys and girls (H); only one boy or girl figure was presented at each trial. The context was varied only in the relative positions of S, H and P; for the offer context P was placed next to H and for the request context P was placed next to S. The triads of sentences were of the form: 'Would you like to do A?' as stimulus sentence, with response alternatives 'I want you to do A' - appropriate in the Request condition - and 'I'll let you do A' - appropriate in the Offer condition. These sentences were presented to the fourteen children (7 at $2\frac{1}{2}$ years and 7 at 3 years old) over a tape-recorder, and the children selected the response alternative which they thought to be appropriate. See opposite. The results showed that these children were able to distinguish requests and offers, but while the 3 year olds could discriminate requests better than could the younger children there was no difference in their ability to discriminate offers. Scores for both age-groups were higher in the offer condition than in the request condition.

Reeder's approach to what we might call the development of illocutionary competence differs with that of Dore in more

than straight-forwardly methodological ways. For while Dore sets out to trace the development and conventionalisation of the child's repertoire of (primitive) speech act types in the child's own terms, Reeder has demonstrated the child's ability to discriminate the illocutionary force of two conventional speech act types. Both of these approaches are valuable since both aspects are involved in the child's becoming an accomplished user of a language. My reasons for describing Reeder's experiment in some detail lie elsewhere; I want to argue that methodologically it has several shortcomings.

Reeder's experiment, as he describes it, takes no account of the possibility of the child's egocentrism. Piaget has claimed that children under the age of 6 or 7 years are very bad at communicating because they are unable to 'decentre', or to see things from the point of view of another. This claim is to be taken as meaning that children are 'egocentric' both in the literal sense of only being able to see things from their own perspective and in the cognitive or conceptual sense of being unable to appreciate that the knowledge or experience of others may differ from their own. Piaget bases these claims upon data derived from many observations and tasks devised for children, of which one of the best known is the 'three mountains' task (Piaget and Inhelder, 1956). A model of three mountains is placed before the child, with a doll which is set at various points around the base of the model and a set of pictures of the model. The child is then asked to pick out that picture of the model which corresponds with the view the doll would see from a given point. Up to the ages of 6 or 7 the children have a strong tendency to choose the picture which shows what they themselves can see, and it is not until they are eight or nine years old that they can perform the task successfully. Piaget takes this as indicating that the child is unable to treat his own (temporary) perspective as just one among a set of different possibilities which can be related to one another within a coherent system.

Martin Hughes (1975) doubted Piaget's conclusions. He felt that the problem for children who make egocentric responses lies less in their inability to decentre than in fully understanding what they are required to do. He very carefully introduced a simplified version of the mountains task and found that pre-school children were able to give a high proportion of correct responses. He accordingly devised a task involving a little boy doll, with one or more (up to three) policeman dolls and a series of walls. The child's task was to 'hide the doll so that the policeman can't see him'. Hughes argued that this was a task in which the intentions and motives of the little boy doll were clearly accessible to children, and as such would maximise the chances of the task making sense to children. Furthermore the child's problem was only to decide <u>what</u> the policeman would be able to see and not <u>how</u> it would appear, as for the doll in Piaget's task. The task was presented very carefully, making sure that the child understood at each stage exactly what was required of him, and the thirty children in the study (aged between $3\frac{1}{2}$ and 5 years) achieved a correct response rate of 90%. Even the 3 year old group in the most complex version of the task got over 60% of the trials correct.

In Reader's (1980) experiment there is no mention made of the possible confabulating effects of the child's position relative to the positions of S, H and P. Whether or not the child is as egocentric as Piaget suggests, the series of experiments conducted by Hughes demonstrates that this aspect of the child's grasping what is required of him in the experimental situation is too important ever to be ignored. We would require to know how the relative positions of the child and the experimental materials may have been varied before accepting Reeder's results at face value; particularly the rather surprising finding that children are better able to identify offers than requests, when most workers have picked out requests as one of the speech act types which children can comprehend and use at an early age (Shatz, 1974; Halliday, 1973; Bruner, 1975; Ervin-Tripp,

1974; Dore, 1973; Garvey, 1975).

But a more cogent criticism can be made of Reeder's experiment on general methodological grounds. With the possible exception of differential psychology, procedures in psychology represent the experimenter's attempt to assess the competence of his subjects from an analysis of their performance on various tasks seen by the experimenter as tapping that competence in which he is interested. When one's subjects are pre-linguistic, or minimally linguistic, young children, about whose level of reflective awareness we know very little except that it is probably very different to that of adults, the problems of assessing competence become even harder. One cannot, for example, credit the child with any appreciation of the role of an experimenter who has certain expectations of the ways in which the child will behave; one cannot, therefore, assume any co-operation of an informed kind on the part of the child. What the child does on being confronted with an experimental situation which we have arranged may correspond only poorly with our expectations of him. To put this another way, his performance may not in any reliable way reflect the competence in which we are interested. Our only solution to this problem is to keep the framework of our experimental paradigms flexible, to allow the child's actual behaviour to inform us of the kinds of things of which he is capable, rather than to prescribe certain kinds of behaviour as correct and others as wrong. On page 31 we discussed the importance of posing a problem to the child under conditions of mutual and goal-directed action and in terms which are meaningful and salient for him. These criteria are not satisfied in a forced choice paradigm. But not only are the children in Reeder's experiment required to make judgements of a rather artificial kind, they are required to do so in the absence of almost all the normally available cues on which such a judgement might be based. These include preceding interaction, prosody and other paralinguistic and extralinguistic accompaniments to verbalisation such as gestures, facial

expression and body movements (Lyons, 1970), and the child's shared (intersubjective) cognition of the person with whom he is interacting. Under these conditions, when the only cues available to the child are the relative positions of the experimental materials themselves, it would indeed be surprising if Reeder's results did not seriously underestimate the child's competence at discriminating illocutionary force. And while Reeder's stated aim was to discover whether children are able to use only 'contextual' cues to discriminate requests from offers, our arguments about the ways in which the young child's cognition and use of language develop entitle us seriously to question whether data on the basis of such impoverished cues can tell us anything useful or interesting about the child's abilities.

In assessing the value of speech act theory for our approach we may pick out three main points. We shall discuss these in turn.

In the Introduction we identified our purpose as being a study of action (doing rather than thinking) and, more particularly, the study of selves acting in relation with one another. And such an approach, we argued, must assign central roles to Agency and to communication. We later explored the inter-relation of these ideas, attempting to show that each is logically implicated in the other; just as the child's cognition of agency is an essential part of his developing ability to communicate, so a study of the child's communicative abilities affords our best evidence as to the level of the child's cognition of agency. As we have seen in this section, a pragmatic speech act approach permits us to study the young child as communicator from the time when he first begins to express (identifiable) communicative intentions. Although the performance of communicative acts may have little to do with language in the initial stages, this approach permits us to order the kinds of communicative intentions which a young child may express, as Dore (1973) has done. On that basis we should be able to examine his developing cognition of other persons.

Given that the child's cognition of what others can do develops as part of his initially 'intersubjective' (ritualised) communicative routines with his mother, we may observe how this becomes more generalised as the mother requires that his communicative acts come progressively to approximate more closely with the adult or conventional form (see Richards, 1974). In the process of learning how to communicate the child is also, necessarily, learning about other persons. A speech act approach emphasises the importance of the other person, the purpose of a communicative act being to cause some effect in the other, or achieve 'a certain correspondence between the mental states of the speaker and the hearer' (Fodor, 1976). As such it appears for us a promising method of inquiry.

We have already mentioned (page 81) that speech act theory in its pragmatic formulation suggests a way in which the shift from pre-verbal to verbal communicativity may be studied. This is because it allows of the inclusion on a systematic basis of factors extrinsic to language in the inference by a receiver of a sender's communicative intention. There are no restrictions as to the information channel by which a message may be sent (MacKay, 1972), provided only that whatever means are adopted obey the rules of a convention shared by the participants. If this is so we can treat pre-verbal communicativity as a real phenomenon insofar as it satisfies the criterion of the mutually successful performance of communicative acts. This raises a methodological problem, to be discussed in Section 3.1, of how we may determine whether this criterion is indeed satisfied, but the argument appears to me to be in principle a good one. In this way speech act theory should allow us to see more clearly the factors constituting what counts as a conventional system for the mother and child, and the rules by which this system works, as the child begins to use words in the expression of his communicative intentions.

Our third point relates to Dore's appeal to 'emergence' in order to account for the appearance in the child's

repertoire of referring and predicating expressions. Referring expressions are emergent entities because at the time when intentions begin to emerge they are combined with newly acquired (single) words to form primitive speech acts (Dore, 1973), and the PSA consists of a rudimentary referring expression under a primitive force indicating device (an intonation contour). We have already argued (page 53) for a view of intentionality as something which does not emerge nor develop but which achieves expression through the discovery by the child of the means of causing some effect upon his environment. This, taken together with the claims of many cognitive theorists that referencing is derivable from prelinguistic gestures, would constitute an argument that referring expressions are not emergent but are wholly explicable in terms of the child's prior experience. The question which now concerns us is: Does a view that the referring expression is not a language universal, in the sense of being a maturationally controlled structure of language, in any way prejudice the legitimacy of our following the guidelines of a speech act approach? I would like to argue that it does not. For if our remarks concerning the nature of intentionality are reasonable, and if communicative intentions develop in the way in which we have suggested they may (on page 62), then an argument that referring expressions are explicable in terms of the child's experience does not constitute an argument that referring expressions are not 'universals of language'. The mechanisms to which we have appealed, insofar as they are real at all, are real for any child learning any language. For speech act theory it matters not at all how the components of the speech act come to form part of the cognition of language structure of all users of a natural language, provided only that they do so. Seeking the prelinguistic equivalents of referring expressions may commit us to positing semantic structures of the kind which Dore was anxious to avoid but this seems to me more satisfactory than assigning a greater role to maturational factors which can only ever be hypothetical.

2.4 The Cognitive Underpinnings for Communicative Acts (1)

We have identified two components within a communicative act by a child; his intention of some effect (Ei) and his intention that his mother will recognise his intention of this effect. We said also that the sorts of effect which a young child will attempt to communicate take the form that 'M should do or believe X'. We shall examine more closely the basis for this claim in Section 2.5. There is, however, a set of (Ei)s which are not predicated in the action of another person and which do not, therefore, constitute part of a message addressed to another person. This set is composed of those effects which the child attempts to achieve in the course of his solitary (non-communicative) playing. Two questions arise here. First, in what sense are intentions of this sort equivalent to those kinds of intentions which are addressed to Mother? That is, can we justifiably label both '(Ei)'? And second, even if they are in some sense equivalent what relevance or usefulness can an investigation of the child during solitary play have to an assessment of his communicative abilities?

At the beginning of this chapter we argued that the child's ability to have and to express communicative intentions depends, in the same way as it does for any other class of intentions he may entertain, upon the level of his cognition (page 60ff). And the source of the child's cognition, we had claimed, lies in perceptuo-motor schemas organised within a discursive system through which a process of abstraction may occur. The child generates hypotheses on the basis of his existing schemas, which hypotheses are then tested through action. In acting the child intends (attempts to achieve) some effect, and his perception of the results of his activity provide the data for the formation and elaboration of schemata.[1] By this argument, then, a communicative

[1] This description, though idealised, should not conceal the fact that the reasons for success or failure in achieving some effect may be complex. The child may fail in some activity not because he is attempting the impossible but

intention and a non-communicative intention which the child may entertain at any time are equivalent to the important extent that both depend upon the level of the child's cognition at that time. There are doubts concerning the homogeneity of the child's cognition at any stage, which are incorporated in Piaget's notions of equilibration and horizontal décalage, but these do not prejudice our case. For there is no reason to suppose that the cognitive bases for two communicative intentions need necessarily be any less dissimilar than the bases of a communicative and a non-communicative intention. In any case, the notion of 'the intention of some effect (Ei)' in itself carries no implications for the logical, or cognitive complexity of the basis upon which it is constructed. Thus we may take it that the child's intention of some effect, which he attempts to communicate to another, and his intention of some effect constructed in the course of his solitary play are essentially equivalent. But why should instances of the latter kind be interesting to us?

In our analysis of agency we made a distinction in principle between the child's cognition of self-as-agent and of other-as-agent. While learning pertaining to each of these is probably inter-related and mutually beneficial we can to some extent deal separately with them, since children engage both in solitary activity and in mutual, co-operative activity with others (page 43). Our discussion of representation commits us to the view that hypotheses (about entities themselves or about the relation of entities) must exist independently of and prior to action. Actions are the expression of intentions and not the intentions themselves as Piaget and Bruner maintain.[1] Now if communicative intentions are equivalent to other kinds of (specific) intentions, the

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because he lacks the necessary skill. Or again, he may succeed 'by accident'. Situations such as these may still be occasions for learning.

[1]On the other hand, we pointed out (page 54) that the child's actions constitute our only evidence as to his intentions.

claim is entailed that the child cannot express communicatively something which is not cognitively represented. The meanings of which the young child can conceive ultimately depend upon his cognition.[1] Cromer (1974), at the end of a short but thorough review of the evidence concerning the relation of thinking and language, offers the weak form of a cognitive hypothesis that:

> We are able to understand and productively to use particular linguistic structures only when our cognitive abilities enable us to do so. Our cognitive abilities at different stages of development make certain meanings <u>available</u> for expression. (Cromer, 1974;246)

Other writers have argued that understanding a verbal expression depends upon the mastery of the underlying concept (Piaget, 1970; Sinclair de Zwart, 1969; Slobin, 1973). As regards the child's communicative abilities, a study of his solitary activity may provide us with clues as to the nature of his cognition at any time, which in turn may be helpful in deciding whether our claims about the communicative intentions he is attempting to express at that time are reasonable. For example, if we observe a child apparently enlisting his mother's aid to achieve some goal, complementary evidence might be provided by our observation of a previous (or successive) attempt to achieve it on his own. Both solitary activity and communicative activity can serve to indicate what the child already knows and/or what he is attempting to discover, and they can illustrate the grasp the child has of the rules for thinking upon which the competent use of a language depends. Wells (1974) discusses the ways in which the form of language is related by the child with the categories he is establishing in the organisation of his non-linguistic experience, and Macnamara (1972) and Nelson (1974) both argue that children are able to begin to learn language because - and to the extent that - they are

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[1] This is in direct contrast to Bates (1976) who maintains that before the child has a representation of the relation of the entities in a proposition (prior to s-m stage VI) the child is able to perform 'pure performative' requests.

able to organise and to interpet situations. When we begin to look at our data (in Chapter 4), evidence as to the nature of the child's conceptualisation of his world and of his role within it as witnessed by his solitary activity will therefore constitute one class of those of his abilities in which we shall be interested.

There is already an enormous body of literature relating to the young child's conceptualisations (notably, though by no means exclusively, from the Piagetian school) and to the forms of exploratory activity by which these are arrived at (reviewed by Ross, 1974). It would be beyond the scope of this thesis to examine this literature here; we shall have occasion, in the course of Chapter 4, to compare certain of our findings with those of other writers. But one question with which we must contend is: At what level of abstraction should we attempt to characterise the infant's cognition? Or, to put the problem in terms more conducive to a discussion of his communicative abilities, of what kinds of propositions (meanings, intended effects (Ei)) should we regard the infant as being able to conceive? We could follow Greenfield and Smith and make statements of a rather general nature:

> At Stage IV (8 months), the child is able to set aside a barrier in order to reach a more distant goal. (This demonstrates) the awareness of distant goals in relation to immediate objects ... (1976;171)

And,

> When a child begins to express volitional objects, he necessarily makes reference to a potential situation that is different from the existing one. (ibid.;172)

Or we could make more particular statements like Piaget's (1952) observation that the child, in organising a sensorimotor schema, will first go through a phase of dealing separately with particular objects before he is able to subordinate the use of one object to the other, as in using one as a tool for getting the other. Or, at the lowest level of abstraction, we could attempt an analysis of the child's cognition of agency in line with Bower's (1976) definitive account of the development of the object-concept. What is

at issue here is not the question of the actions which an infant or young child is able to perform but of the level at which these are described and of the sorts of attributions which can reasonably be made on the basis of them.

Piaget argues that the young child's inability to deal with the three mountains task is evidence of his profound early egocentricity. This egocentricity is itself a particular example of a more general characteristic of 'preoperational' thinking - the inability to consider two aspects of a situation at once. And the evidence for this claim comes principally from observations of the child's inability to 'conserve' the physical properties (such as weight, volume, size and number) of entities undergoing transformations. (See Piaget, 1954; Piaget and Inhelder, 1969.) We have already seen how Hughes' (1975) work must modify Piaget's view of the child's early egocentrism. Other counter-evidence comes from Bruner's (1975) discussion of the sharing of attention and the communication of intentions between the mother and infant, from Trevarthen (1974) and Trevarthen and Hubley (1979) on early intersubjectivity, and from Bower's (1976) account of the development of the object-concept. Similarly, Sinha and Walkerdine (1975) argue that the child's failure to conserve is not wholly explicable in terms of 'preoperational thinking' (the gradual development of the logico-mathematical structures of thought; reversibility, associativity, identity and closure) but is at least partly due to the limitations of his linguistic competence. They quote a number of studies which demonstrate that varying the experimental arrangements and simplifying the requirements made of the child can lead to significantly more correct responses than do the standard experimental procedures (Bryant and Trabasso, 1971; Gelman, 1972; Rose and Blank, 1974; McGarrigle and Donaldson, 1974). As Donaldson (1978) points out, it is not Piaget's findings which are in doubt (the performance of children on tasks he has devised) but the claims (egocentrism, non-conservation) made on the basis of them, and the explanations (his theory of intellectual

development) offered for them.

Likewise, when we turn to look at language acquisition studies we can witness the need for caution in extrapolating from evidence to more abstract theory. Nelson (1974), for example, advises:

> ... while it can be stated that naming is dependent upon the existence of concepts, the existence of concepts need not lead directly and easily to naming them.

The non-occurrence of a structure or concept in the child's linguistic output should not necessarily be taken to indicate the 'lack' of that concept in underlying cognition. McGarrigle and Donaldson (1974) argue that children in the early stages of language acquisition interpret the behavioural aspect of a communicative event to arrive at a notion of the speaker's meaning and use this knowledge to make sense of the language, to 'crack the linguistic code' (Macnamara, 1972). Thus Strohner and Nelson (1974) found that 2-3 year olds act in accordance with a 'probable event strategy', even to the extent of performing incorrectly on simple active voice sentences about improbable events - sentences they can easily comprehend in other situations. Findings such as these do not contradict an argument that:

> ... a child may need to have the cognitive underpinnings which make him capable of carrying out certain types of operations before they are observed in either action or language. (Cromer, 1976;342)

But they raise the questions of why the necessary cognitive underpinnings should be evidenced earlier in manipulative play than in language (Slobin, 1973), and why should not linguistic interpretations be relied upon? More problematically, how are we to decide whether 'wrong' performance is due to non-comprehension of a particular linguistic structure, or to reliance upon behavioural cues which conflict with linguistic cues, or to the conflict of two 'language-comprehension strategies' (Dulay and Burt, 1974)?

Spurious claims made on the basis of a well established but incorrectly interpreted findings can seriously mislead theories of any sort.

Our dilemma is that of striking a balance between claims

based upon the child's action which do not seriously underestimate his cognition of the conventions and structures necessary for communication (as we have suggested many laboratory studies do) and claims which do not more reflect an unjustifiable adult-like analysis of a situation than they capture the child's perception of it (see page 43). Competence and comprehension have both been claimed to precede performance but there is no way of establishing how far this is generally true. As noted on page 55, we cannot know to what extent any concept the child has may be integrated and coherent (adult-like) and we should therefore restrict our claims about his cognition to just those which are required for a full description of his identifiably intentional actions, be they communicative or otherwise.

2.5 The Cognitive Underpinnings for Communicative Acts (11)

If the child's solitary activity constitutes one source of evidence as to his cognition of the ways in which his world is ordered and of his place within it, a potentially much richer source lies in his communicative activity. Here, the child's (communicative) acts display not only the goals of which he is able to conceive but also his cognition of other persons (as agents like himself) and of the conventions governing the expression of communicative intentions. Fodor, Bever and Garrett (1974) deny that this is so. That is to say, they deny that inferences about underlying cognition can be drawn from observable (linguistic) behaviour:

> ... It does not follow from the fact that language development is contingent upon cognitive development ... that we can infer the order of the child's acquisition of concepts from the order of his employment of the forms which express these concepts. (1974;463)

They argue that other factors, such as the relative grammatical complexity of these forms, could determine the order of their expression. Then, taking an issue that is

directly relevant for us, they ask:

> What do the available data (on the acquisition of such concepts as 'agent of an action') tell us about the mastery of the relational concept actor-action and of the grammatical relation subject-verb which English uses to express this concept? (ibid.;464)

And they conclude that these data do not allow us to choose between four possible hypotheses:

1. That the syntactic definition of the grammatical relations form part of the child's innate linguistic endowment, and are the basis of his mastery (e.g. McNeill, 1970).
2. That the child first has to master the concept actor-action, through sensory-motor engagements with his environment, and then learn that this concept is expressed in English by the relation between subject and verb (Bloom, 1973).
3. That the actor-action notion is innate and the corresponding grammatical relation must be learned.
4. That both grammatical relations and the concepts they express are specified in the child's innate endowment, and that the observed ontogenetic sequence is a purely maturational phenomenon.

These hypotheses raise in a different form a dispute which we have already touched on, and correspond roughly to the claims that single words i) convey full sentential structure/are holophrases (McNeill, 1970; Rodgon, 1976), ii) express a comment upon an implicit topic, the restriction to one word being a cognitively-based limitation on encoding capacity (Bloom, 1973; Greenfield and Smith, 1976; Bates, 1976) and iii) are rudimentary referring expressions which are the first to 'emerge' of a number of innate structures which become grammaticalised through learning (Dore, 1975). No-one appears to have adopted a position based on the extreme nativism of hypothesis 4. Whether or not Fodor, Bever and Garrett are correct in claiming that the available data preclude none of the hypotheses they outline we must examine the extent to which our previous discussion commits us to

one or another of these views of the one-word stage.

The 'holophrase' view supposes that one-word utterances are analogous to adult speech, and that single words are predicate adjectives and predicate nominals. These are representations of deep syntactic structures (McNeill, 1970) and the child's experience with language, together with the maturation of his memory and vocal apparatus (Lenneberg, 1967), allow the learning of the appropriate surface structures of his language community. Rodgon's (1976) use of the term holophrase differs with McNeill's (1970) view in that she considers a holophrase to represent a consistent relation rather than an entire sentence. This has the advantage that an observer need not attempt to decide which (of all possible) whole sentence(s) the child actually intended. In this view the expression of consistent relations is allowed by, and indicates, the child's preliminary awareness of the linguistic relations and structure of adult speech. Rodgon does not appear to think that this awareness is based on innate syntactic definitions, and as such allies herself more closely with McNeill's (1974) position, which posits the 'syntagma' as a meaning-unit which expresses linguistic content and which is the direct product of previous cognitive development. She further disagrees with McNeill's earlier claims in identifying a proportion of single word speech as labelling (Naming); that is, (just) the association of the arbitrary symbols used in language - words - with objects, events, actions and relations in the world. The 'innate syntax' view does not allow of this possibility:

> The referential function is always used for predication. Children never utter mere labels (McNeill, 1970;23).

Such an account leans heavily on the theory of transformational grammar but can offer no justification for supposing that young children have intuitions of grammaticality and can make judgements of acceptability, both of which are crucial to that theory.

We have already suggested that focusing on the child's developing ability to express communicative intentions pre-

sents a way of studying the shift from pre-verbal to verbal communicativity. And we have tried to argue that the child's intentions, of whatever kind, must at the relevant age be essentially equivalent and are therefore comparable (see pages 81 and 97). By this line of argument, which views the earliest single words as constituting accompaniments to action rather than independent acts of a purely linguistic nature, one-word utterances may be described as predicative (holophrastic, in Rodgon's sense of that term) - or indeed as referential or imitative - but such a description should not be taken to imply that the child is considered to have (innate) knowledge of deep syntactic structure. Such a description does however imply that the child must be able to entertain and express propositions which may be not at all, or only partially, linguistically encoded.

In linguistic theory, the term proposition is used to refer to the objects, states and events that make up the core ideas behind a sentence, but the requirement that a proposition be linguistically expressed appears to be entirely arbitrary (Myers, 1979). Propositions are units of meaning, combinable in various ways, whose expression 'denotes states or events, denotes facts about states or events, or qualifies parts of other propositions' (Vendler, 1967). The expression of a proposition is, then, an act of meaning, and such acts can be performed either verbally or non-verbally. Austin (1962) pointed out that his definition of the illocutionary act does not rule out non-verbal expressions - an illocutionary act can satisfactorily be performed non-verbally. We have described as communicative acts those acts in which a child intends his mother will recognise his intention of some effect (Ei). Now, if a proposition refers to the objects, states or events that make up the core ideas behind a communicative act, we are arguing that in the performance of a communicative act the child expresses a proposition; any act which is or could be communicative must have associated with it an underlying proposition. That proposition is, precisely, the effect with respect to which

the child has some intention (Ei). It follows that, for us, the limitations upon the kinds of proposition of which the child is able to conceive and which he can express are cognitive limitations, and that propositional development should be traceable through pre-verbal and verbal communicativity.[1]

Our view therefore consists broadly with Fodor, Bever and Garrett's second hypothesis, It supposes that empirically discoverable factors other than grammatical complexity of form govern the expression of concepts (in propositions) by admitting of other than linguistic data. It bypasses the need to posit deep syntactic structures. And it considers a single word to be the (partial) expression of an entire proposition based in cognition rather than an emergent - innately based - referential structure. At this point two questions present themselves. The first is methodological: How is one to assess the child's ability to express propositions in his communicative - or solitary - activity? I propose to defer treatment of this question until Section 3.1. The second is a theoretical one we have already encountered: At what level should the child's cognition of other persons and the propositions he attempts to express through the performance of communicative acts be described? There are many studies which suggest that even very young infants are able to take account, to an extent, of the intention structure of a co-interactant and several which claim that, prior to language, children 'understand' agency as defined under case-grammar. Let us look at some of these.

Flavell, Botkin, Fry, Wright and Jarvis (1968) have claimed that children's role-taking abilities - 'the attempted discrimination of another person's role attributes' - are

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[1] The view expressed here contradicts Searle (1969), who allowed that there could be illocutionary acts with no propositional content, and also Myers (1979), who argues that in the case of 'indexical acts' - which convey no proposition - communication depends upon a pragmatic inference by the addressee based upon shared knowledge. We shall reconsider this disagreement in Chapter Six.

quite primitive, and that children 'are markedly insensitive to the hidden role taking requirements of communication', even by school age. I think there is now overwhelming evidence that they are wrong, evidence of both a general and a particular kind.

Bruner (1974) provides evidence for the establishment of 'intuitions' about participants' reciprocal intentionality. Other writers have noted that the components of the infant's activity are synchronised with, and mesh with, those of his caretaker (Condon and Sanders, 1974; Schaffer, 1977; Trevarthen, 1974; Newson and Newson, 1976). Flavell was a co-author of a study (Masangsky et al., 1974) which reassessed role-taking and the early development of inferences about others, and Newson and Pawlby (1973) have studied the ways in which imitation permits the child to participate in new ways with another. Infants, they say, soon grasp the possibility of back-and-forth sequences of acts. This is not simply a matter of the temporal synchronisation of action, but requires a mutual understanding and appreciation of the other person. Newson and Newson (1976) argue that dialogues of this kind come about through the mother's treatment of certain of the child's acts as communicative. Such acts achieve privileged status by incorporation in the dialogue and they 'punctuate' the child's contribution. Trevarthen (1974) talks of the mother 'marking' particular gestures by imitating them; around six months of age the child begins to imitate some of his mother's actions. Macfarlane (1974) suggests that the process begins at birth; children whose mothers greet them on delivery, and who are treated as 'partners in a personal relationship', are more interested in other persons. In similar vein, Hess and Shipman (1965) and Tulkin and Kagan (1972) provide evidence which supports the view that styles of mothering are crucial in determining the complexity of the intentions and goals which a child will himself spontaneously construct.

Turning to studies of a more particular kind, there is evidence that both mothers (Collis and Schaffer, 1977) and

infants (Scaife and Bruner, 1975) are able to use the other's line of regard to identify an object of attention. Shotter and Gregory (1976) have identified eye-contact as a means by which mothers mark a comment on the child's action and ensure that the episode is salient for him. As regards communication through language, Shatz (1974) claims that two-year-olds respond to intended requests for action whether or not a conventional form is used, and Garvey and Hogan (1973) and Keenan (1974) support the idea that from an early age children treat speech addressed to them as meaningful. Donaldson (1978) tells the story of a little Arab girl of 13 months who apparently understands the sense of a sentence addressed to her by an English woman; this understanding is based in the actions of the woman and of the little girl's brother, aged 7, who like her speaks no English. Donaldson claims that in order to interpret situations of this sort, and arrive at a notion of speaker's meaning and thus a knowledge of language, 'the child must in a general way be capable of inference' (1978;30). It is at this point, when we begin to consider the implications which such interpersonal skills and abilities have for the child's cognition, that difficulties arise. The development of the concept of agency provides a good illustration.

(In Section 2.2 we described the case-grammar analysis of language presented by Fillmore (1966, 1968, 1971) as an alternative to standard theory, and we discussed in general terms the problems involved in trying to apply this analysis to the first utterances of young children. The following remarks rest upon and elaborate the points raised in that discussion.)

Miller (1975) claims that at 21 months children use only surface structures which express non-redundant semantic intentions. Because a child of this age is communicatively egocentric, his own point of view will be the deictic centre of any utterance he makes. Any reference to himself is therefore redundant and the child will characteristically produce utterances like '(I) want' and 'Give it (to me)'. Leaving

aside the question of egocentricity, I take it that the expansions Miller cites amount to a claim that a child of 21 months has some awareness of himself as agent and of the abilities of an addressee to comply with mands like these mentioned. More explicitly, Bates (1976) argues that 'expectant looking' indicates understanding by the child of the adult as agent at around 11 months of age:

> A confirmation of this new understanding of agency ... rests in the fact that both subjects, in certain conditions where a need or desire can be inferred, will look at the adult and wait until that adult begins some appropriate activity. (1976;54)

The closest Bates comes to a definition of this concept of agency is to identify schemes in which the child involves the adult 'as an agent or tool' or 'as a source of causality'. (ibid.) In this she follows Sugarman (1973) who likens Bruner's (1973) account of early skill development - the combining of skilled routines that have first developed separately - with Piaget's (1952) account of the organisation of sensori-motor schemas and postulates that the child will first go through a stage of treating persons and objects independently but will finally combine them into a unified schema: Person-as-agent-to-help-obtain-object. Sugarman's data indicate just such a progression, as judged by the signalling techniques the child uses. In neither of these accounts is there any serious attempt to analyse the concept Agency attributed to the child on the basis of that child's involvement of an adult - at sensori-motor stage V - nor indeed is there any indication of the status such a concept enjoys. We are not told, for example, how the 'understanding' of agency of a child of this age might compare with that of an older child. Some of the relevant questions we should want to ask are, 'Does the child perceive all adults as agents or only those to whom he addresses a mand?' and 'Does the child's understanding of the adult as agent encompass a full range of adult abilities or only those abilities implicit in the propositions underlying the communicative acts which the child performs?' 'If, as Bates' allegiance to Piagetian theory

would suggest, she sees the 11 month old child's cognitive functioning as of a strictly sensori-motor kind - that is non-representational - in what sense is it reasonable to attribute that child with an 'understanding' of something as abstract as 'agency'?'.

A similar kind of criticism can be levelled at Greenfield and Smith's (1976) attempt to categorise early language development in terms of the acquisition of more and more complex meaning relations. They distinguished fourteen semantic functions - adapted from Fillmore's cases - and discovered a developmental sequence in the expression by the child of one-word utterances fulfilling these functions. Of these, the Volitional function is claimed first to appear at 11;24 (Matthew) and 11;28 (Nicky) while the Agentive function first appears at 13;03 - though it does not do so reliably until around 18 months - and Action or State of Agent appears at 14 months. Volition is described as 'a particular kind of performative (whose) basic function is to obtain some desired response from the person addressed' (1976;51). To employ the volitional function the child must, then, have some representation of the fact that a person so addressed can comply with his wishes; he must have some notion of agency, as Greenfield and Smith tacitly admit later in the discussion of Volition:

> More careful analysis of gestures and intonation along with experimental work on the child's awareness of the role of agents in satisfying his demands might allow a better definition of the uses of this word (mama) (ibid.;92)

Yet at the same time Greenfield and Smith want to tie-in the expression of the semantic functions with underlying cognition. Serious problems exist when a function is itself not expressed until long after aspects of the cognition on which it depends must be assumed to be present.[1] While we may accept the proposal that regarding the linguistically

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[1] In terms of its expression the Agentive function is particularly awkward as the agent of action is often self-evident and is therefore 'assumed' or 'presupposed' and not linguistically encoded.

expressed item as one part of a whole semantic relation which resides in a word+situation combination informs us of the ways in which adults arrive at an interpretation of a one word utterance, this procedure tells us little about the child's grasp of semantic relations, about the ways in which (parts of) these come to be linguistically expressed and about the comparability of the younger child's grasp of a relation with that of an older child; in short, about whether case relations are a useful way of describing the meanings or propositions which a young child attempts to express.

There seem to me to be good reasons for supposing that the propositions which a young child expresses before and in the early days of his use of language exist at a level rather more basic - less complex - than that suggested by a description in terms of (some adaptation of) case grammar, positing cases like Agent and Instrument which denote concepts of a high level of abstraction. Although much work has been done upon the processes of concept-formation in general (for example, Bruner, Goodnow and Austin, 1956; Kendler and Kendler 1961; Wason and Johnson-Laird, 1972) and upon the stages through which children are presumed to pass in the attainment of conceptual thought (Piaget, 1951, 1953, 1954; Vygotsky, 1962), this work is unlikely to be relevant here; as Judith Greene points out:

> ... the kinds of tasks used in concept-attainment experiments, which normally require the subject to discover some arbitrary concept the experimenter has in mind, have more in common with problem-solving than with the acquisition, storage and utilisation of concepts as they represent our knowledge of the real world. (1975;42)

What we are attempting to describe is not the child's ability to justify or explain his view of the world in terms of some criterion of rationality or coherence but rather the schemas and constructs which constitute that view. More pertinent to our discussion is the work of Bower (1976). He found that the development of the 'object-concept' does not depend upon a simple, uni-dimensional progression but involves the appreciation by the child of a number of facts about ob-

jects; facts such as that objects which are stationary do not cease to exist when they move, that two objects cannot be in the same place at one and the same time, that an identical object cannot be in two places at once and, later, that two objects can be in the same place if one is inside the other. Facts of this kind together constitute what is known as the object-concept and its development seems to reach completion at around 18 months. While we might wish to say that the object-concept only becomes a unified part of the child's cognitive structures at that age this does not mean that the child knows nothing about objects prior to 18 months. His cognition of objects is, however, in some sense less complete than that connoted by the term concept. Nelson (1974) identifies three levels of infant conceptualisation, Instances, Attributes and Concepts. Of these, only instances occur as perceptual wholes and provide the child with data for learning. The identification of attributes, she claims, depends upon the analysis of instances, and concepts are the product of the synthesis of attributes. In Nelson's view the perception of instances allows the child to develop constructs or concepts which take these instances as their functional core, and the child's early words - for example, the names of objects - represent for him these functional core concepts. This kind of approach appears to be consistent with our previous discussion in which we identified the source of the child's cognition as his perception of the effects of his activity in the world and the construction of schemata capturing these data. Since the child's experience is limited his schemas will be correspondingly restricted in range. This, I think, clarifies the claim that the principle difference between the understanding of adults and infants resides in the complexity of their 'concepts' and the form in which these are available for inspection, manipulation and abstraction (Fodor, 1976). If concepts are constructed by means of the perception of instances (schema-formation) and the identification of attributes (contruct-formation) then we must try to chart the progression in the

child's cognition of others as agents rather than grant him an understanding of agency as soon as he demonstrates some awareness of the role of other persons. Like Bates and Sugarman we shall want to use non-linguistic behavioural indicators as our basis for attributing constructs (and concepts) to the pre-linguistic child but we shall try to make explicit the implicature of these attributions.

Though we have identified the communicative act as a rich source of evidence about the child's cognition, we have yet to specify the particular kinds of communicative intention at which we shall be looking. It will be recalled that in defining a communicative intention we maintained that the sorts of effect (Ei) which the child will attempt to communicate take the form that 'M should do or believe X'. Searle (1975) identified five classes of speech acts as follows:

1. Representatives: e.g. statements or assertions, which covey to the receiver the sender's belief in the truth of a proposition,
2. Directives: e.g. requests and commands, which get the receiver to act in response to the sender's request for action or information,
3. Commissives: e.g. promises,
4. Expressives: e.g. congratulations, and
5. Declarations: e.g. bequests.

Most writers seem to support the idea that the earliest speech acts children perform are assertions and requests, acts belonging to the first two of Searle's classes (Bruner, 1974; Dore, 1973, 1975; Halliday, 1975; Greenfield and Smith, 1976; Clark and Clark, 1977), though Myers (1979) thinks that 15 month olds may also be able to perform Expressives by means of indexical acts. It is this, reported, early ability of the child to perform requests and assertions respectively which lead to the contention that his earliest communicative intentions will be that his mother should recognise his intention that 'M should do or believe X'. If requests and assertions do indeed appear earlier than other communicative act types

they will be the best source of data on the development of pre-verbal communicativity and the transition into the use of language. We shall therefore concentrate upon these communicative act types when examining our data.

We have so far identified the child's solitary activity and his (putative) ability to perform requests and assertions as offering evidence about the kinds of goals of which he is able to conceive, his cognition of others as agents and of the conventions governing the expression of communicative intentions. There is a further kind of activity in which the child partakes which may be useful to us and which is not solitary nor is it strictly communicative as we have defined that term, requiring the recognition of an underlying proposition. I refer to such things as peek-a-boo games and the early back-and-forth and imitative sequences identified by, for example, Newson and Pawlby (1973) and Trevarthen (1974, 1977). I take it that these sorts of activity are indicators of the infant's growing appreciation of what other persons are like, which is crucial to the development of his ability to communicate with them. We shall characterise such sequences as 'interpersonal routines'.

PART TWO

Chapter Three: Methods

3.1 The Operationalisation of the Indicators of Cognition

Having identified three kinds of activity in the young child's repertoire as being the sources of our evidence as to his cognition of agency, we must now tackle the problem of how these indicators may be operationalised. Since our method will vary for each we shall deal separately with communicative activity, with solitary activity and, last, with interpersonal routines.

We have argued that any act which is or could be communicative must have associated with it an underlying proposition, and that in the performance of a communicative act the child expresses his intention with respect to a proposition. One way of tracing the development of the child's cognition of agency would consist in assessing his ability to convey such propositions in any given modality and in describing the complexity of these propositions. Since the proposition exists as part of a communicative intention, what we require is a method by which to identify, precisely and in a verifiable way, any communicative intention on the part of the child. I take it that the straightforward attribution of such intention by an observer is an inadequate basis for data because the details of the convention existing between a child and his mother need not be accessible to the observer and because such judgements, although they might be correct, are not verifiably so.

A more reliable procedure would be to make use of the mother's knowledge of the private convention which she and her child are constructing. During communicative exchanges with her child a mother acts as if she attributes communicative intentions to him and in turn performs acts which take account of the child's preceding act. It seems reasonable to assume that we, as observers, will recognise within such exchanges those of the mother's communicative intentions which are conventionally realised. However, those communi-

cative intentions of the mother which we can recognise can only provide part of a clue to the child's preceding intention if the mother's communicative intention is in some sense contingent upon the meaning of the child's act. Not all communicative acts convey a communicative intention which exists as part of a two-way exchange of meanings between interactants. We shall use the term Interactive Act to refer to those which do so. A communicative act by a sender (S) counts as an interactive act if the communicative intention expressed in its performance either takes account of the communicative intention conveyed to S by the receiver (R) during R's preceding act or is acknowledged within a similarly contingent intention conveyed by R during R's succeeding act. To put this more simply, an interactive act is a communicative act which is contingent upon the recognition of the interactor's preceding communicative intention and/or which is similarly reciprocated within a communicative act by him. An interactive act can therefore occur at the beginning, in the middle or at the end of a sequence but it cannot occur in isolation. In the terms of the method we are presently outlining, in which the mother's understanding of her child is to be used as a clue, only those communicative acts of the child which are also interactive acts will qualify as evidence.

We must entertain the possibility that the mother (M) as well as the child (C) may perform an interactive act which we, as non-participant observers, do not recognise, by virtue of some private agreement between M and C about the relationship between the form of some act and the meaning it expresses. Such private exchanges cannot constitute part of our data. Even in cases where we can recognise a (sufficiently) conventionally expressed communicative intention by M which is apparently contingent upon a prior communicative intention she has attributed to C, we should not take this alone to be precise evidence as to C's intention. M could have interpreted C's intention inappropriately or else she could be refusing or diverting an intention which is unacceptable to her.[1]

At this stage of the sequence we have no way of judging whether or not the communicative intention M attributed to C corresponds with that which he attempted to convey, nor whether M's response is acceptable to C.

A possible solution presents itself on those occasions when the child performs an act which appears to re-express his original intention - or a modification of it - following his mother's response. Since any given intention may be expressed in an indefinite number of different ways, one criterion for such a repeat by C would be that it is similar to the original act in terms of the behavioural medium of expression. Let us summarise the moves in an exchange as follows: C_1 is the child's initiating interactive act, M_1 is his mother's response which identifies C_1 for us but does not <u>establish</u> its meaning and C_2 is the child's reaction to M_1. If C_2 is a (modified) repeat of C_1 there are several possible interpretations; five of them might be as follows:

1. C is trying to initiate a repeat of M_1 which was appropriate to C_1.
2. C is reinstating his attempt to achieve a co-operative response from M; M_1 was not appropriate.
3. C is trying to initiate a repeat of M_1 even though M_1 was not appropriate to C_1.
4. C is trying to initiate a repeat of M_1 even though he had no original intention; C_1 was not an interactive act.
5. C is repeating C_1 regardless of M_1; neither C_1 nor C_2 is properly described as an interactive act.

Our strategy for choosing between all possible interpretations of C_2 must hinge upon two further factors which we take it are accessible to us as observers. The first of these relates to the physical locations of M and C and of the objects or events on which their interaction is focussed, and to the physical movements associated with the acts C_1,

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[1] Examples of such tactics by mothers can be identified in the case of mands, for example, when she attempts to redirect the child's attention to some alternative object or topic.

M_1 and C_2. We may call these situational clues. The second factor is the association with C_2 of some affective index; for example the expression of pleasure or displeasure, tonal emphasis, excitement or rage. A way in which the expression of what we take to be an affective index could be formally identified as contingent upon M_1 at present eludes me. At this stage we must simply say that the expression of affect is transparent to us by virtue of our being human, and that the temporal contiguity with M_1 of such an expression is a sufficient basis on which to claim that the child's reaction was occasioned by M_1. (See Feinman and Feldman, 1982). In commonsense terms we might expect the expression of pleasure to be consistent with interpretations 1, 3 and 4 above, neutral affect to indicate interpretation 5 and negative affect - frustration or displeasure - to be associated with interpretation 2. But these are only some of the possible interpretations. Let us try to present more formally the possible courses which a putative exchange may follow. We are interested in the moves which might lead to the child's performance of an act, C_2, which appears to re-express his original intention and which has associated with it an expression of positive (+), negative (-) or neutral (0) affect.

Rationale

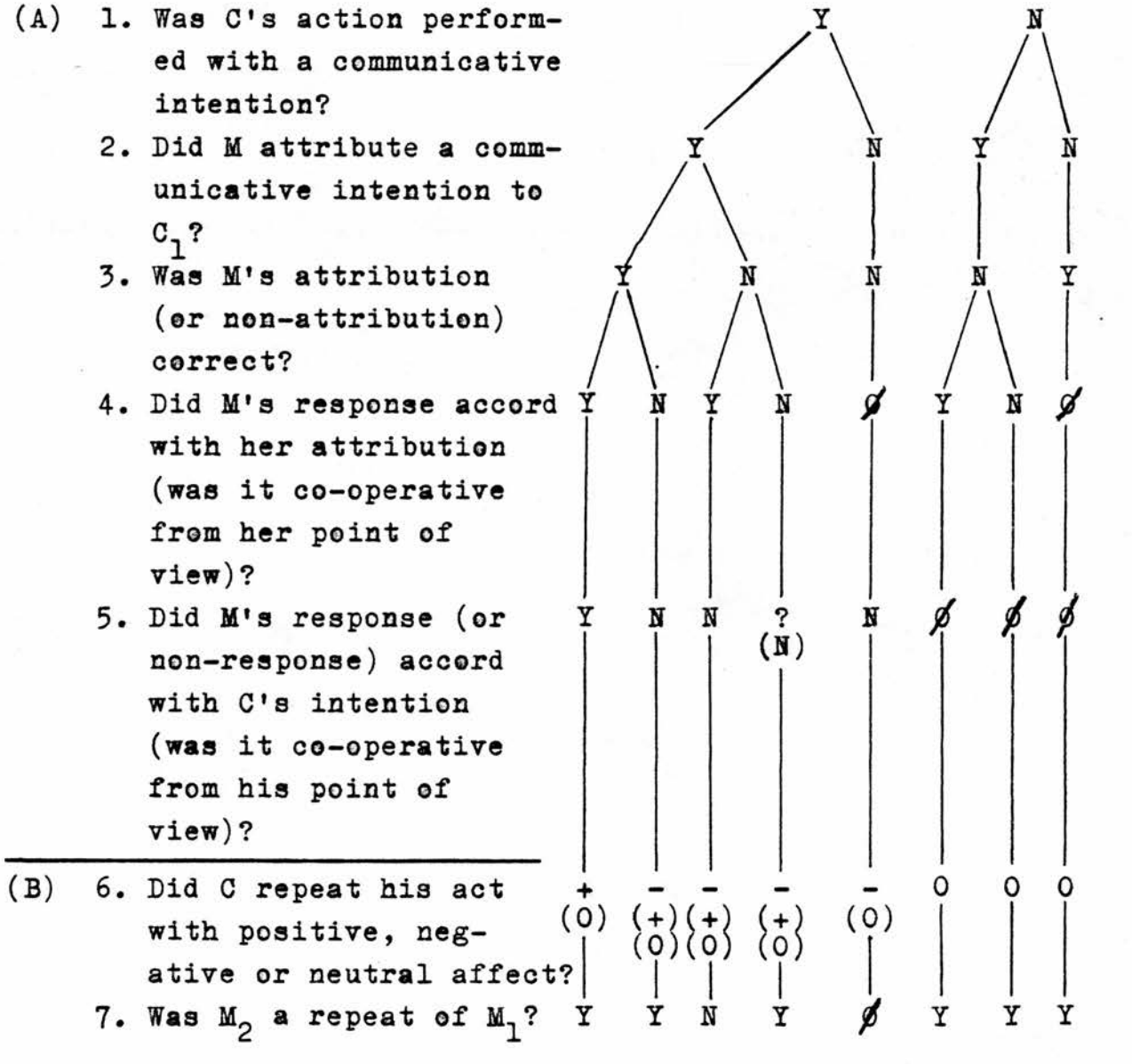
Our decision as to whether any particular action by C was performed with a communicative intention recognizable by M rests upon our finding answers to three fundamental questions: Did M attribute a communicative intention to C_1? Was M's attribution (or non-attribution) correct? And hence, Was C's action performed with a communicative intention? (Was C_1 an interactive act?)

Our answers must be inferred from the physical characteristics of the behaviour we observe; I have argued that those aspects which are accessible to us as observers and which are likely to be most useful are situational

clues and affective indices. We can attempt a formal statement of the steps to the identification of a communicative intention by means of the following algorithmic table:

Table Two

Possible Bases for a Putative Exchange. (Adapted from Myers, 1980)



(Note: Answers in part (B) are obtained by observation while answers in part (A) must rely upon inference. Ø means that the question is inapplicable.)

As will be described in Chapter Four we may obtain pointers to questions 2 and 4 directly from M herself, but there are two reasons for our being unable to rely solely upon her direct reports. First, in order always to be able to ask the right questions of her we must immediately recognize the occurrence of a putative exchange. We cannot presume to be able to do this; in fact we are assuming that the detailed analysis of video-tape recordings will reveal far more than is casually observable. Second, the possibility that M may be wrong is intrinsic to our rationale. Thus while we may discover M's interpretation of some acts C_1, and her reasons for responding in a particular way, we cannot discover whether her interpretation was correct.

Only C knows whether M_1 was consistent with his intention; hence question 5 is an important link in the rationale. Since only C knows the answer it is to his subsequent behaviour (C_2) that we must look. In particular we can observe whether C_2 has associated with it a positive (+), negative (-) or neutral (0) affective index.

Negative instances

From an observer's standpoint a negative instance indicates both that C had some communicative intention and that M's response did not accord with that intention; thus it provides answers to questions 1 and 5. From M's standpoint it is potentially more informative because she also knows the answers to 2 and 4. Provided that she has tried to co-operate, a negative instance will tell her the answer to question 3; she has not attributed the correct intention (Interpretation III). If, on the other hand, she has not responded co-operatively, a negative instance could indicate either Interpretation II or Interpretation IV; M does not know whether or not her attribution was correct. Whether or not M responds co-operatively it is clear that a negative instance cannot specify C's original communicative intention for her. (We must assume that a mother will respond co-oper-

atively in most instances, at least partly because non-co-operativity would impede the development of communication with her child.)

The observer only achieves clear indications to question 4 (and then to questions 3 and 2) if C_2 is followed by a second response, M_2. If her response to a negative instance is not a repeat of M_1, then either Interpretation III or Interpretation V is indicated; further inquiry is now unnecessary since, in either case, in performing C_1 the child did not succeed in performing an interactive act. If M_2 <u>is</u> a repeat of M_1 we may assume that M was not attempting to co-operate. But this rationale is unable to tell us whether or not M's attribution was correct (question 3), and thus whether or not C successfully performed an interactive act.

<u>Positive instances</u>

While the performance of an act C_2 with positive affect points uniquely to Interpretation I in the rationale, we must allow for the possibility that C_1 was not strictly an interactive act. If M often responds to any action by C with an act which customarily elicits positive affect, then C_2 may indeed be a signal that M_1 should be repeated without C_1 having conveyed any communicative intention.

<u>Evaluation</u>

This rationale rests upon the assumption that the child will behave in ways which appear logical to us. For example, we assume that occasions when the child's intention is not met will give rise to negative affect. It rests also upon the assumption that, given the preceding sequence, there should only be one answer to each question. The rationale is flawed to the extent that in some cases the validity of both assumptions may be questioned. We can illustrate this by means of the following putative exchange:

1. C performs an act with a communicative intention, C_1.
2. M attributes a communicative intention.
3. M's attribution is not correct.
4. M does not intend a co-operative response but, because her attribution was incorrect, she inadvertently fulfills C's intention.

In Table Two, question 5 column 4 must be labelled 'query' to allow for the above possibility, although the most likely outcome is that M_1 was not co-operative from C's point of view (N). Similarly there may be occasions when M misconstrues C_1 or intends an unco-operative response which C, although his original intention is not fulfilled, enjoys enough to perform a repetition with positive affect with the (new) intention that M_1 should be repeated. Non-paradigmatic cases are represented in columns 2, 3 and 4 for question 6. Or again, it is conceivable that C_2 may be a negative instance, even though M interpreted C_1 correctly and responded co-operatively, if C did not enjoy the outcome. While C is perhaps more likely to perform a different act at C_2, the possibility of a repetition with negative affect cannot be excluded.

What then is the value of the rationale?

While it leaves us unable, solely on the basis of the expression of positive or negative affect, to determine the nature of the communicative intention conveyed in any interactive act by C it does provide a framework for the examination of situational clues. These may reveal the existence of a shared focus of attention, or co-operative action with some task, and so on. M's reports as to her shared knowledge with C may also be applied in specific cases.

When affective clues leave open more than one

interpretation of C_2, or when the expression of affect is such as to prejudice the behavioural similarity of C_2 with C_1, an appeal to situational clues may clarify the meanings of the child's acts. For example, some modification of posture or line of regard may allow us to choose between Interpretations II, III and IV in the anomalous cases outlined above.

While this rationale would be justified if it allowed us to identify just one instance of the child's expression of a communicative intention, we must accept that for some - perhaps many - triad sequences it will leave us uncertain as to whether the behaviour we putatively identify as C_1 was in fact an interactive act and, even if it was, as to the precise nature of the child's communicative intention. In practice our method may reject a substantial amount of potential data. A further problem for the method is that it can only be successful if a mother attributes communicative intentions to a substantial proportion of her child's behaviour and credits him with some ability to recognise her own intentions. From work on styles of mothering (for example, Tulkin and

Kagan, 1972) we already know that there are differences in the willingness of mothers to do these things (see also Nelson, 1973). In the extreme case we could be left in the position of basing our procedure upon a mother whose behaviour denies the possibility of the communicative exchanges we are looking for. Fortunately the likelihood of this extreme case seems remote and variations in mothering style are more likely to lead to differences in the ways in which children communicate - as described by Nelson (1973) - than to the presence or absence of communicative behaviour. We do, however, need to develop some strategy by which to reduce the unnecessary rejection of potential data referred to above.

In a triad sequence of the kind we have described the child performs an interactive act, C_1, to which his mother responds, M_1. In performing M_1 the mother may either attempt to co-operate with the intention she takes C_1 as conveying, and succeed, or she may attempt to co-operate but fail because she has misinterpreted C_1, or else she may interpret C_1 appropriately but act so as to refuse or divert the intention conveyed by C_1. Given that we are regarding the child as capable of goal-directed behaviour involving the derivation and testing of hypotheses, there are, broadly, three kinds of reaction we might expect of the child. First, the child may 'change the subject', either because his original intention has been satisfied or because he accepts its refusal. On the other hand, if the intention conveyed by C_1 is neither satisfied nor refused by M, the child may either perform an act C_2 which is similar to C_1 - if, for example, M may not have been properly attending to C_1 - or else he may perform an act C_2 which is different to C_1 but which conveys the same communicative intention. This last would be appropriate behaviour if C_1 may have been ambiguous, or if the child is experimenting with different expressive forms, or if he is unsure of the conventions governing the expression of his original intention. Clearly on those sorts of occasions when the child might perform an interactive act C_2 which is similar to his previous act C_1 in terms of the behavioural medium of expression he could just as reasonably be expected to perform an

act which is different to C_1 but which is nonetheless designed to convey the same intention.

We can include in our programme those interactive sequences in which C_2 is behaviourally dissimilar to C_1 only if we relax the criterion that to qualify as a repeat of the original communicative intention C_2 must be similar to C_1. The relaxation of this criterion leads directly to the placing of greater emphasis upon situational clues and affective indices in our interpretation of the child's communicative intentions. While this increases the range of interactive behaviour falling within the scope of our procedure it may reduce the certainty of our interpretation of that behaviour. However, it should be stressed that we are still focussing upon triad sequences of interactive acts, and that the mother's responses M_1 (and perhaps M_2) remain as the principal identifiers of the child's communicative acts.

Whereas in studying communicative behaviour it is possible to identify sequences of interactive acts and to use the interpolated acts of the mother as a clue to the communicative intentions expressed by the child, the investigation of the child's solitary activity involves no convenient accomplice. There are, however, certain formal similarities between the events occurring in the course of communicative and solitary activity, which we can apply to the development of a procedure for studying solitary activity. First, it would in principle be possible to identify triad sequences of events during the child's solitary activity, consisting of exchanges between the child and his environment, formally analogous to the exchanges occurring between the child and his mother. In the course of such an exchange the child might perform some act designed to produce a certain effect in the world. We may again call this C_1. There would follow some event in the world which may or may not coincide with the effect the child intended. Let us call this event E_1. Depending upon the form of E_1 the child may then perform a second act, C_2, which, as in the case of communicative exchanges, may be behaviourally similar to or

dissimilar with his prior act C_1. Specifically, C_2 may be similar to C_1 if E_1 conformed with the effect the child intended and he wishes to repeat it, or if E_1 did not so conform but the child considers C_1 was an appropriate form of act. On the other hand C_2 may be dissimilar with C_1 if the child now intends a different effect, or if he is experimenting with different forms as alternative means to achieve the same effect.

Second, those clues which we have called situational clues, relating to the physical locations of the child and the objects or events on which his action is focussed, together with the physical movements and motions associated with the acts C_1, C_2 and the events E_1, E_2 are still accessible to us.

Third, we may again use the association with C_2 of some affective index as an indication of whether or not E_1 conformed with that effect intended by the child in the performance of C_1. In parallel with the case of communicative activity, we must assume that the expression of affect is transparent to us by virtue of our being human and that the temporal contiguity with E_1 of such an expression by the child is a sufficient basis on which to claim that the child's reaction was occasioned by E_1.

It is to the expression of affect that we must look, in the case of solitary activity, for our principal means of identifying the child's acts, C_1, and of establishing the effects they were intended to achieve. In the absence of any other participant with a privileged understanding of the child's behaviour, his behaviour alone can inform us of the child's intentions. The proposed procedure rests upon the assumption that the association of an affective index with C_2 reveals to us the child's pleasure or displeasure at the perceived outcome of his preceding act, C_1. While it is entirely possible that the child could express pleasure upon perceiving E_1 even though E_1 did not correspond with the effect C originally intended, such an outcome is more likely to evoke surprise or curiosity if not actual

displeasure. In general we are assuming that we may take the expression of positive or negative affect in association with C_2 as evidence of the child's recognition of the success or failure, respectively, of his preceding act, C_1.[1] If this assumption is reasonable we should be able to identify the child's original intention in almost all cases where C_2 has a positive affective index associated with it. We may or may not be able to identify the original intention where the subsequent affective index is negative depending upon the evidence afforded by situational clues, our general understanding of the child's cognition from other data, whether or not the child perseveres in his attempts and so on.

The third kind of activity which we identified as being of potential value to us is that involved in interpersonal routines. We noted that this activity is neither solitary nor strictly communicative as it does not require the recognition of an underlying proposition by either participant, beyond that of wishing to engage in a mutual activity. Given that these routines appear very early, at around 4 months of age (Trevarthen, 1974), it seems likely that they are the fore-runners of communicative activity, during which the child is learning skills basic to the establishment of dialogue such as methods of gaining and directing the attention of others and the rules of turn-taking. Our interest in interpersonal routines lies, then, in the information they can provide as to the infant's cognition of other persons and his grasp of certain skills basic to communication.

Given that the propositional content of these routines is not our focus - for there may indeed be none other than the pleasure of interaction - it will be sufficient for us simply to record a number of features of each routine as it occurs. Those which appear to be most relevant to our purposes are:

1. Who was the initiator of the sequence and how was the

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[1] See Watson, (1973) and page 55.

the initiation achieved?

2. Of how many 'turns' did the sequence consist? Was there a progression of form or style as the sequence proceeded or was it uniform throughout? Who was responsible for any progression that occurred?
3. Who terminated the sequence and how? More interestingly, is it possible to establish a reason for the termination? A mother is unlikely to simply stop interacting with her child, unless to attend to some emergency, but a child may have a variety of reasons for terminating a routine. He may do so if, for example, he is distracted by some other movement or noise, or through boredom (non-progression), or because his mother's turn is markedly different from her preceding one or is simply unfamiliar (too great a progression). Although it will depend partly upon surmise, information of this last kind could tell us how confident the child is in the routines being established and how much variation or unfamiliarity he will tolerate in the other's behaviour.

3.2 The Subjects and Methodology

The detailed longitudinal examination of a small number of children - often single cases - has long been a popular and productive strategy in developmental studies. One could point to any number of workers who have used this technique, from Leopold's (1939-49) classic study to those who have constructed particular and detailed accounts of one aspect of development (for example, Halliday, 1975). But the greatest strength of this strategy is also its weakness in that the detail afforded concerning individual children admits of the criticism of non-generalisability.

On the other hand, the practice of deriving statistical generalisations from the cross-sectional observation of large numbers of subjects at a similar age or presumed level of

development does not readily lend itself to the investigation of very early communicative abilities. We have already noted that any particular communicative intention may be expressed in an indefinite number of ways. It follows that while we may want to describe the meanings of the interactions of two mother-child dyads in similar terms, the behaviour which expresses these meanings may be entirely different in each case; especially the behaviour of the children - in whom we are primarily interested - since they are not so constrained as are adults by convention. Observations of this kind led Gauld and Shotter (1977) to claim that:

> No general understanding of the processes of infant development can emerge from the quantification (and statistical correlation) of gross and physically identifiable pieces of behaviour in highly impoverished environments. (ibid.,212)

The strategy adopted in the present study aimed to gain the detail of a longitudinal study but to combine this with a validation technique. It involved observing one child at fortnightly intervals over a period of 15 months, from 8 months to 22 months of age, and deriving a model based on these observations of that child's developing cognition of agency into the two-word stage of language use. This model was then checked against observations made of a further five children over a period of approximately 3 months each who together spanned the age range 7-22 months. The children observed were Anna (8-22 months) - whom we may call the primary subject - and secondary subjects Daniel (7-10 months), Sarah (10-13 months), David (12-15 months), Victoria (15-18 months) and Leon (18-22 months). While no attempt was made to control for place in the family or number of siblings, four of the children were in fact singletons and a fifth had two very much older sisters. Only Leon had close siblings and these were a sister and a brother aged three and five years respectively.

For the five secondary subjects the observation sessions were recorded using standard video-tape equipment in a room

in the Department of Psychology. This room contained one arm-chair and two smaller chairs, and a large cardboard box containing an assortment of suitable toys. The camera was sited at one end of the rectangular room and commanded a full view of the play area through a wide angle lens. There were pictures, posters and children's drawings in the walls. The mother and her child were shown into the room and after a few minutes for relaxation and adjustment the experimenter retired to an adjoining room, switched on the recording equipment and watched the entire session of 30 minutes on a TV monitor. The only explicit instruction given to mothers was to 'play with (your child) as you would at home, or if he seems to prefer it allow him to play on his own'. These observation sessions were therefore completely non-intrusive, with just one exception to which we shall return in a moment. The method of non-intrusive observation was adopted because, as argued on pages 31 and 91, it appears to be the best means we have of encouraging children spontaneously to demonstrate what they are able to do. While watching the session on the monitor the experimenter noted down episodes which seemed to be of particular interest to aid in the later analysis of the tape.

In view of the large number of sessions involved and for reasons of general convenience the sessions with Anna, the primary subject, were recorded at her home using portable equipment. The regular intrusions into her living-room appeared to disturb her not at all, perhaps partly because she was only 8 months old when they commenced, and certainly because her mother was adept at behaving as if things were entirely as usual. Anna's toys were similar to those in the Department and in several instances identical ones were provided for both situations to permit closer comparison of the different children's behaviour. The one exception to the non-intrusive nature of the observations of the secondary subjects consisted in the experimenter from time to time requesting a mother to try to interest her child in a particular toy or game in which Anna had at the equivalent age

shown a special or unusual interest. This again was done for the purposes of closer comparison.

As soon as was practicable after the end of an observation session the tape underwent a preliminary analysis. This involved transcribing those sequences which appeared to be important and significant and editing these onto a master tape for full analysis later. Typically between 10 and 20 minutes worth of material was retained from a 30 minute tape, consisting of sequences of just a few seconds up to five minutes or more. For the full analysis of the master tapes the activity of each child was tabulated individually on large sheets of card (size A1). These tables recorded the child's age and a code number for the observation session along the horizontal axis. The vertical axis was divided into three sections, namely 'Focus of Activity', 'Solitary Activity' and 'Mutual Activity'. Within each of these sections further sub-divisions were made, as shown in Table 3. Those sub-divisions which were relevant varied slightly for each child and varied strikingly with age; hence some relate to specific items and activities while others are more general. It was found useful to include a division 'marginally involving mother' under the solitary mode of activity to cover these sequences in which a child playing on his own turns briefly to his mother for help or for comment before resuming play on his own. Such cases received an entry under solitary play and under 'Directives' or 'Representatives' as appropriate. In general, for any sequence separate entries were made under 'Focus of Activity' and under 'Mode of Activity', and these were cross-referenced, so that the trends in any particular aspect of the child's activity could more easily be followed through.

Appendix K (page 277a) provides protocols showing the application of the procedures described in Section 3.1; one example is given for each of the three kinds of activity. The data table for each child - see Table Three - is composed of entries such as these.

Table Three

Showing the way in which data for each child were tabulated during analysis.

		Session (Age)		
	Child's name	B1 (15:10)	B2(15:25)	etc.
Focus of Activity	Stacking cubes			
	Posting-box			
	Ball(s)			
	Pull-along toys			
	Dolls			
	Towels/cloths/ nappies/clothes			
	Boxes/drawers			
	Food/drink			
	Mother			
	Other			
Solitary Mode of Activity	Assimilative			
	Imitative			
	Marginally involving M			
	Other			
Mutual	Directives			
	Representatives			
	Interpersonal routines			
	Orienting in response			
	Giving/exchange			
	Expressives			
	Other			

3.3 The Presentation of Data and Derivation of a Model for the Cognition of Agency

In view of the kinds of indicators of cognition which are being used in this study it would in principle be possible to present the data from which the model of the developing cognition of agency is to be derived in two quite different ways. One strategy would involve dividing the whole 15-month period of observation into segments of, say, four or six months. The evidence from each of our indicators could then be considered, and a model of agency sketched out, within each period in turn. This procedure would have the advantage that the child's activities and abilities within each period could be considered as a whole. It would lead to a stage-like model. Another strategy would involve individually tracing the child's development over the whole 15 months in each of the three kinds of activity which we have identified. These would then be summarised and a dynamic model of the developing cognition of agency drawn for the whole period.

In this study it was originally intended that the first of these courses would be followed, and this for two principal reasons; first, because it seems likely that experience of self-as-agent and of other-as-agent - that is, experience gained during solitary and mutual activity - are mutually beneficial in the development of cognition, a wholistic approach segmented over time seemed the more appropriate procedure; second, the data for the five secondary subjects are intrinsically of a segmented nature and could therefore most easily be related to a model of Anna's cognition which was similarly segmented. However, during the analysis of the tapes of Anna it became apparent that it would not be possible satisfactorily to divide her observation period into segments without masking interesting phenomena. For example, whereas distinct progressions could be identified in the form and nature of Anna's requests these did not coincide with the progressions in her solitary activity. The appropriate segmentation would have been different in each case and to rely upon one mode of activity as a basis for

segmentation would have been to place undue emphasis upon one indicator at the expense of the others in the derivation of our model. In the following chapter the second of the two strategies outlined above has been adopted, the evidence from each of our indicators being presented independently before an attempt is made to draw up a model of Anna's developing cognition of agency.

Chapter Four: Anna

4.1 Introduction and Summary

The stated aim of this chapter is to draw up, on the basis of three different kinds of activity, a model for the development of the cognition of agency. The following three sections are devoted to a rather detailed account of the sequences and episodes occurring during filming which demonstrate significant advances in Anna's cognition. We deal with interpersonal routines in Section 4.2, with communicative activity in Section 4.3 and with solitary activity in Section 4.4. In each case a story is told about the development we can observe, with descriptions of the episodes supporting this story included at the appropriate points.[1] Except in the case of interpersonal routines, no attempt is made to summarise the evidence which emerges, within each section. Section 4.2 includes a summary, in the form of the examination of six explicit hypotheses, because our methodology for gathering data on interpersonal routines was different to that for communicative and solitary activity. The summary renders these data in a form in which they may be collated with our other evidence.

Section 4.5 opens with a table (Table 4.1) presenting a skeleton summary of the principal findings from each source. It may be used as a key for easy reference in reading these three sections of detailed evidence. It serves in the same way for the discussion of the inter-relation of the evidence which follows it. There are then two further tables. Table 4.2 draws out what is revealed to us of Anna's cognition of self-as-agent and of other-as-agent. Table 4.3 offers a model for the development of the cognition of agency in the form of a flow-diagram. This shows the child's abilities and accomplishments, which should be seen not as stages reached but as unfolding processes which are mutually interdependent.

The discussion of the model draws out five conditions

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[1] The episodes described in the text are keyed to the Appendices by the figures in the left-hand margin.

for the normal development of agency, variations within which would affect the child's progress through the model. These are:

1. Opportunities for the creation of structure for action.
2. The active and regular participation of another person.
3. The ability and willingness of that other person to interpret and support the child's activity and to allow him to direct their interaction.
4. The consistent application of rules relating act and meaning.
5. The consistent application of limits within which interaction may proceed.

In examining the data for the five secondary subjects, in Chapter Five, we shall be testing our model of cognition against them. It is to variability within the factors listed above that we shall look for the explanation of inconsistencies.

4.2 Interpersonal Routines

Introduction

It is our contention that interpersonal routines are the fore-runners of communicative activity; that they are part of a process through which the young child learns skills basic to the establishment of dialogue such as gaining and directing the attention of others and the rules of turn-taking. We have suggested that within such routines we may observe the development of the child's nascent abilities to intend, to act and to communicate. In presenting the data for Anna we shall therefore deal first with those activities we have grouped under the heading Interpersonal Routines.

In Section 3.1 we identified a number of features of interpersonal routines which seemed most relevant for our purposes. This identification rested upon a set of largely

commonsense assumptions which we can now make explicit in the form of a set of hypotheses:

H_1: Since we presume the very young child to know little about either the possibility of 'interaction' or the mechanics of initiating and sustaining such interaction, his mother will be the predominant initiator of early interpersonal routines.

H_2: As a number of routines become established the child will begin to initiate them.

H_3: Over time the child will begin to use established techniques to initiate new routines.

H_4: Routines generally will become more complex, with more flexibility, and innovations (that is departures from the normal routine) being permitted.

H_{4a}: Routine length will increase.

H_5: In conjunction with increasing general activity and mobility the frequency of these occasions when the child terminates the routine in favour of some other activity will increase.

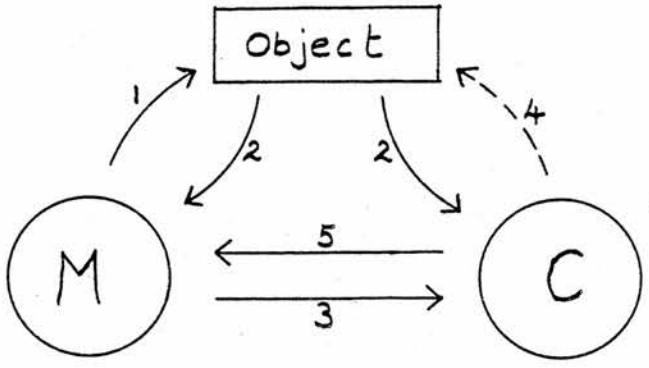
During the latter part of the period during which Anna was observed it became increasingly difficult to distinguish behaviour which was simply interpersonal from that which shaded into the communicative mode. As a general rule, interpersonal behaviour of hers which could not be clearly identified as the performance of an expressive or a directive or a representative communicative act type, but which was ordered, was assigned the status of interpersonal routine. More specifically, this grouping includes behaviour classified under the descriptors Rehearsal of Expectation (which includes 'expectant looking' and peek-a-boo games), Turn-taking, Giving, Giving-Exchange, Joint Action and Reciprocity. These categories were not exclusively defined - and indeed they all inter-relate to some degree - but constituted an expedient to the management of data. In fact, as we shall see, they represent a developmental shift in the form and nature of the behaviour they describe. A summary of all the interpersonal routines identified in the tapes of Anna is given in Appendix A.

The Evidence

In the earliest recorded instance of an interpersonal routine we already find Anna, aged 8 months 11 days, perfor-

ming in a way which Trevarthen and Hubley (1979) would classify as belonging to the stage of secondary intersubjectivity. In conformity with their system we might represent this routine as shown in Figure Three.[1]

Figure Three



The routine is centred around a digital watch of the kind having a display which illuminates for four seconds at the press of a button. The watch is lying on a low table against which Anna is supporting herself standing. M presses the button on the side of the watch (1) and the display lights up (2). M watches C (3) to observe her reaction. C observes the display during the whole of the time it is illuminated (4) then, when it goes out, she looks at M (5). At this M repeats the initial action (1). This sequence continues through seven complete cycles, the only development being that M marks the act of pressing the button (or equally the event of the display illuminating) by uttering the word "Pop". The routine is terminated by M who withdraws while the display is still illuminated. By this technique M avoids denying or rejecting the expectancy conveyed by the child's subsequent look (5). Seeing that M has moved away C looks back at the watch for several seconds and then herself turns away.

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[1] In this routine the co-interactant is in fact Anna's father who takes a considerable share in the care and amusement of his daughter. The father was not present during the recording of any other subject and for convenience C's co-interactant is always designated M.

Anna clearly shows some appreciation of the relationship between M and O in this example, but her behaviour at the end of the sequence belies the claim that she perceives M's action to be the cause of the event (2). The number of times the routine is exactly repeated suggests, however, that C perceives some relationship and, in looking at M (5), wishes this relationship to be reactivated. The evidence is insufficient for us to be able to specify an intention in Anna's behaviour yet we should want to claim that some expectation is inferred by M since the initial action (1) is repeated appropriately each time. Because we are unable to attribute a precise communicative intention to Anna's look this sequence is described as an interpersonal routine, and specifically as a 'rehearsal of expectation'. It contains the rudiments of turn-taking but Anna's competence in this respect is qualitatively different to that demonstrated two months later.

Turn-taking

2 At 10;21 Anna initiates a routine which involves her falling into a large floor-cushion. Anna is standing on the floor next to the cushion holding both of M's hands with her own, for support. She begins the routine by simply letting go of M's hands and falling into the cushion. M is surprised and amused at this and says "Oooh". C rolls onto her back and holds both arms up to M. M lifts her up and supports her standing next to the cushion again. The cycle is repeated three more times without variation and is terminated by M who stands Anna on her knee instead of next to the cushion.

The difference between this routine and the last lies in the variable delay which Anna interposes between her turn and that of M. She does this by waiting after rolling onto her back, and then throwing up her arms suddenly in a movement which indicates 'Now it is your turn'. Although this routine exhibits a similar rehearsal of expectation to the last I take this signalling of the other's turn to be a significant advance and have described it as an instance of

Turn-taking.

A further advance is demonstrated two months later, when there occurs a sequence which is still a turn-taking routine but which has embedded within it a ritualistic exchange component and the beginnings of joint action. This occurs at 12;17.

Joint action

Anna is playing with a set of tuning pipes;[1] she can blow them competently. At the same time her mother is holding a small hurdy-gurdy, which plays a simple tune when its handle is turned. Both are familiar toys to Anna but this is the first occasion she has been filmed playing with either of them. Anna walks over to M's chair, blowing the pipes as she goes, takes the hurdy-gurdy from her mother and gives her the tuning-pipes. M accepts the tuning-pipes but does not blow them. Anna turns away and blows the hurdy-gurdy at several points on its surface. No sound is produced and Anna gives the hurdy-gurdy back to her mother, takes the pipes and blows them again. At this M says "Look, Anna" and slowly turns the handle of the hurdy-gurdy so that its tune is played. Still holding the pipes to her mouth Anna tries with her right hand to turn the handle of the hurdy-gurdy which her mother is holding. Anna is unable to turn the handle effectively and soon turns away thus ending the sequence.

One aspect of this routine which immediately strikes us is what appears to be a clear example of the extension of a schema, something like 'Blowing through something causes a sound to be made', to an object for which this schema does not hold. There are other occasions when this schema is tested as we shall see in our dicussion of solitary activity. Giving and exchange are already established rituals in Anna's repertoire and it is interesting to note that when first

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[1] These consist of four small pipes joined side by side, each of which when blown produces a pure tone. They are used in the tuning of stringed instruments.

taking the hurdy-gurdy Anna gives the tuning-pipes to her mother; she could quite easily have held both, one in each hand. But perhaps the most interesting feature of this episode is the way in which Anna accedes to her mother's clear suggestion that they should try to play the hurdy-gurdy together. It is another month before Anna herself directly initiates a joint action sequence, but at 12;17 she participates in a number of such routines initiated by M. (There is in fact an earlier example with another toy, at 11;12, but on this occasion the attempt at joint action is so unsuccessful - due to insufficiently precise motor control on Anna's part - that the nature of Anna's action is uncertain and the continuation of the routine is impossible.) The episode just described is the first in which Anna's behaviour is such as to justify a claim that Anna interpreted appropriately, and acceded to, her mother's suggestion that they should attempt some task together and that Anna demonstrated some appreciation of the mechanics of the task.

An interesting sequel to this routine occurs at 13;5. Anna spontaneously picks the hurdy-gurdy out of her toy-box and gives it to M. M holds the toy on the arm of her chair close to C and plays it. Anna takes the toy and tries to play it herself but cannot. She then takes the hurdy-gurdy to another adult (A) who is present and gives it to her.[1] A takes the toy and plays it. Again Anna takes back the toy and tries to play it herself. When again she cannot she turns and bangs the (metal) hurdy-gurdy against the arm of a tubular steel chair. She turns to her mother, smiling and banging the toy, apparently sharing her own pleasure at the metallic sound produced.

Progressive routines and games

At around this time interpersonal routines become recognisably games, which continually evolve and develop, and

[1] This person is a family friend with whom Anna is quite familiar and who is present at several of the recording sessions.

have embedded within them clear directive, representative and expressive communicative acts of a non-verbal nature. These routines come to involve the management - as opposed simply to the occurrence - of the interpersonal, and the newly-established modes or turn-taking and exchange shade into the beginnings of co-operation and dia_logue. The earlier cyclical routines begin to disappear in favour of what we may call progressive routines which cannot be represented as a closed system as in Figure Three (page 138). Two episodes at 15;9 illustrate this point.

Anna has a toy which consists of a vertical plastic tube, six inches long and of half-inch diameter, mounted on a hemispherical base. Onto the pole may be slid six plastic shapes; these are pressed down against the force of a spring in the base. The compression of the spring is released by the action of a trigger on the base of the toy, causing the six shapes to fly off. This toy acquired the name 'Pinger'. It will be noted that three operations are involved in playing with the pinger; sliding the shapes onto the pole, pressing them down so as to engage the spring and pressing the trigger to fire the shapes off again. Anna begins this routine by collecting the (loaded) pinger, setting it on the floor near her mother and firing it. M slides the shapes one by one on to the tube and presses them down while Anna watches. Anna then fires the pinger again and her mother reloads it. On the next occasion, however, after pressing the trigger Anna herself collects the shapes and slides them on to the tube. (This is a difficult task which Anna has been practising for three months. She was first observed to attempt to put on the shapes at 12;17 but could not do so reliably until the present session.) Anna then presses the trigger; when nothing happens she waits while M presses down the shapes to engage the spring. Anna then fires the pinger successfully. Once more Anna loads the pinger, waits for M to 'prime' it, then fires it herself. She now reverts to an earlier activity and the routine is ended.

Our second example is centred around a bag of sweets

9 and begins with a cyclical routine involving Anna and her father. Anna is standing holding a paper bag of sweets in one hand and a single sweet in the other. Her father slowly reaches out to take her sweet. Anna stands still until his hand is very close then turns, moves two steps away and holds out the hand containing the sweet. Again her father reaches for that hand; C waits until he is quite close then withdraws her hand. Her mother says "Let mummy have a sweet". Anna turns towards her mother and holds out her hand but as soon as M reaches for it she runs away and 'offers' it to her father again. Before he can move she turns and runs over to a chair where her Teddy is sitting and holds the sweet to his mouth. Anna's father says "Oh, lucky Teddy", at which Anna puts the sweet into her own mouth and turns to smile at her father.

The assertion of self

We can see from these two examples that Anna is now able to change the pattern of a routine and to interpose new moves which alter the course of an existing cyclical routine. Two factors are identifiable in this process. The first, as seen in the first example, is Anna's increasingly precise motor control which reduces the constraints upon the kinds of action she may attempt to perform within the context of an interpersonal routine. It allows her to become a more active participant in routines in which she had previously been more passive, and it lays open opportunities for activities which previously had been impossible. These activities themselves become occasions for experimentation and innovation. The second factor is Anna's evident cognition of the nature of other persons whose motives and behaviour are predictable to her, at least in the case of sweets, and are clearly distinguished from those (sic) of her teddy. This cognition is further evidenced by the fact that in the progressive routines we are now beginning to observe Anna is frequently both the initiator and the innovator. It is M who becomes the more passive partner, filling in the spaces

which Anna creates in their activity. Furthermore, it is about this time that Anna begins sometimes to reject M's moves; at some point in a sequence Anna will 'undo' M's move and substitute a move of her own which is often similar to but is sometimes quite different from M's. I want to argue that Anna's innovations and her rejection of M's actions are both indicative of a new level in Anna's cognition of self. If we treat 'wanting that which is-not' as analogous with 'not-wanting that which is' then we may say innovations in interpersonal routines - and directive communicative act types[1] - are similar to rejections of the moves of others - and, by extension, to refusals and negation. Both of these kinds of behaviour constitute an assertion of self by the child. We take it that from such assertions we can arrive at the level of the child's cognition of self. We shall take up these threads again in Section 4.4, in deriving the model of Anna's cognition.

At 17;25 there occurs another routine which I should like to describe in some detail because it neatly illustrates the degree to which Anna can now control her relation with others. Anna begins by taking a picture-book to M and climbing onto her lap. Anna sits holding the book and facing away from M. M leans slightly to one side, points at the pictures and describes them to Anna. This initial phase of the routine lasts several minutes. Anna herself points at the pictures and vocalises, usually without clear words but sometimes naming the objects she sees, and she turns the pages of the book at will. After some time Anna gets down and exchanges the book for another in her toy-box which she takes back to M and continues as before. Throughout this time M provides, as it were, a verbal accompaniment to the child's activity. Next Anna climbs down with her book and goes over to the chair where her father is pretending to be

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[1] We may here generate a hypothesis that in the context of communicative activity there will be an identifiable change in either the form or the nature of the directives which Anna performs, at around 15 months of age.

asleep. 'Waking Daddy' is an established routine in which Anna touches her father who pretends to wake up with a start then immediately falls asleep again. This game continues for three cycles before Anna's father sits up and lifts her onto his knee so that they can look at her book together. It is as if having already changed her reading matter Anna then decides to change the reader.

Reciprocal routines

This example marks the beginning of a type of routine which seems principally concerned with Reciprocity. These routines, which are often very complex and only rarely involve the earlier cyclical components, display the previously established skills of rehearsal of expectation, turn-taking and exchange but yet these skills do not appear to be the focus of the interaction as previously they were. The critical feature of interpersonal routines which are concerned with reciprocity appears to lie in the nature of the roles of M and C. And we can identify a gradual change in these roles in the case of turn-taking and joint-action routines also. Whereas previously M was the more active partner and C the more passive, we now find, as I have just described, C becoming the more active and 'directive' interactant. But there is another set of changes involved also. For while in earlier routines of all types C's apparent relative passivity required that the roles of M and C in their interpersonal exchanges were fundamentally different, we now find their status as interactants - at the level at which these interactions occur - becoming more nearly equivalent. Specifically, in turn-taking and joint action routines we begin to see M and C performing similar roles in the accomplishment of some task.[1] We also find routines developing in which M and C perform similar roles but which do not obviously involve the accomplishment of any task. It is these routines which represent the beginnings of a period when the

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[1]See routines 28 and 29, APpendix A.

inter-relation of M and C seems principally concerned with reciprocity.

At 16;29 there is an episode recorded in which Anna sits in a chair on one side of the room while her mother sits on the other side of the room. For several minutes Anna points round the room, babbling quickly and looking back and forth from her mother to whatever she is pointing at. At first her mother takes it that Anna is naming various objects and complements Anna's vocalisations by repeating these names with elaborations. Latterly however it becomes clear that C is not naming - she does not utter the names of objects which she does know and she does not repeat their names as M says them - and M then begins to talk (literally) nonsense back to C. They continue like this for some time until C abruptly stops and gets down from her chair. A short time later during the same recording session there is another essentially similar episode.

These are routines which appear to have no focus other than the pleasure of interaction. M and C both obey the turn-taking rules of dialogue, in that their vocalisations carry the characteristic terminal fall in pitch and they mesh accurately one with another, but their exchanges lack any identifiable referents. M seems to regard her role as simply that of filling in the spaces which occur in the 'dialogue' in order to keep it going. The interpretation of C's behaviour which is most consistent with the evidence is that she is rehearsing the vehicles of dialogue - or perhaps of verbal interactive acts - but without performing or attempting to perform communicative or interactive acts; that is without reference and predication and without the intention that M should perceive any intention (Ei) which resides in C's vocal output. We should, however, want to argue that in her behaviour C conveys - and M apprehends - the intention that M should respond in a way which (at least) permits the continuation of the routine. If we compare this behaviour with that in the episode we have already described at 17;25, in which M and C engage in what can more legiti-

mately be described as dialogue, we can I think claim two things. First, we can say that at around 16 to 17 months of age there is occurring a significant and qualitative change in the style of the interpersonal routines involving Anna and her mother. Second, we can claim that this change involves an adjustment in the status of M and C such that now having equal access to the procedural rules of joint action, turn-taking and of dialogue they can now, within the terms of the routines in which they engage, adopt similar and interchangeable roles and have equivalent status in determining the course of these routines.[1] We believe the developments which culminate in such a qualitative change to be identifiable within earlier interpersonal routines.

Role-parity and the beginnings of dialogue

There are two further episodes I should like to describe which highlight the correspondence between the roles of M and C. Both of these occur at 19;13. The first is centred around a plastic duck which is about the size of a tennis ball. The duck can be pulled along on its wheels by a cord attached to its breast; as it is pulled its head turns from side to side by virtue of an eccentric bearing on the axle of the wheels. The duck's wings are mounted on the sides of its body and can rotate through 360° in a vertical plane. On each wing are four thin strips of different coloured plastic, representing feathers, which can be removed and replaced quite simply. Anna commences this routine by taking the duck to M and holding it out to her. M takes this action to constitute a request that she should 'repair' the duck. (The cord is wound round one of the wings.) Anna takes the duck again and holding it in her left hand moves its wings and head, vocalising quietly. M takes up this behaviour and also moves these parts, describing them and the different ways they turn. Together Anna and her mother remove and

[1] We must here insert the proviso that Anna's moves are constrained by the limitations of her grasp both of formal language and of the physical world.

replace the wing feathers and describe these also. Now Anna takes the duck to her father and 'talks about it' in the same way as she did with her mother. He too responds to Anna's approach and looks at the toy with her. Soon Anna gives the duck to her father and moves away to begin a new activity.

This episode contains all the elements of dialogue except the formal language which characterises true dialogue. Such words as do occur in the sequence - and Anna is still producing mainly single words - are largely repetitions from within M's utterances, but I do not believe they should be seen just as examples of Naming or as 'vocal accompaniments to action' (though they are both of these things). Anna's words seem to constitute her attempt to match her verbal contribution with that of M in an episode in which their behavioural contributions are already matched. If this is so it represents an extension of the process we have been describing and suggests one way in which Anna's acquisition of language might be tied in with other interpersonal behaviour.

13 By contrast the second episode from this session contains no verbal input at all from Anna. It involves a toy car on which she can sit and push herself along with her feet. The seat of the car hinges forward to reveal a space six inches square by six inches deep. Anna pushes the car over to M who immediately lifts the seat and puts in a foam block which was lying nearby. Anna walks round and looks in then holds out her hand towards where three other blocks are lying. These are passed to her one at a time and she puts them in. M closes down the seat and says "Would you like to sit on it?" Anna climbs on and M pushes her. Anna pats the horn on the steering wheel. (This is the only way she can press it hard enough to make it produce a sound.) C and M press the horn in turn for a little, then Anna pushes the car forwards with her feet. M grabs the car from behind and pulls Anna back. She turns and smiles then pushes herself forward and stops facing her father. As M pulls her back again Anna waves to

her father. He looks on but makes no comment. When again Anna pushes herself forwards and stops she turns to look at M, and laughs when M starts to pull her back. Finally Anna pushes the car forward beyond M's reach and climbs off signalling that this game is ended.

Barring the short horn-pressing segment this episode contains no identically repeated moves. The meshing of the behaviour of M and C is fluent and confident and the pattern of that behaviour changes constantly. In this sense we are not here dealing with a 'routine' at all but with unique and original interactive behaviour. Furthermore within the episode Anna performs at least three (nonverbal) communicative acts.[1] As shown in Appendix A two further interpersonal routines were identified in the tapes of Anna (at 20;08) but it was felt that after this age they no longer constituted a useful method of describing her behaviour. In the terms of our original formulation routines were posited as the fore-runners of truly communicative behaviour; these later episodes are markedly different in style from the earlier routines we described and they now include activity which consists with our definition of communicative behaviour, and which properly belongs in Section 4.3. The constraints upon Anna's interactive abilities do not now appear to be the level of her cognition of other persons nor are they to do with uncertainty over the sorts of things it is possible to communicate about. Rather the remaining barriers are her cognition of the way the physical world is ordered and her capabilities within it and also her limited grasp of formal language.

Summary : Examination of hypotheses

We turn now to consideration of the hypotheses set out at the beginning of this section and to a summary of the

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[1] Near the beginning of the episode there is a directive - that M should pass to C three foam blocks - and later there are two expressive acts - a wave to her father on being pulled away from him and a laugh of pleasure to her mother.

points our discussion has attempted to bring out. Because the interpersonal routines which have been recorded will presumably constitute only a small sub-set of all the routines which occur between M and C a statistical examination of their features would not be justified. We must, however, assume that the recorded routines are representative in style and format at any given age of the child and permit the drawing of some general conclusions.

H_1 (see page 137) is sustained by our data in that during the earlier recording sessions (up to 11;12) M initiates roughly three times as many routines as does C. Latterly (H_2) C initiates much more frequently than M. However, C's intentions are not at all confined to those routines which are already established; even at 10;21(t) we find her instigating an entirely original episode. In the sense in which it is framed H_2 appears to underestimate the child's abilities as within our data there is no time when Anna (only) uses an established method to initiate an already rehearsed routine. She does indeed do this - for example at 11.12 - but, importantly, she has already demonstrated her ability to engage her mother in a new routine with an unrehearsed technique (10;21(t)). This implies that the child moves fairly swiftly from a state of being primarily a recipient of interpersonal initiatives to one of being herself an initiator. We can say that this change occurs at around 10 months of age; it will be interesting to look for some corollary in her communicative behaviour.

Regarding H_3 we can readily identify a range of techniques which Anna uses to gain M's attention and thereby to commence a routine. These almost always involve Anna being, or moving to be, within arm's reach of M. Sometimes M takes Anna's approach alone to be a signal that her participation is expected though more often the process is mediated through some object which C offers or shows to M. Only rarely in our observations - for example at 16;29(t) - does Anna initiate a routine when she is at some distance away from M. In general it appears that almost from the beginning of our observations

of Anna she is cognizant of the possibility of her initiating interaction with M and further that she recognises the necessity in so doing of gaining or directing M's attention. As stated H_3 also underestimates the child's abilities. What we observe from 10 months onwards is not Anna beginning to use 'established techniques to initiate new routines' but rather her increasing confidence in and refinement of techniques which are already plainly demonstrated by, for example, her use of a request at 10;21.

The refinement of Anna's ability to direct M's attention proceeds hand in hand with a developmental shift in the form and nature of the routines in which M and C engage. As we have described these progress from simple, cyclical episodes involving the rehearsal of expectation and exchange, through turn-taking and joint action routines which become progressive in form, to a stage when they are reciprocal in nature. Characterising this shift is a gradual increase in the extent to which C controls the structure and outcome of the interaction, culminating at 16 to 17 months in a qualitative change in C's status to what we may call role-parity with M. The features postulated in H_4 are clearly seen during this period. Only after 17 months, however, does the average length of an episode increase markedly (H_{4a}); up to this age both short (a few seconds) and long (three to four minutes) routines appear to be evenly distributed. The appearance of routines concerned with reciprocity and the advent of C's role-parity with M are marked, as we have said, by a change in which the mechanisms of turn-taking and joint action become subordinated to the goal of reciprocity; from being the foci of the routines in which they occur, between 10 and 17 months, they become skills which are used as tools in later interactions. In attempting to account for the child's growing level of interactive awareness over this period I candetect neither physical invariance nor gradual change of other than the most general kind in the mechanisms by which turn-taking and joint action are achieved. The situations in which they occur and the toys and events through

which they are mediated are simply too varied to throw up evidence as to what precisely constitutes the data from which the child might derive rules concerning the nature of other persons and the conduct of interaction with them. Perhaps our other data will shed some light on this.

While it is true that with increasing age there is a greater tendency for Anna to terminate a routine by switching directly to some other activity, such that after 15 months this is the means used in about half of the terminations for which she is responsible, this effect is not as marked as might be expected. Even before she was walking confidently Anna diverted from a routine to a new activity on several occasions. This suggests that mobility alone is not a primary factor (H_5) even though it greatly increases the scope of the child's activity. In fact the distinction which I have made between 'withdraws' and 'diverts' as methods of termination may be an artificial one; often the new activity is itself pursued for only a short time. It appears in most cases that at some point the child decides to end a period of interaction and the means by which this is done depends more on external factors - the occurrence of some extraneous event or the proximity of a particular object - than on any factor connected with the routine itself. Only in one set of instances can we claim with any confidence that the reason for Anna terminating a routine is intrinsic to that routine. This is in cases when she is unable successfully to perform her turn and abandons the attempt, usually turning away but not usually commencing a new activity. The behaviour occurs only in turn-taking and joint action routines between 11 and 16 months and disappears entirely by the time reciprocal routines are established. This is consistent with our claim that in reciprocal routines the mechanics of the routine are subordinate; incomplete and ineffective moves can be tolerated and C will accept or request assistance rather than withdraw. I believe this demonstrates C's appreciation that her goals and intentions are accessible to M even though they may not be expressed in the performance of a communicative act.

4.3 Communicative Activity

Introduction

It will be recalled that in Chapter Two we identified our task as being to describe the development of the child's ability to express communicative intentions. We said that communicative intentions are expressed in the performance of a communicative act, and we further identified two components within such an act; the child's intention of some effect (Ei) and his intention that his mother will recognise his intention of this effect. Typically, we argued, the kinds of intention a young child will attempt to convey are that 'M should do or believe X', expressed in the performance of (rudimentary forms of) the Directive and Representative communicative act types, respectively. In accordance with the method described in Chapter Three for the identification of interactive acts the effects (Ei) which Anna conveyed to her mother were established.[1] Those which were expressed by means of a directive act are listed in Appendix B and those by a representative act in Appendix C. Since we are also interested in the child's cognition of the conventions governing the expression of communicative intentions a description of the act C_1 - and of C_2 if this was markedly different from C_1 - is also given. The actions of Anna's mother are not described but it is indicated whether a request was granted, refused or diverted.

Directive acts

Development in the nature of requests

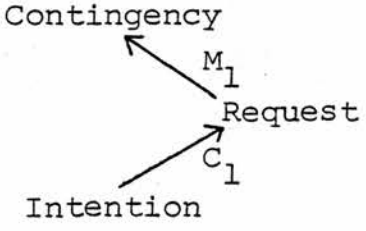
It might be argued that the interpersonal routine reported on page 138 contains the implicit request, repeated several times, that 'M should repeat the act which precedes the display lighting up'. This sequence is not listed in Appendix B because we cannot certainly attribute this (or any other) communicative intention to C's behaviour. There is however a similarity between this episode and several of Anna's early requests[1] which strengthens the argument that

[1] See Appendix K for a protocol for the identification of a communicative intention by Anna.

interpersonal routines constitute a testing-ground for skills and techniques which are used in later communicative activity. If we look at Anna's requests up to 13;05 we see that they consist of three explicit requests for food or for an object, two requests for assistance in standing and two requests that some event be repeated. In these last two cases there is no sense in which the child involves herself, or even attempts to do so, in the causation of the event; she simply expresses her wish that it should recur to which expression M attributes the force of a request. We may summarise all of these occasions on which 'C uses M as a source of pleasure', as represented in Figure Four.

Figure Four

C uses M as a source of pleasure.



The pleasure ascribed to C can result from the provision by M of some desired thing or from the activation by M of some contingent relation in the world which C knows to exist but which she cannot herself deploy. We must take it also that the achievement of the standing position is a source of pleasure to a child of this age.

At 14;02 Anna requests 'that M sound the tuning fork'. On this occasion she follows up the request - which is granted - by attempting to repeat this event herself. Although her attempt is not successful it is significant because it marks a shift from a phase in which Anna uses M to cause the occurrence of some event to one in which she uses M to show how some event is caused in order that she may attempt to

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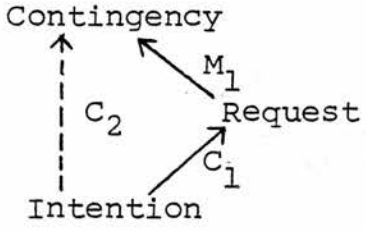
[1] I propose to use the term Request as a short-hand for all communicative acts of the directive type.

cause it herself (see Figure Five). We may say also that this discovers an elaboration of the structure of the child's intentions. Her intention now is not identical with the act by which it is introduced but extends over time to govern a sequence of acts. The child can now entertain intentions

Figure Five

C uses M to show how some effect is achieved.



at different levels such that a procedural intention - such as a request - is embedded within a superordinate goal. This is the case when at 14;26 Anna is trying to replace the cork in an empty sherry bottle. She accidentally knocks over the bottle and picks it up in both hands with her thumbs pointing toward the base so that it is impossible for her to set it upright. Still holding the bottle Anna looks at her mother. M has not been watching but immediately appreciates the problem and sets the bottle up for her. Anna then continues trying to insert the cork.

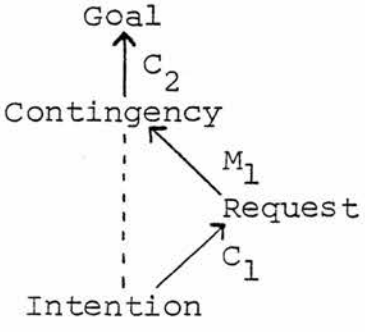
Before this stage - and there is similar evidence from Anna's solitary activity - the consummation of an immediate intention typically ends the episode; often the child appears uncertain as to what to do next. This implies a restriction of the intention to the act through which it is manifest; the act <u>is</u> the intention. Over time there must be a separation of means and goals allowing, as we see, the embedding of a communicative intention within an overall plan. This must involve a derestriction of the intention from any specific act and implies that the child can now conceive of the failure of a particular act to achieve her goal and can modify such an act or introduce subsidiary acts. Again we can find a demonstration of such a modification at 14;02. M finds and

picks up a piece of soap which Anna has been eating. Anna sees this and reaches for the soap, looking at it and saying "Duh". M says "No" and holds the soap away from Anna's outstretched hand. Anna tries again, holding M's gaze and reaching. Again M refuses. Anna then transfers the object she is holding from her left to her right hand and reaches for the soap with her left hand, maintaining eye-contact with M. When again M refuses to give her the soap Anna throws down the object she is holding and turns away. The restatements of her original intention by C and her subsequent withdrawal indicate that she knows her intention to be accessible to M and that she believes herself to have used a conventional - that is an understood - means for its expression.

Several of Anna's requests for assistance and commands at 15;09 signify a third phase in the nature of her requests. At this time she requests that she be passed an out-of-reach object so that she can play with it, that the door be opened so that she can go out of the room, that M should give her a towel so that she can carry on with her game (of collecting washing), that a box be opened so that she can play with what is inside. These may be represented as occasions on which C uses M to create the conditions in which she can pursue some goal (Figure Six). C's communicative intention is now clearly distinct from her intention with respect to the physical world, that is her goal; the fulfillment of her communicative intention has the status of a sub-goal.

Figure Six

C uses M to create the conditions in which she can achieve some effect.



As might be expected Anna's requests over the succeeding seven months became considerably more diverse in form and more clearly articulated but there is no further development in their nature. By 15 months the child has demonstrated by the nature of her requests that she can conceive of states of the world which she herself is unable to achieve. She knows also that others are able to achieve effects beyond those of which she is capable and that it is in principle possible to enlist the aid of others to achieve these effects. Besides being rule-governed the young child's cognition must therefore be of other than a purely sensori-motor nature, receiving input only from the consequences of her own action. It must be allowed that schemas may be formed on the basis of events which are observed without participation. Since the child's learning is limited by her hypothesis-forming capacity (see Section 1.2), it seems likely that learning of this kind will be restricted to events and relations which are of a level of cognitive complexity similar with those which are already represented in the child's cognition. In effect we are arguing that observational learning may permit the elaboration, generalisation and formation of schemas at a given level but cannot directly give rise to schemas of a kind more complex than those which are already present.

'Communicative competence'

Before moving on to a discussion of the form of Anna's requests I should like to refer to two later episodes which I believe to be illustrative of Anna's ability to take account of M's understanding of a communicative intention and if necessary to modify in an intelligent way the act expressing it. On earlier occasions when a request is not granted after C_1 Anna's repetitions tend to be expansive, that is exaggerated performances of the same basic act.[1]

[1] I am excluding occasions on which C accepts a refusal of her request and either withdraws or performs the requested action herself. Both of these occur at 15;09. 22 23

In the sequences below Anna resorts to forms which are not expansive restatements but are quite different means of conveying her message.

26 In the last sequence listed at 18;16 Anna requests that Panda be passed to her - which is granted - and then gets down from her chair and touches the pinger indicating that it should be fired at her again. Interposed between these moves is a delay during which Anna raises her arm. Clearly M did not attribute to this arm-raise the force of a request since she did not respond; hence the action is not described. It does seem, however, that C must have intended M to take her arm-raise as a signal to fire the pinger; when the act fails to communicate her intention she adopts a more certain means in getting down and touching the pinger directly. If this is so, besides highlighting the intelligent way in which the child can monitor the accessibility of her intentions to M, it suggests that in the process of her learning how to perform requests there will be (perhaps many) occasions when the form of the child's act is so far removed from a conventional - that is understood - form that the adult is unaware that a communicative act is being attempted. The lack of reinforcement should serve to eliminate such non-effective forms from the child's repertoire but their occurrence, albeit hypothetical, would support the case that the child's search for ways of communicating is an active and experimental process.

27 A rather different story unfolds when at 19;13 Anna requests that a table-lamp should be switched on. This request is refused, in fact because the light would interfere with the camera. Anna then turns and points at another light which is on (C_2) as if to check that her meaning was understood by M. M elaborates C_2 saying "Yes, that light is on". Anna then points to a third light which is off and babbles. M gets up and switches this light on. With this confirmation that her meaning is clearly understood by M Anna points again at the table-lamp and exclaims loudly. M says gently "No, we can't put that light on", Interestingly Anna accepts this refusal at once and returns quietly to the game she

had just interrupted. Apparently the non-fulfillment of her request matters less to the child than the possibility that her request was not understood, and she proceeds in an ordered way to check that it was indeed understood by establishing the relation between the form of her act and the meaning it expresses.

We can infer from this episode that C believed her initial request should have been accessible to M, as in fact it was. In general her communicative activity, though still not founded on a verbal component, is now becoming increasingly transparent and, by 21 months, when the course of M and C's interactions suggests that a request might be appropriate it is frequently rendered unnecessary by M's anticipation of C's intentions. On the basis of the evidence just presented we may claim that the child can perceive the extent to which her meanings are understood by M and, in cases where she is uncertain, can perform acts which establish for her the extent of M's understanding.

Development in the form of requests

In looking at the development of the form of Anna's requests we shall want to address ourselves to two questions. First, are there at any level physically invariant features of requests and if so what might be the source of these? And second, do developments of form generalise to all requests or are they restricted to particular topics or types of request? We will get some way to answering these questions by posing in each case the more pragmatic one, What are the physical features of an act by C which prompt M to attribute the force of a request to that act?

With the exception of the two early requests that she be helped to stand all of the requests Anna makes up to 14;26 have to do with topics - objects or events - that are already a current focus in her own or another person's activity. This has as a consequence that in performing a request she is not required to bring to M's attention some new or non-salient referent; she has only to convey the fact that

she has some intention with respect to a pre-existing topic.[1] Only at 15;09 - and twice at this age - does Anna begin to introduce referents which are new. In the early period we must distinguish between the different types of request which are attributed to Anna. The most obvious distinction to draw is between requests for objects (Gimme) and requests about objects or events (Request repeat and request assistance). Gimme is a type of request which is largely stable in form in this early phase. Characteristically it involves reaching, with the line of regard either towards M to check that she is attending or towards the object to specify it more clearly. The child does not usually switch her gaze from M to the object or vice versa within any one act though if a repetition is involved-as at 14;02 - the other line of regard tends to be used. There may or may not be a vocalisation associated with the request. In the case of requests repeat and requests for assistance on the other hand there is no standard format of this kind. Here whether or not M takes some behaviour to constitute a request is almost entirely constrained by the context in which it occurs. Thus when at 13;05 Anna takes the hurdy-gurdy to M, to which action M attributes the force of a request that she should play the hurdy-gurdy, C is superficially behaving precisely as in the exchange routines recorded at 12;17 and 13;05. It is entirely possible that as far as the child is concerned her behaviour is equivalent in all of these cases and that it is M's response which distinguishes between them, granting to one the status of a request and to the others that of a move in an exchange routine. Had M acted differently in response to C's 'request' the child's subsequent act may have revealed a clear distinction on her part between these episodes, we cannot say. The present point is that there is nothing in-

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[1] It is perhaps a shortcoming of our procedure for the identification of requests that any attempts Anna makes which are not picked up by M cannot be established. It may well be that during this time Anna tries to perform requests with respect to extraneous things.

herent in the action the child performs per se which distinguishes requests repeat from other interpersonal acts in this early period; the basis upon which M attributes a request must therefore reside in the context of that act and the preceding events and presumably in her understanding of her child.

18 By 14;26 there is no longer the possibility of such lability on the child's part. At this stage Anna requests that she be lifted off her car. M misunderstands this request and moves away at which Anna evinces clear distress. Although Anna entertains and attempts to communicate a definite and quite precise intention there is again nothing inherent in the act she performs which specifies that intention. It must be inferred by M from the context of the act's occurrence.

Referring and the use of words

Over the succeeding months there is only one significant advance in the form of gimme types of request and this is the simultaneous development of pointing and naming. In general pointing is used to specify some desired object which is either out of the child's reach or is at some distance from her but not for an object which is in another's possession; the child always reaches for objects in another's possession whatever the distance between them.[1] There are, however, several reasons for arguing that the development of pointing is not a development in the form of gimme requests as such but is rather a development in the child's ability to refer which is used in such requests as well as for other purposes. It will be sufficient here for us simply to list these reasons. First, at about the same time as pointing first occurs 22 within a request (15;09) it also occurs in naming games and 38 in representative communicative acts. Second, this request

[1]Reaching means arm extended with palm upwards and fingers cupped. Pointing is initially characterised by palm downwards and all fingers extended, Later only the first finger is extended with the others curved downwards.

at 15;09 is significant also in being the first occasion when the child attempts verbally to specify the desired object. We might say that the child points manually and verbally at the same time on this occasion. And in fact on all future occasions when pointing forms part of a request there is also a verbal component. Third, referring by verbal means, although lexically and phonologically imprecise at this stage, begins to be used for purposes other than specifying requested objects. Fourth and perhaps most significant, it is only with the advent of pointing and naming that the child begins to perform gimme requests with respect to objects which are not a current focus of attention or activity. It would appear then that we can claim that the type of request we have designated gimme remains basically similar in form throughout the period of our observation of Anna with the one qualification that the development of the ability to refer to distant or non-topical objects by pointing and naming, beginning at 15 months, affords a new dimension and enlarges the scope of these requests.

Turning again to the other types of request we see from Appendix B that from 15;09 onwards all of the requests which Anna performs which have to do with an object which is not in her own nor in M's possession have verbal referring expressions associated with them. It would seem that as far as the child is concerned her problem in performing such requests lies not so much in conveying to M the precise nature of her intention as in making clear what object or event it is that she has some intention about. In cases where the referent is involved in current activity its specification is not usually a problem, but when it is novel its specification receives the emphasis within the child's communicative act. Once the referrent is established and if its nature and the context of C's act do not reveal her intention then that emphasis will be altered within her subsequent act, C_2. Thus at 15;09 Anna walks to the door, puts her hands against it and says "ăd-jū-jū". M took it that C was 'naming' the door in spite of the fact - as she reported - that naming utter-

ances usually have a rising terminal pitch contour. When M does nothing Anna shouts"ūd-dū-dū-dū"; M gets up and opens the door and Anna goes out. Or again, in the light episode at 19;13 which has already been described, C_1 involves the clear word "lye". Once light has been established as the topic none of C's three succeeding acts contains this word although two of them do have a vocal component. In other cases C's identification of the referrent is sufficient for M to deduce C's intention and no subsequent act by the child is necessary.

Conclusions on the form of requests

What seems clear is that within the context of requests concerning novel objects the child uses verbal referring expressions - naming - as a means of identifying for M the object with respect to which she has some intention. Furthermore, such instances are among the earliest occasions when the child utters identifiable words. With someone as adept at perceiving her child's needs as is Anna's mother there is little incentive for the child to use words on other occasions, at any rate for communicative purposes; we might suggest that the need to disambiguate the (novel) referent of a request constitutes for Anna a major factor in her early use of language.

Two further, related points must be made regarding the form of Anna's requests. The first is that right up to the end of the period during which Anna was recorded there remains no standard format to her requests for assistance and commands. (Requests repeat largely disappear after 14;02.) The only possible exception to this lies in her use of the names of objects to identify them as topics of her intentions. However, naming also occurs on occasions when the child is not ostensibly performing a request. The second point is that so long as the child utters only single words, or combinations of words which do not have sentential structure - for example noun phrases[1] - then these words will function as referring

[1] At 20;08 the child produces "hunna-wu" which is to be taken as meaning '(the) other one'.

expressions when they occur within requests. The predicate - that is the complementary part of the proposition the communicative act is designed to convey - resides totally in
30 the context of the act's occurrence. At 21;09 and again at
31 22;00 on the other hand the child produces utterances putatively having a Verb+Pronoun+Preposition structure.[1] On these occasions it is the predicate which is explicit and the referent which is to be understood being represented by the pronoun. It is possible that this signals the beginning of a new phase in Anna's requests, in which her communicative acts will become much more explicitly verbal. Unfortunately the recording of Anna had ceased before the examination of the tapes threw up this possibility. It is worth noting that the propositions expressed more verbally within these later acts are not in any way more complex than others which have already been expressed non-verbally.

Representative Acts

In summarising those communicative acts by Anna which are putatively representative acts, in Appendix C, I have explicitly described the inherent proposition as that which is attributed by M. According to our definition, in the performance of a representative act C conveys to M her belief in the truth of a proposition X and intends that M should believe it also. When such acts are performed without words or with only a subsidiary verbal component, as are nearly all of these examples, they are open to alternative interpretation by M in a much more fundamental sense than are directive acts. Non-verbal representative acts are ambiguous not only in respect of the proposition they convey; their very classification as representative depends upon M's response. For example, at 17;25 Anna holds out to M the empty
39 squeezy bottle with which she has been playing. M comments "oh, you've finished with that have you?" which forms the

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[1] "ŭĭd-dŏ" and "ŭĭd-dī-dŏ" both of which M translated as 'take it off', 'it' being an item of Anna's clothing.

basis of the attributed proposition 'That C has finished playing with the bottle'. Compare this with C's act at 19;13 of handing her cup to M while looking at another object
28 (described in Appendix B). On this latter occasion C's subsequent act conveys to M the message that C_1 was to be taken as a request ('that M should put her cup on the table'). One might argue that the proposition 'C has finished with the cup' is implicit within this request. The important distinction for us is that M does not explicitly attribute this proposition and it is not therefore admissible by our procedure.

The nature of the proposition attributed by M was established in one or more of the three following ways. Either it was identified from the gloss which M provided for C's act at the time of its occurrence and/or it was revealed by an 'aside' by M to the author at that time and/or it was elicited by questioning M at the end of the recording session. What such attributions in effect inform us of are the kinds of propositions which M believes her child to be capable of representing.

Kinds of representative act

There are four principal kinds of representative act which Anna performs, which I have termed as follows. 'Comments' about the state of the world are classified as Observations. This category includes naming, either spontaneously or in response to a question from M, though after 16;29 examples of naming are not included in Appendix C because they are frequent and not apparently significant. Three 'comments' by Anna of a personal nature are also classified as Observations. Expressions by Anna which refer to her activity, either in progress or just completed, are classified as Performatives. On only one occasion does Anna explicitly negate M's counteraction of C_1. This occurs at 18;16 and I
40 have described C_2 as an Assertion. C_2 is a repetition of C_1 in behavioural terms although C_1 was not apparently intended as a communicative act. (Had C_1 been communicative it

would have counted as a personal observation.) Finally there is a type of representative act which occurs after a pair of moves by C and M and in which C appears to offer a Clarification of the proposition which C_1 was intended to convey These are broadly similar to repeated requests, the distinction between them residing in M's interpretation of the force of C_1.

The importance of M's interpretation

In looking at interpersonal routines we identified 10 months as being the approximate age at which Anna moves from a state of being primarily a recipient of interpersonal initiatives to one of being herself an initiator. If this observation is reliable we should expect to find communicative activity beginning in earnest at this time also. In the case of directive acts there is indeed an apparently sudden onset at around 10 months. This is not however the case with representative acts; although there are two earlier examples it is not until 14 months that we see a marked increase in behaviour which M is prepared to interpret as bearing the force of a representative.

If we look at the form of those acts which M treats as being of a representative kind, as described in Appendix C, we find that up to 18 months they most frequently involve the child holding some object out to M. By this C appears to be specifying the referent of her act but the remainder of the proposition and the force with which it is to be taken must be deduced (or imposed) by M from the context of the act's occurrence. In fact the physical behaviour constituting a representative is in several cases identical with that which M might on another occasion take to be a directive act. There is, in other words, no apparent behavioural feature which distinguishes representative acts from other communicative act types, at least before 18 months of age.[1]

[1] There does occur a rather unreliable contrastive feature which is that the vocal or verbal component of a directive act usually has a falling terminal pitch contour while that

This begs two questions: What is it about the context of occurrence of some communicative acts which persuades M to treat them as representative acts? and Why is their reliable appearance delayed by almost four months after the appearance of directive acts? We shall return to these questions shortly.

32 At 10;21 Anna vocalises while pulling herself up to a standing position. M's gloss ascribes a performative type of proposition to this vocalisation. As a segment of interaction, albeit at a minimal level, the example differs from both interpersonal routines and from sequences involving a directive in a quite particular way; the child does not acknowledge M's comment as such. In fact if we look through Appendix C we find that up to 18 monthsthe occasions when C_2 is linked to C_1 by M's response are comparatively rare. We cannot say, however, that the child does not take account of M's response. It seems that in performing what M takes to be a representative act the child requires no particular action on the part of her mother, she requires only that her mother should publicly acknowledge her act. This at any rate is the typical course of an incident involving a Performative or an Observation by the child; C_1 is an act which M interprets as a representative, M_1 is an acknowledgement of the proposition she attributes to C_1 and this acknowledgement is most often in the form of an affirmative. After this the child does not usually perform an act which is thematically related to the two preceding moves. She may perform a similar but unrelated act, or she may return to solitary activity; in any event she does not as a rule signal that she has registered M's response. On only two occasions before 18 months does C perform a subsequent act C_2 which <u>is</u> related

34 to the preceding C_1 and M_1. At 14;26 she walks over and gives to M the duck she is presumed to have offered (and then

36 immediately walks away) and at 15;09 she drops onto M's lap

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of a representative act often has a rising terminal pitch contour. However only about half of the acts of each type carry a vocal or verbal accompaniment and their intonation patterns are not exclusive.

the laundry she has just held out to her (and likewise walks away). Had the child expected any action from M which was related to her being given the duck or the laundry it seems most unlikely she would simply have walked away. Thus in the case both of Performatives and Observations, prior to 18 months, we find that characteristically the child appears to expect from M simply an acknowledgement of her act C_1, and indeed M's recognition of this requirement must be the basis upon which she ascribes a representative force to such acts by the child.

We have already noted that the physical qualities of an act by the child which M takes to constitute a representative act are to us indistinguishable from those of an act which M might treat as a directive. We suggested that the basis of M's discrimination must reside in the context of the acts occurrence. But there is no reason to suppose that distinctions of context, subtly construed, should be any more evident to us than are possible distinctions in the form of the child's act. Herein lies the justification for our use of the mother as an 'explicator' of the child's developing communicative abilities. Leaving aside the perlocutionary aspect - intonation - there is only one contextual feature which appears to be common to most of Anna's representatives before 18 months; that they occur in the middle of, or just after, a period of solitary activity. But this will not do as a distinguishing feature, for many of Anna's requests also arise out of her solitary activity. It would appear that on the basis of the evidence here available we cannot say how M knows that C_1 calls (only) for an acknowledgement and is to be treated as a representative act.

The source of representative acts

From our earlier discussions we may find some pointers to the reason that representatives only appear reliably some four months after the first requests were recorded. Remembering we have observed that the propositions M attributes to the child's acts in effect inform us of the kinds of propositions M believes the child to be capable of repre-

senting, we are prompted to examine the sources of M's belief. One such is her communicative experience with the child. And we recall that it is around 15 months of age that cyclical interpersonal routines begin to disappear in favour of progressive ones in which turn-taking and exchange shade into the beginnings of co-operation and dialogue. And in the case of requests it is at 14 months that we find the child beginning to use her communicative ability to pursue some goal which exists over and above any immediate communicative intention. It seems reasonable to suppose that once Anna is capable of entertaining hypotheses about the world and about her own action which enable her to pursue definite goals then she will be able also to offer 'comments' about her action and about her surroundings and that her mother will recognise these as such. The attribution of a proposition with the force of a representative is precisely what would be entailed by this kind of recognition by M.

Renegotiation of roles

In the session recorded at 16;29 Anna is very social and babbles incessantly. Naming comprises a high proportion of her verbal output, but examples of this are not included in Appendix C because they were so frequent and without apparent significance. At this point we may note also that Performatives do not disappear, as might be suggested by their omission after 15;09, but they do seem to become personally directed rather than communicative. Session 17;25 is in one sense very different to that of a month earlier and in another sense quite similar. On the one hand Anna plays almost completely on her own, only once involving her mother (and her father) in a sequence of any duration, but on the other she pauses frequently during her play to show or to name an object to her mother. Her mother reported that over the period from 16 to 18 months she noticed this inconsistency frequently. While Anna was at times quite aloof and would interact only in short bursts and often from some distance away she was at other times highly communica-

tive and appeared to enjoy interaction for its own sake. There may be a connection between this behaviour and the qualitative change we identified as occurring at 16 to 17 months in the style of interpersonal routines. After this period there is a change in representative episodes which again mirrors the change we noted in the case of requests.

Representative acts in dialogue

From 18 months onwards it characteristically happens that the topic or theme which Anna has introduced by performing a representative act is no longer abandoned after M's acknowledgement of it. More usually the theme is pursued within a further pair of moves. At 18;16 we find an example 41 where C herself extends the theme in comparing the motion of her roundabout to that of the spool on the VTR, and at 43 19;13 we see M not simply acknowledging C's identification of flowers but asking a question which develops that idea: 'What do you do with flowers?' The interpersonal elements of dialogue which were identified in Section 4.2 are here combined with a relatively explicit exchange of propositions. Anna's comprehension of speech addressed to her is evidently sufficient for the achievement of a kind of dialogue, but there is evidence that she knows her own speech to be an uncertain means of conveying a message. At 19;13 M holds up 42 a picture of a spinning top and asks 'What's that?' Anna points to the picture and says 'tɔ̄'. When M queries 'What is it?' Anna does not repeat her utterance but turns and points at her own spinning top which is lying nearby. By this C demonstrates that, at least in this case, pointing - referring by behavioural means - is a more reliable form of identification than is naming. Now if we reconsider the 27 light episode discussed on pages 158-9, which occurs during the same recording session, we find that here the topic is clearly understood by both C and M, and C's efforts are directed to ensuring that M has apprehended the predicate '(that the light) should be turned on'. In this C also resorts to non-verbal means. It would appear that at this

time, when the interpersonal routines of M and C have reached a reciprocal form and when their competence at communicating with each other now permits a form of dialogue, that (i) C can establish non-verbally how far her communicative intentions are understood by M and (ii) in cases where M queries or appears to misunderstand a verbal reference C will resort to non-verbal means. This is as we should expect if language, construed as an ordered set of skills for the conveying of simple messages, is progressively substituted into behaviourally expressed messages by the developing child. In representatives, as was the case with directives, it is the referent of a message which is the first part to be verbally expressed. Initially the word occurs simultaneously with a behavioural form - pointing - and if this communicative attempt is unsuccessful the child will adopt an exclusively behavioural means of Clarification.

44 45 At 21;09 the child moves beyond the purely referential use of language. 'All-gone', used on two occasions, functions as the predicate of a proposition whose subject is made clear by C's action in the first case and by M's question in the second. The status of the word 'dǒ' is uncertain but in any reasonable gloss it is clear that the word does not function as a simple referent. Once again, the same processes seem to be occurring in representative acts as was the case with directives; after 21 months the child moves on from the use of words only as simple referring expressions to their use as telegraphic representations of a whole proposition.

33 42 Finally in this section I should like to examine how far the incident at 13;05, classed as a Clarification, is analogous to the clarification occurring at 19;13. At 13;05 M reported that while she took it that C was 'explaining what she should have done with the cups' she had no idea quite what she should have done. An explanation of the incident which would be more consistent with M's report and with the other data is that Anna's first act of giving three cups to M was intended as a request (for example that M should fit the cups together). When M does nothing C takes

back the cups and babbles at M. The act which M has treated as a representative would under this description constitute C_2 in an attempted directive sequence in which M failed to recognise the intended force of C_1. Strictly taken our methodology does not allow us the possibility of claiming in any particular case that M was wrong but the other data in Appendices B and C do suggest that this episode should be seen as a misunderstood directive and not as a representative.

4.4 Solitary Activity

Introduction

Our purpose in examining the child's solitary activity is two-fold. Principally we want to discover changes in the level of the child's cognition about her physical world and about her role within it - what she knows and what she is attempting to discover - but also we are looking for supplementary evidence that the propositions attributed to the child's communicative acts consist generally with her cognitive structures. It must be emphasised that our aim is not to duplicate nor to redraw the results of much careful work by students of early cognitive development, such as the acquisition of the object concept or of the concepts in, on and under (see Edwards, 1973; Neilson, 1978; Bower, 1979). While our data would be analysable in terms of the appearance of behaviour witnessing the child's cognition of general concepts, we shall be more interested in particular cases. We require to know how far the child is able, and perceives herself to be able, to master the constraints on successful action in her own surroundings. For example, with complex toys which can be mastered in different stages and at different levels we shall chart the child's progress so that her cognition can then be related to the conclusions derived from communicative activity.

Presentation of data

While the data for this section were originally drawn in a format similar to that of Appendices B and C I have here dispensed with the behavioural details in order to take the analysis a step further. Appendix D shows three entry columns for any instance of purposeful action by Anna, of which the first records the effect, Ei, which her action was apparently intended to achieve. Some of these actions were unsuccessful and the second column records the reason that the event which occurred, E_1, did not conform with the effect the child intended, $E_1 \neq Ei$. These reasons fall into four types, Motor, Behavioural, Perceptual and Strategic, as defined below. The third column allows a description of the factors - areas of knowledge - presumed to be relevant to the construction and execution of C's intention, Ei.

Occasions when '$E_1 \neq Ei$ is due to Motor reasons' are those on which Anna appears fully to grasp the requirements for the achievement of Ei but fails purely because of motor incapacity or imprecision. An example of this occurs at 52 10;10. Anna is holding the edge of a towel in both hands and is attempting to pull the towel backwards over her head. She fails because her arms are neither long nor supple enough to take the edge of the towel completely over her head; when she lets go the towel falls to the floor in front of her. Behavioural reasons for failure account for occasions on which the child's action might reasonably be expected to lead to success but does not, almost incidentally. For 48 example at 10;10 Anna is attempting to fire the pinger by hitting it with her right hand. Although she strikes the trigger several times it is without sufficient force to fire it. (Later in the same session Anna repeats the action and 49 manages to fire the pinger.) Perceptual reasons are those which are due to some oversight by the child in the design of her action. They cover such situations as when Anna in trying to fit together two seriated cups fails to align them quite correctly or when she cannot locate the hole in a shape over the pinger tube in trying to replace the shape. The

most extreme reasons for failure are those of a Strategic kind. Here the action(s) the child performs could not under any likely circumstances serve to achieve the effect she appears to intend. In many cases it is difficult to be sure of the precise nature of Ei. Again at 10;10, Anna is reaching up for a towel hanging out of her reach over the back of a chair. She looks down, briefly raises the edge of the rug on which she is standing then immediately reaches up for the towel again. Anna seems to have believed that by raising the rug she would somehow enable herself more easily to reach the towel.

50

Data Reduction

Many of the actions identified were repeated during the course of the same or a subsequent session. Where this occurred only the first instance of several essentially similar actions is cited. The same entry appearing in the first column therefore means that the child attempted to achieve Ei by means of different actions. It is possible that this presentation will obscure the occurrence of discontinuities in development (Bower, 1979). Since our interest lies not so much in describing and explaining the child's cognitive development as in charting her self-perceived ability to master her environment it is not anticipated that the obscuring of any such discontinuities will present a problem. We shall now look at Anna's behaviour with respect to a number of toys and offer some general comments. Following this there is a brief correlation of solitary activity with her communicative activity concerning these toys. Finally we shall draw some conclusions about Anna's cognition of agency from the evidence of this section.

The Wheel

This is a broad wheel, some 6" in diameter, with a figure of a policeman suspended by two elastic bands from each end of the wheel's axis. As the wheel rolls forwards the policeman, whose feet are weighted, remains vertical thus

winding up the two elastic bands. When the wheel stops the elastic bands cause it to turn backwards and it returns almost precisely to the place from which it started.

46 At 8;11 Anna watches the wheel roll past her then crawls forward to a point just in front of M (who rolled the wheel) turns and sits and catches the wheel as it returns. She then releases the wheel, which rolls away from her. Anna is surprised and crawls after it. In order to predict the position in which she would be able to catch the wheel the child must have appreciated that the wheel would roll back towards M and she must have had some notions of its path and rate of motion. That she understands little about how the wheel might move in another situation is demonstrated by her surprise at the wheel rolling away when she sets it down again.

51 Two months later she can move around more quickly and at 10;10, in circumstances similar to those above, Anna lunges forward and catches the wheel as it rolls past. But 65 it is not until 13;05 that she attempts to roll the wheel towards M after catching it. On this occasion she pushes it abruptly and the wheel falls over onto its side. Anna looks at it for a few seconds then turns away. Although apparently having grasped the nature of the wheel's motion she never succeeds in rolling it accurately and with control, and loses interest in it after 15 months of age.

Seriated cups

Anna has a standard set of twelve round cups, each with a rim which makes them fit quite securely over one another 61 in a stack formation. By 12;17 she knows that smaller ones will fit inside larger ones, though she usually has difficulty with adjacent sized cups; orientation becomes more important the closer the cups are in size. Also at 12;17 Anna's behav- 60 iour reveals her appreciation to an extent of object-permanence - an object which has been covered will be exposed if the covering object is removed - and of containership. (If a large cup containing a smaller one is turned over the

smaller cup will fall out.)

33 We have suggested that at 13;05 C may have performed a request 'that M should fit the cups together' but in general she does not involve M in her play with the cups and is little interested in M's initiatives. She does, however, return to a stack which M has made and left standing. At
63 13;05 Anna removes two cups from a stack and then replaces them correctly. Although this apparently requires her perception of the precise orientation of the cups and of the fine difference in their sizes there is reason to doubt this ability. She is still unable at this time either to build a stack or to fit the cups inside each other in serial order. It seems more likely that her ability consists in the performance of simple reversible actions in a prestructured
60 situation. This may be related also to her apparent conception of object-permanence at 12;17. But her notions of this and of containership appear to be robust in the session at 14;02. Anna has no difficulty in recovering a necklace
70 which was hidden by a complex series of moves in three seriated cups fitted together. She herself then tries to put the necklace in a cup.

At the same age there is an ambiguous sequence of moves.
71 A cup is lying upside down on the floor and Anna has in her hand the next larger cup. She places the cup in her hand over the smaller cup, completely hiding it, then slowly raises the larger cup again. This action is repeated three times until on the fourth occasion the smaller cup remains inside the larger one as she raises it. At this Anna laughs and shakes the smaller cup out onto the floor. It is uncertain whether she was trying to lift the small cup with the larger one or whether she was simply hiding and revealing the small cup, but I believe the former to have been her intention. Her ability to hide and reveal things has already been amply demonstrated. In raising the smaller cup Anna is not performing a simple reversible action but is enacting a novel intention in an unstructured situation. After 14;02 Anna does not play with the seriated cups.

The Pinger

This toy, which has already been described on page 142 is the only one which remains popular throughout the time Anna was recorded. Although she has had the toy only a
47 short time, by 10;10 she has grasped that the shapes slide
48 up and down on the pole, that the pinger 'fires', that the
49 trigger on the base has something to do with it firing and that banging the base sometimes makes it fire. She cannot replace the shapes, however, and she does not know that they must be pressed down to prime the pinger. She cannot perceive, therefore, why pressing the trigger does not always make the pinger fire.

Over the following three months Anna's play with the
53 pinger is mainly centred upon discovering how to replace the shapes. She succeeds in this at 13;05 but cannot do so reliably until 15;09. That the other aspects of the pinger are less important between 11 and 15 months is sug-
54 gested by: (i) at 11;26 Anna fires the tower by carefully pressing the trigger but shows neither surprise nor pleasure and makes no attempt to repeat the event and (ii) in a long sequence with M at 12;17 during which Anna collects the shapes and passes them to M to put on, then slides them off and tries
62 to put them on herself, she does not try to fire the pinger nor does she request that M do so. But shortly after replac-
67 ing a shape without assistance (at 13;05) Anna does try to fire the pinger. When nothing happens she bends down and slowly and deliberately presses the trigger with her index finger. In fact her finger is not strong enough to press the trigger sufficiently hard. That she clearly knows pressing the trigger is what makes the pinger fire is shown by
72 an almost identical episode at 14;26. Again her first attempt is unsuccessful and she bends down to press the trigger more carefully (but is still unsuccessful).

By 15;09 Anna has discovered a new and more certain
74 means of replacing the shapes on the pinger. This involves laying the shape on the floor and locating the pole into the hole in the shape. Holding both the pinger and the shape

she turns the pinger the right way up so that the shape slides down the pole. She only succeeds by this method in putting on a single shape; although she does try another one the first shape invariably slides off in the process.

There follows an apparently latent period during which Anna tends not to play with the pinger on her own but enjoys having the shapes fired at her by M. Not until 21;09 does she manage to put on two shapes and then quite suddenly at 22;00 she discovers the priming mechanism. It is possible to press this down without any shapes on the pinger, and this Anna does alternat_ely with pressing the trigger at which the mechanism clicks sharply. These actions are repeated many times.

Anna's eventual mastery of the pinger depends upon her finding solutions to both motor and cognitive problems. Interestingly, she appears to concentrate upon one aspect of the toy at a time, overcoming this by discovery and much rehearsal before moving on to the next problem.

Spinning-top and Roundabout

These toys are remarkably similar in shape and appearance. Both consist of a 6" diameter horizontal disc through the centre of which there projects a vertical plastic tube. The roundabout has a base which is however obscured by the disc when looked at from above. The roundabout's disc is suspended from the top of the tube by three strings while the spinning-top has no such strings, but this is the most obvious difference between them. Both have small removable plastic pieces which slot into holes in the disc.

Anna managed to work the spinning top immediately upon getting it at 16 months. She sat holding the knob at the top of the tube, pressing it down and watching the disc spin round. Most of her subsequent play with the top had to do with the removable pieces and, as with the removable and moving parts of her duck, these provided the theme of a sustained dialogue with M (at 17;25).

She received the roundabout on 18;16 and immediately

set it upon the floor and tried to press down on the central tube. When nothing happened Anna indignantly banged the toy on the floor. M reached down and showed her how to spin the disc to and fro with her finger. Anna seems to have been guided wholly by the similarity in shape of the roundabout to her spinning top and to have believed that the toys would therefore work in the same way.

General Observations

Anna's behaviour with the roundabout is illustrative of a prevalent type of activity in the period from 14 to 18 months. She does a great deal of experimentation within a single mode - for example blowing or pushing or banging - upon many different objects in turn. In this she seems to be trying to ascertain the field of operation of particular modes of behaviour. It may be that at this stage objects and toys are classified according to the effect each action has upon them. One would expect, if this happened, that toys which were operated by one such action would easily be assimilated into the child's repertoire. And indeed, between 14 and 18 months Anna adopts many unusual toys - a plastic tube, a small cardboard box, an empty squeezy bottle - which produce unusual sounds when blown into, or which are otherwise interesting - a glove, an old china mug. We also find her extending quite distinct actions to apply to new situations such as locating a pinger shape onto M's finger, at 13;05, and pulling along her telephone as if it were a wheeled toy like the duck, at 16;01.

66

During earlier sessions attempts to pick out actions which were the execution of a clear intention were made difficult by three factors in particular: (i) that Anna engaged in much repetitious activity with no apparent motive, (ii) that her attention span was very short and her activity was therefore highly labile, and (iii) that many of her intentions seemed poorly formed and easily went amiss through distraction, accident or maternal intervention. While the identification of acts does become more certain after 14

months, and while many of these acts are experiments with established forms of behaviour, they do not to me appear to be wholly concerned with the characteristic modes of this period; the application of existing means to new ends and the search for new means to established goals (Piaget, 1953). These things are undoubtedly occurring - there are some sequences which can in no other way be explained - but there are also sequences, superficially of this kind, in which the child's principal aim seems to be a quiet exhibitionism for M's benefit. For example, at 15;09 Anna and her mother are playing with a school cap, setting it upon each other's head in turn. Anna fetches a towel and pulls it over her head, then reappears laughing at M. Shortly after this she puts the towel in the washing basket - without any suggestion from M - and proceeds to collect other pieces of material from around the room which she puts in the basket. Throughout this M observes and occasionally comments and Anna, while pursuing her own ideas, constantly 'refers back' to M.

After 18 months examples of intended solitary acts which can be identified by our procedure become quite rare. There are two reasons for this. First, Anna has distinguished between effects which she can achieve and those she cannot. Those which she can achieve she does so without hestiation and without any (confirmatory in our view) subsequent act, C_2; those which she cannot become, if desirable, the focus of a request to M.[1] Second, the interaction of Anna and her mother has now reached a fluent and dynamic phase and M, who knows well what C can and cannot do, will often intercede at points which to us would be interesting.[2] During the last three months of Anna's sessions the only instances we can clearly identify are those upon which Anna makes some discovery, such as how to fit two shapes on the pinger and how to prime the pinger.

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[1] The 'light' sequence at 19;13 is one example of this.

[2] See discussion on page 159.

Correspondence between Solitary and Communicative Intentions

Without anticipating the substance of the next section we must now examine the kinds of Ei attributed to solitary behaviour to check that they generally consist with those (Ei)s which M attributes to communicative acts. For example, it would be confirmatory of our conclusion that Anna has mastered the cognitive requirements for sounding the tuning-
69 fork at 14;02 if we could point to an example from communicative activity in which C requests 'that M should (show her how to) sound the tuning-fork' at about the same age. Earlier in the same recording session Anna in fact performed this
16 very request. Similarly, at 13;05 she is presumed to have requested 'that M (show her how to) play the hurdy-gurdy'
15 and later tries to play it herself, revealing in so doing that she knows the handle to be important. To take a third
68 example, at 17;25 Anna commands that the cassette player should be switched on. When this is refused she gets up
25 and switches it on herself, confirming both M's interpretation of her communicative intention and that in pressing the button on the machine she was trying to switch on.

Perhaps more important than the fact that such parallels occur across the data - as indeed they should since the criteria for the identification of Ei were similar in each case - is the fact there are no cases in which the evidence from one source is obviously contradicted by that from another. Often, solitary activity containing specific intentions toward a toy was the basis for the performance of a communicative act concerning that toy, as is reflected in the examples above. With toys which took the child some time to master, on the other hand, we more typically find phases during which she will either investigate it on her own, or she will play socially with the toy, but she will not usually combine these types of activity. It is in comparing the propositions attributed to activity separated by type and by time that we might be more likely to find inconsistencies. But in cross-checking the data in the Appendices there are none which are obvious to me.

Discussion of development in Solitary Activity

When the very young child performs an action which we can identify as being of a goal-directed nature, as in 46 catching the wheel at 8;11, the attainment of the goal typically ends the episode. That the child had no further intention, nor entertained a hypothesis about what the wheel might now do, is suggested by her surprise that it rolls away from her when she sets it down again. At this time the child's intentions are simple and specific and are directly linked to the acts by which they are expressed. These acts themselves consist of simple movements which are often repeated 48,49 in a cyclical fashion, as in trying to fire the pinger and in trying to pull a towel over her head, both at 10;10. In 52 all of the examples up to about 12 months of age Anna's acts are permitted by the pre-existing structure of the situation in which they occur. To put this another way, she is able to exploit the natural affordances of a situation. She can, for example, attempt to fire the pinger if it is already loaded and move to catch a receding toy. But she is unable to create the structure within which to act. She does not attempt both to load and then to fire the pinger, even with assistance from M, nor does she play with the toy she has caught. That the limitation of her intentions to what the existing situation affords is a cognitive rather than a perceptual limitation is suggested by the fact that on occasions separated by other behaviour Anna does attempt at one time to fire and at another time to reload the pinger.

The creation of structure

At 11;26 there is an isolated instance witnessing the 57 separation of act and intention. Anna crawls to the door and pushes it shut. This is greeted with applause from M at which Anna first opens the door a little way and then bangs it shut again with a flourish. She looks at M who laughs. Her opening of the door constitutes the structuring of a situation in which she may then close the door. Similarly, 62 at 12;17 she attempts to replace a shape she has just pulled off the pinger.

Three other developments can be observed from about 12 months onwards. These are, first, the application of existing means to new ends - blowing and banging objects in an experimental way - and, second, the use of simple reversals
59 of her own or of M's actions. For example, retrieving a hidden object is well within her abilities at 12;17 provided
60 she can expose the object by 'undoing' the act which hid it. Furthermore, the child will then play with the object she has retrieved. The third development is a sudden increase in the extent to which Anna copies M's actions. Her imitations do not necessarily follow immediately upon the act they copy but those which can be identified do occur within the same sequence of behaviour. In these processes we no longer find the child at a loss after the successful performance of an act. Specific intentions now are executed within a stream of activity in which it becomes possible to identify longer term goals. This transitional stage culminates at 14 months.

71 At 14;02 there is a sequence which appears ambiguous, I believe, only because it is anomalous. Although the weaker hypothesis - 'To hide and reveal the smaller cup' - has also been stated in Appendix D, Anna's delight at lifting the smaller cup by placing the larger one over it convinces me that this was her actual intention. The description of this event on page 176 shows that Anna used a non-canonical means of lifting the small cup, that is a means which is not obviously afforded by the shape and function of cups. In this we see the experimental application of a new means to an existing goal, and it is a means of her own devising which has not been observed within M's behaviour nor previously used by the child. This is important because it demonstrates that the child has discovered the possibility of acting wholly independently of others. The execution of her intention did not depend upon a situation which had been structured by prior activity, nor was the intention itself related to an event she had previously observed, directly or indirectly.
73 Likewise at 14;26 Anna investigates a clockwork toy at length

and discovers some of the criteria for it working other than by applying stylized methods such as blowing and banging. At 15;09 she discovers an entirely novel means to replace a shape on the pinger.

74

Derivation of Constructs

The period from 14 to 18 months is characterised by behaviour which involves 'experimentation within a single mode' - as discussed on page 179 - and which seems designed to discover the range of application of particular forms of act.[1] At the same time, however, there are examples like the three above which demonstrate that Anna is also discovering new forms of act and is discovering about her own independence as an agent. It is a period of consolidation and experimentation. The consolidation which is occurring does not relate only to 'action-schemas' which confirm the effects of certain modes of behaviour; it is reflected also in the robustness of some rules about the world whose application is implicated in many different circumstances. These are rules which are independent of the child's action and which therefore have the status of concepts, but which are not necessarily coherently related as true concepts must be. A list of the rules which the child applies would include the following:[2]

1. That objects can be obscured from view but do not therefore cease to exist; object-permanence, containership,
2. That some actions and events are inherently reversible while others are not,
3. That contained objects fall out when the container is inverted,
4. That an object's path and rate of motion can be extrapolated,
5. That the orientation of objects to one another affects

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[1] Most of these are omitted from Appendix D as non-novel acts.

[2] To say that the child applies these rules is not to say that they are always applied appropriately or successfully.

the action of one on the other, and

6. That objects which look similar will function similarly.

It is not possible to state what might be the cognitive achievements of the child during solitary activity after 18;16 on the basis of only two novel accomplishments. We should expect to see a continuing refinement, and application to new situations, of rules (about the world and about the limits and consequences of her own behaviour) which the child has been discovering. One further factor should be mentioned here. During times when the child is playing on her own M very often provides a commentary upon the child's activity and the events which occur. While the child rarely acknowledges M's contribution we know from her accession to M's requests, commands and suggestions that from around 14 months she understands more and more of the messages M attempts to convey.[1] M's commentary therefore identifies for the child the ways in which her actions and apparent intentions are construed by another. It will reveal which of her actions make sense to others and which do not. M's commentary can thus exert an important influence upon the socialisation of the child's thought even in situations which are not interactive. We shall look at this in more detail in Chapter Five in discussing the data from the secondary subjects.

4.5 A Model for the Cognition of Agency

Collation of the evidence: a schedule of development

We must now attempt to bring together the changes and developments we have identified in our discussions of inter-

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[1] Data on this is not presented in this chapter. Briefly, up to about 14 months Anna recognises only that she has been addressed - and she will usually respond - but increasingly thereafter she displays comprehension of M's meaning. The first clear case of this occurs at 14;26 when Anna performs a representative act in response to a warning from M to be careful. (See Appendix C.)

personal routines, communicative and solitary activity. We shall do this by noting the changes which occur in each type of activity at any given age. For example, at 10 months we note that a new form of interpersonal routine appears - turn-taking - and also that C now begins to use M as a source of pleasure in the earliest form of requesting. At this stage we do not attempt to draw conclusions from the fact that (related) changes may be observed simultaneously in different types of activity, but where such co-incidences occur they are highlighted and the degree to which they may reflect a common underlying development is discussed.

The data summary is presented in chronological order, as far as this is possible, and at each age the type of activity in which a change has been observed is either explicitly stated or keyed by its initials; I.R. for interpersonal routines, D.A. for directive acts, R.A. for representative acts and S.A. for solitary acts. The preceding text has included exemplars for each change that is claimed to occur, all of which can also be found in the relevant appendix. In this schedule no examples are given, but no claims are made here which have not already been made in the prior discussion; only the correlation of effects is new. It follows that any change described in the schedule can be traced in the appendices. Some selection of evidence has been inevitable - developments occurring together in two types of activity perhaps receive a fuller treatment than those occurring alone - but I believe there have been no significant omissions; the appendices record all of the examples from each activity in the recordings of Anna, and there are no cases in either the appendices or the preceding text which contradict any claim made in the schedule.

From the schedule is extracted Table 4.1. It presents a skeleton summary of the most significant changes which have been identified. Its terms are one step removed from the data, but once again it contains nothing which has not already been discussed. The Table does not serve as the basis for

further treatment of the data; its major functions are intended to be as a key for cross-referencing developments in each type of activity and as a shorthand to the schedule from which it is extracted. For these reasons Table 4.1 is presented overleaf, near the beginning of the schedule.

A schedule of Anna's development

8 months Anna's acts are simple and direct and are identical with her intentions. Intentions are limited to the possibilities naturally afforded by the structure of a situation and are highly labile, easily diverted by accident, distraction and maternal intervention. Her acts are often cyclically repeated, (S.A.) Interpersonal routines at this early stage are also cyclical and conform to a pattern of rehearsals of expectation. The limitation upon Anna's intentions and hence her action appears to be cognitively rather than perceptually based (S.A.) There is no communicative behaviour, as strictly defined.

10 months She now begins to initiate interpersonal routines and a new form appears in that turn-taking is controlled by signalling. Anna is beginning to perceive that she can effect change not only in her surroundings but in her mother also. (I.R.) M begins to attribute communicative intentions to some of the child's actions which are expressive of her internal state. In fulfilling these perceived desires M provides data for C that it is possible for her to prompt actions by M which she enjoys. In thus using M as a source of pleasure C is also discovering something of the range of interactive possibility and is exploring new routines.

12 months Two new routines are added to Anna's repertoire; these are joint action and exchange. The latter

Table 4.1

Skeleton Summary of the Principal Findings for Anna

Age (Months)	Interpersonal Routines	Directive Acts
8 months	Rehearsal of expectation, routines are cyclical	
10 months	Turn-taking Begins to initiate	Uses M as a source of pleasure
12 months	Joint action, Exchange C becomes the more frequent initiator; often withdraws due to non-fulfilment of her turn	
14 months		Uses M to show how some effect is achieved
15 months	Appearance of games; progressive routines	Uses M to create the conditions in which to act; Can refer by pointing and naming
17 months	Reciprocal routines, M and C have role-parity. Dialogue	
18 months		Can modify M's interpretations
19 months		Primacy of being understood
20 months	Constraints on interaction with M are now cognition of the world and of formal language, not her grasp of mechanics of communication.	
21 months		Verbal expression of propositions, mostly in telegraphic form.

Representative Acts	Solitary Acts
	Acts and intention are closely tied, limited to natural affordances
	Begins to create the structure in which to act; Experimentation within modes; Action-reversals; Imitation
Performatives, Observations and personal Observations - all labile	Applies specific means to new goals, discovers new means to old goals; Perceives and exhibits independence
	Consolidation and experimentation; Derivation and application of rules
Acts become less labile	
Clarification and Assertion; acts embedded in dialogue	
	Rarely fails to achieve Ei
Constraints are now cognition of the world and of formal language	
Telegraphic verbal expression of propositions	

arises quite straightforwardly from the giving by M of an object to C, and mimics the simultaneous appearance in solitary activity of acts by C which are simple reversals or are imitations of prior acts by M. While both solitary acts and routines are still predominantly cyclical in form, progressions are beginning to appear in all types of routine. (I.R.,S.A.) The new ability of the child to separate intention from action, which allows her to create the structure within which to act and thus permits the pursuit of goals, also finds a parallel in interpersonal behaviour. Joint action routines represent the sharing of a goal by M and C, as far as the child is concerned, and they reveal to C what sorts of goals are socially recognised and acceptable. These together with the solitary experimentation within modes which is now beginning to appear (S.A.) disclose to Anna the extent of her effectiveness as an agent and as an interactor. Frequently from now onwards she will withdraw from an interpersonal routine because of failure to fulfill her move, implying that she believes herself to be capable of some things she in fact fails to achieve. Here her cognition seems to be in advance of motor capacity. (I.R.)

14 months Confirmation of the idea that cognition is in advance of motor capacity comes from the finding that C now begins to use M to show her how some effect is achieved, so that she may then attempt it herself. (D.A.) Often her attempt is unsuccessful. (S.A.). The child knows her intentions to be accessible to M and that she is required only to draw to M's attention the fact that she has some intention with respect to an already salient object or topic. Conversely we could say, the child knows sufficient of the agency of

M to perceive and apply a rule 'that M will act in the desired way if she (the child) expresses her intention in a particular form of act.' M's attribution of proposition and force is fundamental to the establishment of a system of conventions relating the form and meaning of interactive acts. M's new willingness to attribute quite complex meanings must be based in her observations that the child can now plan and execute novel means to the achievement of established goals and that the child can now act wholly independently of her. (S.A.)

M's attribution of proposition and force is also fundamental to the appearance in C's repertoire of representative communicative acts. Initially it is only M's attribution which classifies these as such and, right up to 18 months, they are labile both as to force and as to meaning. At this stage there are no identifiable contextual or behavioural distinctions between directives and representatives; M's decision apparently rests upon whether she is required to act upon or merely to acknowledge C_1. The representatives which Anna performs up to 18 months can be classified as Performatives, Observations and Personal Observations.[1] (R.A.) An important aspect of Anna's behaviour which does not receive formal inclusion in our data is the extent to which she now exhibits to M her pleasure at achieving an unlikely or novel effect. (S.A.) It shows to us that the child perceives her own success

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[1] Personal observations are, in essence, what Myers (1979) refers to as expressives which may be performed through indexical acts. A separate category of expressive acts is not used in this thesis because examples which fitted this category were found to cut across our only real distinction between directives and representatives, which depends upon M's response. Thus, directive acts around 10 months which require some action in M_1 and personal observations which require only an acknowledgement both consist essentially of an expression of affect.

and it must assist her mother to perceive and to act towards the child in ways appropriate to the level of her competence.

15 months Evidence that this is a period of consolidation and experimentation for the child comes from all of our sources of data. Consolidation consists in the performance of action-schemas and rehearsing their effects upon common toys and objects but also in the derivation of impersonal rules about the contingent relationships which pertain in her world, that is the way her world is ordered. We have cited some of the rules which are implicated by their recurrent application in Anna's activity on pages 184-5. Important features of these rules, however, are that they are often applied inappropriately - as when Anna inverts and shakes a closed container (rule 4) - and that they are neither extensively defined not mutually coherent. The experimentation we see at the same time must be directed to the refinement of these constructs and to the derivation, by abstraction, of new ones, broadly in the manner discussed in Section 0.3 (S.A.).

Progressive interpersonal routines are now the typical mode of interaction between M and C, having embedded within them identifiable communicative acts and often developing into games. Such activity provides a platform for practise with the mechanisms of joint action, exchange and turn-taking. In addition Anna can explore the ways in which her mother behaves and reacts and will thus elaborate her cognition of M and of what constitutes socially meaningful activity. (I.R.)

The nature of Anna's requests becomes modified to the use of M to create the conditions in which to act. Requests often arise out of solitary activity and this signifies the abstractability of intentions for the formulation of strategies

for their achievement. That the child can apparently learn by observation as well as by action supports the claim for an abstraction process which must be intrinsic to perception and cognition. But the most significant advance in Anna's ability to express her communicative intentions stems from the development of her ability to refer to distant or non-salient objects and topics by pointing and naming. While in no way affecting the complexity of the meanings M attributes, referring qualitatively broadens the scope of topics which Anna can mean something about.

17 months Given Anna's increasing interpersonal skills and effectiveness as an agent it is entirely predictable that her representatives should around this time begin to be less labile. From her ongoing experience of the child M must now perceive her child as a person independently capable of goal-directed activity and able to involve her, by requesting, in the pursuit of goals which are difficult. Interpersonally, M will have observed that Anna can interpose new moves and thus alter the pattern of a routine in which they are engaged. At 17 months interpersonal routines undergo a change of form, representing an adjustment in the relative status of M and C to an interface at which they enjoy role-parity, and become reciprocal. In this type of routine the mechanisms by which the interpersonal is managed - those of turn-taking, joint action and dialogue - are subordinate to the interaction itself, whose main aim is the sharing of pleasure. We should expect a child able to perform in these ways to be able to offer comments about her action and about events and states of the world.

18 months Clarification and Assertion, two forms of representative act which are evidently non-labile,

appear from 18 months and indicate a new level in the child's cognition of self. Not only can she interact on equal terms with M in situations where they concur, but where disagreements arise Anna begins to assert her own intentions. Distinct representative acts come to be embedded in dialogue centred upon a prevailing theme. Another, complementary, process which is not formally included in our data is the negation of M's suggestions and requests by which M attempts to involve herself in C's solitary activity. This chiefly occurs during a period of inconsistency in C's behaviour, referred to on pages 169-70. Assertion and clarification, together with negation and the readjustment of interpersonal status, tie in closely with what Sinha (1978) calls a 'phase of non-cooperation' (between 16 and 20 months) which represents a 'renegotiation of power relations', based presumably in some notion the child has of developing autonomy. This notion must rest upon the child's cognition of her own agency, and it is partially explicable in terms of a diminished accession to others. As longer term plans develop the child perceives also the possibility of their being disrupted (as a result of experience). She becomes more careful about letting M join in with her games and especially about giving objects away. (Exchange routines no longer occur.)

An interesting feature of solitary activity from now on is that while there are no qualitative developments in strategy or in skill Anna now rarely fails to achieve her goal. She can apparently distinguish in advance those steps within a strategy which she can execute herself and those for which she will require assistance. In requests arising in this way Anna shows herself able to take account of M's interpretation and if necessary

to act in an intelligent way so as to modify that interpretation. Knowing how to do some things, how to get M to do things she cannot do herself and being aware that there are possibilities for action not yet conceived is a healthy condition for further learning by the child.

20 months The constraints upon interaction do not now seem to be Anna's grasp of the possibilitites for and rules governing communication with others but her cognition of the world and the lack of a formal system by which complex meanings may be precisely conveyed; a language. That being understood is a primary consideration is revealed by the 'light' episode at 19;13, but quite clearly interaction is now fully multifunctional in the child's terms. Instead of seeing increased solitary activity, as we might expect if limited cognition of the world is one of the child's barriers, we actually see a decrease. This suggests that interpersonal situations provide a matrix for learning about the world as good as - or perhaps better than - that provided by solitary activity. Throughout the previous six months M has assigned social definition and significance to the child's behaviour. There could be no better way than through reciprocal interaction for the child to further her integration into, and effectiveness within, her socio-physical world.

21 months The only further qualitative advance we can observe is the use of words not only as referring expressions but as telegraphic representations of entire propositions. The propositions thus expressed are in no way cognitively more complex than the meanings M has attributed to non-verbal acts and verbal expression is still an unreliable means of conveying a message.

Anna's cognition of agency

We are now in a position to extract from this schedule what can be claimed for the child's cognition of agency. In accordance with the theoretical distinction drawn in Chapter One we try to distinguish between her cognition of self-as-agent and that of other-as-agent. Table 4.2 (on page 199) presents the factors which are presumed to underlie the behaviour recorded in the Appendices A, B, C and D. The procedure for deriving the terms used in Table 4.2 requires some explanation. The following notes are intended to clarify it.

1. Conclusions as to the cognition of self-as-agent are based mainly upon Appendix D and the discussion in Section 4.4, on solitary activity. Evidence from interpersonal and communicative activity is included if it pertains to the child's abilities in the physical world. For example, Anna's requests for assistance reveal the things she believes herself capable of and what things she believes to be possible but for which she requires assistance. The conclusions on other-as-agent are based in Appendices A, B and C and Sections 4.1, 4.2 and 4.3.
2. Appendix D displays the effect Anna appeared to intend in performing some act. It is supposed that in performing an act she entertains a hypothesis such that the intended effect (Ei) will be the outcome. The right hand column of the appendix records the 'factors and fields of cognition presumed relevant to the construction and execution of C's intention'. That is, it shows the kinds of schemas or constructs which must be presumed present to permit the entertaining of that hypothesis. The description of these constructs must necessarily be tentative with respect to their level of

abstraction and generality, but, as was urged in Part One, they are described at the lowest adequate level. Where the child's act was unsuccessful, the reason that the event which occurred did not coincide with the intended effect is often helpful. Reasons for failure have been divided into four categories; Motor, Perceptual, Behavioural and Strategic. An act which fails because of motor imprecision may yet allow us to claim that the child understood both that the relevant Ei is possible and how it may be achieved. An act which fails for strategic reasons permits no such conclusion; in fact Ei itself may be obscure.

3. Appendix B records the effect which a directive act was intended to produce. This reveals - and it can be verified against the context of other activity at that age - something of the child's cognition of self, of other and of the means for conveying messages. In the case of representative acts (Appendix C) it is the proposition which M attributes in her acknowledgement of C_1 which is presented. Such propositions have precisely equal status with Ei in the other appendices.

4. Table 4.2 is a summary of the underlying changes and developments identified in the Schedule on pages 187-195. At this stage all direct reference to specific episodes has been omitted. Because they must be presented briefly the entries in the Table consist exclusively of phrases which have been used in the schedule so that their source may be checked. There are no ideas introduced in the Table which are not included in the schedule.

No attempt has been made to ensure that the entries constitute descriptions at the same logical level. There is no suggestion from what we know of the character of the child's cognition that logical equivalence

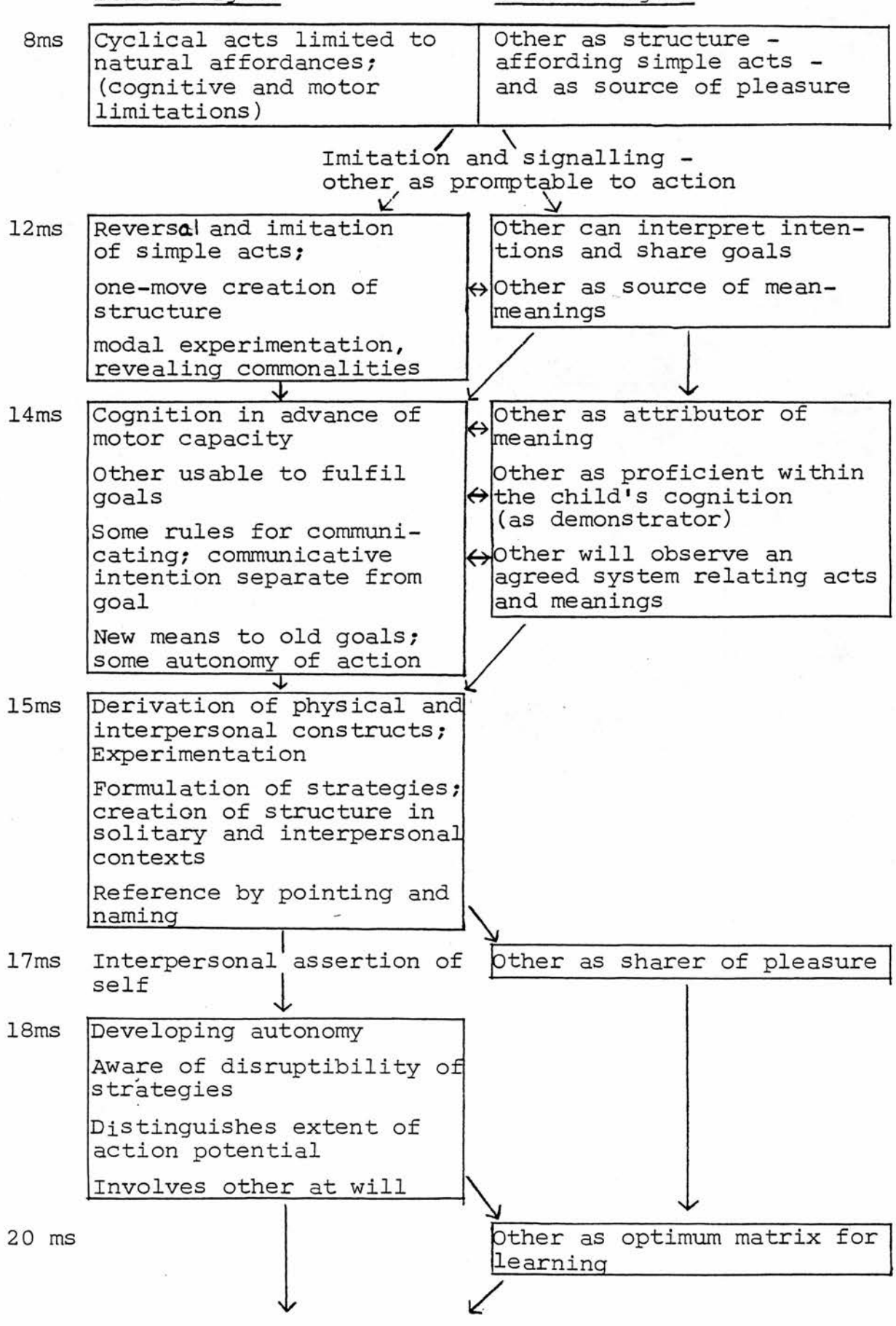
is required or even recommended. (See Section 1.2.) To attempt it unnecessarily would be to ascribe unjustifiable certainty and coherence to the terms used. In any case, as the child's cognition develops so must the complexity of the ideas and concepts used to describe it increase.

5. Age is shown down the left hand side of the Table. This provides a convenient time-base, but it should not be over strictly applied. From it can be taken only the approximate age to which a description applies.
6. The Table represents a set of continually unfolding processes and, while there are important landmarks, these processes do not readily lend themselves to description in terms of steps or stages. The entries in the Table should therefore be seen as transitions through which developing cognition passes, and not as states which the child achieves at each given age. The time-base indicates the age at which the behaviour signifying such an element in cognition was first observed, but no sudden onset (nor sudden disappearance) should be assumed. Entries at each age are grouped together in boxes only for purposes of presentation.
7. The arrows between boxes show how the form of cognition at any time might provide a basis for or contribute to the succeeding form. The horizontal arrows between individual entries are meant to suggest that these elements are probably inter-dependent.

Table 4.2 is presented on the next page.

Table 4.2

Anna's Cognition of Agency



A model for the cognition of agency

Table 4.2 has presented a summary of the abilities and constructs which seem to constitute Anna's developing concept of agency. From these constructs and their interrelations we now want to derive the principal factors around which the child's cognition is centred at any age. To do this we must collapse together those items in Table 4.2 which appear to be equivalent or fundamentally interrelated and posit a common factor. In a sense this mimics the psychometrist's method of factoring out traits and personality factors, but our method is not statistically based; it must rely upon our adult notions of what makes sense.

The results of this derivative process will be presented in Table 4.3, as a model for the cognition of agency. The source of many of the terms will be self-evident, as once again familiar phrases are used, but some justification is required for the choice of some terms and the exclusion of others. We do this by reference to the age at which they are relevant, in Table 4.2.

8 months Our observations of C's use of M - as 'structure' to act upon and as a source of pleasure - suggest that M is not clearly distinguished from other (physical) aspects of the child's world. When C is just beginning to perform simple acts she appears to treat M as (just) another natural affordance permitting certain kinds of action. Hence, all we can reasonably claim at this age is that the child perceives the existence of a set of natural affordances.

10 months With the beginning of imitation, the appearance of signalling in turn-taking routines and the earliest requests we now find C recognizing that she can have an effect upon M's behaviour. In learning to prompt particular acts by M, the

child realizes M's reactance.

12 months This realization progresses a step further in that C's requests now include the use of M to show how some effect is achieved. C's appreciation that some simple acts and events are reversible, together with her new perception of M, permit her now to create for herself the structure within which to act and to use M to create such structure.

The beginnings of true communication require that C treats M as the source of meanings and as the legislator upon the relation between the form of an act and the meaning it expresses; the process of conventionalisation. The meanings of which the child is aware will be those which arise out of joint action, involving the interpretation of intentions and the sharing of goals.

14 months With her new ability to create structure and thus to perform a series of acts the child now has some autonomy of action, which is, however, limited by the fact that her motor abilities appear to lag behind her cognitive abilities. Thus she also uses M to fulfill goals. This in turn depends upon C's cognition that her goals are separable from the (communicative) act which will lead to their achievement. She must know that M is proficient and she must know some of the relevant rules for communicating. Again it is M who attributes to the child's acts whatever meaning they carry.

15 months From our analysis of the child's acts around this time we see that she is beginning to apply rules such that different forms of action are appropriate in different contexts and with different objects. This presumably arises out

of her earlier modal experimentation. At the same time she is discovering new means to achieve established goals and she is introducing progression and innovation in her interpersonal routines with M. All of these things suggest the derivation of constructs about both the physical and the interpersonal worlds enjoys a central role in cognition, which constructs are continually consolidated and refined by experimentation.

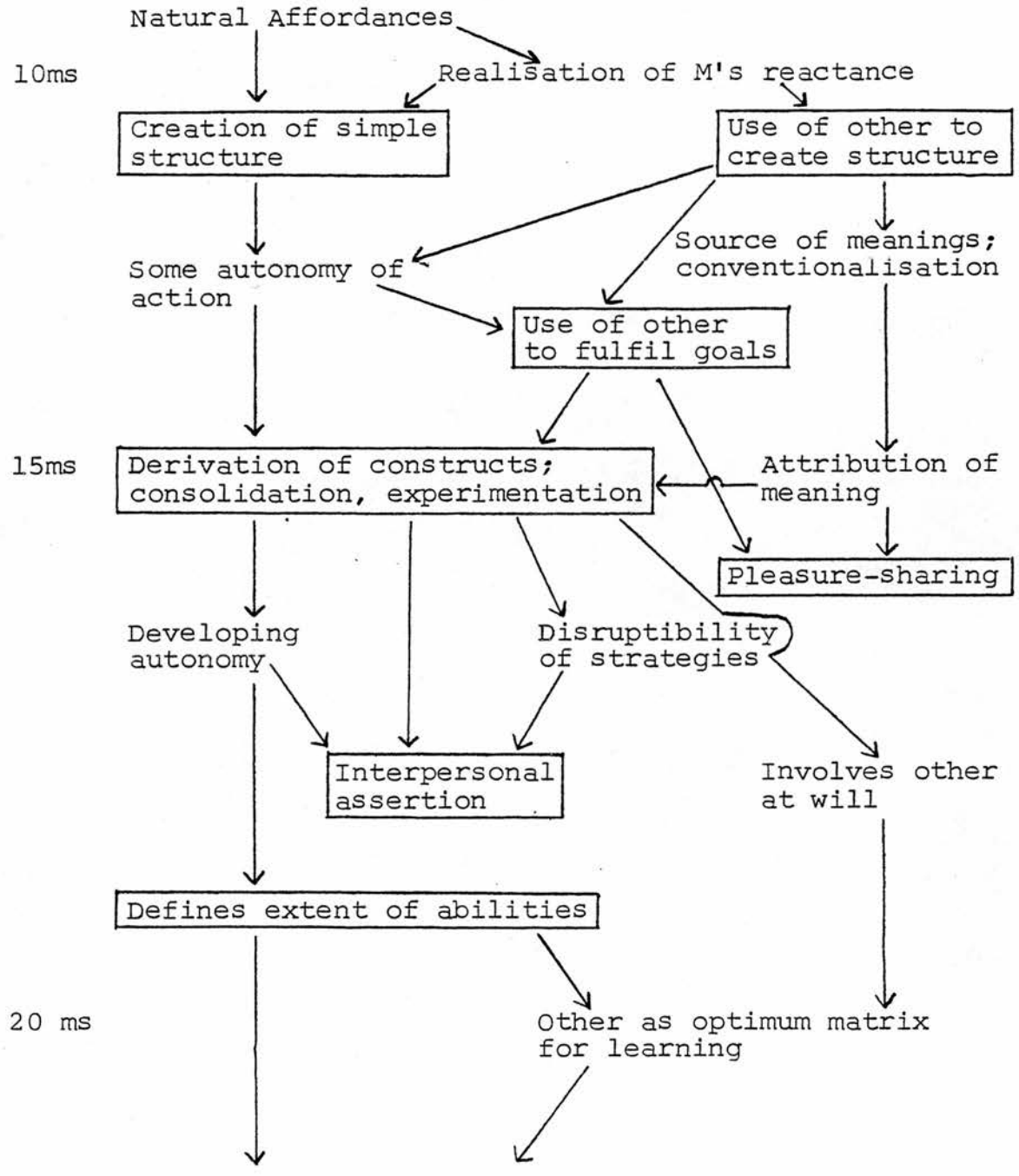
17-18 months — The data on interpersonal routines show that pleasure-sharing is important to the child. But at the same time her ability to formulate strategies for action and to set up quite complex action sequences reveal to her the development of autonomy. She begins to perceive that her strategies are disruptible and to assert herself in interpersonal situations. The pursuit of complex action sequences and her experimentation also permit the child quite accurately to define the extent of her abilities, to such a point that she rarely attempts something at which she does not succeed. Where she has some goal which she believes herself unable to achieve she involves M at will.

20 months — No significant developments were noted at this age beyond the general tendency to treat M as the optimum matrix for learning. The child has distinguished what she can do from what she cannot and knows that in general the best way to discover how to do something or to get something done is through M.

Table 4.3, which is presented overleaf, consists of the terms which are underlined in this brief discussion. All of these terms are to be taken as 'process-states' - that is point-of-time descriptions of abilities which are not inherently stage-like.

Table 4.3

A Model for the Cognition of Agency



The terms in our model are those, among all the terms in Table 4.2, which seem to capture the culmination of a number of different processes at each age. The cognition thus represented does not become fixed but is applied, and thus itself develops, through the subsequent links in the diagram. Some of the terms are boxed while others are not. Boxed terms are those which appear especially to represent a qualitative shift in cognition, resulting from a culmination of processes. Boxed terms which appear as end-points are those for which no direct links with subsequent terms can be made. Again, these are not 'states' but will be applied and modified through subsequent activity.

The theoretical distinction between self-as-agent and other-as-agent, on which Table 4.2 is based, is not formally sustained in the model. It is preserved to the extent that terms down the left hand side are principally concerned with cognition of self and solitary action, while those on the right represent cognition of other and interaction. But they are fundamentally inter-related, as is suggested by their direct links and by the terms falling in the middle of the diagram. While the theoretical distinction helped us to state the problem faced by the learning child it has not been found to represent a real distinction within what she knows. (See Chapter Six for discussion.)

Variability of the model

We now want to look at the factors and variables which might influence a child's progress through the model, both to estimate its tightness and to set up some hypotheses for the secondary subjects.

Consistency in M's behaviour

The first major factor is that the child should realize - recognise through use - his ability to prompt M to perform actions which bring the child pleasure. This requires that M should consistently treat certain of the child's behaviour

as signals to act before the child has any notion of what signalling is. This realisation is the foundation for the creation of simple structure upon which to act and for the use of M to this end by requesting, both of which follow.

Consistency in M's behaviour is essential to the process of conventionalisation, as the source of vehicles of communication and of rules governing interaction. Clearly, by the time the child begins to perform requests as a means to some goal, at around 14 months, M's influence will be evident. Remember that it is M's attribution which defines an act by C as a request of a particular kind; if M does not attribute an appropriate proposition and force then de facto the child has not performed a request. In the extreme, the child may well learn something of his own autonomy but he would be incapable of meaning and therefore of using a proficient other to further his learning. While the extreme is only likely to be encountered in cases of severe child abuse of the kind which occasionally come to light, we must grant an important role in the development of meaning to the mother's conception of the child. She must treat him as at or slightly above his real level of competence.

M's conception of the child

Another aspect of M's behaviour which we must consider is that which depends upon her conception of her own role in interacting with the child. For simplicity we can posit this as a dichotomy though there will of course be a continuum between the cases. At one end we should find a mother who perceives her role during interaction as being to present the child with situations and events to which he may discover - or in which he may be shown - socially approved forms of response. This may provide a sufficient basis for learning and for communicating but it will have the important consequence that the child would not be considered to intend or to know things on his own account and M will not generally recognise his spontaneous attempts to involve her and to modify their interaction. (In fact there may not be any

such attempts.) This may have further consequences during a 'phase of non-cooperation' as will be discussed below. At the other end is a mother who sees her role as that of assisting in the pursuit of C's goals without unnecessary intrusion and in inviting the child to join in with her games which he may then control. It must be said that Anna's mother conforms more closely to the latter of these patterns. What is interesting is what the consequences of different patterns of M - C relationship might be as the child begins to derive constructs and become aware of his own autonomy towards the middle of the second year.

Conflict inherent in C's changing role

Anna and her mother resolve the potential conflict inherent in the child's perception of increasing autonomy in two ways. First, they manage to sustain at a high level interaction whose only obvious outcome is the sharing of pleasure. Second, M makes clear that the limits to C's autonomy are not only the degree of her own effectiveness as an agent but include consistently applied rules which M dictates. In other words, M clearly distinguishes occasions and activities in which C can assert herself and experiment freely from those in which she may not. Implicit here is M's recognition that Anna's negations and assertions are in no sense a rejection of M but are part of a process by which a new relationship will be established between them. In this way M allows and assists the child to pursue the possibilities of which she is able to conceive, within defined limits which preserve the order of the household - among other things - without unnecessarily restraining the child's potential and without in any way prejudicing their relationship.

The insights afforded by our model allow us to offer a rather different scenario. For if a mother is not accessible to the child's attempts to share his goals she is denying him both her assistance and her confirmation of his own agency. The interaction between them would then be less rewarding and

less enjoyable and consequently more fragile. Solitary activity would provide better opportunities for learning and for experimentation. Entering a period in which the child is increasingly aware of his independence and of his ability to make sense of the world with no clear rules of protocol would pose new threats to an uncertain relationship and promote conflict in other aspects of it. We might expect, for example, that difficulties would emerge when M is trying to direct the child's behaviour, at meal-times and in toilet-training.

The physical world

As to the child's physical world, all that is required by our model is that there should exist contingent relations which the child may exploit, with opportunities for the creation of structure for action allowing the derivation and elaboration of constructs capturing some part of the way the world is. Given that the physical features of the surroundings in which all the recordings were made were quite similar, including for the most part identical toys, we should not expect any variation between Anna and the secondary subjects to be due purely to physical factors. The secondary subjects may play more, or be less adept, with toys they do not have at home, but this should not obscure their overall competence nor the characteristics of their interaction with M.

A situational factor

One factor which might well affect our data, however, is the use of a laboratory in a university department for the observations of the secondary subjects. Although mothers knew nothing of the aims of the research and were invited to 'play with your child as you would at home, or if he seems to prefer it allow him to play on his own', it is likely they would see their role as being to show off what the child could do. In short, even in non-intrusive laboratory observation we might expect to find M adopting a more intrusive and imposing role than she normally would. But again, this should not obscure the style of their relationship.

Conclusions

Finally, we must comment upon the tightness of our model, in terms of time-scale and in terms of the ordering and interrelation of different processes.

Intuition tells us that the optimum conditions for a child will be those in which all kinds of experience which might be useful to him are available. Our model suggests that principal among these conditions are:

1. Opportunitites for the creation of structure for action.
2. The active and regular participation of another person.
3. The ability and willingness of that other person to interpret and support the child's activity and to allow him to direct their interaction.
4. The consistent application of rules relating act and meaning.
5. The consistent application of limits within which interaction may proceed.

If the child is to become able to function normally and socially we can safely claim that the first two conditions are absolute requirements. The other three conditions have already been discussed above. Within the range of variation likely to be found in them we have seen that two related effects will show up; first, in the emphasis the child places upon solitary activity with exclusion of the other and, second, in the quality and resilience of the mother-child relationship.

If we trace down the left-hand side of Table 4.3 it does appear that a child could arrive at a conception of agency - a set of definitions of his own ability within a partially rule-governed world - with only the minimal fulfillment of interpersonal conditions. On the other hand, if a child is provided with insufficient experience of a usefully and consistently participating other we should expect to see restrictions in the breadth of his cognition, in both the physical and the interpersonal realms, and we should expect its development to be delayed. Beyond this the question of the flexibility or fixedness of the schedule

becomes an empirical one, and we must see whether the secondary subjects shed further light upon it.

Chapter Five: The Secondary Subjects

5.1 Introduction and Summary

Having derived a model for the cognition of agency and specified the parameters within which variation might occur we turn now to the data for the five secondary subjects. While similarities between these subjects and Anna would provide valuable confirmation of the model, we shall be more interested in differences. The most exacting way to test the reliability of the model is to derive an independent Table for the secondary subjects, corresponding to Table 4.2 for Anna, and see to what extent our model captures it.

Each of the subjects was observed over a period of approximately three months. Since there is no relationship between them it would not be sensible to present their data sequentially within each type of activity as was done for Anna. In this chapter the children are dealt with in order, one section for each, and the data in the corresponding Appendix are grouped together within each observation period. For the sake of brevity the discussion concentrates on the differences between each secondary subject and Anna. In Section 5.7 their data are summarised; Table 5.1, the cognition of agency in the secondary subjects.

Notes on Appendix format

Appendices E-J are identical in format. Each is a complete summary of the relevant activity of one child and therefore contains all the main categories of the four appendices which summarise Anna's behaviour. This requires that each column should fulfill several functions. The second column distinguishes the type of activity involved and specifies the mode of an interpersonal routine or the kind of a request. The third column then shows how and by whom a routine was initiated or, in the case of a request, what was C's intended effect, Ei, and so on. The only major difference in this presentation - and its major disadvantage - is that the behavioural detail of communicative activity is lost. Where an episode is important to the argument it is described in the text.

Summary

It is shown that there exists a lassitude of around two months in the timing of some aspects of the child's cognition in the lower half of the age range, and that this is at least partly attributable to M's behaviour. Data on solitary activity after 18 months was sparse in Chapter Four. The evidence here suggests that there is a notable increase in the complexity of intentional structures, presumably ongoing, which should be represented in the model. Barring these two points the model is supported.

There is a broad range in the styles of M's interaction with C across subjects, but all Ms' behaviour falls within the limits of the conditions specified on page 208. This allows us to assess the impact of the situational factor. Its influence is considerably less important than the conception of her child on which a mother bases her interactive style. This aspect is further explored in Chapter Six.

5.2 Daniel (7;05-9;22) Appendix E

In line with our findings for Anna, Daniel performs no representative acts during this period and his only requests are concerned with changes in posture and with the simple affordances of M and of objects. There is, however, one area of difference with Anna (and with Sarah who is discussed in the next section). This is that Daniel spends very little time playing on his own and is highly accessible to M's initiatives. While it is true that these do not generally lead to recognisable routines or acts - and there are few in Anna's data over this period - Daniel appears thoroughly to enjoy M's attention.

There is one example from which it is clear that he does know something of his role in affecting outcomes with M, from a very early age. By 7;16 a routine has developed in which M supports Daniel in standing by holding both of

his hands. He then bends at the knees and jerks up again; after two or three times M will lift him high in the air then set him on his feet again. What is significant is his reaction when M, who is trying to alter this activity, does not lift him up. Daniel pauses after completing his turn, then exclaims and repeats it. At this M lifts him up once more but sets him down in a sitting position.

Whereas Anna seemed to discover her ability to signal M's turn and to perform explicit requests at about the same time as she started to play much more on her own - at 10 months - Daniel exhibits early interpersonal skills long before he is much interested in solitary play with objects. But it should be pointed out - see page 129 - that Daniel had two very much older siblings and was accustomed to more attention than a singleton might usually receive. The variation we see here can, I believe, be tolerated by our model of agency since it affects only the timing and not the ordering of the processes we have identified.

5.3 Sarah (10;04-12;21) Appendix F

Interpersonal routines

There are ten examples of interpersonal routines in the tapes of Sarah and they follow a sequence remarkably similar to that for Anna. At 10;04 there is a rehearsal of expectation and later an example of turn-taking. There is an attempted progression in this example, when Sarah tries to take on part of M's move. This is earlier than Anna attempted a progression - not until 11;26 - but Sarah is unsuccessful and there are no other progressive routines with her. Exchange and joint action routines follow in the same order and at about the same time as for Anna but Sarah never becomes the principal initiator of routines. Indeed, she only ever initiates exchange routines and these invariably break down after one or two moves when she withholds the object. What

is not revealed in Appendix F is that on several occasions Sarah resists M's attempts to initiate interaction and that there are no protracted interpersonal sequences. An example at 12;21, in which M hopes to engage Sarah by hiding a sweet, is included to illustrate this point.

Communicative Activity

Precisely as was so for Anna at this age Sarah performs rather few directive acts and these are requests for assistance in standing (or sitting) and for objects in M's possession. There are no requests having to do with the operation of toys. But whereas Anna performed no reliably classified representatives over this period there are three examples in Sarah's data. The first, which occurs at 11;01, is slightly ambiguous. Sarah has been playing on her own with a set of seriated cubes. She succeeds in placing a small cube inside a larger one and immediately takes it out again and holds it up to M who is about six feet away. M at first takes this to be an offer but when she leans forward to take the cube Sarah withdraws it and tries to replace it in the other cube. M then acknowledges that C was simply showing her the cube.

At 12;21 there is an act to which M attributes unambiguous representative force. In response to a question from M about what she is doing Sarah turns and shows M the object in her hand, and vocalises. This is similar to episodes with Anna at 14;26; Sarah seems to be some two months in advance in this particular kind of behaviour.

Solitary Activity

There is much more solitary activity in Sarah's first two sessions than in her second two. Interestingly, the sessions with most solitary play are the ones before she performs two observations at 12;21. Furthermore, her play is in some ways in advance of Anna's. While we can see the cyclical application of modal behaviour at the same ages- banging and blowing different objects - Sarah retrieves an

object hidden by M at 11;01 by a simple reversal of M's action (12;17 for Anna) and at 10;04 can already create, by a preliminary move, structure within which to act (11;26 for Anna). At 10;04 Sarah throws a ball into the toybox and retrieves it. She then throws it in again, but misses and the ball rolls away across the floor. Sarah reaches in the toybox for the ball, until M hands it back to her. Or again, at 10;04 she removes one seriated cube from inside another and then immediately tries to replace it.

By 12 months Sarah is also more skillful in her motor control than was Anna. Sarah can carefully place one cube on top of a stack of four others and when investigating a friction toy she can move the parts of it quite adeptly. With a toy of which she had no prior experience, on the other hand, Sarah shows no especial interest and no more ability than did Anna.

Discussion

With Sarah we see evidence of a cognition of other which corresponds in level and function to that of Anna, but we see it used less often, and we see a significant, two-month advance in her representative acts and in the complexity of her solitary activity. While no doubt some of Sarah's emphasis on solitary play can be ascribed to the unusual situation and novel toys in the laboratory, there are suggestions that her relationship with M is also a factor. It has been noted that their routines are always short and that there are no fully-fledged exchanges, and an example at 12;21 shows Sarah's rejection of an attempted initiative by M. Another example at 12;21 suggests an explanation. Here Sarah is playing with a pack of cards and seems about to bend or tear them, for M sharply scolds, "uh-uh". Sarah immediately tosses all the cards in the toybox, looks round at M and sits motionless. The abruptness of C's reaction suggests that this is a well-rehearsed sequence, which in turn implies a pattern of M monitoring C's solitary play without participating.

If C was not accustomed to M joining in with her play, her rejection of M's attempts during the recording sessions becomes reasonable. And if M is directive rather than participatory we should not expect Sarah, who is herself increasingly able, to involve M nor to request assistance in her activity. Sarah's competence itself justifies the apparently anomalous early occurrence of representative communicative acts from within a context which is not interpersonally oriented. A child who is comparatively able for this age and 'willful' (in her mother's words) must be credited early with the ability to comment upon her activity and its consequences.

Again, the relative emphases on different types of behaviour and the timing of the developments we are looking for vary from the model pattern, but the ordering of these processes is not prejudiced.

5.4 David (12;20-15;01) Appendix G

Interpersonal Routines

The routines characteristic of Anna's interaction are generally represented in David's behaviour but there are three important differences. First, there are no exchange routines at all. Second, David never initiates a routine with M; in addition he rejects or ignores many of M's attempts. Third, turn-taking and joint action routines are not easily managed and are of only short duration. There is only one routine involving a progression, at 14;04; progressive routines are not prevalent as for Anna over this period. In spite of these differences a semi-reciprocal and apparently much enjoyed turn-taking routine occurs at 15;01.

Communicative Activity

There is only one representative act and this is an observation, by naming, by David that he has discovered a

teddy in the toybox, at 14;04. Three of the five requests which David performs are to do with a trumpet which he is unable to blow. (This toy is also the focus of several interpersonal routines.) Characteristically, at 13;05, 14;04 and at 15;01, David passes the trumpet for M to blow, then attempts it himself, then passes it back, and so on. There are of course variations in this pattern, but at 15;01 when he succeeds in blowing the trumpet he still hands it back to M so as to distinguish the end of it which must be blown. This is the only toy with which M and C enjoy a routine of any length and the only one about whose operation David performs an explicit request. The other two requests are both Gimmes for things in M's possession.

Solitary Activity

What is especially remarkable about David's interpersonal and communicative behaviour is that he is never observed to use M to create the structure within which he may act. While it is true that Anna did not reach this level until 15 months - at the top end of David's sessions - David's motor control and the intentional structures apparent in his solitary activity suggest that there are no cognitive barriers to his enlistment of M's assistance.

Comparably to Anna, David at 12;10 engages in quite long sequences of solitary activity, creating for himself structured situations if anything rather more complex than were Anna's. In this, coupled with his better motor control, he exhibits by 15 months a greater degree of autonomy of action. Yet there are no attempts to enlist M's help in creating structure.

Discussion

If the barriers to David's involvement of M are neither cognitive nor motor, nor are they to do with the mechanics of communication - since some requests are satisfactorily performed - the conclusion is inescapable that these barriers must stem from within the relationship itself. Let us

examine M's behaviour more closely.

In the case of interpersonal routines we noted that David is never the initiator. M constantly tries to interest him in some toy or game, by demonstrating then offering him a turn, some of which David takes up but many of which he refuses. It is tempting to suggest that the reason many are refused or are of only short duration concerns M's subsequent behaviour. She requires that David should fulfil precisely the move she defines for him. Two examples may illustrate this. At 13;05 M attracts his attention and demonstrates how to reload and fire the pinger. She repeats this then sets the pinger on the floor in front of David and says "Now you". David reaches for the pinger, but knocks it over, and when he picks it up all the shapes slide off. M withdraws and sits in her chair again, leaving David looking confused. At 14;04 M hides a coin in one hand and holds both fists out to David. Several times the guessing game is repeated with David first choosing both hands at once, and then trying to take the coin. M insists that he is cheating and maintains the format of the routine, thereby disallowing any progression in it. David soon withdraws.

A similar sort of constraint upon their interaction is M's failure to recognise C's wish to participate. At 13;05 M untangles the duck's cord and demonstrates how it is pulled along. She pulls it past David four times. After the second, third and fourth times David reaches for the cord but this is missed or ignored by M. When it is his turn she simply drops the cord. David picks up the duck to look at it and M sits up on her chair again.

What we observe here is a relationship in which the intentions of M and C are not sympathetically interpreted and only rarely coincide. The result is a set of short, easily disrupted sequences of interaction and the extensive non-use of his mother to develop his activity and his learning by a comparatively able child. Yet, in the requests to do with the operation of the trumpet, David reveals that he is fully competent in the performance of (non-verbal) requests, and

there are no obvious adverse consequences for his cognition of agency at this age. It might have been interesting to observe David six months later.

5.5 Victoria (15;02-17;12) Appendix H

From Appendix H we see that Victoria does not play on her own. Or at least, there are no clearly specifiable intentions from within her solitary activity. As for the two previous secondary subjects Victoria's mother is highly intrusive and is the initiator of almost all the interaction between them. But here is perhaps a useful indicator of the impact of the situational effect of laboratory observation. For while both Sarah and David rejected or ignored many of M's intrusions, Victoria is amenable to them and they are the source of much joint action. This suggests that the major factor in the cases of Sarah and David is indeed their relationship with M and not any temporary differences in M's interpersonal behaviour.

Interpersonal Routines

Victoria's mother customarily initiates interaction by finding a toy and exploring it herself before inviting Victoria to play with it too. In so doing she does not define the precise way in which the toy works nor does she impose limits upon how they might play with it together. For example, at 16;05 M finds and shows to C a small lorry in the back of which sit two men. With C holding the lorry M shows her how to put the men in. M then pushes the lorry on the floor. C grabs the lorry and puts the men back in the toybox. M puts the shape from the posting-box in the back of the lorry and C now pushes it about. M never withdraws when C diverts to a new activity but will either watch or comment and join in.

Communicative Activity

As for Anna at a slightly later age, the necessity for Victoria to perform explicit requests is largely removed by M's close attention and involvement in her activity. This is in some ways a disadvantage for us as the lack of solitary activity denies us the opportunity to look for the consolidation and experimentation we saw with Anna, and the scarcity of requests obscures whether Victoria is similarly able to use M to create the structure in which to act. That M's involvement does reduce Victoria's use of requests is shown by two examples in which C clearly needs assistance - and receives it - but does not perform a communicative act.

At 16;05 C is trying to climb out of the toybox but cannot raise her foot high enough to clear the side. She is holding on with both hands to the edge of the box and so perhaps could not lift her arms in the usual appeal to be lifted, but nor does she vocalise as we might expect. M comments and lifts her out, and C chuckles as if acknowledging M's assistance. At 16;25 C is trying to put a football inside a plastic carrier bag. After some time M holds the bag open for C to put the ball in, although C had not looked at M nor vocalised nor in any way appealed for help. The possibility that she was determined to do it on her own is excluded by her ready acceptance of M's assistance.

There is one representative act in the data, at 17;12. It is an Assertion of Victoria's refusal to put the pieces of felt she is chewing into their bag as M has suggested. She does this by shaking her head and walking over to the toybox (but she does stop chewing them). This corresponds well to the age at which Anna's representatives were becoming less labile, though it is a month before Anna's performance of an assertion.

Discussion

In these data there is a pattern of much initiation by M and few requests by C similar to that in the latter sessions with Sarah and all the sessions with David, but here there

is an important difference. It lies in the qualities of the interactions in which M and C do engage. For Victoria's mother does not monitor and attempt to control C's behaviour in a directive way as do the others. Rather she offers topics and objects for interaction and then permits the child to take them over; she suggests rather than directs. At the same time she is sensitive to the child's activity and quickly infers the existence of intentions which might require her assistance. This makes for more fluent and relaxed sequences marked by the sharing of pleasure and of longer duration.

This difference permits us to uphold the claims that laboratory observation might cause M to adopt a more intrusive and imposing role than usual, but that this effect should not obscure the child's overall competence nor the characteristics of his interactions with M. In other words, the majority of the dissent of the other children can be ascribed to interpersonal and not to situational factors. With Victoria the outcomes are quite different.

5.6 Leon (18;01-22;08) Appendix J

Interpersonal Routines

All of these are reciprocal and progressive, and many of them contain dialogue. Leon's mastery of language - phonologically, lexically and grammatically - is in advance of Anna's. At 20;13 Leon twice engages M in play with the posting-box although he has previously demonstrated his mastery of it (at 18;20). The purpose of these routines appears to be pleasure-sharing and, in the second case, to provide an opportunity and focus for dialogue. M does not at all show the tendency of other mothers constantly to intrude upon C's activity, and in fact she initiates their interaction only once. Leon is very amenable to M's suggestions within joint action and is also an accomplished

interpreter of her intentions. At 18;20 M starts building a stack of cubes and Leon immediately collects and hands to her the next in sequence. His skill may reflect the influence of close siblings.

Representative Acts

At the second recording session with Leon his elder brother Anthony (4½ years) was unavoidably present. In the event this was not a disadvantage as it provided a source of ideas to explain some of Leon's actions. At 18;20 M intercedes in a dispute between Anthony and Leon over custody of the football. Leon then flaunts the ball in front of Anthony in a provocative way (with predictable consequences). The important point is how much of the play between siblings concerns the possession and control of playthings. Leon is here demonstrating (Observing) not just that he has the ball but that he has a temporary advantage he does not usually have.

Twice at 22;08 Leon demonstrates social skills which presumably derive from the same source. On both occasions C diverts M's attention by pointing and vocalising about some (imaginary) distant thing in order to obtain an object she had been withholding. Situations between siblings in which such tactics might be used can easily be imagined. Interestingly, M claimed to be aware of C's intention but pretended to be fooled for his benefit.

Directive and Solitary Acts

Most of Leon's requests are for objects in M's possession but there are two requests for assistance, in play with the posting-box and the seriated cubes. These two toys are the focus for much of his solitary play; the posting-box he masters almost immediately upon having the more difficult shapes demonstrated by M, but the seriated cubes take rather longer. Following his request at 19;16 Leon can by 21;16 both stack and nest the cubes if M will confirm that each one in turn is the correct one. By 22;08 the seriation

problem is solved but he is still unsure before trying it whether a cube is the right one. Unfortunately Anna lost interest in her seriated cups at 14 months and was never observed to stack or nest them all correctly.

Discussion

But for the posting-box and seriated cubes there are very few instances within Leon's solitary play in which we can identify a specific intention. We noted in the discussion of Anna (page 180) that examples of solitary intentions become rare after 18 months and we suggested two reasons. To these we may now add two more. First is the very much longer time-base over which an intention might hold. For example, the last sequence quoted for Leon, in which he is nesting the seriated cubes, lasts over four minutes. Unless the end-point of the activity is clear also to us it is impossible to say quite what the child's intention was. An extended time-base increases the problem. Second is the increasing complexity of intention structures themselves. At 18;20 Leon is playing with the posting-box when he looks round and prepares to sit down. He perceives, however, that when sitting the posting-box will be out of his reach, so he first moves it and then sits down. Though superficially quite simple this example illustrates the point; it shows Leon's prediction of a future state of affairs and the consequent embedding by him of an intention - to move the box closer - within another intention - to sit down - which is itself already embedded - in the intention to carry on playing with the posting-box. This demonstrable complexity of intentional structure deserves a place in our model of agency.

Leon applies rules something like those which were identified from Anna's activity. (Leon in fact displays rather more competence in the world but the details of this need not concern us here.) He uses M in cases where he is uncertain how to act and (in the two examples here) quickly applies the information she affords. He demonstrates his

autonomy and his ability to get his own way by cunning, in adverse circumstances.

As with Victoria there is none of the non-cooperation of C with M which Sinha (1978) leads us to expect. But C clearly enjoys role-parity within their interactions, is responsible for much of the initiation and progression, and knows how to assert himself. Rather than a 'renegotiation of power relations' our evidence suggests that the important thing is whether M, on the basis of the child's evident interactive awareness and growing competence as an agent, ascribes to him a role equivalent to her own within play. The child cannot assume power within their relationship unless M is willing to let him.

5.7 The Cognition of Agency in the Secondary Subjects

The procedure for deriving the terms in Table 5.1 is identical with that which was used for Anna in Chapter Four. It is based upon the earlier Sections in this chapter and upon Appendices E - J. The notes of explanation provided on pages 196-199 therefore apply also to Table 5.1. However, the data are segmented by the nature of their source, so this Table must also be segmented; it shows to which secondary subject a description applies and vertical connecting arrows are not drawn between boxes.

The differences between Tables 4.2 and 5.1 are referred to in Chapter Six when we consider what modifications to the model are required by the data from these secondary subjects.

Table 5.1

The Cognition of Agency in the Secondary Subjects

	Self-as-agent		Other-as-agent
7ms Daniel 10ms	Cyclical acts limited to natural affordances	↔	Other as promptable to action, by signalling Other as source of pleasure
10ms Sarah 12ms	Some autonomy of action Reversal of simple acts One-move creation of structure Modal experimentation	↔	Other as source of some meanings Other can interpret intentions, but also disrupts plans Other as directive rather than participatory
12ms David 15ms	Creation of structure in solitary activity - some autonomy of action New means to old goals Derivation of physical constructs; consolidation and experimentation Some rules for communicating	↔	Other can interpret intentions and share goals, but unreliably Other as demonstrator in some circumstances Other <u>can</u> observe agreed systen relating acts and meanings
15ms Victoria 18ms	Derivation of physical and interpersonal constructs Formulation of joint strategies with other Reference by pointing and naming Interpersonal assertion	↔	Other as sympathetic participant Other as sharer of pleasure
18ms Leon 22ms	Developing autonomy Complex structuring of intentions in long-term strategies, disruptible by others Subtle interpersonal assertion	↔	Pleasure-sharing - beginnings of dialogue Mutual interpretation of intentions at high level Other as optimum matrix for learning

Chapter Six: Conclusions

6.1 An Adaptive Model for the Cognition of Agency

Support for our model from the secondary subjects is overwhelming, both as to its general terms and as to the evidence upon which it is based. Trends in the development of interpersonal routines, in the use of requests and the nature of solitary activity, and in the developing autonomy implicit in representative acts, are broadly equivalent between children for any given age. Only in two respects does our model, as it stands, require modification, but it requires the addition of a parameter capturing the effects of differences in M's style.

The timing of development

The first modification we must make will allow for the variations across children in the timing of the processes we have identified. We noted that in no case was the ordering of the model brought into question, but that three of the five secondary subjects differed with Anna in the ages at which certain behaviour was first observed. These differences are summarised below.

1. Daniel signalled M's turn in a routine at 7;16. This is represented in our model as 'realisation of M's reactance', at 10 months for Anna. While Anna's first routine at 8;11 did not clearly exhibit signalling she did at this age request that she be helped to stand, which constitutes signalling of an equivalent kind. The model should therefore allow that C can realise - perceive and use - M's reactance from this earlier age.
2. Both Sarah and David exhibited communicative abilities on a par with Anna's, but both of them were up to two months in advance with respect to some aspects of solitary activity. In particular, their motor control was more precise and they demonstrated earlier the ability to structure a situation within which to act. Taken together

these factors permit them rather more autonomy of action at any given age.[1] The older children, Victoria and Leon, did not exhibit an equivalent advance, though Leon in particular gave the impression of rather better motor control. To accommodate Sarah and David the entries 'creation of simple structure' and 'some autonomy of action' must be brought forward by about two months. Whether the other terms on the left hand side of the model should also be brought forward is uncertain. The best course seems to be to permit a range of two months in the terms which relate to the physical world, which may be done by lengthening their share of the time-base.

Complexity of intention structures

An instance is reported in which Leon, at 18;20 performs a series of acts which allow us to infer the simultaneous operation of three hierarchically arranged intentions. Evidence about the structure of Anna's intentions was difficult to assess over this period because there was little solitary activity. The addition of a term describing the 'complex structuring of intentions' is advised by Leon's activity.

A dimension for M's 'style'

From the evidence available, the factor which most influences a child's progress through the model is his mother's conception of him and the role she consequently adopts in interacting with him. The model in Table 4.3 contains no representation of this factor.

In Section 4.5 a dimension for M's style was postulated, ranging from directiveness and control with little attribution of independence, on the one hand, to suggestion and participation on terms determined by the child, on the other. This dimension falls principally within the realms of the third and fifth conditions deemed necessary for the cognition of agency.[2] Of our subjects, David's mother tends towards the

[1] We return to an examination of the background for these effects later in this section.

[2] See page 208.

former style while the mothers of Anna, Daniel, Victoria and Leon are grouped towards the latter. Sarah's mother falls somewhere between them in that she is both less intrusive than David's and less participative than the others'. But Sarah is regarded as 'willful' - that is independent - and M is strict in her judgements as to what constitutes acceptable behaviour.

It was suggested at the end of Chapter Four that insufficient experience of a usefully and consistently participating other might cause the child's cognition to be delayed. In fact, David and Sarah are physically more competent for their ages than the rest, and there is no evidence that they are any less competent at this time in social or interpersonal terms. The effect they show is in not using their communicative ability to the same extent. It may very well be that over a certain limit non-participative mothering has deleterious effects upon cognition, but up to that limit - and well within the range of variation found here - its early consequence seems to be to encourage solitary activity on the part of the child, with advantageous effects upon his mastery of the physical world.

Nelson (1973) draws a distinction between 'object-oriented' and 'interaction-oriented' children, which captures neatly the differences we have observed. What is not clear from her account is whether this distinction echoes one in M's style along the lines we have indicated. Nor is it clear whether object-oriented children experience more difficulty in negotiating role-relations with M in the middle of the second year. This is an important possibility about which our data offer no indications because the three children studied over this period had highly participative mothers. Discovering whether such a pay-off exists would be a useful focus for further work both in its own right and to assist in clarifying the ontogeny of what is defined as 'difficult' behaviour.

The author is aware of current research, funded by the Scottish Home and Health Department, examining difficult behaviour in three-to five-year olds. The children in this

study attend a day-care centre at which they receive group treatment. The purpose of the research is to discover whether a mother's perception of her child, and of his behaviour, is changed after a number of sessions, and to ascertain whether her perceptions mirror any real changes in behaviour. It is possible that a causal link between child's behaviour and mother's perception might operate in either direction, or there may be a complex inter-relation. Whatever the outcome of that research, to establish whether there are specifiable precursors and explanations for such difficult behaviour from within the second year would be a valuable contribution.

Our present problem is to represent within our model the demonstrable effects of differences in M's style. This is done by dividing Table 6.1 into two parts, representing the different pathways favoured by mothering styles corresponding to the two ends of the dimension we have described. **Table 6.1 (overleaf) presents an adaptive model of agency.**

Notes on Table 6.1

1. An adaptive model

The derivation of a useful concept of agency and its application to the study of communicative development, explored in some detail in Chapters One and Two, rest upon the assumption, explicitly stated and justified in the Introduction, that the child should best be seen as the active constructor of his knowledge, intelligently directing his search for new knowledge as a means to achieving active mastery of his environment. In this light we argued that communication constitutes a primary information source for the child, since 'people become associated with the pleasure that is inherent in the game of contingency detection' (Watson 1973). Now if a child's mother acts and interacts with him - for whatever reason - in ways which do not permit and augment his learning and the exercise of his cognition, to concentrate upon solitary activity would be for him an adaptive response. Extended over time as a feature of their interaction, such a mothering style promotes, as we have seen, the

Table 6.1

An Adaptive Model for the Cognition of Agency

(a) to 'direction and control'.

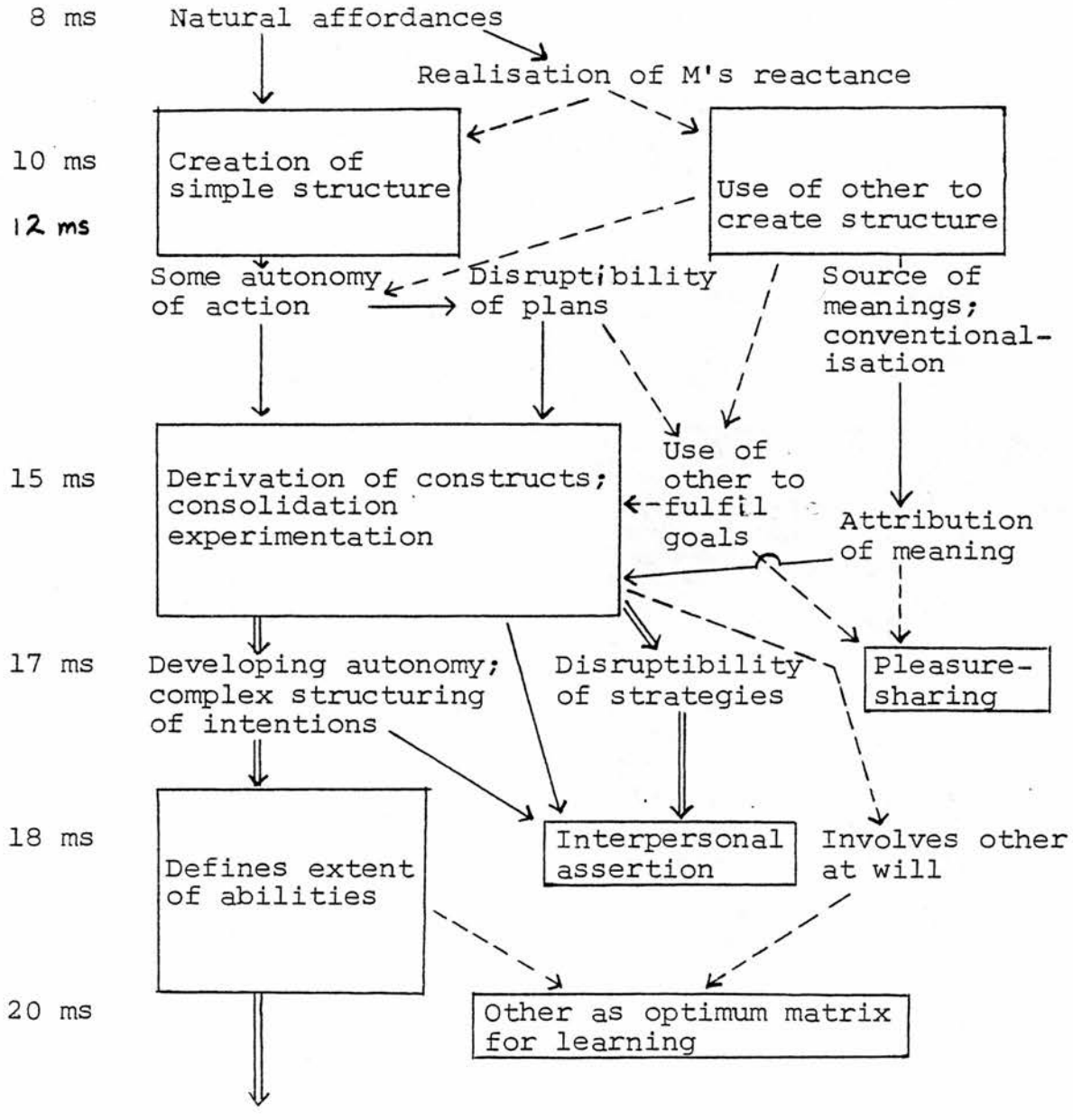
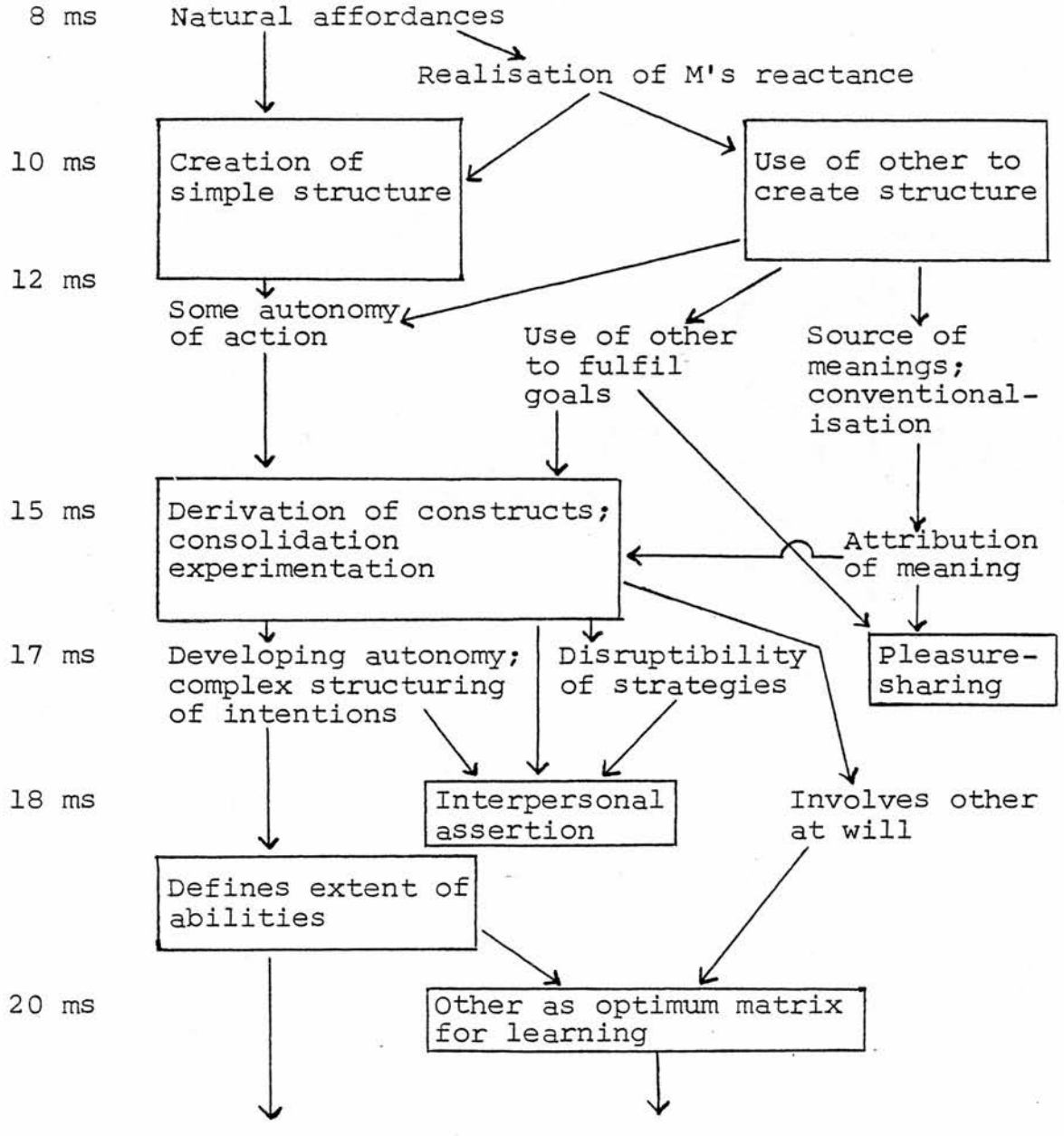


Table 6.1

An Adaptive Model for the COgnition of Agency

(b) to 'suggestion and participation'



early appearance of some aspects of cognition. A model for the cognition of agency which captures the child's active response to varying conditions must, then, be an adaptive model. Table 6.1 shows how the emphases within the cognition of agency vary in accordance with the child's adaptive response to the interpersonal circumstances of his learning. Part (a) shows adaptation to a mothering style characterised by direction and control and part (b) that to one of suggestion and participation. Again it must be stressed that these are the two ends of a continuous dimension.

2. The links between terms

In part (a) the fact that the child is capable of communicating with and using M as fully as any other child is conveyed by the (almost) identical presentation of terms. But the fact that he does so less often should be read from the dotted lines connecting some of these terms. Correspondingly, his tendency to rely more upon solitary activity and the consequent enhancement of mastery of the physical world are represented by the double lines between relevant terms. Part (a) includes one additional term, 'disruptibility of plans', at 12-14 months. While part (b) children may also perceive this disruptibility it does not for them feature as an obstacle to interaction as it does for David.

Excepting the modifications discussed above, part (b) of Table 6.1 is identical with Table 4.3. This is because the activity of Anna closely corresponded with that of the secondary subjects representing this end of the continuum.

3. Time-base

The terms down the left hand side, dealing principally with cognition of the physical world, have been vertically extended to convey the age-range in which the relevant activity was first observed. The time-base should be taken only as a general indicator.

4. Conditions

The conditions for the cognition of agency listed after Table 4.3 (page 208) remain necessary in the adaptive model. Should mothering style move so far beyond a certain point of (unsympathetic) direction and control as to preclude any of these conditions it is postulated that there would be noticeable and deleterious effects upon the child's cognition.

5. Conclusion

The cognition of agency does not develop suddenly. The status of agency as a concept in the child's cognition depends fundamentally upon his capacity to derive rules about the world, and about others, and thus effectively to act and to communicate.

6.2 Review of Theory and Methodology: an evaluation

The nature of knowing and learning

There are no reasons to doubt the value of an approach based in action, either as a general principle or as a particular approach to (communicative) development. In a sufficiently well elaborated model of cognitive development we could presumably chart the child's search for knowledge quite specifically. But one aspect for which the approach outlined did not allow is the possibility of learning by observation.

With the exception of Daniel all of the children in this study manifestly used their mothers to show them how to do things. Furthermore we saw the earlier appearance of what were taken to be requests for repetition. For a child to be able to request that M should perform some act in order that he may then try, he must, by our theory, possess some representation of that which is to be done. We can escape the counterargument, that if this is so and if cognition is constructed through action then requests repeat should not appear before requests for assistance, only by claiming that it is

M's attribution which is all-important in the child's performance of a request repeat; that there is no clearly formulated communicative intention. We should have to claim that the child is principally discovering what count as communicative acts, with any propositional content being subsidiary. This claim is not unreasonable, and is supported by the disappearance of requests repeat from Anna's data after 14 months. It is clear, however, that if the child subsequently performs a request for assistance in recreating the same event - as does happen - we must allow a significant role to observational learning. This can be accommodated in our theory provided it is not taken in an abstract sense. Learning of any kind must be bedded in hypothesis formulation and the child's early hypotheses relate only to the immediate and the salient.

The theory further demands that observational learning should be restricted to the elaboration, generalisation and formulation of schemas of a kind equivalent to others in the child's cognition. The hypotheses which are confirmed or dismissed by observation cannot be any more complex than those which are tested through action. There is no evidence here which clearly contravenes this principle but in many ways the evidence is not of a kind which can thoroughly test it. A proper examination would require the systematic comparison of things which the child has learned by observation with things which he has learned through action; it would be a major piece of work in itself.

Two Kinds of Agent?

In Section 1.3 we distinguished cognition of self-as-agent from cognition of other-as-agent, and argued that neither was logically prior to the other. The postulate that 'only through the discovery of his own agency could the child conceive of the agency of others' is equally strong with the postulate that 'only through perception of the contingencies afforded by others could the child learn of his own agency'. We suggested that cognition of each kind

would provide 'building blocks' for the other.

Our data suggest that these aspects of cognition are psychologically as well as logically equivalent. Up to about 12 months what the child knows about others is intimately related with what he knows about the physical world. He makes no distinction in kind between affordances of the world and affordances of others as far as agency is concerned, since the two are closely interdependent. Thereafter, once the child becomes able himself to structure a situation within which to act, he treats the other as proficient within his own terms. There is no apparent lag in either kind of cognition; the function of the other remains the provision of contingent relations - such as conventions relating acts and meanings - and the child assimilates and uses these in the same way as other, physical, relations. Nor does David's cognition of his mother seem in any way different from the others' in spite of his infrequent use of her as a co-interactant.

In practice the distinction we have drawn is not reflected in the child's activity in any identifiable way. It seems safe to conclude that it does not represent a real distinction in cognitive terms. Where it has been useful, however, is as a methodological tool, in providing a means to identify the kinds of knowledge involved in the cognition of agency and in suggesting the types of activity which should be observed.

Three Kinds of Activity

Classifying a portion of a child's activity as interpersonal, or communicative, or solitary is not an exact procedure. Decisions as to what constitutes a useful, interesting or important chunk of action or interaction are no doubt constrained by the interpretations a researcher unwittingly reads into the events he observes. What is taken to be the starting point of an episode or sequence is critical to the evaluation of what transpires. One case of an ambiguity is explicitly presented in the text, at the end of the discussion

of Anna's representative acts, but all other possible ambiguities have been denied, simply by the process of description.

Nevertheless, there is clearly a distinction between interaction which involves the performance of interactive acts - as we have defined them - and that which does not, and both of these differ from solitary activity. The data is not compromised by the facts that a solitary act may have been identified within an interpersonal routine and that a communicative act may have arisen out of a period of solitary activity. The justification for looking at each separately and for independently assessing the contribution each can make to a model of agency lies in the outcome that each type of activity threw up unique kinds of evidence and that these were reconcilable within a superordinate model. Interpersonal routines, for example, provided a sequential model for the mode of the child's interaction with his mother. What begin as his first appreciation of his ability to signal acts and events, in rehearsals of expectation, are then practised through turn-taking, joint action and exchange routines, and reach their functional purpose in reciprocity and dialogue where child and mother enjoy role-parity. This account of development in the mechanics and rules of communicative interaction in turn provides a background to and justification of the proposed schedules for the development of requesting and commenting. Similarly, the abstractions we can make about solitary acting mirror in kind those drawn from communicative activity in terms of the complexity of the child's intentions.

Once again, there is no reason to suppose that types of activity are distinguished by the child as sources of different kinds of information. Except for David our subjects switched fluently and frequently between all three, and while David communicated less often he was not unsure of the means for so doing. In circumstances in which the child's range of experimentation is not restricted by, for example, the absence of a familiar other, the distinction between types

of activity is of only theoretical and methodological value; it is not reflected in cognition.

Sources of Data in Developmental Studies

We have argued that in order to achieve a maximal demonstration of the child's various abilities he must be studied under circumstances which fulfil the important conditions of salience, of opportunity for free experimentation and of the active and sympathetic participation of a familiar other. The qualifications which must be made upon data derived under more formal conditions, to allow for the confounding influences of task comprehension (Sinha and Walkerdine, 1975) of attention (Greenfield, 1982) and of meaningfulness (Donaldson, 1978) in effect mean that performance will most nearly reflect competence if we do not constrain the child's activity within rigid experimental paradigms. The conclusion is drawn that these criteria are best observed in the non-intrusive observation of free play involving child and mother.

In non-intrusive observation the scientific emphasis shifts from the establishment of conditions under which data may be gathered - the experimental set-up - to the derivation of methods for deciding what count as data and for handling and correlating these data. The requirements upon these methods are, ideally, no less stringent than their counterparts in formal experimentation, and the evidence which emerges is, I would suggest, at least as rigorous and more reliable.

The Operationalisation of the Indicators

The method formulated for the identification of communicative intentions owes a great deal to speech act theory and to the thinking of Myers (1979) on early interactivity. An adaptation of this method served the examination of solitary activity. Here we must assess their value in relation to this work. But first there remains one theoretical disagreement which must be discussed, with Searle (1969) and

with Myers (1979b). It concerns whether or not all communicative acts must convey a proposition.

We have committed ourselves to the view that learning must proceed through the formulation and testing of hypotheses - in Section 1.2 - and to the view that such hypotheses are based in schemas, arranged within a discursive language of thought and together constituting what the child knows. Hypotheses are tested through action, and action is thus the source of learning. In acting the child intends some effect in the world; any effect which he can intend must arise from an internal representation and is a proposition, as some part of a schema or construct, which proposition is manifest in the child's act. Since the relation between schemas, and constructs, is ordered, intentions expressed during solitary activity are essentially equivalent with communicative intentions; all must be a faculty of learning and all must reflect an underlying proposition. This is the same as saying that the ability to have and to express communicative intentions must be a faculty of learning.

Now speech act theory proposes a set of acts with no propositional content, which for us presents a problem. Simply stated, the problem is this: If there are indeed communicative acts which do not convey an underlying proposition we cannot account for their appearance in the child's repertoire. In our terms a non-propositional act cannot represent the testing of a hypothesis and cannot therefore provide for learning. In other words, we have no way to account for the means by which a child might learn what constitutes the performance of a non-propositional act. If we are to sustain the argument concerning the origins and development of the ability to communicate we must depart from speech act theory on this issue and maintain the claim that any act which is or could be communicative must have associated with it an underlying proposition.

We turn now to an assessment of the methods formulated for the identification of intentions.

Communicative Acts

Two shortcomings of the procedure were mentioned in the text. One was our inability to identify as communicative any acts by the child which his mother did not recognise and mark by her response, and the other was our incompetence to claim that a mother's attribution may have been wrong or inappropriate. Since examples of both kinds are cases in which the child's performance of a communicative act was, by definition, not successful their exclusion does not affect our conclusions about the child's ability for successful performance. While it is possible that a greater laxity would have added breadth to the data, for example in clarifying the means the child uses to discover what count as communicative acts, this does not merit the sacrifice of reliability in evidence about what he <u>can</u> achieve.

One other drawback to the procedure is that cases in which C_2 was behaviourally similar to C_1 were comparatively rare, and in some requests and most early representative acts there was no clearly relevant subsequent act at all. In the main, the latter were cases in which the child appeared to accept his mother's response as appropriate and fulfilling of his intention. While the use of affective indices and situational clues was explicitly permitted, reliance upon them becomes much greater when there is no confirmatory act. But this only underlines the importance of treating a mother's responses as critical in the identification of communicative acts. If the child accepts her response as appropriate and fulfilling we obtain direct evidence as to the nature of his intention.

The procedure remains applicable from the earliest observations, in which the child's meaning is to an extent determined by his mother's interpretation, up to and beyond the time when verbal means of expression begin to be used. Unfortunately our observations ceased at the time when words were beginning to be substituted into non-verbal frameworks but there is no obvious reason why the procedure should not be used to trace the transition to a fuller reliance on speech.

Solitary Acts

At the younger end of the age-range the identification of intentions was made difficult by the child's short attention span, the poorly formedness and lability of putative intentions and the imprecision of motor control. Arguably, this is no fault of the procedure but reflects the fact that up to 10 months or so of age we are witnessing the tentative beginnings of directed action. Events in the world do not conveniently attribute intentions in the way a mother does, and we (as well as the child) must rely solely upon his uncertain activity.

However, the difficulties we found in specifying intentions after about 18 months point clearly to an inadequacy of the procedure; they suggest that the usefulness of a procedure analogous with that derived for communicative acts is restricted to the period in which the child's goals are very short term and require only a small number of moves for their achievement, that is to the period up to about 18 months. In solitary activity there is no parallel to the sentence by which a complex intention might be explicitly and briefly expressed. For example, a verbal request 'to put the seriated cups together' represents briefly - and rests upon the same understanding as - an attempt to do this himself which might take several minutes and involve numerous sub-goals, such as finding a cup which is lost and so on. The communicative act presupposes no less ability on the child's part than the solitary goal but it is much more easily identifiable. The procedure used here served our purpose, in establishing the extent of the child's competence as an agent in his surroundings, but it does not have the broader value of specifying the precise rules and constructs which comprise his cognition of the world.

What seems to be required for an assessment of cognition in solitary activity towards the end of the second year and beyond is the provision of a series of tasks, ordered in their complexity and having defined sub-goals and end-points. This could be undertaken within a non-intrusive paradigm.

Interpersonal Routines

The analysis of this activity involved the least rigorous of the three formulations and the one which was most open to bias in its application. For example, the researcher must himself decide what constitutes the initiation of a routine, what counts as a progression within an otherwise cyclical routine, when a temporary interruption becomes a termination and what caused this, and so on. On the other hand, our purpose in looking at this type of behaviour was not to provide a basis for specific claims about cognition but simply to identify early patterns of mother-child interaction. This is evidence of a different order to that concerning the developing nature of communicative intentions, for example; the description of observable events does not require such a formal method of analysis.

It was suggested that interpersonal routines would disclose something of the child's use of the skills essential to successful communication (which include gaining and directing attention, signalling and turn-taking, and exchange) and thus reveal the forms of interactive framework through which communicative acts might begin to be performed. The study of routines was, in fact, much more useful, and useful over a longer period than had been anticipated. They show an orderly progression from the early forms in which the child is beginning to perceive the possibilities of his role as an active participant, through forms in which the mechanics of interaction are practised and refined, to a culmination in early dialogue, role-parity and pleasure-sharing. They provide a descriptive framework within which to place evidence from other sources more directly relating to the child's cognition over almost the whole observation period. By the time, around 20 months, when routines become so long and incorporate so many sub-routines and communicative acts as no longer to constitute a useful form of description, their purpose from the child's point of view is also fulfilled. He now knows what it is to cooperate and to communicate with others; his main requirements are to discover principles about the

world and to master formal language.

A concept of agency?

In Part One agency was characterised as a set of rule-governed abilities and constructs which together permit effective action and communication. We developed a hierarchically ordered approach to intentionality which, while not approaching the comprehensive and authoritative treatment of this difficult area by Dennett (1979), is not at odds with what I take Dennett's position to be, and which served our purpose of deciding how agency might be investigated. We concluded that solitary and communicative activity should be studied, using specified methods, and a model was derived of these developing abilities and constructs. Two questions yet remain: Is the model really testable? and What does the model tell us agency is?

Confronted with the problem besieging all psychological research, of how to estimate competence from the observation of performance, I have argued that the appropriate framework for studying infants is that which most avoids formal, experimental constraints. In order to sustain claims which are at all scientific, explicit definitions must be provided for what will count as data gathered in this way. But these data must be interpreted and while the data themselves may be rigorous they can only be interpreted in ways which are not inherently falsifiable. The value of the model can however be judged in practice. If it is a good model we should be able to take any child for whom the necessary external conditions apply (page 208) and describe his behaviour in terms of the model. And it should make no difference who is interpreting the data and applying them to the model. This practical method is the means which has been used here to test and modify the model. The usefulness of the model therefore resides in its general applicability, and it can be falsified only by failing to apply in some cases.

What does the model tell us agency is?

It supports the idea that agency is not a unitary concept - may not be a concept at all in the sense in which developmental theorists customarily use the term - but is an abstraction we can make based on the child's ability to do things. The cognition of agency we may claim the child to have is, precisely, the product of his perception of his ability to master the physical and interpersonal worlds. The model tells us, within the limits of exactness of its terms, what these abilities are up to the time, around 20 months, when the progress of his mastery affords the child the means to discover solutions to any problem he can conceive.

Suggestions for further work

Several indications have already been made as to avenues for further research. These include a comparative analysis of the roles of learning by observation and by action in early cognition, and the formulation of procedures within a paradigm of non-intrusive observation for analysis of the constructs about the world the young child is deriving.

A third line of work suggested was into the ways in which communication is used for the negotiation of relations between mother and child. We have seen evidence here that the middle of the second year is a time at which the child learns what it is to assert himself, and this is manifest in such things as negation, rejecting or ignoring his mother's suggestions and refusing to cooperate, as well as in more positive things such as clarification and the directing of joint action. Clearly a relationship which is not resilient and stable over this period is one in which later difficulties might be exagerrated. A fuller treatment than we were able to give of this area would require a formal system for describing and classifying a mother's initiations and responses within their contexts, for relation to the child's characteristic modes of inter-

action with her. It may be possible to establish routes to subsequent difficult behaviour stemming in a specifiable way from mothering style.

The transition to the reliance on speech as a means of communication and discourse remains a topical research area, and the methods used here for the identification of communicative intentions could be used to plot this transition more closely. At the same time, the model here derived for the cognition of agency should be applied to the child's early verbal productions in the analysis of their semantic content. This could be done either by additional work along the present lines or by an examination of the already large corpus of data on early speech in the literature. It would involve comparing the nature of cognition as portrayed in the model with those aspects of the concept agency presumed to be implicit in the child's putative use of this semantic category.

Appendix A: Summary of Interpersonal Routines Identified in the Tapes of Anna

No.	Age	Mode	Initiator and Method	Type	Responsible for progression	Terminator and method
1(t)	8;11	Rehearsal of Expectation	M. Demonstration[1]	Cyclical		M. Withdraws[2]
2	10;10	Rehearsal of Expectation	C. Expectant look	Cyclical		C. Withdraws
3	10;10	Turn-taking	M. Demonstration	Cyclical		C. Withdraws
4	10;10	Giving	M. Offers object	Cyclical		C. Withdraws
5	10;21	Giving	M. Offers object	Cyclical		C. Withdraws
6(t)	10;21	Turn-taking	C. Demonstration	Cyclical		M. Diverts[3]
7	10;21	Rudimentary exchange	C.'Requests'	Cyclical		C. Withdraws
8	11;12	Rehearsal of Expectation	C. Established method	Cyclical		C. Distracted
9	11;12	Turn-taking	M. Demonstration	Cyclical with a progression	M	M. Diverts
10	11;12	Joint action	M. Offers object	Cyclical		C. Withdraws
11	11;12	Turn-taking	M. Demonstration	Cyclical		C. Withdraws[4] (non-fulfilment)

No.	Age	Mode	Initiator and Method	Type	Responsible for progression	Terminator and method
12	11;12	Turn-taking	M. Demonstration	Cyclical		C. Withdraws (non-fulfilment)
13	11;12	Turn-taking	M. Established method	Cyclical		C. Withdraws
14	11;12	Turn-taking	M. Demonstration	Cyclical with a progression		C. Withdraws (non-fulfilment)
15	11;26	Rehearsal of Expectation	M. Established Method	Progressive	C	C. Diverts
16	11;26	Imitation	C. Utters sound which M repeats	Cyclical with a progression	C	C. Distracted
17	11;26	Exchange	C. Offers object	Cyclical		C. Diverts
4 18(t)	12;17	Turn-taking (exchange/ joint action)	C. Approaches M	Progressive	M and C	C. Withdraws (non-fulfilment)
19	12;17	Joint action	C. Requests assistance	Progressive	C	C. Withdraws (non-fulfilment)
5 20	12;17	Exchange	C. Offers object	Progressive	M	C. Diverts to new object
6 21	13;05	Exchange	C. Offers object	Progressive	C	C. Diverts to new activity

	No.	Age	Mode	Initiator and Method	Type	Responsible for progression	Terminator and method
	22	13;05	Joint action	C. Involves adult in her game	Progressive	C and M	C. Withdraws
7	23(t)	13;05	Joint action	C. Requests assistance	Progressive	C	C. Excludes M from her game
	24	15;09	Joint action	C. Involves adult in her game	Cyclical		C. Takes her game elsewhere
	25	15;09	Joint action/ Reciprocity	M. Demonstration	Progressive	C	C. Withdraws (non-fulfilment)
8	26(t)	15;09	Joint action	C. Established method	Progressive	C	C. Diverts to other activity
9	27(t)	15;09	Exchange	M. Requests	Progressive	M and C	C. Eats her sweet; 'topic' of routine
	28	16;01	Turn-taking	C. Offers Object	Progressive	C	C. Withdraws
	29	16;01	Turn-taking	C. Offers object	Cyclical		C. Distracted by an accident
10	30(t)	16;29	Reciprocity	C. Addresses M	Cyclical		C. Withdraws
	31	16;29	Reciprocity	C. Approaches M	Cyclical		C. Distracted by an accident
11	32(t)	17;25	Reciprocity	C. Approaches M	Progressive	C	M. Diverts

No.	Age	Mode	Initiator and Method	Type	Responsible for progression	Terminator and method
33	18;16	Reciprocity	M. Demonstration	Progressive	C	C. Distracted by other event
12 34(t)	19;13	Joint action/ Reciprocity	C. Requests assistance	Progressive	C and M	C. Diverts to other activity
13 35(t)	19;13	Joint action/ Reciprocity	C. Approaches M	Progressive	M and C	C. Withdraws
36	20;08	Turn-taking	C. Offers object	Cyclical		C. Diverts to other activity
37	20;08	Dialogue	M. Approaches C	Progressive	C	C. Withdraws

Notes: The routines marked (t) are those described in the text.

[1]The form of initiation described as 'Demonstration' means that M showed C how to perform some task or how some toy worked.

[2,3]Both M and C terminate some routines by withdrawing. Where this is done in favour of some other activity this is described as 'Diverts'. 'Withdraws' means that the interactant stops the routine but does not then immediately begin a new activity.

[4]Particularly between 11 and 15 months C frequently withdraws from a routine because she is unable successfully to perform her turn. Where such 'non-fulfilment' is taken to be the reason for withdrawal this is indicated.

Appendix B: Communicative Acts of the Directive Type Performed by Anna

	Age	Description of C_1	Description of C_2 (if diff. from C_1)	Intended Effect (Ei)	Classification	Outcome
	8;11	Crawls to M, raises left arm, vocalises		That she be helped to stand	Request assist	Granted
14	10;10	Displays excitement, vocalising and hitting the pinger		That the pinger be fired again	Request repeat	Granted
	10;10	Vocalisation, sustained gaze and arm reach		That she be given some cake	Gimme	Granted
	10;21	Crawls to M and vocalises	Pulls herself up on M's chair	That she be helped to stand	Request assist	Refused
	10;21	Reaches for object and vocalises		That M give her an object she holds	Gimme	Granted after a repeat
	11;12	Sustained gaze with bobbing up and down while standing		That she be given some cake	Gimme	Granted
15	13;05	Takes hurdy-gurdy to M	Takes hurdy-gurdy to A	That M (A) play the hurdy-gurdy	Request repeat /demonstration	Granted
16	14;02	Hands tuning fork to M	Tries to play it herself	That M sound the tuning fork	Request repeat	Granted

	Age	Description of C_1	Description of C_2 (if diff. from C_1)	Intended Effect (Ei)	Classification	Outcome
17	14;02	Reaches for soap M is holding, looking at soap, and saying "Duh"	Eye contact with M while reaching; (C_3) Reaches with her other hand	That M give her the soap she is holding	Gimme	Refused
18	14;26	Sitting on her car holds up one hand, says "get-off"	Sits motionless, manding	That M lift her off the car	Request assist	Granted after C_2
	14;26	Seeing M give juice to another child, mands from across the room		That she be given some juice also	Gimme	Granted
	14;26	Reaches for bottle another child holds	Stands watching	That she be given the bottle	Gimme	Apparently ignored, then granted
19	14;26	Knocks over a bottle and picks it up the wrong way; looks at M		That M set the bottle upright	Request assist	Granted
20	15;09	Points and says "ū-dù, uhud-dù"[1]	Approaches, points and says "dù" more loudly	That she be passed an object out of her reach	Gimme/ Request assist	Granted after C_2
21	15;09	Walks to the door, puts hands against it, says "ad-ju-jù"	Shouts "ud-du-du-dù"	That the door be opened for her	Command[2]	Granted after C_2

	Age	Description of C_1	Description of C_2 (if diff. from C_1)	Intended Effect (Ei)	Classification	Outcome
22	15;09	Goes to M's chair, points and says "daa"[3]		That M should give her - or let her take - the towel M is sitting on	Gimme/ Request assist	Granted
23	15;09	Turns small box in her hands, gives the box to M and says "hūh-dūdū"	Knocks the box out of M's hand	That M open the box for her	Command	Refused
24	15;09	Climbs on a chair, drops her sweet over the back; exclaims loudly	Repeats, looks at M, pauses, gets down and retrieves the sweet herself	That M pick up her sweet	Gimme	Refused
	16;01	Switches on cassette player. (It plays) Looks at M and says "Daddy"	Dances to music	That M should put on a cassette of her father	Command	Granted
	16;01	Sitting in her toy-box raises both arms		That she be lifted out	Request assist	Granted
	16;01	Goes to bookcase, points at duck, says "Dĕ"		That the toy duck be handed down to her	Gimme	Granted
25	17;25	Points to cassette player, says "dū, dū, dū"	Gets up and turns it on herself	That the machine be switched on again	Command	Refused

Age	Description of C_1	Description of C_2 (if diff. from C_1)	Intended Effect (Ei)	Classification	Outcome
17;25	M pulls toy-box out of the way; C reaches and says "ŭh"		That the box be replaced	Command	Granted
18;16	Reaches for balloon M holds	Turns and moves away (as directed by M)	That she be given the balloon	Gimme	Refused
	Picks up balloon, tries to blow it up then hands it to M		That the balloon be blown up and released again	Command/ Request repeat	Granted
18;16	Tries to switch on the torch; hands it to M		That the torch be switched on/she be shown how it works	Command/Request demonstration	Granted
26 18;16	Climbs up on a chair sits and waits		That M fire Pinger at at her	Command	Granted
	Points at Panda, says "dă-dăă"		That Panda be passed to her	Gimme	Granted
	Gets down, touches pinger, says "dă-dăă" climbs on chair again		That the pinger be fired at her again	Command	Granted
27 19;13	Points at table-lamp, says "lă-lyĕ"	Points at another light which is on	That the lamp be switched on	Command	Refused
	Points to a third light and babbles		That this light be switched on	Command	Granted
		Points to table-lamp again and exclaims loudly	That the lamp be switched on	Command	Refused

	Age	Description of C_1	Description of C_2 (if diff. from C_1)	Intended Effect (Ei)	Classification	Outcome
	19;13	Puts duck on floor points to it, looks at M and vocalises	Claps her hands and pulls duck away	That M untangle the duck's cord	Command	Granted
28	19;13	Hands cup to M, but looks at another object	Looks at M, points to the table then runs over, puts her hand flat on it and looks at M	That M should put her cup on the table	Command	Obeyed after C_2
	20;08	Sitting on donkey, holds out her hand and says "ŭh, ŭh"		That M should steady her while she climbs off	Request assist	Granted
29	20;08	Kneels on a cushion points and says "hŭnnă-wŭ"	Lies on both cushions	That the other cushion be passed to her	Gimme	Granted
30	21;09	Looks at M fingering the shoulder-straps of her dungarees	Walks to M saying "tĭd-dŏ"	That her dungarees be taken off	Request assist	Granted
	21;09	Reaches for a cup of coffee M is holding	Drinks from her own cup	That she be allowed to taste M's drink	Gimme	Granted
31	22;00	Approaches M fingering the zip of her dress, saying "ĭd-dĭ-dŏ"	Stands still and plaintively says "tĭd-dŏ"	That her dress be taken off	Request assist	Diverted

Notes: [1]The lines drawn above Anna's verbal utterances indicate rising, falling or level pitch contour.

[2]The criterion for the distinction between requests for assistance and commands lies in whether or not Anna is directly, physically involved in the action M is required to perform. If M's act does not involve C directly C_1 is classified as a Command (or as Gimme or Request repeat, as appropriate); only if C is involved in M_1 is C_1 classified as a request for assistance.

[3]Increasingly after this session (15;09) Anna's directives are performed within a context of structured play and are related to immediately preceding events. For the sake of brevity these events are not described even though the omission may render C_1 obscure.

Appendix C: Communicative Acts of the Representative Type Performed by Anna

	Age	Description of C_1 (+prologue)	Description of C_2	Attributed Proposition	Classification
32	10;21	Vocalises while pulling herself up to stand		That her action is difficult	Performative
33	13;05	Gives three seriated cups to M, then takes back the cups and babbles at M		That she is 'explaining' what M should have done with cups	Clarification
	14;02	Failing to put a necklace in a cup, holds it up, turns to M and says "dʊ̆"	Continues trying to put necklace in cup	That she is unable to accomplish this task	Performative
	14;26	Puts her cup on the table, turns to M and says "dă" (M has just warned her to be careful)		That she has placed her cup on the table successfully	Observation
	14;26	Picks up the ball which has rolled in among her toys and hands it back to M saying "ʊ̆h-dʊ̆h" (Oh dear)		That the ball rolling in among her toys was as accident	Observation
34	14;26	Holds her duck out to M (from about ten feet away)	Walks over and gives the duck to M then walks away	That she is offering the duck to M	Performative
35	14;26	Finds her dummy in the toy-box, holds it out to M and says "ɪ̆-dŏ"	Takes the dummy to M, babbling	That she is naming the object she has found	Observation

	Age	Description of C_1 (+prologue)	Description of C_2	Attributed Proposition	Classification
36	15;09	Holds laundry out to M and says "Hē-dŏ"	Deposits the laundry in M's lap and goes to collect more	That she is offering the laundry to M	Performative
37	16;01	Takes a book to M then gets a set of headphones also	Sits down and names the pictures in the book	That wearing the headphones is an essential part of the game	Personal Observation
38	16;01	Kicks her ball then points to where it went		That M is to acknowledge where her ball now is	Observation
39	17;25	Blowing into an empty squeezy bottle, holds it out to M while looking the other way at something else	Goes to fetch another toy	That she has finished playing with the bottle	Personal Observation
	18;16	While entertaining Anna who is in front of her chair M accidentally knocks two metal objects off the arm of her chair. Anna picks them up and says "ōh-dēā"		That she believes she was responsible for the objects being knocked off and is apologising	Personal Observation
40	18;16	Switches on the radio and turns the knobs. (M switches it off again)	Shakes her head and switches it on again	That the radio should be on (although it is not tuned to a station - M explains that she likes the light on)	Assertion

	Age	Description of C_1 (+prologue)	Description of C_2	Attributed Proposition	Classification
41	18;16	Traces the motion of the spool on the VTR and says "round and round" (M agrees)	Finds her toy roundabout, makes it go round looking at M, smiling	That the action of these things is similar	Observation
42	19;13	M holds up a picture of a spinning top and asks "what's that?" Anna points to it and says "tɔ̃"	M queries "what is it?" Anna turns and points to her own spinning top	That the picture is of a spinning top, like her own one	C_1: Observation C_2: Clarification
43	19;13	Finds a picture of flowers and points at them, vocalising	M asks "What do you do with flowers?" C holds the picture up to her face	That she is naming the picture That you smell flowers	C_1: Observation C_2: Observation
	19;13[1]	Puts duck on the floor, points to it, looks at M and vocalises. (M glosses "It's got its wing stuck")		That the duck's wing is stuck	Observation
44	21;09	Throws a golf-ball which rolls under a chair; says "all-gone"		That the golf-ball has gone out of sight	Observation
45	21;09	Says "all-gone" in reply to a question as to the whereabouts of a toy	M finds the toy; C points to it and says "dɔ̃"	That the toy is out of sight/she does not know where it is C_2: That a dog has chewed the toy	Observation Observation

Notes: [1]This episode is listed also in Appendix B. M's comment upon C_1 appears to be a gloss of its meaning with the force of a representative. M then fixes the duck's wing as if taking C_1 to be an indirect request.

Appendix D: Intentions to cause some effect, Ei, identified in Anna's Solitary Activity

	Age	Intended Effect, Ei (hypothesis entertained)	Reason for failure ($E_1 \neq Ei$)	Factors and fields of cognition presumed relevant to the construction and execution of C's intention
46	8;11	To catch the wheel as it returns		That the wheel will return to M; path and speed of movement
47	10;10	To fire the pinger	Strategic	That the shapes slide up and down on the pole; that the pinger fires; the way the trigger moves; that the trigger has something to do with firing
48		To fire the pinger	Behavioural	
49		To fire the pinger		That banging the trigger makes it fire
	10;10	To regain a receding toy		Path and rate of movement; separation of the toy from the surface it rests on; 'graspability' of toy
	10;10	That she should stand up		Firmness of chair used as support; her ability to stand
50	10;10	To obtain a towel which is out of reach	Strategic	Possibility of increasing reach by standing on something higher(?)
	10;10	To fire the pinger		Need for attention when pressing the trigger
51	10;10	To catch the wheel		Path and (faster) rate of movement; her own ability to move faster

	Age	Intended Effect, Ei (hypothesis entertained)	Reason for failure ($E_1 \neq Ei$)	Factors and fields of cognition presumed relevant to the construction and execution of C's intention
52	10;10	That she should pull a towel over her head to cover it	Motor	Some notion of hiding or pretending; the nature of towels (opaque, soft)
	10;21	To slide the shapes off the the pinger		None new
53	11;12	To replace a shape onto the pinger	Behavioural/ Perceptual	That the pole fits into the hole in the shape; approximate orientation of shape and pole
	11;12	To avoid being hit by a shape M has just fired		Trajectory of shape; possibility of avoidance; shield properties of her arm
54	11;26	To fire the pinger		None new
55	11;26	To open a cassette box	Motor	Observation of M's action; possibility of her copying M's action
56	11;26	To open a diary		Recognition that cassette boxes and diaries open in similar ways
	11;26	That what she sees in the mirror is happening behind her		Recognition of familiar persons and objects;
	11;26	To check that the front and back of a mirror are different		That mirrors are unusual things

	Age	Intended Effect, Ei (hypothesis entertained)	Reason for failure ($E_1 \neq Ei$)	Factors and fields of cognition presumed relevant to the construction and execution of C's intention
57	11;26	To shut the door To show that she can open and shut the door		Swinging motion of door; which edge of the door to push Distinction of door from surround; where to pull the door to open it
58	12;17	To play hurdy-gurdy by blowing through it/to see if it makes a sound when blown	Strategic	Sound-producing effect of blowing; importance of blowing at a particular point; how hard to blow
59	12;17	To replace the cellophane wrapper on a cigarette packet	1. Behavioural 2. Strategic	Reversibility of some actions and relationships (e.g. cups, pinger shapes); orientation of wrapper and packet
60	12;17	To retrieve cellophane from where M has just hidden it		Object permanence; ability of inverted cups to contain objects; reversibility of M's act
61	12;17	To hide and expose one seriated cup with a larger one		None new
62	12;17	To replace a shape she has just pulled off the pinger	Motor	Required orientation of shape and pole
63	13;05	To reform a stack of cups		Serial differences in size/colour differences; care required for balancing the cups <u>OR</u> Simple reversibility

	Age	Intended Effect, Ei (hypothesis entertained)	Reason for failure ($E_1 \neq Ei$)	Factors and fields of cognition presumed relevant to the construction and execution of C's intention
64	13;05	To pick up a larger cup with a smaller one/To hide the larger cup/To practice stacking cups	Strategic Strategic	Knowledge that this is possible Appreciation that some cups fit over some others; that some stack upon some others; uncertainty over serial order
65	13;05	To roll the wheel as M did/ To roll it back to M	Behavioural	Action required for throwing and rolling objects; possibility of causing event similar to that caused by M
66	13;05	To fit a shape onto M's finger		Extension of rules governing shape and pole to a similarly shaped thing
67	13;05	To fire the pinger	Behavioural	Use of index finger to press the trigger; that it is necessary to press hard
68	13;05	To play the hurdy-gurdy	Motor	Knowledge that the handle has something to do with playing the hurdy-gurdy
	14;02	To retrieve a shape M has just hidden in a box		Object-permanence; containership
69	14;02	To sound the tuning fork	Strategic Behavioural	Possibility of sounding tuning fork; Grasp of the need to bang the fork on something hard and then to hold it against a hard surface
70	14;02	To recover a previously hidden necklace and then to hide it herself	Behavioural	Imitation of M's act - not a role reversal

	Age	Intended Effect, Ei (hypothesis entertained)	Reason for failure ($E_1 \neq Ei$)	Factors and fields of cognition presumed relevant to the construction and execution of C's intention
71	14;02	To raise a smaller cup with a larger one OR To hide and reveal the smaller cup	Behavioural then successful	Appreciation that this is possible if you tip the two cups over
72	14;26	To fire the pinger	Motor	Full attention to pressing the trigger
73	14;26	To restart/investigate a clockwork toy		Need for the toy to be upright on the floor for it to go
74	15;09	To replace a shape on the pinger		Appreciation that inserting the pole through the hole in the shape is easier than locating the shape onto the pole; need to hold both parts as she turns the pinger up so that the shape does not slide off
	16;01	To blow through a clothes peg to see if it makes a sound	Strategic	Many other (unlikely) objects do make a sound when blown
	16;01	To hear Daddy play on the cassette machine	Behavioural	That a particular button makes the sound come; that other buttons control volume or change the sound
	17;25	To make the cassette play	Behavioural	None new
	17;25	Play with spinning-top: a) To find a missing part b) To replace this part c) To enlist M's aid in replacing the part	Motor	That the toybox is the best place to look for missing toys; Where and how the missing part fits

	Age	Intended Effect, Ei (hypothesis entertained)	Reason for failure ($E_1 \neq Ei$)	Factors and fields of cognition presumed relevant to the construction and execution of C's intention
	17;25	To prepare the duck for pulling		That the duck has to be upright with wings back, for pulling; that the cord must be untangled
75	18;16	To set the roundabout in motion	Strategic	Perceived similarity of roundabout with her spinning-top
76	21;09	To replace a second shape on the pinger		As at 15;09 and that the first shape will slide off when she inverts the pinger; that holding the pinger by the pole will prevent the first shape from sliding off and will permit location of the second shape
77	22;00	Repeatedly to fire the pinger		Mastery of firing sequence; load, press down, press trigger

Appendix E[1]: Interpersonal Routines, 'Directive' and Solitary Acts Performed by Daniel[2]

Age	Mode of routine Type of act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
7;16	Request assist	That he be helped to stand/held standing	Granted	
7;16	Rehearsal of expectation Turn-taking(?)	M. Hoists C into the air from standing position when he bobs up and down	Cyclical M. Tries to divert	C complains by pouting and exclaiming when M does not lift him up although he had bobbed at the knees as usual
8;23	Gimme	That M should roll a ball within his reach	Granted	Usefulness of M; that manding in particular ways works
9;22	Solitary	To operate the vane inside a transparent sphere		That shaking and turning the sphere make the vane spin

Notes: [1]An explanation of the format of the five Appendices for the secondary subjects is given on page 210.

[2]Daniel performed very few acts of a kind which are recognised by our procedure. This reflects more upon the procedure than upon the child, as discussed in Chapter Six.

Appendix F: Interpersonal Routines, Directive, Representative and Solitary Acts Performed by Sarah

Age	Mode of routine Type of act	Initiator and Method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
10;04	Rehearsal of expectation	M. Demonstration	Cyclical, C withdraws	
10;04	Request assist	That M should help her sit up	Granted	Manding with negative affect, no reaching or pointing
10;04	Solitary	To compare sounds of banging with hand and with hard object		Sounds similar on hollow box; continues at great length
10;04	Solitary	To throw a ball into a toybox and then retrieve	Behavioural/ Perceptual	Containership, retrievability
10;04	Gimme	That M should pass her a ball	Granted	C starts to move for the ball, M moves, C pauses, M pauses, C requests, M rolls the ball; fine reading of intention
10;04	Solitary	To replace a seriated cube she has just removed	Motor/Perceptual	Cannot hold the nest nor single cube steadily; grossly misaligns them; simple reversibility
10;04	Turn-taking	M. Demonstration	Cyclical with C's attempted progression M. Withdraws	M pushing away, and C pulling back, a pullalong duck; C tries to take on M's turn

Age	Mode of routine Type of act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
11;01	Solitary	To replace a cube which has just fallen out	Motor/Perceptual	Can replace a cube whose relative orientation is unchanged, not one which has turned
11;01	Observation(?)	That she is showing M the cube she replaced		M mistakes this for an offer; C attempts to share her goal with M
11;01	Solitary	Investigation of glass container		Looks at coffee jar, puts her hand inside and looks at it through the base; takes out her hand and looks at base again
11;01	Solitary	To post a shape in the posting box	Perceptual	That shapes do go in; no discrimination by colour or shape; bangs shape on lid when unsuccessful
11;01	Solitary	To retrieve a shape M has just hidden	Successful	Object-permanance; containership; simple reversal of M's move
11;01	Solitary	To post round shapes in posting box	Successful	M indicates the correct hole; C succeeds but soon withdraws
11;01	Exchange(?)	C holds object out to M, M reaches, C withholds, C accepts new object M offers then withholds both objects	M, Withdraws	No complete notion of exchange, C dislikes giving up possession

Age	Mode of routine Type of act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
11;22	Turn-taking	M. Shows C how to slide beads on the abacus	Cyclical C. Diverts	That the beads do slide; imitation of M's action
11;22	Solitary	Investigation of posting box and lid		Containership and removability; identity; no colour or shape discrimination
11;22	Exchange(?)	C offers, M takes, C immediately starts to complain and M returns, C offers then withholds	Cyclical C. Diverts	
11;22	Joint action	C obtains box, M offers shapes for her to put in	Cyclical C. Diverts	Only successful with spheres; C is not wholly absorbed and soon diverts
12;21	Observation	That she is showing M the object she is playing with		Apparently a response to M's address
12;21	Exchange(?)	M offers object, C accepts; C offers object then withholds	Cyclical C. Diverts	
12;21	Rehearsal of expectation	M gets hanky to wipe C's nose, C holds her head up and then ducks away	Cyclical C. Succumbs	Repeated several times; C must recognise M's preparatory move

Age	Mode of routine Type of act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
12;21	Turn-taking	M. Loads and fires the pinger	Unsuccessful C. Reverts to earlier activity	C accepts M's initiation only reluctantly; does not persevere when her move is incomplete
12;21	Observation	To name 'Cat' in a book M is showing her		Points and names clearly; M repeats "Cat" after C
12;21	C rejects M's initiative	M hides a sweet under three seriated cups	C watches but no attempt to find the sweet	Exemplifies a feature of M-C interaction; C excludes or ignores M frequently
12;21	Solitary	To balance a cube on top of four others	Successful	Motor control; some perception of orientation
12;21	Gimme	That M should give up her coffee cup	Refused and diverted	
12;21	Solitary	To investigate a friction toy		Runs it back and forth; listens to the sound; picks it up and moves wheels etc.;
12;21	Rehearsal of expectation	C is playing with a pack of cards; M scolds		C abruptly throws all the cards in the toybox, then looks round at M and sits motionless

Appendix G: Interpersonal Routines, Directive, Representative and Solitary Acts Performed by David

Age	Mode of routine Type of act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
12;10	Solitary	To replace a shape on the pinger	Successful	That shapes slide on and off; orientation of shape and pole
12;10	Solitary	To investigate a pile of seriated cubes		M suggested this activity; she hovers while C takes out four small cubes then withdraws when he diverts
12;10	Solitary	To replace seriated cubes		Piles several small ones into the largest, no attempt to nest them
12;10	Turn-taking	M. Demonstration of how to blow the trumpet	Cyclical C. Withdraws	C tries but cannot, holds it up to M who blows; C tries again, looks at it then offers to M
12;10	Solitary	To put the pinger in the posting box	Perceptual	With the box lid open the base of the pinger nearly fits in!
12;10	Solitary	Play with posting-box		Some awareness of orientation; full appreciation of how to use the posting box
13;05	Joint action(?) Turn-taking(?)	M. Loads and fires the pinger twice	Cyclical M. Withdraws Cyclical C. Diverts	C knocks over the pinger, shapes slide off when he picks it up; C perseveres and M joins in again

Age	Mode of routine Type of act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
13;05	Gimme	That M should let him drink her tea	Refused	Approaches, reaches, vocalises tries to climb on M's knee
13;05	Turn-taking	M.Demonstrates how to pull duck along	Cyclical C. Withdraws	M misses C's attempts to join in, then hands over and withdraws; C perseveres, M joins in and a cyclical session occurs
13;05	Request repeat	That M should blow the trumpet again	Granted	M says "Now you" and holds the trumpet out; David doesn't
14;04	Turn-taking	M. Holds a coin in one of two fists	Cyclical C. Withdraws	Many turns in which C tries to alter the game; M disallows any variation
14;04	Joint action Turn-taking	M. Joins in with C's game with the pinger	Cyclical C. Diverts to posting box Progressive C. Diverts	Sliding shapes on and off; C puts in shapes, M takes them out and hands them to C one by one; C takes them out
14;04	Solitary	To transfer shapes from posting box to an empty coffee jar		Diversification of ends
14;04	Gimme	That M should pass him the coffee jar so he may retrieve the shapes	Granted	

Age	Mode of routine Type of act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E^{1} \neq Ei$	Comments; factors relevant to construction and execution of C's intention
14;04	Request assist	That M should blow the trumpet	Granted	
14;04	Solitary	To blow the trumpet	Behavioural Strategic	Succeeds occasionally but not reliably; does not distinguish which end must be blown
14;04	Joint action	M. Holds out the jar for M to put the shapes in and take them out	Cyclical M. Diverts to new activity	M shakes the jar to make it more difficult for C to put in and take out the shapes
14;04	Observation	That C is naming the teddy he has just found		M repeats "Teddy"
15;01	Imitation	M. Comments, suggests and demonstrates	Cyclical C. Diverts	With the snow-scene
15;01	Imitation Turn-taking(?)	M. Demonstrates a game with the abacus	Cyclical C. Diverts	C copies briefly
15;01	Request assist	That M should blow the trumpet so that he can try	Granted	C distinguishes ends of the trumpet; can blow it reliably
15;01		M. Demonstrates operation of a friction toy, at length		C watches M but makes no attempt to join in, nor to play with it himself afterwards

Age	Mode of routine Type of act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
15;01	Turn-taking (Reciprocity)	M. Puts her hand into a cardboard tube which C is investigating	Cyclical C. Diverts	Their hands touch inside the tube; each takes out a hand and replaces it; this is the only occasion on which both M and C laugh while interacting

Appendix H: Interpersonal Routines, Directive, Representative and Solitary Acts Performed by Victoria

Age	Mode of routine Type of Act	Initiator and method Intended Effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
15;20	Imitation	M. Demonstration	Cyclical C. Diverts	M's act is copied by C, immediately and accurately
15;20	Joint action (Dialogue)	C. Shows object to M	Progressive C. Diverts	About the transparent sphere, M commenting, C verbalising intermittently
15;20	Joint action	M. Demonstration	Cyclical C. Withdraws due to non-fulfilment	M loads and fires the pinger many times, then finds another shape; C tries at great length to put this on but cannot
16;05	Joint action (Dialogue)	M. Demonstration	Progressive C. Diverts to new activity	Putting men in the lorry; C alters the game
16;05	Request repeat	That M should push the friction toy (again) so she can try herself	Granted after C_2	C says "gĕ-ĕ"; M pauses then queries "Again?"; C repeats and goes to retrieve the lorry; M pushes it then C tries
16;05				C does not request assistance in climbing out of the toybox though she plainly needs, and gets, it

Age	Mode of routine Type of Act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
16;25	Joint action (Dialogue)	M. Intrudes on C's game with the postingbox	Progressive C. Diverts to new activity	Naming shapes and discussing where they go; often C puts them e.g. in the lorry
16;25	Reciprocity (Imitation)	M. Tickles C's face with a feather, says: "Tick, tick, tick"	Cyclical C. Diverts	C's action is a precise role-reversal of M's
16;25	Joint action	C tries unsuccessfully to put football in a plastic bag; M assists	Progressive C. Diverts	C does not request M's help but accepts it when given
17;12	Assertion	That C will not accede to M's suggestion		C ignores M's first comment; to the next she shakes her head, puts down the felt pieces and walks away
17;12	Joint action	M. Offers toy	Progressive C. Diverts	Pull-along duck; setting it upright, untangling the string; both pull it
17;12	Performative	That C is offering to M another felt piece		M twice scolds C for chewing felt pieces, then herself starts putting them away; C_1 follows
17;12	Joint action (Dialogue)	C. Finds a bag of tools in the toybox	Progressive M. Withdraws	M and C discuss each tool, find out how they work: C plays at length with one and M withdraws

Appendix J: Interpersonal Routines, Directive, Representative and Solitary Acts Performed by Leon

Age	Mode of routine Type of act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments: factors relevant to construction and execution of C's intention
18;01	Request assist	That M should show him how pyramids and crescents go in post-box	Granted	C can manage cubes and spheres, without difficulty; orientation and shape perception
18;01	Reciprocity (Turn-taking)	M. Offers ball	Progressive C. Withdraws	C accepts the ball, runs away then turns and throws it back, etc
18;20	Solitary	To master the postbox	Successful	Can succeed with all shapes, but if one takes too long C opens the lid and puts it in
18;20	Observation	C hands to M the next cube in a sequence to go on a stack		Perception of size (or colour); deduction of M's intention
18;20	Solitary	To put the posting-box where it will be within reach when he sits down		Playing with box, starts to sit down; stops, moves the box closer to where he wants to sit, then sits down
18;20	Observation(?)	To inform Anthony that he has charge of the ball		M intercedes in a dispute over custody of the ball;Leon flaunts the ball in front of Anthony

Age	Mode of routine Type of act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
19;16	Solitary	To remove and replace seritaed cubes	Perceptual/ behavioural	Replaces 2 in serial order; third will not go so puts in a much smaller one and puts on the lid; starts a second nest from the remaining cubes; sees that they do not fit correctly; undoes his first nest, then ...
19;16	Request assist	That M should show him how to replace cubes	Granted	Collects all the unstacked cubes and passes them to M
20;13	Reciprocity	C. Hands a shape to M to put in the post-box	Progressive C. Diverts	C is quite able to post all the shapes himself; he involves M and they play together
20;13	Reciprocity (Dialogue)	As above		As above, but with both commenting; C says "You do it", "Take this" etc.
20;13	Command	That M should throw the ball to him again	Granted	C sitting on a chair with M bouncing the ball to him; he cannot catch it on the chair
21;10	Gimme	That M should give him the pack of cards	Granted	C is playing with something else; sees that M is shuffling cards
21;10	Solitary	To post the shapes in box	Successful	C bangs each shape on the lid several times before slotting it in; M comments

Age	Mode of routine Type of act	Initiator and method Intended Effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
21;10	Interrogative	That M should confirm that this is the next cube in sequence	Confirmed	C is nesting the cubes; holds up each in turn and says "ŭŭh"; M says "Yes, that's right"
21;10	Gimme	That he may have a biscuit	Queried	C points and says "Biscuit"; M queries, demanding clearer pronunciation; C goes and gets a biscuit himself
21;10	Solitary	To build a stack of cubes	Perceptual	Seriation is the only problem; C can succeed if M will confirm or pass him the correct cube
22;08	Diverson(?)	C hands an object to M then reaches for it but M withholds		C hesitates then looks up at the light, points and vocalises; when M looks up C takes object from her hand
22;06	Solitary (Make-believe)			C tries to drink the snow-scene; 'pours' it into a cup; chases it around like a ball; M laughs and comments, C laughs
22;08	Gimme	That M should give him her cup of tea	Refused and diverted	M offers C some juice which he accepts; says "Yes please"
22;08	Diversion	C points and vocalises about something behind M		M turns and looks; C leans forward and picks up her cup

Age	Mode of routine Type of act	Initiator and method Intended effect, Ei Attributed proposition	Type and termin^{n} Outcome Reason for $E_1 \neq Ei$	Comments; factors relevant to construction and execution of C's intention
22;08	Gimme	That M give him her tea (in exchange for his juice)	Refused then granted	When M refuses C offers her his juice; M pretends not to understand; C repeats, M relents
22;08	Solitary	To replace all the seriated cubes	Successful	Puts them in and has two left over; takes some out, tries again; cannot tell until after he has put one in whether it is right or wrong; succeeds at last

Appendix K: Protocols for the Application of Procedures to Identify 'Acts'.

To clarify the ways in which the procedures described in Section 3.1 were applied in the analysis of the video-tapes, three worked examples are included here. They are

(1) an interpersonal routine at age 12;17, described in the text on page 140 and keyed by the number 4 in the margin,

(2) a directive act at age 14;26, described on page 161 and keyed by the number 18, and

(3) a solitary act at age 12;17, cited on page 183 and keyed by the number 59.

The photographs provided were obtained by freezing the video-tape at specific frames and using a polaroid camera. Regrettably their quality is rather poor.

Plate One

Plate Two

Plate Three

In Plate Four Anna then tries to turn the handle of the hurdy-gurdy while M holds it steady.

But she is not successful; she turns and moves away blowing the tuning pipes and thus terminates the sequence. Plate Five.

It has been concluded that Anna initiated this sequence, by approaching M, and also terminated it by moving away when she could not successfully play the hurdy-gurdy. The routine consisted of two exchanges, the attempted extension of a schema concerning blowing, and one of the first examples of joint action.

Plate Four

Plate Five

Directive Act.

Our purpose in studying directive and representative acts is to identify the child's communicative intentions. The procedure is described on pages 115-125.

At the beginning of the sequence in which this directive act is identified M sits Anna upon her lorry and holds her on while gently moving the lorry backwards and forwards. Plate Six.

After only three or four seconds M leans down and kisses Anna on the side of her right cheek while still pushing her back and forth. M is standing behind and to the right of Anna. Anna immediately says "Get off" and holds up her right hand. Plate Seven.

M stops holding Anna and moves back, saying "Get off? All right", M_1. By so doing she indicates to us that she takes C's utterance and arm-raise to be a rejection and/or a request that she should withdraw. M has thus attributed a communicative intention to the child's act, which we may now putatively call C_1.

Anna now brings down her right hand and sits motionless, manding in a distressed way. Although behaviourally dissimilar to C_1 this appears to be a restatement of the communicative intention which C_1 was intended to convey. M quickly moves forward and lifts Anna off the lorry, M_2. Plate Eight.

Plate Six

Plate Seven

Plate Eight

In lifting Anna off the lorry M reveals that she takes C_2 to be a directive act with that intention. While C_1 and C_2 are behaviourally dissimilar, the association with C_2 of an expression of negative affect suggests that they carried the same communicative intention and that M_1 was not an appropriate response to C_1. We may say that M was correct in attributing an intention to C_1 but that she identified it wrongly. C actually intended that she be lifted off the lorry.

Solitary Act.

Not all communicative sequences rely so heavily as the above on the child's expression of affect for their clarification. In the case of solitary activity, however, the child's expressions are a principal means for identifying the effect an act was intended to achieve.

In this sequence Anna picks up from a low coffee table an empty cigarette packet which still has on the lower half of its cellophane wrapper. She turns the packet over in her hands, then holds it by the top with one hand and slides off the cellophane with the other. Plate Nine.

Plate Nine

Anna partially crumples and then drops the cellophane, but we cannot say whether or not this was intentional. Almost immediately she picks up the cellophane with her right hand and presses it against the bottom of the packet. Plate Ten.

She appears to be trying to replace the wrapper, and we tentatively identify this as an act C_1 with that intended effect. E_1, the event which occurs, is that the cellophane is squashed and crumpled against the bottom of the packet. Adults know that it is almost impossible to replace the wrapper on a cigarette packet and might reasonably question whether C was trying to do this. However, C now changes the packet to her right hand and the wrapper to her left and again presses them together, C_2. Then she bangs the two together in apparent frustration at her failure to achieve the effect intended. Plate Eleven

Finally, Plate Twelve, Anna throws down the crumpled cellophane.

It is the repeated expressions of negative affect which suggest that C_1 and C_2 were acts with a definite intention which was not achieved. That intention seems to have been to replace the wrapper on the packet.

Plate Ten

Plate Eleven

Plate Twelve

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