COGNITIVE AND SITUATIONAL FACTORS IN THE SOCIAL BEHAVIOUR OF AUTISTIC CHILDREN

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Thesis submitted for the degree of Doctor of Philosophy in the University of London.

March 1981

ACKNOWLEDGMENTS

No piece of research can be effected through the efforts of one person alone and the work in this thesis is no exception. It is only right that those who have had a significant influence in terms of their wisdom, advice, assistance, support and encouragement should be recognised at the outset.

Professor Michael Rutter pointed out to me that the issues were ones in which research might usefully be carried out and defined some of the problems. The studies were carried out while I was employed in the Department of Child and Adolescent Psychiatry, University of London Institute of Psychiatry, of which Professor Rutter is the head. Throughout this time Professor Rutter was continuously in touch with the progress of the research and gave criticism and advice at all stages. Funding came from a Bethlem and Maudsley Hospital Research Fund grant given to Professor Rutter.

My degree supervisor and friend for many years, Dr Chris Kiernan, was the person who first suggested I study for a PhD and his patience and encouragement since then are major elements in this final report. His keen criticism of the written drafts have been invaluable.

Research of this kind cannot be carried out without repeated access to autistic children.

Lusia Arendt, Head Teacher of The Sybil Elgar School, Doris Holden of Heathlands School and Ian Ashton of Doucecroft School were all most generous in allowing me to use the children at their schools. The staff at all three schools were most tolerant for putting up with my taking children out of classes. The children also deserve thanks for having taken part in experiments designed, amongst other things, to examine their lack of cooperation.

Experimental design, data collection and statistical analyses were all carried out by me: However, Experiment 6 required the use of observers who were 'blind' to the purpose of the study. Hilary Piercy and Sheila Rutter carried out the task of coding many hours of videotape recordings with sustained vigilance and patience. Equally accurate is the typing of this final report by Jenny Smith.

All of the above have provided material assistance. Of equal importance has been the encouragement of Rose, whose constant support has been of inestimable value.

DECLARATION OF CANDIDATE'S PERSONAL CONTRIBUTION TO THE RESEARCH

The empirical research contained in this thesis was carried out while the candidate was employed at the University of London Institute of Psychiatry. Funding for the research was provided by the Bethlem Royal and Maudsley Hospitals Research Fund in the form of a grant awarded to Professor Michael Rutter. The research proposal for which the grant was awarded was prepared by Professor Rutter.

As grant holder, Professor Rutter was responsible to the fund giving body for making sure that the research was carried out. As the sole research worker employed on these projects, the candidate was responsible for the design of the experiments, all of the data collection and the data analysis. Throughout the execution of the research Professor Rutters advice was sought and obtained, and this advice constitutes a real influence in the direction of the research. Nevertheless, the experiments described in this thesis, the discussion of the issues involved and the opinions expressed reflect fairly the candidate's contribution and as such are the responsibility of the candidate.

I hereby declare that the above is an accurate statement of the candidate's personal contribution to the research.

Professor M L Rutter

ABSTRACT

Experiment 1 was concerned with factors related to negativism in autistic children, where negativism was defined as the consistent avoidance of a correct response in a multiple choice discrimination task. A procedure employed in an earlier study of this phenomenon (Cowan, Hodinott and Wright, 1965) was modified to allow a more detailed examination of patterning of the child's responses. A positive relationship was found between use of spoken language and successful performance of the task. However, no child was negativistic. Of the 27 children tested,18 had a near perfect performance and 9 scored at chance level. Experiment 2 was an exact replication of the Cowan et al method but this still failed to produce any negativism. Experiment 3 involved a more difficult discrimination task: although this resulted in a higher rate of errors, there was still no negativism. Possible reasons for the failure to replicate are discussed.

Experiments 4 and 5 were designed to examine the effects on the performance of autistic children of varying the cognitive demands being made upon them. The Board Form of the Raven's Coloured Progressive Matrices was administered to 30 children and then, if necessary, either a range of easier 'matrices-type' problems, or the more difficult Standard Progressive Matrices. Distribution and type of errors suggested that for most

of the children tested, success or failure on any item was best predicted by the intrinsic difficulty of that item rather than by the child's lack of cooperation. However, it did appear that for some of the lower functioning children, early experience of failure did interfere with subsequent performance.

In Experiment 6, differences in the reactions of autistic children to different styles of adult 'approach' were explored. Ten children were exposed to four different styles of approach in which the common context was the child's involvement in the completion of a model building task. The styles varied in the extent to which they made interpersonal demands of the child and in the amount of task directed structure that was imposed. Measures based upon observation of the adult's and the children's behaviour indicated that the styles were reliably discriminable and that the children's responses, both social and task-directed, were positively related to the interpersonal and task oriented demands that were made of them.

Results of these experiments are discussed within the context of interpersonal responsiveness, clinical assessment and differential diagnosis of childhood autism.

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CHAPTER 1

OVERVIEW

This thesis is primarily concerned with certain aspects of the behaviour of autistic children; all of the experimental work has been carried out with autistic children as subjects. However, it will be argued that some of the issues transcend the limits of the diagnostic boundaries of infantile autism and have relevance to consideration of childhood psychosis in general and also of mental retardation. There is need, therefore, to see the strategy of the research and the discussion of the findings in a sufficiently broad perspective, both in terms of the relevant work concerned with autism, and in terms of the more general psychological concepts that are implicated.

The research programme was conceived as an attempt to examine the interrelationships between two aspects of the clinical picture of autism, namely the abnormal response to interpersonal contact and the cognitive functioning. Arguably, any move to divide the subject matter in such a way may serve to distort the phenomenological nature of the disorder; however, as a starting point it is necessary as the definitions of autism that exist often refer to a set of universal and specific symptoms that operate in observably different spheres of the child's adaptation to his environment.

<u>Chapter 2</u> presents a selective review of the literature concerned with infantile autism.

Included are a discussion of some of the conceptual and practical problems involved in identifying and diagnosing a syndrome such as autism when one relies on criterial symptoms to define a relatively homogeneous condition; a description of some commonly occurring abnormalities of interpersonal behaviour displayed by autistic children; process and situational factors that have been suggested as explaining or contributing to abnormal social behaviour; and a brief statement of some of the areas of contention to which the research to be reported attempts to contribute.

The original research that will be described is in essence concerned with a practical clinical problem, namely the extent to which the child's intellectual functioning is obscured by his apparent reluctance to comply with the requirements of a task. Our only access to information regarding the methods and limits of any child's intellectual world is through observation of how he copes with a variety of tasks that are presented to him. If the child rejects any attempts on the enquirer's part to get the child to partake in what is essentially a social encounter, or if the child has a defective 'motivational system' which results in no effort being made (both of which, it has been argued are typical of autistic behaviour), then any assessment, formal or otherwise, of the child's ability becomes difficult. The first set of studies (Chapter 3) is concerned with an extreme form of non-compliance, namely the consistent production of incorrect responses in the face of a task which makes demands of the child's cognitive ability. Again, it has been argued both in the clinical and research literature that this 'negativistic' behaviour is characteristic of some autistic children. Experiment 1 was designed as a replication of an earlier study (Cowan, Hodinott and Wright, 1965) which claimed to demonstrate the existence of negativism and its motivational basis. The procedure was modified to elucidate further the nature of negativism and the intention was to follow this up with an examination of the effect of non-task specific 'compliance training' on performance. The most striking result of Experiment 1 was a failure to demonstrate negativistic behaviour in any of the children tested. As a consequence, Experiments 2 and 3 were designed to examine possible reasons for the discrepancy between this finding and that of the previous study. These reasons were sought in the nature of the task and in terms of the procedural modifications: neither seemed to be responsible. Diagnostic differences were discussed as a possibility but the most likely cause seems to be in the original study's use of hospitalised children, either because of their different experiences or because of the reasons that led them to be hospitalised in the first place.

The second set of studies (Chapter 4) examines less dramatic, but for the purposes of cognitive assessment, more problematic aspects of non-compliance, i.e., lack of cooperation and the relationship between the autistic child's performance and the level of difficulty of the task he is being required to attempt. Experiment 4 presents a detailed analysis of a group of children's performance on a modified form of a test of reasoning ability (Raven's Coloured Progressive Matrices Board Form). From this, it is clear that for many of the children, success is appropriately related to the intrinsic difficulty of the item being attempted. Extra-item factors (motivational) contributed little to performance. Experiment 5 follows up those children whose responsiveness to the initial presentation of the RCPM suggested irregularities by extending the range of difficulty of the problems. By using the appropriate range of items, it could be demonstrated that these children could be made to respond appropriately to task difficulty although there was a suggestion that early experience of failure can interfere with subsequent performance.

It is apparent that lack of test cooperation is an area relevant not only to the behaviour of autistic children but also to the assessment of the performance of many clinically deviant populations. This issue is discussed in Chapter 5 with a survey of the mutual development of theories of intelligence and of intelligence testing, a discussion of factors which can influence scores on IQ tests and the problems of interpreting information derived from intelligence tests on populations with handicaps that might appear to be confounded with intellectual deficits. The argument is put forward that considered attempts at measuring the child's level of intellectual ability are indeed very useful; attempts to separate the 'motivational' and 'intelligence' components can be distracting especially in the light of the demonstrated relationship between 'IQ' and prognosis.

Chapter 6 continues the reporting of the original research. As the studies in Chapter 4 deal with slightly more 'macro' issues than Chapter 3, so Chapter 6 continues this progression. Here it is the qualities of the situation that the child finds himself in, over and above the cognitive demands being made upon him by the intrinsic difficulty of the task, that are of interest. An attempt is made to examine the child's behaviour at a level more complex than success or failure, and acknowledgment is made of the fact that the parameters of this behaviour may depend upon the characteristics of the way in which the 'tester' tries to engage the child in maximal responsiveness. Comparing 4 styles of adult approach representing combinations of high and low interpersonal demands and high and low task-directed structure, the results indicated that the children do not react aversively to the most intrusive conditions; nor do they react differentially to the interpersonal and non-social components. The children were most likely to exhibit social behaviour when social demands were made of them and to apply themselves to the task when task-directed structure was imposed. Rates of stereotyped behaviours were not consistently affected by the changes in style.

All of the empirical chapters (3, 4 and 6) end with detailed discussion of the findings of the experiments they contain. Chapter 7 briefly lists summaries of all the main findings prior to a general discussion of all the research (Chapter 8). As well as discussing the implications of the empirical findings, Chapter 8 deals with the methodological issues that are pertinent in research carried out on autistic children, comments on the implications for the diagnosis of the disorder and possible directions for future research in the area.

CHAPTER 2

INTRODUCTION

2.1. Identification of a syndrome

Recognition that there existed, amongst the population of 'mental defectives', a group which might be differentially diagnosed as suffering from what we now choose to refer to as childhood psychosis occurred at the turn of the present century (e.g., DeSanctis, 1906; Kraepelin, 1919), although retrospective analysis of earlier case studies reveals several inspired descriptions of children whose behaviour set them apart from the classically retarded child (e.g., Vaillant, 1962; Wing, 1976; Kanner, 1962; Rubinstein, 1948). Unfortunately, subsequent attempts at defining what is meant by childhood psychosis at a level other than descriptive have proved not at all satisfactory; it appears that to this day there is no precise meaning attached to the term other than references to an altered relationship with, or lack of sense of, reality (O'Gorman, 1965; Rutter, 1979).

The absence of any substantial factor common to childhood psychosis reflects the diversity of conditions that are now so-called; it also explains the emphasis of identifying, and focussing upon, more homogeneous conditions which are subsumed by it. Kanner's (1943) original delineation of a syndrome, which he chose to refer to as an autistic disturbance of affective contact and which subsequently became known as infantile autism, represents perhaps the one most significant development in the classification of psychotic disorders in children. Drawing upon 11 case studies as illustrations, he described the fundamental disorder of the children included in the syndrome as being an inability to relate to themselves from the beginning of life. Abnormalities of language were also apparent, although the range of ability was considerable. Those who did speak at all showed echolalia, immediate or delayed; a certain literalness and inflexibility with concept usage; and pronoun reversal (or at least, personal pronouns being repeated just as heard). They also resented or feared intrusions into their world such as loud noises, moving objects and even sometimes food. The behaviour that they did emit seemed to be regulated by an obsessive desire for the maintenance of sameness. Kanner also asserted that they were "all unquestionably endowed with good <u>cognitive potentialities</u>" although the meaning of this phrase is not quite clear. It seems that this observation was based upon "the astounding vocabulary of the speaking children, the excellent memory for events of several years before, the phenomenal rote memory for poems and names and the precise recollection of complex patterns and sequences", all of which "bespeak good intelligence in the sense in which the word is commonly used". Kanner does, however, point out that intelligence testing could not be carried out because of limited accessibility.

Subsequent to the setting out of these critical aspects of the syndrome, other workers have re-examined the symptoms in attempts at more precise definition, but unfortunately, these attempts may sometimes have made the issue of diagnosis more complicated.

The problem may be described as follows. Before the right hand side of the equation

"autism" = Symptom (1) + Symptom (2) + Symptom (3)....

can be specified, the concept of the syndrome of "autism" (the left hand side of the equation) has to be known to be, and held, constant. Without a definition this cannot be guaranteed and the different emphases that workers put upon elements on the right hand side may well be a result of the different notions of autism that constitute the left hand side. The end result is that both sides of the equation progressively get modified: it is most likely that there are children currently diagnosed as autistic who would not have originally been used as illustrations of Kanner's syndrome.

Thus, Creak outlined nine criteria of what she referred to as 'schizophrenic syndrome in childhood' (Creak, 1961; 1963; 1964).

(1) Gross and sustained impairment of emotional relationships with people,

(2) An apparent unawareness of his own personal identity to a degree inappropriate to his age,

(3) A pathological preoccupation with particular objects, or certain characteristics of them,

without regard to their accepted function,

(4) Sustained resistance to change in the environment and a striving to maintain or restore sameness,

(5) Abnormal perceptual experience in the absence of discernable organic abnormality,

(6) Acute, excessive and seemingly illogical anxiety as a frequent phenomenon,

(7) Speech either lost, or never acquired, or showing failure to develop beyond a level appropriate to an earlier age,

(8) Distortion of motility pattern,

(9) A background of serious retardation in which islets of normal, near normal or exceptional function or skill may appear. Note the comparison of Creak's ninth criterion regarding intellectual ability with Kanner's description of the cognitive potential of the children in his group. None of the features described in this list would exclude a child fitting Kanner's syndrome and yet, despite a different name, Kanner's criteria are included.

Rimland has argued (1964; 1968) that the terms autism and childhood schizophrenia must not be used interchangeably if the disorder described by Kanner is to be 'rescued from the nosological oblivion towards which it is daily being pushed" (1968; p.146). For this reason he has advocated the use of a quantitative method of defining the syndrome and has developed the

Diagnostic Checklist for Behaviour Disturbed Children, Form E2. This is a questionnaire to be filled in by parents and consists of 80 questions covering such matters as social interaction and affect; speech; motor and manipulative ability; intelligence and reaction to sensory stimuli; family characteristics; illness development; and physiological and other biological information. The child is scored with +1 for each autistic symptom and -1 for each question answered in the non-autistic direction. The resulting total is the child's 'autism score' and Rimland states that a score of above +20 is indicative of classical early infantile autism (Rimland, 1971). Regarding the validity of the device, it has been claimed that it correlates well with suspected biochemical abnormalities allegedly present in autism (Boullin, Coleman, O'Brien and Rimland, 1971) and with responsiveness to megavitamin therapy (Rimland, 1973). It should be pointed out, however, that the existence of the validating biochemical abnormalities is disputed (Yuwiler, Ritvo, Geller, Glousman, Schneiderman and Matsuno, 1975) and the significance of megavitamin therapy remains unclear. On applying the E2 scale to children diagnosed as autistic by Kanner himself (N=22), it was noted that the mean score was significantly higher than for a group of non-autistic children. Whilst this suggests that the E2 does indeed correlate with diagnosis by Kanner, the mean autism score was only 13.23 - well short of the cut-off advocated by Rimland. Unfortunately, if the cut-off is lowered then the number of obvious false positives falling into the autism range makes use of the scale unacceptable for diagnostic purposes, (Rimland, 1971).

On the basis of a comparison of children diagnosed as suffering from infantile autism with those suffering from other psychiatric disorders (Rutter, 1966; Rutter and Lockyer, 1967), Rutter has argued the case for the validity of autism being separate from, say, mental retardation, childhood schizophrenia, neurotic disorders and developmental language disorders (Rutter, 1978). The universal and specific symptoms which are necessary to discriminate the autistic children from these other groups are 'a profound and general failure to develop social relationships; language retardation with impaired comprehension, echolalia and pronominal reversal; and ritualistic or compulsive phenomena (i.e., 'an insistence on sameness'). In addition, stereotyped repetitive movements (especially hand and finger mannerisms), a short attention span, self injury, and delayed bowel control were also more common in autistic children, but these symptoms did not occur in all cases (Rutter, 1978, p.4). Further to the three essential criteria described above, the age of onset has been demonstrated to have a significant influence on the course of the child's development (Kolvin, 1971;

Kolvin, Ounsted, Humphrey and McNay, 1971; Prior, Boulton, Gajzago and Perry, 1975; Prior, Perry and Gajzago, 1975). Onset of the psychosis prior to 3 years is characterised by gaze avoidance, preoccupations, echolalia, self isolation, stereotypies and overactivity whereas onset after 3 years is related to the later development of hallucinations, thought disorders and the blunting of affect. The three criteria described by Rutter, together with an early age of onset, are the "characteristics on which there is the greatest consensus" (Schopler and Rutter, 1978, p.508) and are used throughout this thesis. Reliable application of these criteria has been considerably enhanced by the availability of Professor Rutter to confirm the diagnosis.

2.2. Abnormalities of social behaviour

The theme that runs through this thesis concerns certain aspects of the autistic child's behaviour which involve him dealing with other people. The research will examine the influence of certain interpersonal and motivational abnormalities in his execution of tasks. It is necessary, therefore to describe some characteristics of the autistic child's social behaviour.

Although it is the case that all definitions of autism make reference to the abnormal development of social behaviour, the essence of its 'strangeness' is hard to pin-point. In addition, the manifestations of the other 'non-social' criteria quite obviously have implications for interpersonal behaviour. The child who has delayed or deviant language will necessarily be involved in abnormal interactions; compulsive and ritualistic phenomena often take place at the expense of normal social behaviour.

It is clear, therefore, that there are two sets of abnormalities that might be considered. On the one hand, there are those abnormalities of social behaviour that are considered to be secondary to other aspects of the child's handicap, and, on the other, there are those which are primarily related to interpersonal encounters and which cannot be explained in terms of language, IQ or other deficits. However, this distinction is far from easy to make and there is considerable contention regarding which aspects of the syndrome are primary and which are secondary.

What follows, therefore, is a list of behaviours which are common in autistic children and which can be seen to contribute to the abnormal manner in which they interact with others. It is not the intention to allocate primary or secondary status to these aspects of the child's deficits, but rather to describe a picture of the breadth of the child's handicap with regard to interpersonal functioning.

Wing (1969) has described five areas where the autistic child shows particular difficulty with social behaviour and which, perhaps only in degree, mark him as different from normal children or from other groups of handicapped children. These are:

1. Attachments to objects and routines.
2. Abnormalities of emotional response to situations.
3. Lack of appropriate play.
4. Socially embarassing behaviour.
5. Difficulties with social relationships.

As the first in the list seems to be related directly to the diagnostic criterion pertaining to compulsive or ritualistic phenomena, the list is made more complete by adding -

6. Language related difficulties.

<u>Attachments to objects and routines:</u> If one views the attachments as being directed towards non-social objects then its relevance to the development of appropriate interpersonal behaviour becomes clear. The child may demand to have at all times a particular blanket, toy, piece of wood or any object that can be carried around. The original choice of object may appear to be quite arbitrary, and independent of the intended function of that object. Whilst the child is pre-occupied with the object it may be extremely difficult to engage him in any other activity. As attempts at diverting the child usually involve some sort of interpersonal approach, the pre-occupation may be interpreted as a preference for non-social rather than social activity. Tantrums which may result from separating child and object, or from disrupting a routine, reinforce this impression.

However, these attachments can be broken by gradually altering the environment (Marchant, Howlin, Yule and Rutter, 1974) thus allowing the introduction of more constructive activities.

Simple stereotypies might also be included under this heading. Autistic children often flick their fingers, tap or scratch on surfaces, flap their arms, jump, spin around, rock their bodies, weave their heads around or generally engage in self stimulation, apparently to the exclusion of other environmental stimuli. These are essentially solitary activities and their occurrence usually precludes simultaneous social behaviour.

Abnormalities of emotional response to situations: Autistic children appear miserable, cry, laugh, get angry or frightened, but very often for no obvious reason. Thus it would seem that they are capable of behaving in ways that normally suggest an emotional reaction, but do so in situations that are not normally appropriate. Conversely, an impression of emotional detachment can be given when situations occur to which the child does not give the reaction which might otherwise be expected. This inappropriate responsiveness, especially when the demands are complex social ones, seems to persist even when improvements are made in other areas. Thus, a child may learn to laugh when told a 'funny story', perhaps learning to do so when he sees others laughing, but still give the impression that it is not the 'funniness' of the story that is spontaneously bringing about the laughter. It is this 'lack of empathy and failure to perceive other people's feelings and responses' that Rutter (1978, p.10) described as being one of the most evident features of autistic children's impaired social behaviour.

Lack of appropriate play: What it is that constitutes play in normal children, and the functions that it serves, is an extremely complex issue (e.g., Moore, Evertson, and Brophy, 1974; Tizard and Harvey, 1977; Rosenblatt, 1980). It is quite apparent, however, that autistic children engage in very little play-like behaviour, if any at all. They will certainly occupy themselves with toys, but this activity lacks certain qualities that are present when normal children are playing.

For example, the autistic child will very rarely play cooperatively with others. This may be related to developmental factors as it has been noted (Parten, 1932), that normally, the ontogenesis of play progresses through solitary, parallel and associative play, the last appearing at about 3½ years. However, autistic children well above this level rarely show anything at a stage higher than that of parallel play.

Similarly, the autistic infant does not play together with his mother and thus may miss out on the possible role of play as instructional activity directing him to the properties of his environment: the mother is not allowed to act as a 'mediator of stimulation' (Yarrow, Klein, Lomonaco and Morgan, 1975).

A second quality which marks autistic children's use of toys as being different from 'real' play lies in the use to which the toys are put. There is rarely any recognition of the function of the toy. The pleasure derived from, say, a model car may lie in the fact that it has parts that spin around. The wheels may be flicked and the child watch them spin without there being any acknowledgement that the object is 'meant to be' a car. In a more general sense, the child is unable to use objects in an 'as if' fashion (Hammes and Langdell, 1981) which perhaps reflects a pervasive impairment in the ability to use and manipulate symbols (e.g., Hermelin, 1978; Ricks and Wing, 1975).

Socially embarassing behaviour: In much the same way that autistic children may display inappropriate emotional responses (see above), the interpersonal behaviour that they do engage in often contravenes normally accepted rules of conduct, resulting in embarassment for the others involved. One of the children used as a subject in the experiments described in subsequent chapters would frequently comment on the 'blackness' of a West Indian's face, while another six-foot, 14 stone boy would try to hug and kiss strangers in shops or bus queues. The usually normal physiognomy of the children contributes to the surprise and embarassment. The behaviour is best characterised as reflecting naïvety and a failure to comprehend the sometimes subtle distinctions between situations that make reactions acceptable in some and unacceptable in others.

Language related difficulties: One of the criteria for defining autism is the presence of abnormal language development, although ability in language usage varies considerably from child to child. A few children are without any spoken language at all, whilst others are able to function linguistically at a relatively complex level. However, regardless of the ultimate level of ability, nearly all autistic children show a delayed onset of speech (Bartak and Rutter, 1976). There are rare instances of words being spoken before 16 months and then suddenly disappearing (Fay and Schuler, 1980).

If, and when, language does appear, its abnormal development is characterised by a number of features. Firstly, preverbal babbling lacks variability and is monotonous; somewhat similar to normal children when falling asleep (Ricks, 1975). Second, autistic children often go through an extended phase of echolalia ("extended" because a brief period of imitation is thought to be instrumental in the normal acquisition of speech (Chess, 1959)). The echolalia may be immediate or delayed. Third, autistic children have difficulty using personal pronouns, substituting, for example "you" for "I". This is often referred to as "pronoun reversal" although it may more accurately be viewed as an extension of echolalia, i.e., the child repeats the pronoun he hears and fails to reverse the received pronoun (Fay and Schuler, 1980). The notion that the children are avoiding the use of the pronoun "I" (Bosch, 1970) is unsupported by the evidence (Bartak and Rutter, 1974). Fourth, the intonation of autistic children's speech shows certain peculiarities such as being high-pitched or monotonous (Pronovost, Wakstein and Wakstein, 1966).

However, apart from the observation that restricted linguistic ability necessarily limits the extent to which autistic children can engage in normal social interaction, it is the way language is used as a form of communication which is most revealing with regard to interpersonal abnormalities. Thus, although severe language impairment is a characteristic of childhood autism, one must be mindful of the difference between children having problems with the grammatical aspects of language and those who fail to communicate verbally or non-verbally. Not only may the pitch of the speech be monotonous (as mentioned above) but its content may be mechanistic or 'flat in affect' (Kanner, 1943).

One of the qualities of normal conversation is the way the speakers and listener roles have to be continuously shifted if proper "floor appointments" are to be kept (Argyle, 1972), and it is with the subtleties of these shifts that autistic children often appear to have difficulty (Baltaxe, 1977). Normal flowing conversation tends to break down if certain cues, such as nods, smiles or glances, are not emitted or responded to. Ricks and Wing (1975) have incorporated observations such as these into a general theory of symbolic functioning deficits in autism (cf. section on Lack of Appropriate Play). They argue that much of the language and verbal and non-verbal communication difficulties are due to a relative and general inability to manipulate abstract concepts that are sufficiently removed from concrete experience. Consequently, "meaning" embedded in complex stimuli proves elusive and excessive significance is attached to superficial characteristics (Frith, 1968).

Difficulties with social relationships: This area of social difficulty overlaps all those already described but is added to include other abnormalities exhibited in interpersonal encounters. Thus, in the presence of, or at the approach of, another person the autistic child may react not at all or in such a way as to give the impression that he is actively resisting the possibility of social contact. On hearing his name called, he may merely continue with whatever current activity he is engaged upon, not even turning to see who it is that has called. Alternatively, he may not engage in eye contact, turning his head away from attempts to get him to do so. Children walking about in a playground can pass within inches of each other with there being no indication that they are aware of each others' presence. Thus, as well as appearing to resist others' attempts at establishing contact, the child will rarely initiate an approach to another, and will prefer to be on his own engaged in solitary activites.

Disturbed interpersonal behaviour is apparent from a very early age. Mothers report that their children do not show pleasure at their approach, adopt postures anticipatory of being picked up, nor distress at their departure. It has been suggested that the consequent failure to establish the normal bonding process between mother and infant is responsible for much of the later manifestations of the disorder (e.g., Clancy and McBride, 1969).

Obviously, the abnormalities of social behaviour displayed by autistic children vary in both degree and quality, and the examples given above are not characteristic of every child. Nevertheless, the handicap is sufficiently profound in all cases for it to pervade all areas of functioning. It is virtually impossible to apply any form of therapeutic or management regime without consideration of the child's disturbed responsiveness to other people, or to evaluate the child's potential and ability in a variety of skills without taking into account the extent to which his apparent deficiencies are due to a reluctance or inability to cope with social encounters.

2.3. Factors influencing interpersonal behaviour

Elucidation of the factors influencing the social behaviour of autistic children is of relevance both to establishing the significance of other aspects of the syndrome, and to the design of modes of therapy and education.

2.3.1. Psychodynamic factors

There are very few exceptions (e.g., Bettelheim, 1967) to the belief that autistic children are born with an organic predisposition for autism. However, what still remains contentious is the role of early experience interacting with this predisposition in the development. Thus, the predisposition may result from a complication during pregnancy (e.g., Goodwin, Cohen and Goodwin, 1971) or from hereditary influences (Folstein and Rutter, 1977), but it is the manner in which the environment acts upon the vulnerable child which is crucial.

For instance, it has been suggested by Clancy and McBride (1969) that the major point of focus should be the early interaction between mother and child, and that the vulnerable child combined with a particular style of mothering provide the "initiating context for the autistic process" (p.236). Using lazy sucking and feeding difficulties as examples of common phenomena in autistic infants, they suggest that the feeding situation rapidly becomes aversive to both child and mother. Contact between the two becomes minimal, normal bonding is not established and the child develops a dislike of human contact.

Clancy and McBride describe a 'type' of mother whose behaviour is likely to contribute most to the autistic process; she is likely to be practical, capable, the dominant marriage partner, give great attention to detail and become upset easily in the face of seemingly trivial incidents.

Similar process models are put forward by other workers. For example, Szurek (1956; Boatman, and Szurek, 1960) suggests that certain types of marital discord, where the child is used to resolve the conflict are implicated. Parental depression is also considered to be relevant to the development of the process (e.g, Tustin, 1972).

Therapeutic strategies based upon these models usually involve attempts at achieving the primary socialisation that had originally been disrupted. The first step may focus upon the hypothesised feeding problem (see Clancy, Entch and Rendle-Short, 1969) which is gradually expanded into a play session introducing the association between food and social reinforcement.

Common to many such formulations of the autistic process is the presence of early abnormal patterns of parenting, or, more specifically, the presence of some sort of stress. Because diagnosis is usually made subsequent to these hypothesised events, it is difficult to test directly their significance, but the retrospective evidence fails, in the main, to support this notion. Psychotic children, (variously diagnosed), have been found to come less frequently from broken or impoverished homes than do other psychiatric groups (Bender and Grugett, 1956; Lowe, 1966; Rutter and Lockyer, 1967). More detailed analyses of parenting behaviour have found no differences in attitudes (Gonzales, 1976) or in aspects of rejection (DeMyer, Pontius, Norton, Barton, Allen and Steele, 1972; Pitfield and Oppenheim, 1964) between autistic and other handicapped groups. With regard to parental pathology, which in itself confounds hereditary with parenting factors, little evidence can be found to support the notion that the behaviour of the parents is implicated (e.g., Cox, Rutter, Newman and Bartak, 1975; Lennox, Callias and Rutter, 1977). However, in this last respect, <u>some</u> studies have detected parental deviance (e.g., Bender and Grugett, 1956; Meyers and Goldfarb, 1962) although doubt has been expressed regarding the diagnosis of the child sample (see Cantwell, Baker and Rutter, 1978).

Evidence of a different kind and showing differences in aspects of parenting has been provided by Massie (1978). He collected together 'home movies' of psychotic children which had been taken in the first six months of the infants' life, i.e., before they had been diagnosed as psychotic. Comparing these with films of similar aged but normal infants, judges who were 'blind' to the subsequent diagnosis where able to detect differences in the mothers' behaviour. Although the 'prepsychotic' and normal children were not different in touching and eye gaze behaviour, mothers of the former group showed less activity in both these respects. Interestingly, there was no difference in feeding behaviour between the groups.

The tentative conclusion of this research that the behaviour of the mother is implicated in the course of the disorder is complicated by more recent analysis of further 'home-movie'data (Rosenthal, Massie and Wulff, 1980). Observing the children's behaviour and assessing levels of cognitive development (as categorised by Piaget's stages of sensori-motor development) the psychotic group showed marked delay compared to the normal group. Non standardised assessment procedures such as these have to be treated with caution and the observations were based on films taken up to the age of 24 months; nevertheless the causal influences suggested by the previous study (Massie, 1978) must be held in doubt in the light of the possible existence of cognitive abnormalities at an early age.

It would appear that, in the main, controlled retrospective studies do not confirm the hypothesis that the early interactive experiences of autistic children are significant in the establishment and maintenance of the autistic process. Studies that have looked at the consequneces of <u>known</u> abnormal experiences, although demonstrating deleterious consequences, have also failed to demonstrate a link specific to autism (see Reviews by Rutter, 1971; 1979; 1980). In the absence of prospective studies, the relevance of early experience can, at best, be described as not proven.

2.3.2. Other process factors

As well as suggesting therapeutic techniques through established behaviour modification principles, classical learning theory offers models purporting to explain the development of abnormal social behaviour in autistic children.. Ferster (1961) postulated that a history of inadequate or inefficient reinforcement (primary or secondary) could lead to the sorts of deficiencies shown by autistic children: for example, speech may be dropped from a behavioural repertoire if it is not (or only intermittently) reinforced. If behaviour directed towards primary reinforcers goes unreinforced then the opportunity for generalisation and development of secondary (social) reinforcers is limited. As with the psychodynamic factors described above, one must look towards the child's early environment for reasons why such faulty conditioning should occur, e.g., severe disruption of the parents' repertoire or the "prepotency of other performances" (Ferster, 1961, p.445): consequently, the same lack of empirical support applies here also.

The efficacy of therapeutic techniques derived from operant theory lends only scant support to 'faulty conditioning' as a major aetiological factor. Undoubtedly, behavioural repertoires can be enlarged by the skillful application of such techniques (Lovaas, and Koegel, 1973) as is the case with mentally retarded populations, but special problems arise in the case of autistic children. For example, although it is claimed that quite complex behaviours can be shaped (Lovaas, Schaeffer and Simmons, 1965), the effects may be situation specific and reversible, and the treatment very slow (Lovaas, Koegel, Simmons and Long, 1973).

In discussing possible reasons for this restricted and attenuated change, Lovaas and his colleagues (see review by Lovaas, Koegel and Schreibman, 1979) have put forward the notion of 'stimulus over-selectivity' as a possible cause of much deviant autistic behaviour. At its simplest level, stimulus overselectivity can be demonstrated in a discriminant learning task where the S^D consists of several cues impinging simultaneously upon the child. Subsequent testing with the cues presented independently reveals that normal children respond equally to all elements whereas the autistic children use one element as an effective S^D but will not respond to the other elements, (Lovaas, Schreibman, Koegel and Rehm, 1971). The phenomenon is most pronounced when the number of cues is large (Lovaas and Schreibman, 1971) and appears to reflect a real difficulty in discriminating a complex stimulus from its components rather than a 'superefficient' learning strategy that recognises the sufficiency of attending to one cue only in the initial learning (Koegel and Schreibman, 1977). Stimulus selectivity does also appear to be a developmental phenomenon (Schover and Newsom, 1976; Sivertsen, 1976) and to be more pronounced with low IQ (Wilhelm and Lovaas, 1976): its role in the development of specifically autistic features needs therefore to be treated cautiously, especially as many of the findings of Lovaas and his colleagues are based on samples of low functioning autistic children. Nevertheless, the model has been used to explain poor generalisability of autistic children's learning (Rincover and Koegel, 1975), instances of overgeneralisation (Fein, Tinder and Waterhouse, 1979) and deficiencies in observational learning (Varni, Lovaas, Koegel and Everett, 1979).

The last of these findings claims to have relevance to the acquisition of social behaviour. It has been argued that many subtle and complex behaviours are normally learned by watching social interactions of various kinds (Bandura, 1969). If the child who is watching is unable to attend to more than a limited number of the multiple and simultaneous activities exhibited by the 'models' then the learning of the subtleties of the interaction will be largely distorted. Such an explanation of the abnormal development of social behaviour in autistic children rests on many, as yet, untested assumptions and it is a far cry from the simple discrimination learning paradigm which is used to demonstrate overselectivity. Nevertheless, stimulus overselectivity does seem to have useful applications in the technology of behaviour analysis and modification with regard to teaching autistic children basic tasks (e.g., the use of within-stimulus prompts (Schreibman, 1975; Rincover, 1978)).

2.3.3. Situational factors

Several workers have examined factors related to autistic children's social behaviour by identifying environmental or situational influences on their current activity. There are two basic strategies in this approach. The first involves observing the children in a variety of naturally occurring settings and correlating significant environmental events with fluctuations in their behaviour; the second involves testing specific hypotheses through experimental manipulation of the child's setting.

In a study typical of the former strategy, Norman (1955) described in detail the affect and social withdrawal of a group of 25 schizophrenic children. Inevitably, with a group this size and relying entirely on unstructured descriptions, the picture that emerges is a mixed one. "Social withdrawal ..... was by no means a simple and unitary process. In the extreme case it amounted to almost total human avoidance, in the least extreme to a contact that was felt to be shallow .... More baffling is the behaviour where looking and speech and sometimes hearing are avoided, but physical contact is not" (pp. 15-16). Nelson suggests that the autistic child might have a high threshold for responsiveness and that only a grossly stimulating event such as being fondled and nursed is effective in establishing a relationship. Such conclusions must be regarded as only speculative, but the implication is that withdrawal is not an active avoidance of social contact, but an absence of those cues which give normal children the impression of being in touch. The exception to this, she states, is the avoidance looking in the face-to-face position. "They take definite and active measures to avoid the possibility of any visual relationship" (Nelson, 1955, p.16).

In a more rigorously quantitative study, Lichstein and Wahler (1976) observed in detail the behaviour of one child in three naturally occurring settings. Using an already established observation schedule (Wahler, House and Stambaugh, 1976), cluster analyses of the response categories revealed considerable inter- and intra-setting variability in the child's behaviour. Moreover, their observations (made over a period of 6 months) did not coincide with the parents' description of his behaviour. 'Aversive opposition' (e.g., tantrums and destructive acts) very rarely occurred, contrary to what the parents had led them to expect. In this respect, they inferred that when these behaviours did occur, they did so with an intensity sufficiently great as to leave an impression with the parents that they occurred more frequently. Also noted was a decrease in the child's attentiveness to his environment when engaged in self-stimulatory activities. The authors suggest that this can be explained in terms of stimulus overselectivity (see above), i.e., when one modality is being occupied (tactual), auditory or visual stimuli do not register. It is also consistent with the view that self-stimulation is a homeostatic device redirecting the child's attention and reducing the impingement of environmental stimuli which would contribute to cortical arousal (Hutt, Hutt, Lee and Ounsted, 1964).

Interestingly, non aversive adult social attention was associated with a decrease in self-stimulatory and other pathological behaviour. At first, this is not what one would expect if self-stimulation were a device for cutting off environmental or social contact. The result can be explained by the positive social approach bringing about the decrease, or in terms of the adult waiting for the decrease to occur and then making the approach at a time when the child is likely to be most responsive.

Sororsky, Ornitz, Brown and Ritvo (1968) also systematically observed autistic children's behaviour (N=6) in a number of naturally occurring settings and similarly found little within-subject consistency. Peaks of autistic behaviour seemed to occur at random intervals and there was no evidence of periodic or cyclic patterning. Partial social or sensory isolation, had no effect on their behaviour. In general, the authors suggest that autistic behaviours are not reactions to the environment but that they may be modified by it.

Of greater relevance are the studies which have examined the influence of environmental stimulation which is more social in origin. Hutt and Ounsted (1970) observed autistic and non-autistic children in a room which contained cardboard cut-out models of faces showing different facial configurations (happy and sad faces, a blank facial outline with no contours, a monkey's face and a dog's face). The non-autistic group spent equal amounts of time looking at each model, with the exception of the blank face, whereas the autistic group spent less time looking at the two human faces than at the others. It is not mentioned in the report whether these differences within the autistic group were statistically significant, but inspection of the findings suggest that they were not. Consequently, the conclusion that the "smiling face evokes the strongest avoidance reaction, probably because this combination of features has been most closely associated with approach and hence social demands" (p. 108) goes well beyond the data presented in this study.

As well as looking at non-social environmental stimulation, Ornitz et al (1970) and Hutt et al (1965) examined the effects of the presence, in the room with the child, of a passive or responsive adult. In the Ornitz et al study, the impact of any of these conditions seemed to be greater than with the mere presence of a spinning top, but what impact there was indicated considerable variability within the group: it was not possible to discern a group trend. The Hutt et al study was similarly inconclusive; when exposed to an attentive adult, the autistic children spent less time engaged in stereotypic activity, but the number of outbursts was greater.

Churchill and Bryson (1972) employed a similar procedure, with children being observed in a room with a) no adult; b) an unfamiliar and attentive adult; and c) an unfamiliar and preoccupied adult. Three groups of children were compared (autistic, schizophrenic and normal). Whilst the results suggested that <u>all</u> children spent most time in a position where they could see and be seen by the adult, and that this was slightly less when the adult was preoccupied, there was <u>no</u> difference between the groups. Obviously there were differences in terms of qualities of behaviour (style of play and interpersonal contact), but the quantitative measures that were used (number of looks, duration of looks and position in the room) were approximately equal. Churchill and Bryson conclude that doubt must be cast on the validity of avoidance of eye contact in interpersonal relationships *per se* as a diagnostic criterion. They comment that differences in this respect may have emerged if the adult had been more intrusive or demanding and that the 'avoidance behaviour may simply be a reflection of the type or amount of the interviewer's interaction with the child, or the difficulty level of the responses which the interviewer is attempting to elicit from the child, rather than a generalised affective response by the child to all or most of the adults in the world around him' (Churchill and Bryson, 1972, p.176). The absence of differences between autistic and other groups of children, in terms of physical distance, was also recorded by Castell (1970) although differences in the amount of visual attention were noted. It is possible that this discrepancy may be accounted for by unspecified differences in the way the adult was 'attentive'.

Following up this last point, several studies have examined in greater detail the effects of different qualities of interaction on the child's responsiveness rather than just the presence or attentiveness of the adult. Keeping 'task difficulty' constant, Morrison, Miller and Mejia (1971) noted that successful completion of a discrimination task varied with the type of verbal request that the adult made. On the basis that the children (N=2) could do some of the tasks, the authors concluded that the discriminations were all within their capability and that, therefore, fluctuations in performance were attributable to motivational/inter-personal factors. However, such a conclusion requires the assumption that variations in the nature of the verbal request have no impact on the perceived difficulty of the task: in subsequent chapters it will be argued that this assumption is one which must be treated with caution.

The verbal behaviour of the adult is also implicated in the findings of Wallace (1975). Here it was found that the greatest degree of resistance, or lack of cooperation, occurred when a verbal request was made which required a verbal response on the part of the child. A verbal request requiring a motor response was much more compliantly dealt with, suggesting perhaps that the difficulty of what the child is expected to do is relevant. This interpretation is complicated by the fact that increasing the complexity of the verbal response appeared to have no added effect on the child's resistance.

Churchill (1971) tested the hypothesis that within an instructional interaction with an adult, certain autistic behaviours (abnormal looking, social withdrawal, frustration, self-stimulation and other indicators of avoidance) are a function of the ratio of success and failure in a number of problems. The findings supported the hypothesis in that the conditions where the number of failures was high, relative to the number of successes, produced more social withdrawal, frustration and self-stimulation. Looking behaviour, however, did not seem to be affected and there was no difference between autistic children and a group diagnosed as 'schizophrenic'. In the main these findings are supported by Dehn (1970). She found that the larger the number of incorrect and non-reinforced responses, the greater the subsequent resistance. The optimal condition for increasing the number of correct responses was when the number of non-reinforced responses was kept low.

2.4. Summary Remarks

Despite variations in the precise delineation of the autistic syndrome it is agreed that abnormalities of social behaviour are a pronounced and obvious feature. Indeed, most aspects of the child's handicap (language, stereotypies, rituals and compulsive behaviour) interfere with the way he interacts with other people. What is less clear is the extent to which the inability to relate to others reflects an active aversion to the presence, and activities, of other people *per se*, or a less person specific incompetence which makes interpersonal encounters particularly difficult and bewildering.

This contention is reflected in the varieties of models that are put forward as explaining the ontogeny of the disorder. Couched in either 'psychodynamic' or 'learning theory' terms, there are models that emphasise an early history of disturbed and unrewarding interactions which progress through the subsequent failure to develop normal attachments or failure to acquire adequate systems of secondary reinforcement. Attempts at retrospective identification of the abnormal or traumatic early experiences have in the main failed to support these models: the findings mostly point to an absence of differences between, for example, the attitudes and skills of parents of autistic and other groups of handicapped children. The most suggestive evidence in favour of the significance of maternal behaviour comes from analysis of home-movies, although the suggestion from the same data that cognitive abnormalities are also present at a very early age must put the interpretation of causality in doubt. Other process models that implicate specific perceptual/ cognitive dysfunction (e.g., stimulus overselectivity) lack the theoretical subtlety to extend adequately to the high level manifestations of the disorder.

Research into the situational factors influencing rates of pro- and anti-social behaviour provides conflicting results. The literature contains references to non-social environmental stimulation both increasing and decreasing stereotyped behaviours. Similarly, there are instances of the presence of an active or passive adult either increasing or decreasing rates of eye contact or physical approach. Some studies show differences between autistic and other groups of children in this respect while others do not. Reasons for these discrepancies may lie in methodological differences or *a priori* theoretical orientation.

Looking at the manner in which a child is approached by an adult, there is evidence that verbal requests are most likely to be met with oppositional behaviour although it is not clear whether or not this is due to an increase in the complexity of the nature of the task. Several studies agree that resistance is more likely to be encountered in conditions where the child experiences a relatively high number of failures.

2.5. Aims of current research

From the foregoing discussion, it is clear that autistic children show pronounced abnormalities of interpersonal functioning. What is not clear is the significance of the abnormalities in both the aetiology and maintenance of the disorder and as an explanation of the other areas of aberrant behaviour.

If a child finds social encounters aversive and adopts strategies to avoid coming into contact with situations that might normally precipitate social exchange, then it is reasonable to assume that these strategies will manifest themselves as a resistance to, or a lack of cooperation with, attempts to engage him in a joint activity. He may give all the impressions of being passive, inert and unmotivated, or he may be actively disruptive of the activity.

However, when presented with a child whose behaviour gives all the indications of being unmotivated or actively disruptive, to what extent is it valid to infer that the reason he is behaving like this is because he finds social encounters *per se* aversive? Historically, the emphasis that has sometimes been put upon traumatic interpersonal experiences as being a major cause of the development of the psychotic condition make the inference perhaps an attractive one to draw. The inconclusiveness of the research examining situational influences, however, suggests that caution should be exercised.

The decision is an important one as there are implications for possible modes of instructing autistic children. Consequently, the line adopted in this thesis is one of caution: before a motivational explanation of performance deficits can be accepted, other demand characteristics of the situation must be explored to see if the deficit can be linked to a mechanism more specific than a reluctance to engage in interpersonal activities. Some of the possible mechanisms would perhaps appear fanciful if considered for a normal population; but autistic children are far from normal and perceptual/cognitive deficiencies of a sort specific to autism could give rise to the behavioural inconsistencies that are interpreted as lack of cooperation.

The research that is described in subsequent chapters addresses itself to some of the questions pertinent to this issue. To what extent can a child's performance be improved and deviant behaviours be reduced by improving his motivation? How can one come to conclusions about a child's motivational state without drawing inferences from the performance deficits under scrutiny? Does the autistic child react to changes in the difficulty of a task in ways that suggest qualitative differences from normal children? What are the implications of uncooperative behaviour for formal assessment procedures? Does he react differentially to approaches that place different emphases on the 'interpersonal content' of the interaction? To what extent are the problems with social behaviour specific to autistic children or do they apply to other psychotic children where the typicality of Kanner's syndrome may be held in question?

CHAPTER THREE

CHAPTER 3.

3.1. Background

The pervasiveness of the autistic child's handicap into all areas of his functioning has given rise, amongst other things, to various opinions as to how to interpret his performance on standardised tests of cognitive ability. The difficulties involved in gaining the child's cooperation in such a situation have often been described (e.g. Kanner, 1943; Anthony, 1958; Van Krevelen, 1963; Schachter, Meyer and Loomis, 1962; Goldfarb, 1961; Hutt, Hutt, Lee and Ounsted, 1965; DesLauriers and Carlson, 1969). Indeed, some have argued that the autistic child's performance is so unreliable and so influenced by motivational factors, that any normally obtained indices of intellectual ability are uninterpretable (Kohn, 1971; Anthony, 1958; 1962), and that regardless of IQ findings, autistic children have a basically normal cognitive potential (Kanner, 1943; Kanner and Lesser, 1958). On the other hand, there are studies which have shown that IQ scores in autistic children tend to be stable over time and provide a good prediction of later educational attainment and social adjustment, thereby arguing for the validity of the measure (Mittler, Gillies and Jukes, 1966; Gittelman and Birch, 1967; Lockyer and Rutter, 1969; Rutter, Greenfeld and Lockyer, 1967; Alpern, 1967; DeMyer, 1976).

The whole issue of the interrelationships between various factors that might contribute to assessments of ability (especially the relative weights attributable to motivation and intelligence in assessing intellectual performance) is complex and has been widely debated. This is discussed at greater length elsewhere in this thesis (see Chapters 4 and 5) with special reference to 'extreme' populations and in the light of the findings of the studies presented here. Suffice it to say at this juncture that the issue is of considerable importance. Whether or not a child with, for example, a very low IQ is regarded as mentally retarded has implications for therapeutic and educational practice.

The series of experiments described in this chapter are concerned with one particular aspect of the autistic child's behavioural repertoire and one which has specific relevance to the topic of the child's cooperation in the administration of standardised or ad hoc assessments of ability. Specifically this behaviour is characterised by the avoidance of a response that is requested of the child and the substitution of an alternative, incorrect response; this is often referred to as "negativism" (Ekstein, Bryant and Friedman, 1958; Boatman and Szurek, 1960; Ney, 1967; Ney, Palvesky and Markeley, 1971; Oppenheim, 1974; Dehn,1970; Zaslow and Breger, 1969). Those who deal with autistic children will often describe them as "negativistic", but in doing so may imply considerably more than the definition given above actually allows, usually because there are other cues present which lead them to suspect that the child is not failing because of a lack of ability, but is deliberately supplying an incorrect response. (Such cues might be based on the fact that in the past he has performed the same, or similar, task successfully). The child's failure is put down, therefore to a motivational abnormality which is disguising his intellectual ability.

The clinical observation that autistic children can be remarkably successful and consistent in their production of incorrect or undesirable responses to requests perhaps makes the motivational explanation appealing, and also perhaps explains the dearth of experimental findings relating to negativistic behaviour. However, if one is to invoke hypotheses attempting to explain large areas of the autistic child's pathology in motivational terms, then clearly the phenomenon of negativism, which must be described as an extreme form of 'lack of cooperation', should be examined in detail. In particular, the inference that the incorrect response is deliberately produced needs to be verified empirically.

As mentioned above, few studies have been concerned with negativism, and those that have, have tended to include it as just one aspect of resisting behaviour. For example, Wallace (1975) hypothesised a continuum of uncooperative behaviour, along which 5 styles of response, ranging from 'correct' to 'refusal' could be ordered, with negativism occupying the fourth position. In fact, Wallace describes the whole continuum as "negativism", and what in this Chapter is defined as 'negativistic behaviour' was referred to as "substitution".

Cowan, Hodinnott and Wright (1965) observed that "no objective evidence has confirmed or disconfirmed the repeated clinical description of autistic children as negativistic" and applied themselves to remedying this situation. Their study consisted of setting up an objective criterion of negativism, identifying a group of autistic children who satisfied this criterion and could therefore be called 'negativistic', and testing the hypothesis of a motivational cause of the negativism in an attempt to arrive at a method of overcoming this 'resistance'. This study is of considerable relevance and is thus described in detail below.

3.2. The Cowan et al (1965) Study

Twelve autistic children who were long stay patients at a hospital for emotionally disturbed children were included in the study. Nine of the children were assessed to have IQs between 145 and 35 on the Leiter International Performance Scale (Leiter, 1948) and three "could not respond consistently enough for an IQ to be measured".

The experimental procedure consisted of a multiple choice discrimination task using the 12 tiles of the Weigl-Goldstein-Scheerer Color Form Sorting Test (Goldstein and Scheerer, 1941) - three shapes (circles, squares and triangles) each in four colours (red, blue, yellow and green). The tiles were put in front of the child and he was told to put "a square one in the box". The child was rewarded (with popcorn) for responding appropriately, regardless of the correctness of the responses. The tile that had been placed in the box was removed for the immediately succeeding trial, which consisted of exactly the same request. Twenty-five such trials constituted the "Square Pretest". The same procedure was then repeated for an additional 25 trials, only this time the child was asked to put "a red one in the box" (the"Red Pretest"). The outcome of these trials was that 10 of the 12 children performed on both pretests at rates of success less than one would expect even by chance. The authors conclude

> "The children knew the correct responses; they were able to emit them but did not do so on demand. This is negativism by definition. Negativism, rather than indifference, lack of capacity, or lack of experience, is the only possible way of accounting for the failure of 10 of the Ss to give correct responses".
>
> (p.919)

The second stage of the study involved introducing a change in the incentive conditions. Sixty further trials were administered to the 10 negativistic children, but with reward (popcorn again) being contingent only upon correct responses. Half of the group received this 'conditioning' with respect to requests for a "square one" and the other half for a "red one". The outcome of this stage was that 4 children (2 from each half) were giving correct responses to at least the last 10 trials. The remaining 6 children were still giving fewer-than-chance correct responses. Red and Square Posttests were then administered in exactly the same manner as the pretests to all these 10 children. Those that had abandoned the negativistic responses maintained their compliance, whereas the negativism persisted in the remaining 8.

The main conclusions drawn by the authors from these experiments are as follows:

(i) Negativistic behaviour is empirically and unequivocally demonstrable in a group of autistic children.

(ii) A change in the incentive conditions such that reward is contingent upon a correct response can, for some of the children, overcome this type of resistance.

They also observe that the persistent resisters happened to be those with low IQ scores and speculate that "other or larger rewards" may have been effective in "motivating compliance" in these children. The implication is that negativism is under motivational control and that the explanation of the low IQs in terms of increased resistance has to be admitted as a possibility.

The paradigm of a multiple choice discrimination task to demonstrate negativism is certainly appropriate as it allows for the statistical distinction between those who perform at "better than chance", those who perform "at chance level", and those who perform "worse than chance". It is the children who fall into this last category who are designated as negativistic. However, although the conclusion that the 'negativistic' children could discriminate between the items in the task administered by Cowan et al, (red from other colours and square from other shapes) appears correct, it is not justifiable on the basis of the published data to infer that the children fully understood the instructions and were unwilling to comply with them. The data have several weaknesses which require further examination.

(i) The request in each task was not varied. It is important to be confident that the errors are not systematic, and necessary, therefore, to obtain information regarding the way the child's responses would have covaried, if at all, with the systematically varied requests of the examiner.

(ii) Task complexity was not varied. This is particularly pertinent in view of the suggestion that persistence of negativism may be associated with low IQ. It is important to determine whether this relationship reflects a characteristic of the child or of the cognitive and linguistic demands made upon the child by the task.

(iii) Operant procedures were used to train the child only on the same task, so that it is not possible to differentiate between improved motivation and improved task skills or comprehension. Such 'training' can be seen as non-verbal instruction in the requirements of the task. This is particularly important as the negativistic children in the Cowan study were described as having "no language".

3.3. Aims of Current Studies

The current series of experiments was designed to explore the above points and was to consist of three stages. First, the phenomenon of negativism had to be demonstrated using a design similar to that used by Cowan et al., but with the requests for discrimination systematically varied to allow for fuller examination of patterning of wrong responses. Second, those children who are performing consistently incorrectly would be trained, using operant procedures, either on the same or different discrimination tasks. Third, the study would be repeated on all of the children using tasks of varying difficulty, to see if 'negativism' could be induced in previously compliant children, or vice versa.

The first of these stages (the empirical demonstration of negativism) is reported below. It comprises three experiments which are described separately.

3.4. Experiment 1.

3.4.1. Subjects

Twenty-seven autistic children who were pupils at a school for autistic children in West London (25) or who were outpatients of the Maudsley Hospital Children's Department (2) were used in this experiment. The children were allocated to one of four language categories on the basis of the child's medical and psychological records, on his talk in the presence of E, and, in the case of the children seen at the school, on discussion with the language therapist. These categories were (a) no speech at all, (b) a few single word utterances used inappropriately, (c) a few single- or two-word utterances used appropriately and (d) any speech at a level higher than (c). Performance IQs were obtained from the Merrill-Palmer Scale (Stutsman, 1931) or the WISC (Wechsler, 1949), either administered previously as part of clinical assessment or given specifically for the study.[1] Table 3.1. shows the age and performance IQ characteristics for the four language ability groups.

Table 3.1. Age and Performance IQ Characteristics of the Four Language Ability Subgroups

		Category of spoken language[1]			
		(a)	(b)	(c)	(d)
	N	5	3	7	12
Age	$\bar{X}$	9.08	7.81	8.73	11.92
	SD	1.58	.67	2.15	2.98
Performance IQ	$\bar{X}$	82	80	89	90
	SD	13.6	10.5	12.9	18.9

1 (a) = no speech
(b) = a few single word utterances used inappropriately
(c) = a few single- or two-word utterances used appropriately
(d) = speech at a higher level than (c)

3.4.2. Procedure

3.4.2.1. Pretraining

All subjects were tested individually in a room set aside for the purposes of the experiment. The discrimination task required each child, in response to a spoken request by E, to select objects of a specified colour or shape and to place them in a box. It was necessary to establish first that the child could make the type of

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1 Caution must be exercised in referring to IQ when, as here, different tests are used, sometimes in abbreviated form. This difficulty recurs throughout the thesis when describing samples. It should be borne in mind that the scores must be treated as estimates (see Berger and Yule, 1972, pp 128-129).

response required. The nine blocks of the WISC Block Design Subtest (Wechsler, 1949) and a small box were placed in front of the child. E demonstrated how to put one of the blocks in the box and then S was asked to do the same. If S did so correctly he was praised. Five consecutive placements of a block in the box were taken as indicating that this type of response had been established. No child required more than three demonstrations by E.

3.4.2.2. 'Degree of wrongness' testing

Upon successful completion of the pretraining, the WISC blocks were replaced with 16 small wooden tiles. These were in four shapes (circles, squares, triangles and crosses), each shape being repeated in four colours (black, white and two intermediate shades of grey). S was then asked to put a "black one" or a "white one" in the box. The same request was made a total of 20 times and then a further 20 trials were given with the request being for the opposite colour. Fourteen Ss were given 'black' first and 13 were given 'white' first. After each response the tile put in the box was removed from the table and not replaced in the array until after the next response had been made. This precluded the possibility of S perseverating on one tile. S was praised after each response, regardless of the correctness of his choice.

This block of 40 trials constituted what will be referred to as the 'degree of wrongness' task which was designed to allow the child who was negativistic to have a choice of wrong answers which varied in their 'wrongness' and which would allow for the subsequent calculation of an ad hoc index of negativism for each child.

3.4.2.3. Colour and shape discrimination

Upon the completion of the 'degree of wrongness' testing, the tiles were replaced by another set: Nine tiles comprising 3 shapes (circles, triangles and squares) in each of three colours (red, yellow and blue). Half of the children were allocated to the 'shape first' condition in which S was asked to put a named shape in the box. All three shapes were asked for in a pre-arranged, quasi-random order. (The order was random but with the constraint that each shape was requested no more than 9 times and that no one shape was requested more than 4 times in succession). If after 25 trials, S had not made more than 3 errors, i.e. was being compliant, this part of the testing was ended. If more errors were being made, the block of trials was extended to 48 (with the same proportional constraint on the presentation order).

Using the same tiles, S was then required to respond to requests along the colour dimension, the procedure being equivalent to the shape discrimination. The other half of the sample was given the colour trials before the shape trials. In all cases, the shape and colour of each response were recorded and the tile placed in the box was removed for the next trial as in the 'degree of wrongness' task.

3.4.3. Results

Figures 3.1. and 3.2. show the percentage of errors made by each subject for the 'degree of wrongness' tasks and the colour/shape discriminations respectively. The areas bounded by the dotted lines represent those regions of performance which can be described as 'chance success'. S's falling below the lower dotted line, i.e. making fewer errors, are performing at a level significantly better than chance (Binomial Theorem, $p < .05$), while those falling above the upper dotted line, i.e. those making the most errors, are performing at a level significantly worse than chance ($p < .05$). Performance of this latter type is, as defined in this study, negativistic performance.

Only one child, S9, on one of the discrimination tasks, 'white', fell outside the upper chance limit. On 'black' and 'colour' this child made no errors, and only three errors on 'shape'. When the type of errors made by S9 were examined, it was revealed that in response to requests for a "white tile" no black tiles were picked; all responses were either of the two greys (light grey =12, dark grey =8). This child's performance, therefore, might be described as indicating a difficulty with the concept "white", especially as it appears that other Ss were tending to make more errors on this task than they were on the other tasks (cf. Ss 2, 8, 4, 19). To describe S9 as behaving 'negativistically' appears to go beyond the data.

The performance of S24 on the white task, although

Figure 3.1.(a) Distribution of performance for the 'degree of wrongness' (black) task shown as a function of spoken language. The categories of language ability range from a (mute) to d (some phrase speech). The numbers represent individual children.

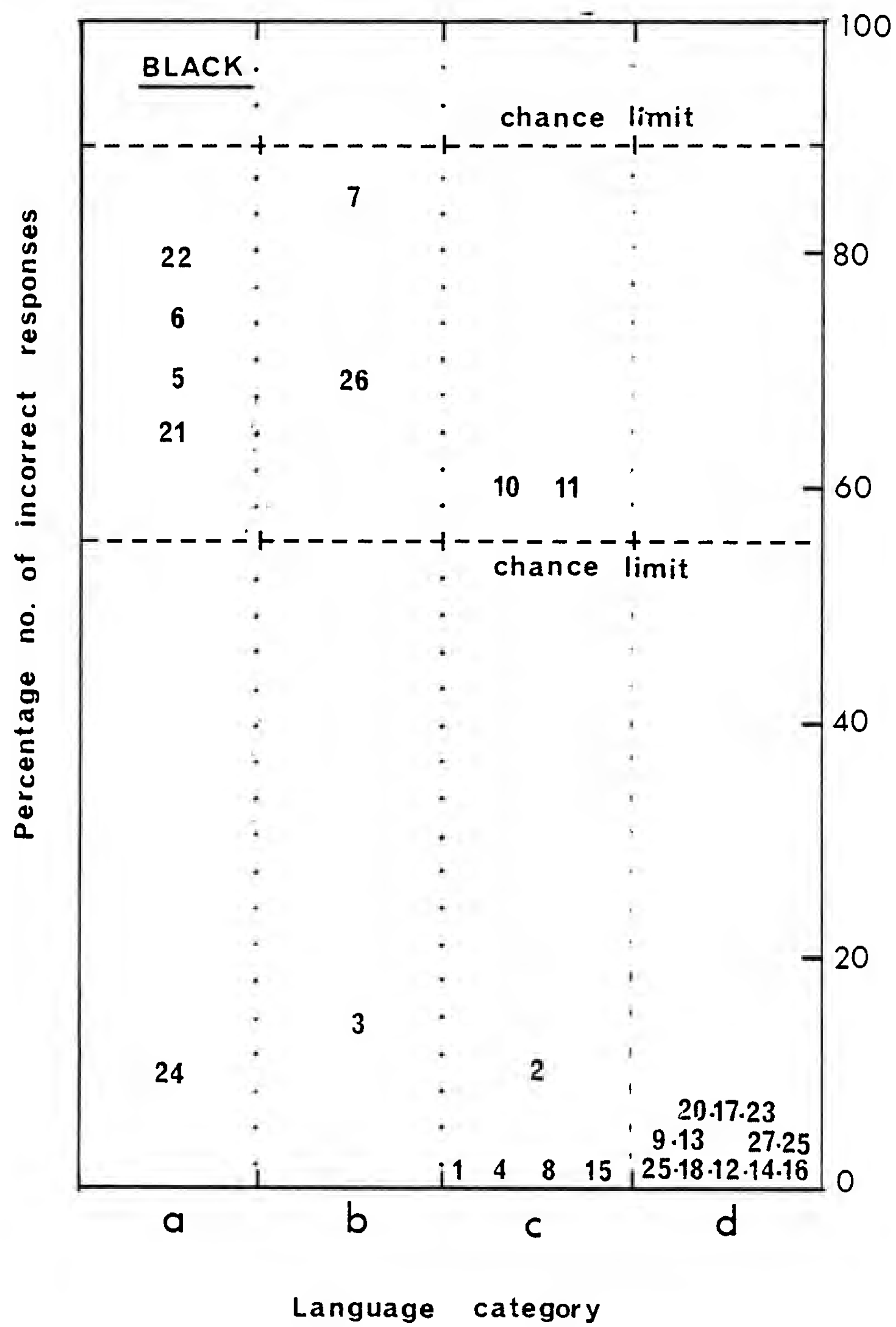


Figure 3.1.(b) Distribution of performance for the 'degree of wrongness' (white) task shown as a function of spoken language. The categories of language ability range from a (mute) to d (some phrase speech). The numbers represent individual children.

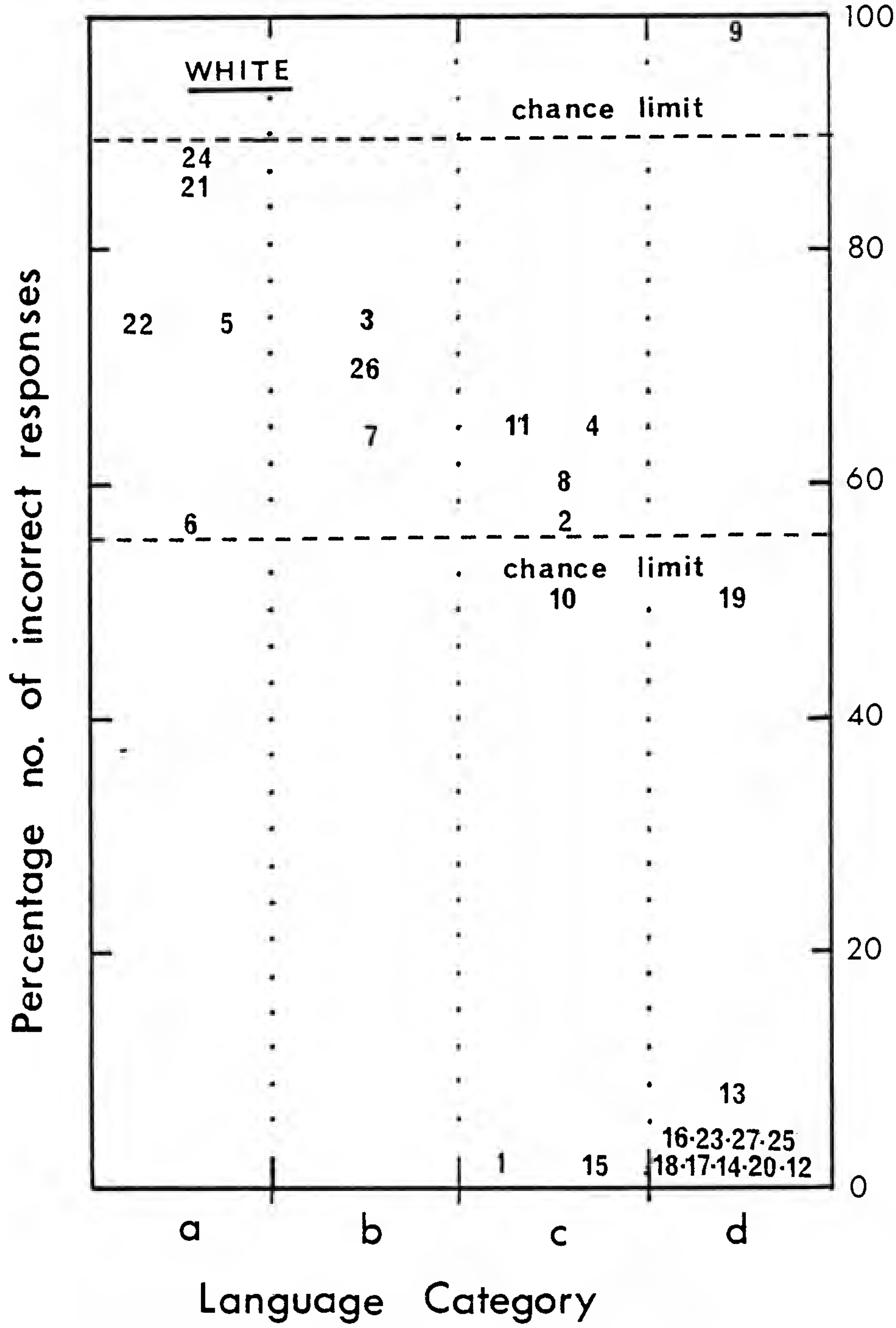


Figure 3.2.(a) Distribution of performance for the colour discrimination task, shown as a function of spoken language. The categories of language ability range from a (mute) to d (some phrase speech).

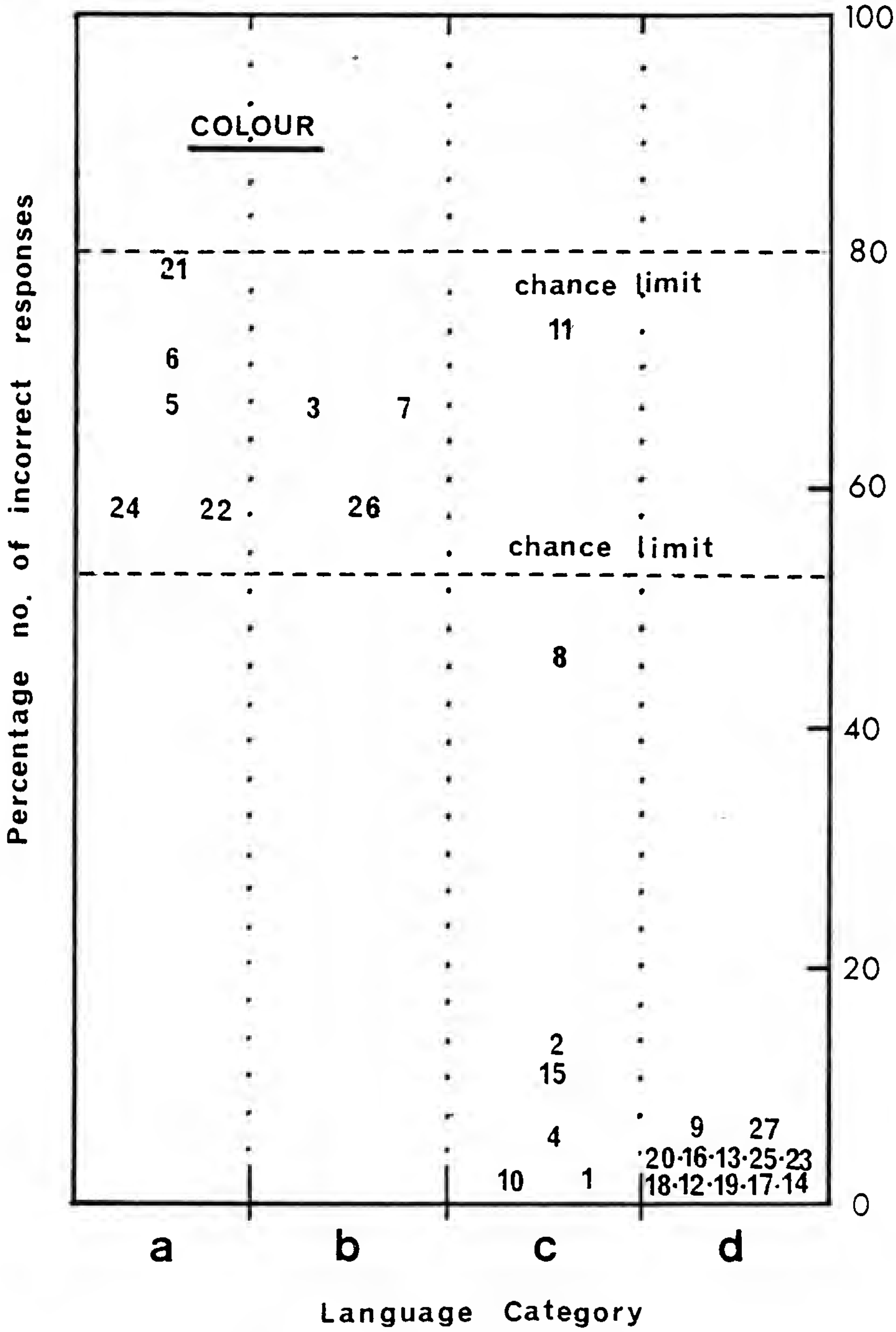
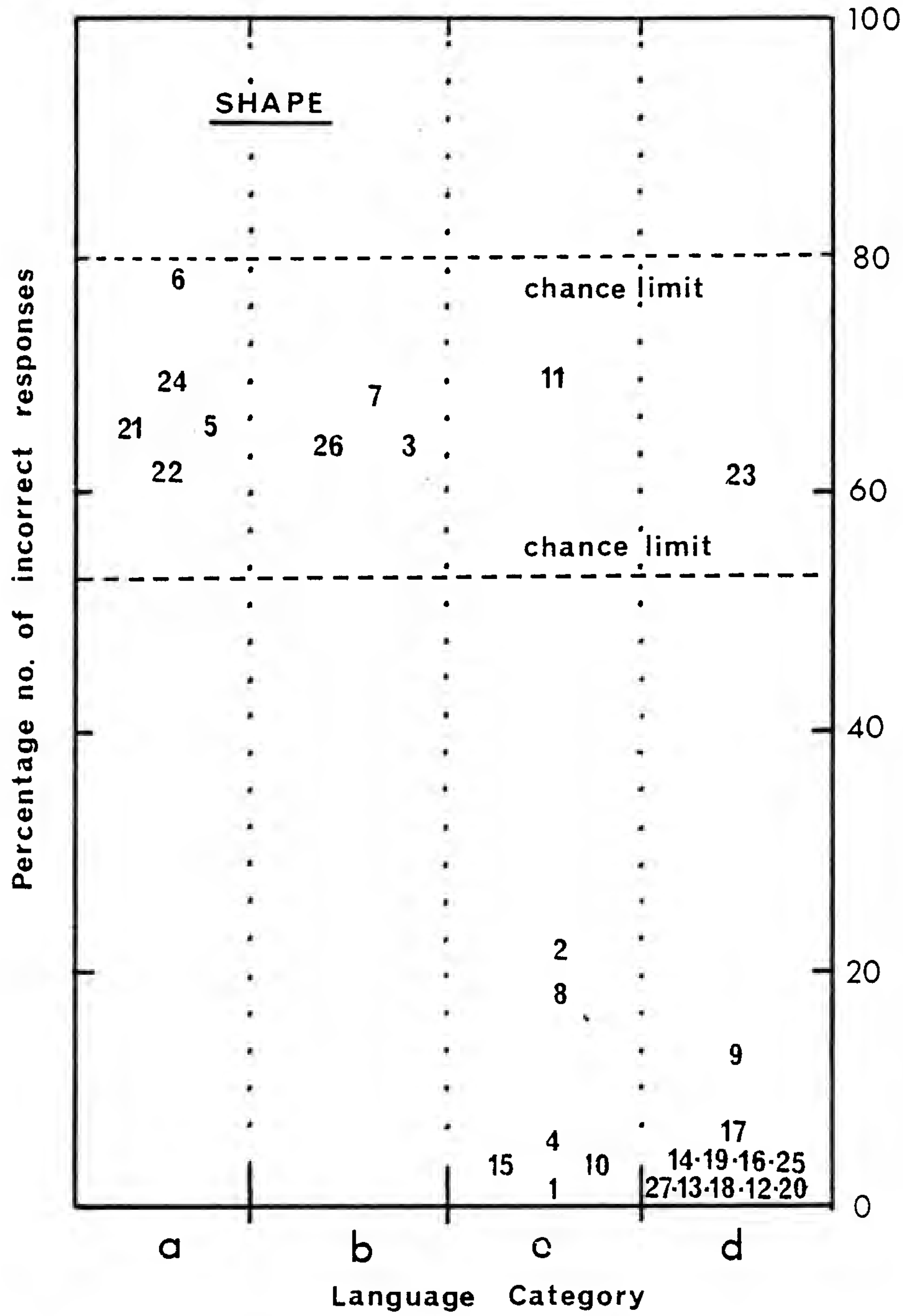


Figure 3.2.(b) Distribution of performance for the shape discrimination task, shown as a function of spoken language. The categories of language ability range from a (mute) to d (some phrase speech).



falling within the frequency limits of chance, is of interest as every response was 'black'. It would appear that in terms of 'degree of wrongness', this child might be described as 'negativistic'. However, this too would be unwarranted considering the childs performance on the 'black' task and the fact that in this instance, the 'black' task preceded the 'white-task.

Although overall none of the children behaved in a way that was negativistic, Figures 3.1. and 3.2. do suggest that there is a relationship between language ability and performance. Cowan et al, described their negativistic children as having "no language", by which they meant "had no speech at all .....(or) used isolated words" (p.915). Accordingly, the children in the present study who fell into the language categories (a)-(c) could be described as having "no language". Table 3.2. shows the relationship between language ability, thus defined, and performance in the four discrimination tasks.

The significant effect on each contingency table indicates that the children with some language (although it should be made clear that none had normal language) tended to make fewer errors, whereas over half of those without language performed at only the 'chance level'. Six of the "no language" children (5, 7, 11, 21, 22 and 26) fall into the chance category on all four tasks, and a further three (3, 6 and 24) do so on three of the four tasks. All of these nine children performed within the limits of chance on both the shape and colour tasks.

Table 3.2. Distribution of performance for "language" and "No language" children

	Black		White	
	C[a]	C+	C	C+
Language	0	12	1	11
No Language	8	7	10	5
	$p=.002$[b]		$p=.003$	

	Shape		Colour	
	C	C+	C	C+
Language	1	11	0	12
No Language	9	6	9	6
	$p=.007$		$p=.001$	

[a] C = chance performance; C+ = better than chance
[b] Fisher's Exact Probability Test

As the study had been designed to allow more detailed examination of incorrect responses (more trials, greater restriction of choices, and greater variation of requests), their performance was analysed to see if overall 'chance performance' disguised patterns of wrong responses that might indicate that the child was concealing an ability to emit the correct response. Table 3.3. shows the eighteen 'request x response' contingency tables (3x3), revealing not one significant association. One child (S3) exhibited

Table 3.3. Relationship between 'request' and 'response' for the 9 "chance level" children on the shape and colour tasks.

S3

Response	Shape Request ○	△	□		Colour Request R	B	Y
○	4	5	6	R	11	6	8
△	4	8	4	B	3	1	4
□	8	3	6	Y	2	9	4
$\chi^2_{(4)}$	=2.72				5.50		

S5

Response	Shape Request ○	△	□		Colour Request R	B	Y
○	9	5	6	R	3	4	8
△	4	3	5	B	6	9	3
□	3	8	5	Y	7	3	5
$\chi^2_{(4)}$	2.41				4.82		

S6

Response	○	△	□		R	B	Y
○	2	7	6	R	5	9	7
△	9	2	4	B	5	5	5
□	5	7	6	Y	6	2	4
$\chi^2_{(4)}$	=5.62				2.02		

S7

Response	○	△	□		R	B	Y
○	5	7	5	R	4	7	5
△	5	4	5	B	6	6	4
□	6	5	6	Y	6	3	7
$\chi^2_{(4)}$	0.16				1.42		

S11

Response	○	△	□		R	B	Y
○	5	7	2	R	3	7	5
△	7	6	11	B	5	6	6
□	4	3	3	Y	8	3	5
$\chi^2_{(4)}$	=2.85				2.18		

S21

Response	○	△	□		R	B	Y
○	7	6	6	R	3	7	6
△	6	4	4	B	7	3	6
□	3	6	6	Y	6	6	4
$\chi^2_{(4)}$	0.72				1.92		

S22

Response	○	△	□		R	B	Y
○	7	4	5	R	6	5	6
△	3	5	5	B	6	6	2
□	6	7	6	Y	4	5	8
$\chi^2_{(4)}$	=0.58				2.16		

S24

Response	○	△	□		R	B	Y
○	3	5	2	R	5	6	4
△	6	6	8	B	2	7	4
□	7	5	6	Y	9	3	8
$\chi^2_{(4)}$	0.86				4.12		

S26

Response	○	△	□		R	B	Y
○	6	5	6	R	6	6	8
△	5	4	2	B	9	6	2
□	5	7	8	Y	1	4	6
$\chi^2_{(4)}$	=0.89				5.51		

a significant preference for red tiles and corresponding aversion to ~~yellow~~ blue tiles ($\chi^2_{(2)}$ = ~~9.94~~ 9.13, p<.05) during the colour task, but this response bias was not related to the request. It can only be concluded that for the children that appeared to be performing at chance level, their responses, although not necessarily random, were independent of the request.

3.4.4. Discussion

The main outcome of Experiment 1 was the failure to demonstrate negativistic behaviour empirically in any of the 27 children tested. On the basis of the discrimination tasks described here, the children could be allocated to one of two categories:

(i) those who could do the tasks, and would do so,

(ii) those who achieved a success rate that can only be described as chance.

There was no evidence that the childrens responses in the latter group were dependent upon the request, and no indication that they were actively avoiding any of the requested tiles. What, then, is the explanation of the marked difference in the findings between this study and that carried out by Cowan et al? Any failure to replicate previous research requires thorough reappraisal of the phenomenon under investigation and of the factors that are thought to bear upon it. The results of Cowan et al are unequivocal; of the 12 children tested, 10 were described as having "no language", and all of this 10 performed at a level significantly worse than chance. This was so for none of the children in the present study.

One question that now becomes pertinent is that, given there are certain procedural differences between the experiment just described and the one carried out by Cowan et al., was the present study an adequate replication? On the basis of the motivational explanation of negativism put forward by Cowan, it was assumed that the procedural modifications should have only clarified the findings. However, this assumption needs to be re-examined: If the procedural modifications did prevent the eliciting of negativism, a reinterpretation of the phenomenon is needed.

A second issue that is pertinent to the two sets of findings concerns the possibility that the samples of autistic children differed. This could arise from either the application of different diagnostic criteria or from different histories. The former is a perennial problem in research into autism and may often explain contradictory results (Prior, 1979; Rutter, 1978; Schopler and Rutter, 1978). The latter has to be taken into consideration as the children in the Cowan study were all long stay hospital in-patients, whereas all the children in the present study lived at home and attended (either daily or as weekly boarders) a school with a very active educational program. All were well used to school work and this may have influenced their responses to the simple discrimination task. As was pointed out earlier, one of the aims of the present studies was to examine whether negativism reflected a characteristic of the child or of the cognitive demands being made of the child. Given the experimental differences between the two samples, task difficulty could well be relevant to the manner in which the child approaches the task.

Experiments 2 and 3 were designed to explore further some of these possibilities.

3.5. Experiment 2

3.5.1. Aim

If a study, or part of a study, is designed according to the logic of the conclusions of an earlier work, then it can be considered to be a replication of that earlier work. Thus, a replication, in the research sense of the word, does not imply (nor could it) an exact repeat of the original procedure, but rather the reproduction of those features that are relevant to the theory which underpins the findings. If the results of the replication are discordant with those of the original work then it is necessary, amongst other things, to examine whether or not the salient features had indeed been reproduced. The outcome of Experiment 1 yielded such a situation.

There were several ways in which the procedure of Experiment 1 differed from that employed in the Cowan et al,. study. These included a) the sex of the tester, b) the nature of the reward and c) the variations in the request. It was considered that only the last of these could realistically be thought to have any bearing on the outcome, so Experiment 2 was designed to reproduce more faithfully the procedure described by Cowan.

3.5.2. Subjects

The same children who performed within chance limits on Experiment 1 (Ss 3, 5, 6, 7, 11, 21, 22, 24 and 26) were used as subjects.

3.5.3. Procedure

The children were all seen individually several weeks after Experiment 1. The same pretraining procedure as before was carried out to establish that the child was able to respond by selecting a single object from an array and putting it in a box. Again, all children were able to do this. Each child was then shown an array of 12 tiles: three shapes (circle, triangle and square) each of four colours (red, blue, green and yellow). The child was asked to "put a square one in the box". Praise and encouragement were given, regardless of the correctness of the response. The same request was made for a total of 25 trials; on each trial the colour and shape of the response tile were recorded and this tile withheld for the succeeding trial. The request was then changed to "put a red one in the box" and repeated, as before, for a second block of 25 trials.

3.5.4. Results

On each 'square' discrimination trial, the possibility of getting the response correct by chance is approximately 1/3. (It is not exactly 1/3 as, after the first trial, there are only 11 tiles from which the child can choose; the previously chosen tile is withheld). Thus over 25 trials, the most likely distribution of correct and incorrect responses would be 8 and 17 respectively, if based on chance performance. Similarly, in the 'red' discrimination, the most likely frequencies are 6 and 19. Examination of Table 3.4. shows that no child deviated in the direction of negativism by more than one from these expected frequencies.

Table 3.4. Number of correct choices for 'square' and 'red' discrimination in blocks of 5 trials, plus totals correct and incorrect.

Square							
S	1	2	3	4	5	$\Sigma\checkmark$	Σx
3	0	1	2	2	2	7	18
5	3	3	1	2	1	10	15
6	1	2	1	3	2	9	16
7	3	2	1	4	0	10	15
11	1	2	0	0	4	7	18
21	2	0	3	0	2	7	18
22	2	2	1	0	3	8	17
24	1	3	1	2	2	9	16
26	0	2	3	0	3	8	17
Red							
3	2	1	1	5	5	14*	11
5	1	2	1	2	0	6	19
6	1	1	0	2	1	5	20
7	2	0	0	3	2	7	18
11	0	2	1	2	1	6	19
21	2	1	2	2	1	8	17
22	0	3	3	0	2	8	17
24	1	2	2	1	1	7	18
26	1	1	3	2	0	6	19

*$p < .001$

One child, S3, now performed at a level significantly better than chance in the 'red' discrimination, but it is not possible to say whether or not this indicates compliant performance or perseveration of response on the colour red. It is probably significant that this is the same child who, in the results of Experiment 1, was described as having a preference for the colour red, regardless of which colour was requested.

3.6. Experiment 3

It is possible that the discrepancy between the Cowan findings and the findings of Experiment 1 could be due to the fact that the task was too simple or too familiar for the children. This possibility has to be admitted within the context of the stated aims of this series of experiments (namely that a distinction has to be made according to whether negativism reflects the motivational state of the child or the characteristics of the demands being made upon the child) and also because of the possible differences in the two samples' experiences and backgrounds. Experiment 3 was designed to present to those children who had previously performed correctly in Experiment 1, a more demanding discrimination task to see if by manipulating the difficulty, compliant behaviour could be eliminated and replaced by negativistic behaviour.

3.6.2. Subjects

Twelve children who had performed the discrimination tasks in Experiment 1 at levels consistently better than chance (Ss 2, 4, 8, 10, 13, 14, 15, 16, 18, 23, 25 and 27) were used as subjects. Some of the children who had participated in Experiment 1 had moved to schools outside of the London area and were therefore no longer available.

3.6.3. Task

The task presented to these children was one which, in both comprehension and execution, was assumed to be cognitively much more demanding than those employed earlier, and yet which still remained essentially a problem of discrimination. The 'matching-to-sample' paradigm was employed whereby the child was presented with a picture of three different shapes, each shape being a different colour. The problem was to match one of these three stimuli to a fourth which was the same in, say, shape and different in colour (or vice versa). The child had to identify which was the relevant concept (i.e. shape or colour) as well as make the appropriate discriminations.

3.6.4. Procedure

Because of the greater complexity of this task, it was necessary to introduce it by way of a strategically designed 'pretraining stage' which was intended to shape the child to the requirements of the task proper.

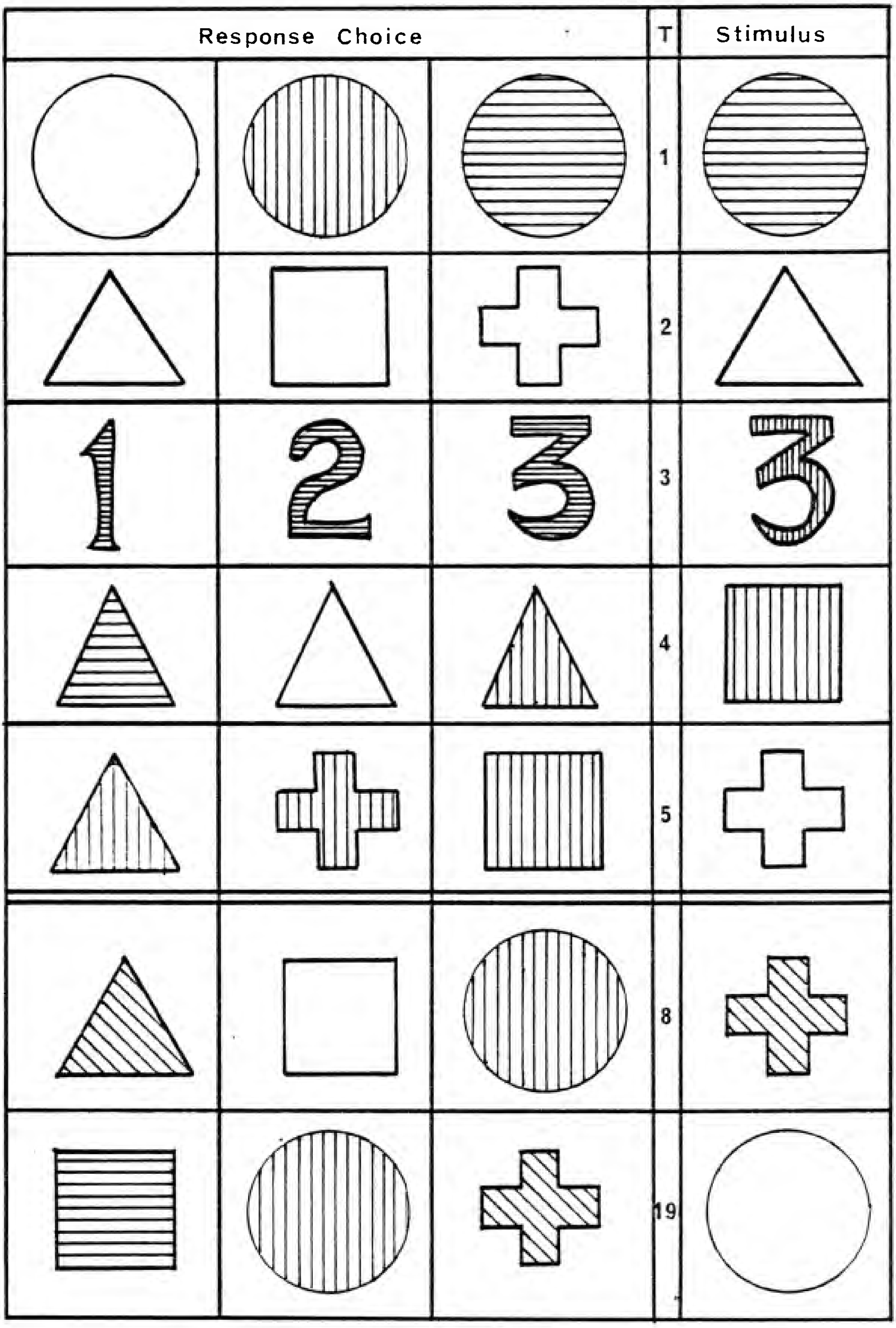
3.6.4.1. Pretraining

The response required in the 'matching-to-sample' task involved the child pointing his finger towards one of three printed stimuli. To establish this type of response, the child was first shown a picture of a red circle. A sheet of paper beneath this picture was then removed, revealing three more circles (yellow, blue and red). The child's attention was drawn to these circles and he was asked "Which one of these is like the one here?" (E pointing to the original circle). If the child responded incorrectly, inappropriately, or not at all, E said "This one (pointing to the correct circle) is like the one up here". The child's hand was moved by E first to the 'stimulus picture' (the single circle) and then to the correct response picture, and he was praised as if he had responded on his own. The next pretraining trial consisted of presenting, on one sheet of paper, a line drawing of a triangle, and on another sheet of paper, three drawings of a triangle, a square and a cross; the instructions were given as for the first trial. Trial 3 consisted of a single red '3' and beneath this the numbers '1', '2' and '3' in blue. Here the notion that the stimulus picture and the response picture were not necessarily identical in all respects was introduced. Trial 4 had a blue square to be compared with a red, a yellow and a blue triangle, and Trial 5 was a yellow cross to be compared with a blue triangle, cross and square. Most children were responding appropriately by Trial 3 and all but 2 by Trial 5.

3.6.4.2. 'Matching-to-sample' task

Trials 6 to 55 constituted the task under examination and varied from the pretraining in that both the relevant and the irrelevant concept were varied (i.e. Trial 6 was a red triangle to be matched with one of a

Figure 3.3. Pretraining trials (1-5) for 'matching to sample' task and two examples of task proper (8, 19).



yellow cross, a green circle and a blue triangle). Shapes and colours were made relevant in a quasi-random sequence (i.e. the order was compiled using random number tables but with the constraint that neither shape nor colour was relevant more than three times in succession and that the correct response was not in the same spatial position more than three times in succession). On each trial the child was prompted into action by E saying, "Which one?" or "Where is it?". Colour, shape and position of each response were recorded. If after 30 trials the child was making very few errors, i.e. less than 6, the testing was stopped; if the number of errors was larger, then the testing was continued to a maximum total of 50 trials.

3.6.5. Results

Of the 12 children tested, 7 made only 1 or 2 errors in 30 trials. One child (S25) made 15 errors in a total of 45 trials, but this still indicates a success rate significantly better than chance ($p < .001$). Two children (Ss 2 and 18) made 30 and 32 errors in totals of 49 and 50 trials respectively - scores which do not deviate significantly from what one would expect of chance performance. Two other children (Ss 8 and 23) failed to pass the pre-training stage and would not make responses appropriate to the task. Although this may be interpreted as resistance to the task, it is not negativistic behaviour in the sense it is being sought here.

Therefore, although this more difficult matching-to-sample task led to more errors than in the previous simple discrimination tasks, no child reacted to the extra demands of the situation by behaving 'negativistically'.

3.7. Diagnostic Differences

The consistent outcome of all three experiments described so far is a failure to produce negativistic behaviour in any of the children tested. In the discussion to Experiment 1, various possibilities as to reasons for the failure to replicate the findings of Cowan et al., were raised and some of these have been examined in Experiments 2 and 3. It seems unlikely that procedural differences were a reason, and a change in the task difficulty also failed to change the behaviour of the children from compliance to negativism. In seeking an explanation, it remains to examine the characteristics of the sample studied for any differences which might be relevant. The only psychometric data available for both groups of children are estimates of performance IQ; Cowan reports that 5 of the children in his sample had IQs of 90 or more, leaving 7 who scored less than this or who "could not respond consistently enough for IQ to be measured", (p.915). The corresponding figures for the present studies are 12 and 15 respectively, which would indicate high comparability between the two groups with respect to IQ (χ^2 =0.03). As for the more qualitative aspects of the clinical picture, Cowan reports that:

> ".... every effort was made to see that these children formed a homogeneous group conforming to Kanner's description (1957) of early infantile autism ..... Their disturbed behaviours had been evident before the age of two but was not linked

> with known organic damage. They spent little time voluntarily engaged in interpersonal contact, ... engaged in many repetitive movements and failed to react adaptively to much stimulation; this was especially true when the stimulation was of a social nature"
>
> (p. 915)

The medical and psychiatric records of all the children used in the present study were reviewed to see if their case histories reflected events which were in any way atypical of the picture of autism presented by Cowan or indeed of any sort of criteria accepted as being necessary to define the syndrome (cf. Rutter, 1978). As a result of this review, any child about whom there was any doubt concerning the typicality of the development of interpersonal relationships, language impairment, or presence of compulsive or ritualistic phenomena, either now or in the past, was considered for the purposes of this analysis as being 'atypically autistic'. This review was carried out by the present author and a child psychiatrist, Professor Michael Rutter, who was familiar with many of the children.

Eleven of the 27 children failed to satisfy the stringent requirements of this re-examination, but 16 children undoubtedly satisfied all of the criteria necessary for inclusion in the autistic syndrome. Table 3.5. shows the comparison between the 'atypically autistic' and 'typically autistic' subgroups in terms of language ability. It is clear that the presence or absence of language is not related to which of these diagnostic categories a child falls into.

Table 3.5. Comparison of Language Ability in 'Typically' and 'Atypically' autistic subgroups.

	Language	No Language
Typically (TA) Autistic N = 16	7	9
Atypically (AA) autistic N = 11	5	6

$p > 0.3$ (Fishers' Exact Test)

Table 3.6. compares the two diagnostic subgroups with respect to their performance on the discrimination tasks in Experiment 1. It can be seen that there is a suggestion that the 'atypical' group tend to perform at a level 'better than chance'. As performance in Experiment 1 was related to language ability (see Table 3.2.), it was necessary to see how this relationship was distributed across the diagnostic criteria. Table 3.7. shows this breakdown, which confirms that the 'chance performers' were most likely to be those children who were 'typically autistic' and who had 'no language'.

Table 3.6. Distribution of Performance on Discrimination Tasks for 'Typically Autistic' (TA) and 'Atypically Autistic' (AA) subgroups.

	Black		White		Shape		Colour	
	C	C+	C	C+	C	C+	C	C+
TA (N=16)	7	9	9	7	9	7	8	8
AA (N=11)	1	10	4	7	1	10	1	10
	p=.06		p> .25		p=.01		p=.03	

Table 3.7. Distributions of Performance on Discrimination Tasks, shown as a Function of Diagnostic Category and Language Ability.

		Black		White		Shape		Colour	
		C	C+	C	C+	C	C+	C	C+
TA	Language	0	7	0	7	1	6	0	7
	No Language	7	2	9	0	8	1	8	1
		p=.003		p<.001		p=.005		p<.001	
AA	Language	0	5	1	4	0	5	0	5
	No Language	1	5	3	3	1	5	1	5
		p=0.54		p=0.35		p=0.5		p=0.5	

3.8. Discussion

At the outset of this series of experiments, the intention was to examine in detail an extreme aspect of 'uncooperative' behaviour, namely negativism. It was considered that while observations existed in the literature documenting this 'deliberate' production of incorrect responses as a characteristic of autistic children, there were insufficient grounds for interpreting the behaviour solely in motivational terms. The strategy that was to be followed consisted of identifying a group of children in whom negativism could be elicited using procedures that had been demonstrated as being suitable in a previous study, and then employing both task specific operant training procedures and more generalised 'compliance' training procedures, to understand more fully the implications of the 'motivation deficit' explanation. Experiment 1 was concerned with attempting to elicit the behaviour and to describe its characteristics more fully than has been done before. With this in mind the results can be described as disappointing; none of the 27 children tested behaved in accordance with the operational definition of negativism, and thus the proposed elucidation studies were pre-empted. The concern of Experiments 2 and 3 then became an attempt to provide a reason for the complete absence of negativism in this sample, a finding in marked contrast to the Cowan et al (1965) study. The results of these experiments suggest that the difference in outcome was not due to any procedural modifications that had been introduced in order to obtain a better description of the phenomenon, nor to any effect stemming from task difficulty: The children made more errors in the more difficult task, as would be expected in terms of the level of cognitive demands, but in neither the simple nor the difficult task was there any negativism. Further analysis of some of the Experiment 1 data also suggested that the difference was not a result of differences in diagnostic practice as the findings covered both a very strictly defined autistic group and one with a rather broader definition of autism. There were, however, differences between these two subgroups in that it was most likely that the 'chance performers' were drawn from the 'typically autistic' children with 'no language'.

Nevertheless, the difference between the findings of the Cowan study and the present one remain. In the absence of further data, one can only speculate on the explanation, but it seems likely that the known differences in the childrens' experiences may be implicated. Cowan et al describe their children as having "lived in the ward" and being "selected for further hospitalization". In contrast, none of the children in the present study were in hospital. They were being educated in a special school for autistic children, and in out-of-school hours they were either at home with their parents or they lived in small family-type units during the week, returning to their parents each weekend. It is known that such differing experiences can modify childrens' psychological development (Tizard, 1964; 1970) and may also influence their approach to the sorts of tasks that were used here. The children in this study, although markedly autistic, were well used to school work of various kinds, whereas those in Cowan's investigation may not have been. In short, it could be that the negativism shown in the Cowan study was a consequence of an interaction between living in an institutional environment and autism, rather than representing a basic feature of the syndrome itself.

It may also be that negativism and associated behaviours are central to the process that underlies the identification of autistic children who 'qualify' for long stay hospitalisation, and possibly even local. If this were the case, then a crucial question would be concerned with finding out the factors which result in some autistic children displaying these behaviours while many do not.

Obviously, further evidence is required before the correct explanation of the occurrence of Cowan's positive findings can be determined, let alone the interpretation of the findings. However, as the autistic children in the present study did not show negativism and did show the usual cognitive and language impairments associated with autism, clearly these impairments cannot be due to negativism. Furthermore, it is evident that negativism cannot be an essential part of the autistic syndrome.

In the overall plan of this thesis, negativism was chosen as a starting point for an investigation into the meaning of motivation deficits in general, because of its extreme nature. What light do the findings of the Experiments described in this chapter throw on these broader ambitions? Obviously, not all autistic children are negativistic, nor has it been possible to identify the characteristics of those that are. But do the findings presented here say anything about whether the children were being compliant or not? A substantial proportion of the children tested performed consistently at chance level and thus may have been disguising full knowledge of, and ability in, the requirements of the tasks by randomly directed behaviour. An answer to this question is not possible with certainty, but there are indications which suggest that it cannot be excluded.

The chance performers tended to be those children who were classified, for the purposes of this study, as 'typically' autistic and yet this classification did not include amongst the defining criteria anything which referred specifically to poor task motivation (nor to intellectual level). Furthermore, these children were the 'typically autistic' children who had 'no language', and again, diagnostic category was not related to language ability (see Table 3.5.). Thus, if chance performance does mean something other than an inability to carry out the task, then it seems essential to investigate further the implications of behaviour.

It was decided, therefore, that the research should approach the question of the associations between motivation, social behaviour and intellectual behaviour from a base rather broader than negativism, i.e. to one which would include the child who picks responses at random, or in terms of his own ritualised interests. In one sense, this is a range of outcome behaviours which one might more acceptably predict of a child whose performance was to be explained in terms of motivation deficits: One of the weaknesses of the Cowan et al formulation of negativism is that such active and deliberate avoidance of correct responses can be seen to require, in a contrary fashion, a relatively high level of task involvement and motivation. It is the child who appears to possess the necessary skills, but yet performs randomly, irrelevantly, or not at all, who is more likely to be described as 'unwilling' or 'unmotivated'. The studies described in the following chapter deal in detail with this issue.

CHAPTER FOUR

CHAPTER 4.

4.1. Introduction

In Chapter 3, one reported aspect of the behaviour of autistic children, namely 'negativism' was selected as indicating an extreme instance of the child's unwillingness to cooperate in a task involving interaction with another person. The absence of any negativism in the group of children that was tested meant that the original brief of examining factors which influence the autistic child's 'lack of cooperation' had to be restated in a rather broader context. The purpose of the studies described in this chapter was to see how the performance of a similar group of autistic children varied when the intellectual demands of the task were systematically varied, and in particular to examine what it was that contributed to the child either not responding appropriately to a request or performing incorrectly. As will be expanded upon in Chapter 5, this has implications for the interpretation of the findings of standard procedures of assessment of, say, intelligence quotients of autistic children. Does a child's low score on an IQ test reflect a limited level of ability or poor motivation when tested?

Clearly, success in a particular task creates no problem as one can conclude that the child has the ability to function at a level which can at least accommodate the cognitive demands of that task (providing, of course, that one is aware of the probability of the child achieving the correct response by chance). It is failure that requires explanation in terms of ability level or lack of cooperation.

In order to examine the relationship between the intrinsic difficulty of a problem and the child's performance, it was necessary to devise the experimental procedure in such a way that it satisfied the following requirements:

(i) It had to be composed of a battery of test items with instructions that made minimal demands on the child's verbal comprehension and that were the same for all items;

(ii) the type of response to each item had to be simple and non-verbal, and the same for each item. This requirement, and (i) above, was to ensure that any differences in the responses to the items could not be attributable to impaired linguistic ability or to differential abilities in comprehending the task requirements;

(iii) the component test items had to differ in the extent of the demands made upon the child's reasoning ability.

The possible circularity of item difficulty, as implied in the third requirement above, being defined in terms of probability of child success had to be avoided by the use of some external criterion, derived either from the logical characteristics of each item, or from the performance of a sample of children not drawn from the population being examined (i.e. drawn from a sample of normal children).

The Board Form of the Raven's Coloured Progressive Matrices (Raven 1956a) was chosen as a test which satisfied these requirements of the experimental task. In addition to it being a multiple item task of reasoning ability involving simple and identical instructions for each item, it offered several other features which lent themselves to the purpose of the study.

(i) the test is constructed from 36 test items in 3 sub-scales of 12 items each. The items in each sub-scale are monotonically arranged in order of difficulty and cover almost the entire range of difficulty that the three sub-scales combined span. Thus after the presentation of the first 12 items (i.e. sub-scale A) there is return to easier items; similarly at the end of the second sub-scale (A_b).

(ii) each item is a multiple choice problem, with the 'choices' being selected to allow examination of patterning of wrong responses. Various studies have used this facility of the Coloured Progressive Matrices to examine the significance of errors in normal children (Crawford, 1955; Sigel, 1963; Jacobs and Vanderenter, 1970), old people (Levinson, 1962), adult schizophrenics (Maher, 1960) and mentally retarded children (Anderson, Kern and Cook, 1967), but none seem to have made the same sort of analysis of the performance of autistic children.

(iii) there is a body of normative data for the test (Raven, 1956a) which provides the necessary external criterion of item difficulty. White (1973) has examined in some detail factors which related to the performance of a sample of normal adults on the advanced Advanced Progressive Matrices (Raven, 1962), which is a test of similar form to the RCPM. Although the model derived in the White study is inappropriate for the purposes of the present work, it does include methods of estimating mathematically indices of item difficulty level. One of the basic premises of the empirical illustration of the model is that the problems can be arranged in ascending order of difficulty according to the proportions of subjects in the normative sample who failed them.

The strategy employed in the succeeding investigation was as follows:

(i) The Board Form of the RCPM was to be routinely administered to a sample of autistic children. According to the motivation hypothesis it was expected that item difficulty would be a poor predictor of item failure. Further, it was predicted that task involvement should decrease as the test proceeded, or more specifically, as a function of the number of items already encountered. It was also predicted that there would be a difference in the nature of error responses, depending on whether or not item failure was a function of item difficulty or of poor motivation.

(ii) children whose performance fell outside the range of the 36 items in the RCPM would be followed up with either more difficult or more easy items in order to ensure that every child was presented with at least several items that were demonstrably within his ability as well as being seen to fail on at least some items.

The procedure and results are therefore described as two experiments: the first (Experiment 4) is concerned with the standard presentation of the Matrices, and the second (Experiment 5) with the various follow-up procedures with those children about whom more information was required.

4.2. Experiment 4

4.2.1. Method

4.2.1.1. Subjects

Thirty children who were pupils at a West London school for autistic children were tested. Performance IQ scores for these children, obtained from the Merrill Palmer Scale of Mental Abilities (Stutsman, 1948) and the WISC (Wechsler, 1949), ranged from 53 to 132 with a mean of 86.6, and their ages ranged from 8 years to 17:5 years with a mean of 12:2 years. As in the 'negativism' studies (Chapter 3), the medical and psychiatric records of all these children were examined to see how closely they fitted the diagnostic criteria of (i) abnormal development of interpersonal relationships, (ii) language impairment, (iii) and presence of compulsive or ritualistic phenomena (Rutter, 1978). On the basis of this review, 20 children certainly satisfied all three criteria and were classified for the purposes of the study as 'typically autistic'; the remaining 10 were atypical in some respect and for the purposes of this study were classified as 'atypically autistic'.

4.2.1.2. Materials

The experimental task involved the use of the Board Form of the Raven's Coloured Progressive Matrices[1]. This consists of 36 "problems of reasoning ability", each requiring the testee to choose which one of six movable tiles completes a simultaneously presented coloured pattern. Each problem was mounted in a cardboard container, 20cms x 11cms in size, hinged along one side. It was arranged so that when closed, the movable tiles held in their correct positions, and when opened it formed a base for the problem, 20cms x 22cms. The pattern to be completed was mounted in the top half of the container and the six 'choices' were in the bottom half, two rows of three.

4.2.1.3. Procedure

The test was administered individually to all of the children in the manner and the order recommended in the Guide to the Coloured Progressive Matrices (Raven, 1956a). The first of the problems is used as a 'demonstration', and for the purposes of this study was used to establish the nature of the desired response (i.e. the placing of one of the tiles into the space in the pattern). This is a type of response familiar to all children at school and was responded to appropriately by all of the children in this study. For each problem, record was made of all pieces that were held in the hand and examined, but it was the first piece inserted in the pattern that was counted as being 'right' or 'wrong'. Each child was continuously encouraged for responding

[1] This apparatus was kindly lent by the Director of the Crichton Royal Department of Psychological Research, Dumfries, Scotland.

appropriately, but was not informed of the correctness of his response.

4.2.1.4. Derivation of item difficulty

In order to examine the effect of items of varying difficulty on the performance of this sample, the component items of the RCPM were ranked in order of difficulty. The ranking was based on the data published in the Guide to the RCPM (Raven, 1956a, Graph IV, p.35) derived from a sample of 608 children aged between 5 and 11.5 years, tested on the book form of the test. Order of difficulty was defined as the order in which the items achieved a 50 percent pass rate in the standardisation sample as total score increased (cf. White, 1973).

Obviously, this procedure is not entirely satisfactory for a variety of reasons: for example, the Book Form of the test is not wholly equivalent to the Board Form, the latter probably being a slightly easier test. The assumption has to be made, therefore, that within each form of the test, the relative difficulty of each item was the same. Jordan (1959) has examined the comparability of the two forms and indeed found that mean scores of two groups of children did show a difference in favour of the Board Form, although this difference was not large enough to reach significance. (The two groups, N = 49, were matched for mental age but the statistical test used was an independent 't' test: this may have contributed to the failure to detect statistical significance). A second weakness lies in the fact that as the order was derived from a visual presentation of of the data (i.e. a graph), it was not possible to take into account the 'standard error' of the difficulty or to group items as being of equal difficulty. The rank order therefore, was imposed on the data according to the order in which each item crossed the 50 percent pass line. However, any inaccuracies of the sorts described above would serve only to reduce any relationship between difficulty and performance. It was considered, therefore, that in spite of these limitations, the order derived from the Guide, provided an external index of difficulty, adequate for the purposes of this study.

Figure 4.1. presents the normative data used and the resulting difficulty rankings for the 36 items. The separate 'traces' on the graph are individual items and represent for each item the percentage of correct solutions (N=608) as total score on the scale increased. The numbers against each trace represent the item numbers (1-36) and at the top of the figure the order in which they cross the 50% pass line is given. It can be seen that the order of difficulty for items A_1, A_2, A_3, A_4, A_b1, A_b2 and B_1 is somewhat arbitrary.

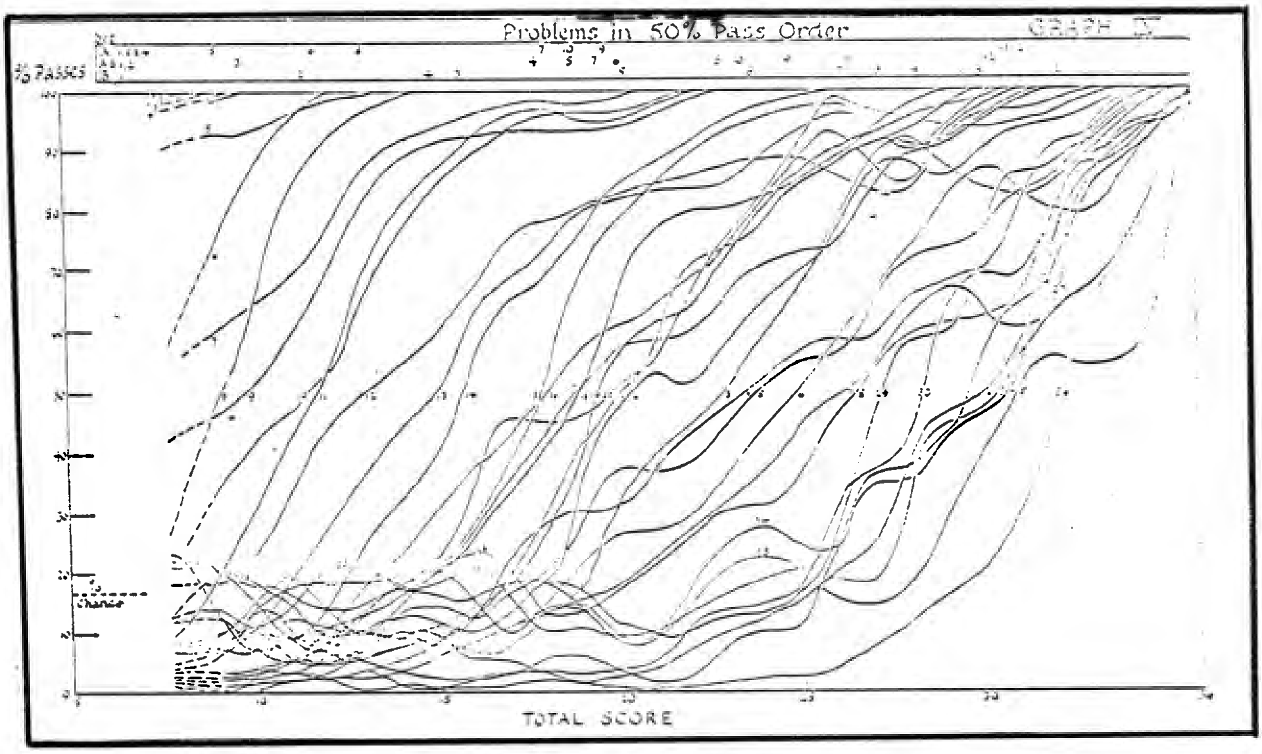
4.2.2. Results

4.2.2.1. Performance of the whole group

The total scores (i.e. number of items passed) for each child covered a broad spectrum, ranging from 36 (out of a possible maximum of 36) to 9, with a mean of 23.6 per child.

Figure 4.2. shows the number of children passing

Figure 4.1. Data used to estimate the rank order of difficulty for each item and the resulting indices. (Graph taken from Raven 1956a).



Subscale

Item number	A	Ab	B
1	1	5	7
2	2	6	10
3	3	9	14
4	4	15	13
5	8	18	22
6	11	21	25
7	16	19	27
8	12	23	32
9	20	26	30
10	17	24	29
11	34	28	31
12	35	33	36
Mean rank difficulty	13.58	18.92	23.00

each of the 36 items of the RCPM. The number of successes per item ranged from the maximum of 30 to 7, with a mean of 19.6.

It would appear, therefore, that used as the experimental task, the RCPM was successful in discriminating between different levels of performance within the sample, and that the individual items were discriminable with respect to the number of children passing each item.

Figure 4.3. shows the same data presented in Figure 4.2. but with the items rearranged along the abscissa according to difficulty.

Examination of Figures 4.2. and 4.3. reveals several points. Firstly, Figure 4.2. shows that beginning with 100 percent success rate on the very first presented items, the performance of the group progressively deteriorated through the presentation of sub-scale A. However, on presentation of the earlier items of sub-scale A_b, group performance improves dramatically, but soon deteriorates as the test proceeds. Similarly, at the beginning of sub-scale B there is an improvement which is followed by a progressive decrease in the number of 'passes'. It seems reasonable to conclude that all of the children understood the requirements of the task and were able to negotiate successfully the very earliest items.

The question that needs to be asked is whether or not the decrease in the number of passes as each successive item within each sub-scale is presented, and the decrease in the mean passes per sub-scale reflects an increase in item difficulty or a decrease in task involvement

Figure 4.2. Relationship between number of children with each item correct and the order of presentation of the items.

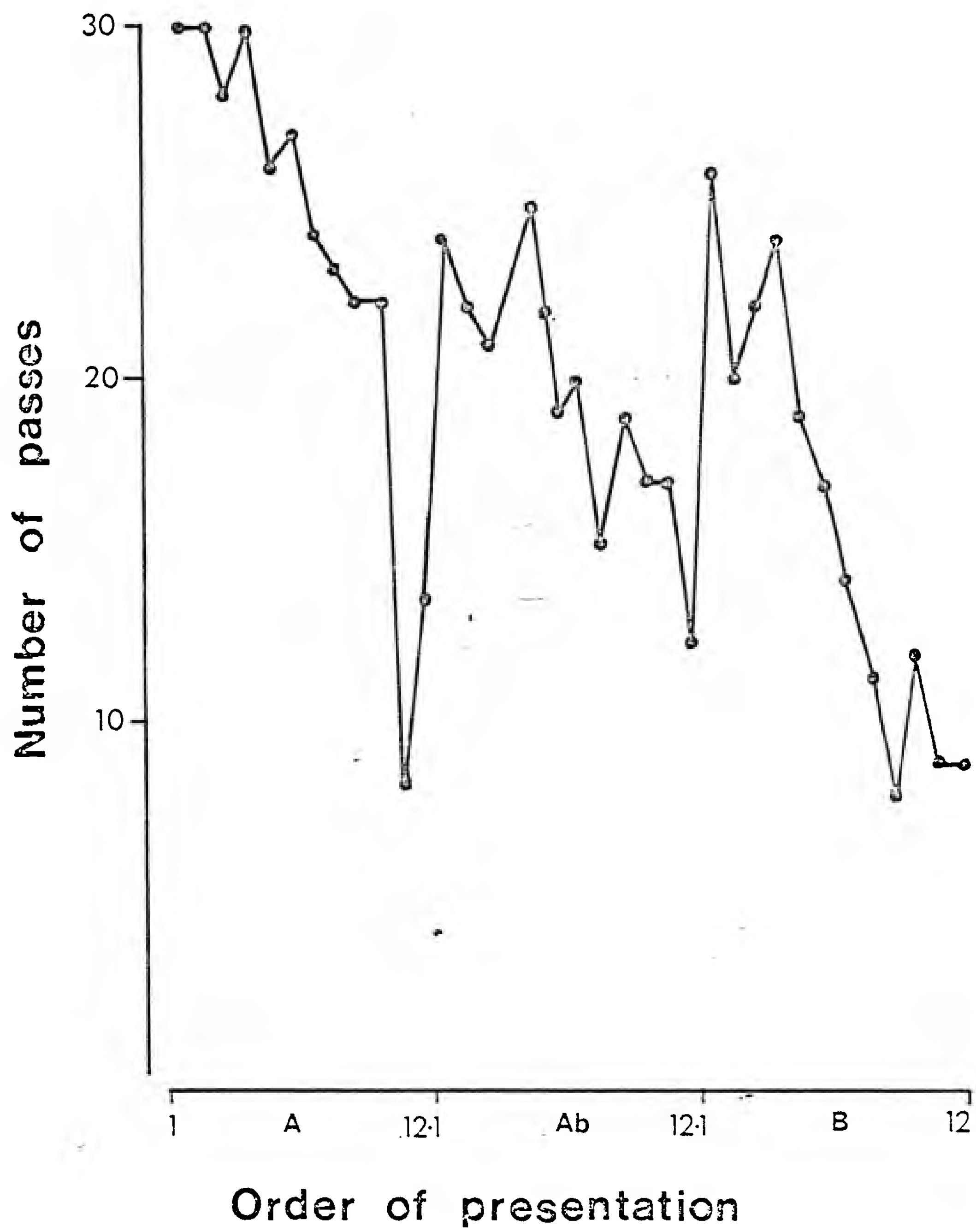
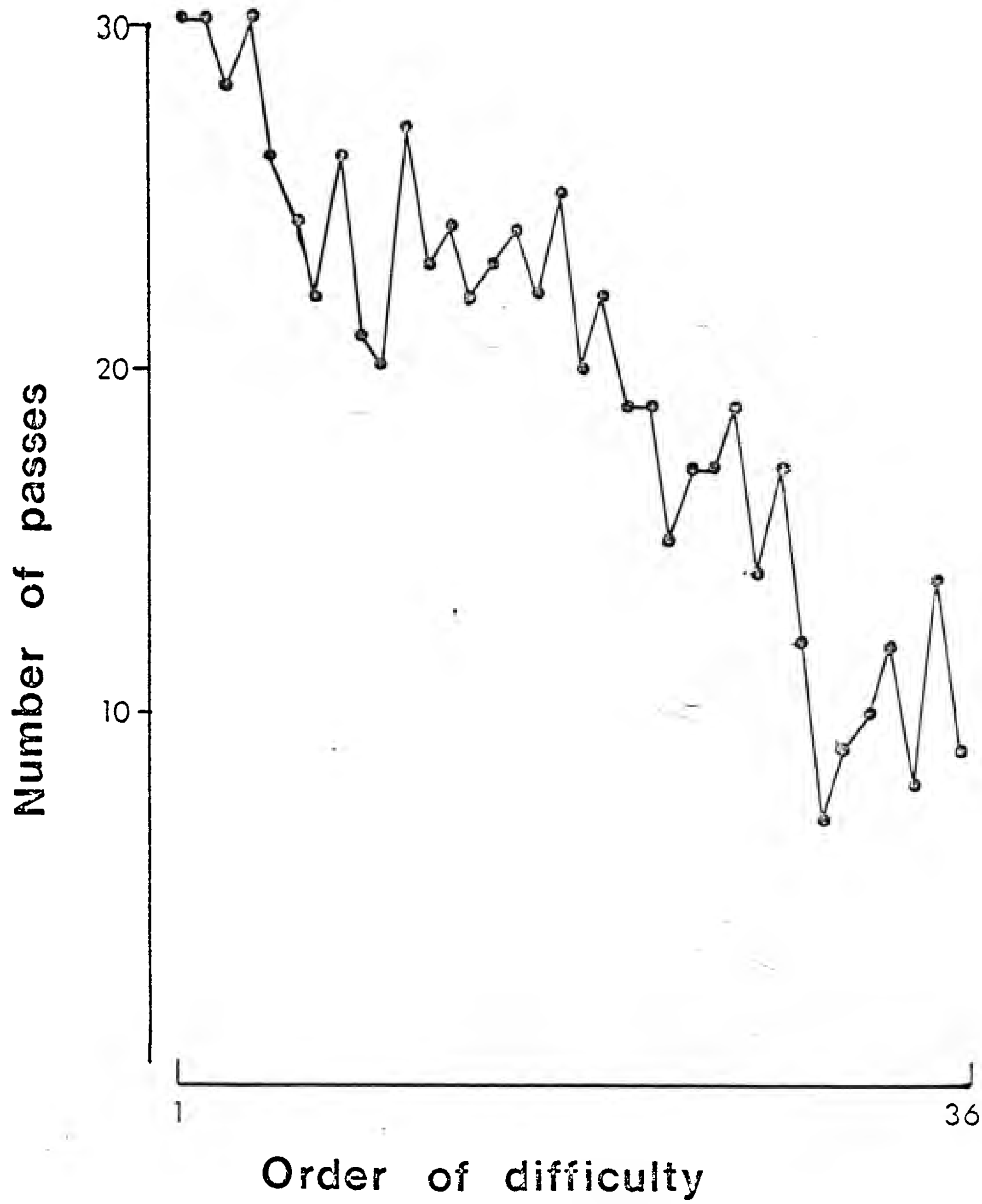


Figure 4.3. Relationship between number of children with each item correct and the order of difficulty of the items.



(see Table 4.1.).

Table 4.1. Mean number of passes per sub-scale for whole group

	Sub-scale		
	A	A_b	B
mean	23.6	17.8	15.9
range	8-30	12-25	8-26

Figure 4.3. would suggest that despite the caution necessary in drawing up the rank order of difficulty, performance seems to be closely related to this index. However, the RCPM is constructed in such a way that order of difficulty is partly confounded with the order of presentation; the more difficult items tending to come towards the end of the test (cf. Anderson, Kern and Cook, 1968). To take this into consideration, Kendall rank correlations (tau) were calculated between presentation order (x), number of passes (y) and rank difficulty (z), and also the partial rank correlations, $tau_{xy.z}$ and $tau_{yz.x}$ (Siegel, 1956). Table 4.2. shows the results of these analyses.

These data show that the relationship (tau) between number of passes and presentation order drops from +0.59 to +0.33 when order of difficulty is controlled for, whereas the relationship between number of passes and difficulty level drops only from +0.79 to +0.70 when similar allowance is made for the order of presentation. (The sampling distribution for Kendall's partial rank correlation coefficient is not known, so the significance of tau, or the significance of the difference between two values of tau cannot be estimated (Siegel, 1956)*.

Table 4.2. Kendall Rank Correlation and Partial Rank Correlation Coefficients (tau) between Presentation Order (x), Number of Passes (y) and Rank Difficulty (z).

$tau_{xy} = +0.59$	$tau_{xy.z} = +0.33$
$tau_{yz} = +0.79$	$tau_{yz.x} = +0.70$
$tau_{xz} = +0.53$	

4.2.2.2. Analysis of errors

As a wide range of performance levels had been sampled by the administration of the RCPM, it was necessary to look at the distribution of correct responses and the nature of the incorrect responses to see if, within the group of children tested, there were subgroups who reacted in different ways to the task. Table 4.3. presents a classification of the possible different response styles that can be exhibited during the completion of the RCPM.

Each response for each child was first classified as being correct or incorrect, and then the incorrect responses were classified into type of error (see Raven, 1956a, p.32); the position of each error in the array of six choices was also noted.

For each child, the null hypotheses that the errors were distributed in proportion across error type and across different tile positions were tested using chi-square tests. With respect to these analyses, expected frequencies in testing for position preferences were based on .17 of the

* To improve upon this and to get an idea of the significance of the values of tau in this study an empirically derived sampling distribution for N=36 was generated, details of which can be found in Appendix A.

total number of response errors; when testing for preferences of error types, the categories listed under "Response is incorrect" (see Table 4.3.) were used and the expected frequencies based upon the proportions .27, .20, .29 and .23 respectively. These are estimated from the frequencies of occurrence of each group of error types in the whole test. Maher (1960) has pointed out that if position preferences only are looked at, erroneous conclusions may be made as position and error type are not wholly independent. Hence both analyses were carried out on all children. Based on whether or not the null hypotheses were rejected at the 5 percent level of significance, the sample was divided into 5 groups. Table 4.4. summarises these groups.

The first response group (A) contained those children (N=8) for whom the task was pitched at an innappropriate level and who made so few errors (less than 6) that it was not possible to examine what contributed to item failure. Group C (N=13) contained those children who made more errors (more than 6) and where the distributions of errors were significantly related to some characteristic of the information conveyed by the response tile; i.e. there appeared to be a problem related strategy, albeit wrong, that the child was employing. Moreover, for 9 of these children, the significant tendency was in the direction of errors that were of the form of repeating a part of the pattern that had to be completed. The remaining four children in this group made errors that showed the same bias but who also showed a tendency to make some "incomplete correlate" type errors (i.e. not quite complete or incorrectly oriented). Figure 4.4. shows examples of these types of errors.

Table 4.3. Classification of Possible Styles of Response to the RCPM

1. Child is responding to some characteristics of the information presented.
    - (a) Response is correct.
    - (b) Response is incorrect.
        - (i) choice is quite irrelevant to the pattern.
        - (ii) choice is based upon "inadequate individuation", i.e. elements of the problem analysed incorrectly or combined irrelevantly.
        - (iii) choice merely repeats part of the pattern to be completed.
        - (iv) choice is correct as far as it goes but is incomplete or incorrectly oriented.
2. Child is responding to the position of the tile in the stimulus array.
3. Child is responding randomly.

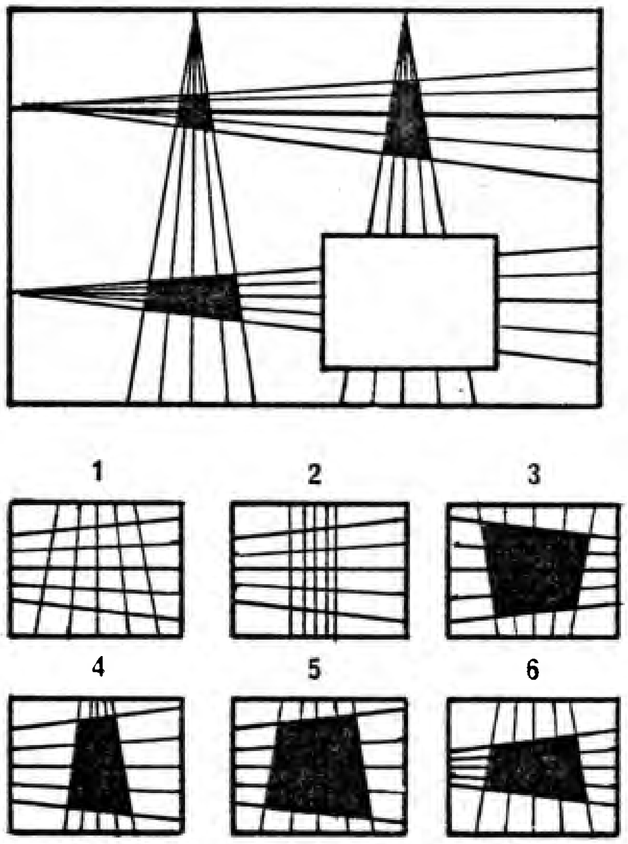
Adapted from Raven (1956a), pp. 32-34

Table 4.4. Characteristics of the 5 Response Groups

		Correct Responses		
Group	N	Range	$\bar{X}$ (S.D)	Errors
A	8	>30	34.6 (1.5)	Very few errors
B	3		27.0 (1.0)	Errors apparently unsystematic
C	13	13-30	21.6 (4.9)	Errors showing a strategy bias
D	3		14.3 (2.3)	Errors showing a position bias
E	3	<13	10.6 (2.1)	Errors showing position perseveration

Figure 4.4. Examples of some of the more frequently occurring information based errors to the RCPM. (key overleaf)

A12



Ab 12

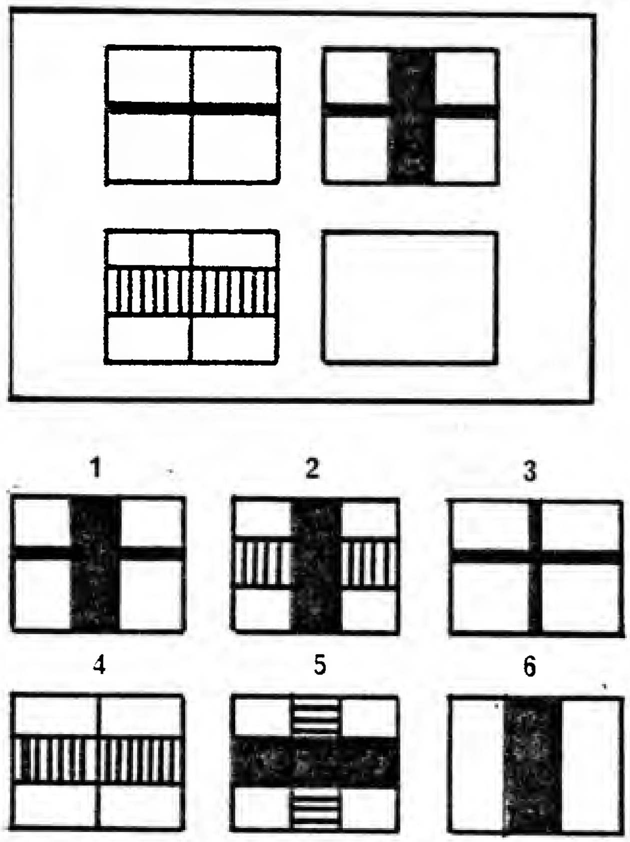


Figure 4.4. Key

Item A12 1 = incomplete

2 = incomplete plus "inadequate individuation"

3 = wrongly oriented

4 = repetition of pattern

5 = correct

6 = repetition of pattern

Item Ab12 1 = repetition of pattern

2 = correct

3 = "inadequate individuation"

4 = repetition of pattern

5 = wrongly oriented

6 = incomplete

It is significant that these are the types of errors most commonly reported in samples of normal (Raven, 1956a) and mentally retarded children (Anderson, Kern and Cook, 1967).

Groups D and E (N=3 and 3) included those children whose errors showed a position bias, the difference between the groups being the strength of this tendency. The children in the first group (D) showed a significant but not exclusive preference for choosing a response from one or two of the positions. Those in the latter group (E) could be described as perseverating with one position only; 89 percent of the incorrect responses were drawn from the same position. Table 4.5. illustrates how dramatic this distinction is.

Table 4.5. Distribution of position of incorrect responses for the children in groups D and E

		Position					
		1	2	3	4	5	6
Subjects	D1	8	9	3	0	2	2
	D2	3	11	6	0	2	1
	D3	0	4	6	0	2	7
	E1	1	26	0	0	0	0
	E2	0	23	1	0	2	0
	E3	0	2	19	0	1	1

Group B comprised those children whose wrong responses were unsystematic in the sense that they showed neither a significant 'strategy' nor 'position' bias. However, this is not to say that they performed randomly: all three children performed at an age appropriate level and made relatively few errors, making any pattern in their errors difficult to detect.

The distribution of children amongst the response types ~~were~~ was examined to see if there ~~were~~ was a relationship with diagnosis (see page 101). For the purposes of this analysis, Groups B and C were combined, as were D and E (Table 4.6.). The insignificant chi-square suggested that there was no relationship between diagnosis (i.e. whether the child fell into the 'typically autistic' or 'atypically autistic' group) and the child's response style.

Table 4.6. Distribution of response type and diagnostic category

	Response type (see Table 4.4.)		
	A	B+C	D+E
Typical	6	9	5
Atypical	2	7	1

Chi-square = 1.78 d.f. = 2

One aspect of the strategy employed throughout this experiment was that the children should be given problems that they could, and did, succeed in and that the difficulty of the problem should then be increased until they were no longer performing successfully. The children were then to be given easier items to see if performance was a function of the difficulty of the problem (i.e. to see whether or not they tended to revert to correct responses). Although the results presented in Table 4.2. would indicate that this is generally the case for the group as a whole, the more detailed examination of individual response patterns, summarised in Table 4.4., suggests that there are sub-groups of the sample whose responses follow different patterns. Findings derived from the group as a whole may therefore be disguising finer processes contained within the sub-groups. The children in Group A made too few errors for it to be possible to examine the factors influencing changes in performance, and those in Groups D and E, as well as tending to respond to the position of the tile, made insufficient correct responses to allow the assumption that the easier items were within their capability. Re-calculation of the partial rank correlation coefficients on the remaining 16 children (i.e. Groups B and C) revealed a sharper differentiation between the partial correlation between passes and presentation order (+0.17) and that between number of passes and difficulty level (+0.69).

Table 4.7. Kendall Rank and Partial Rank Correlations (tau) between presentation order (x), Number of Passes (y) and Task Difficulty (z), recalculated for Groups B and C.

$tau_{xy} = +0.51$	$tau_{xy.z} = +0.17$
$tau_{yz} = +0.77$	$tau_{yz.x} = +0.69$
$tau_{xz} = +0.53$	

In order to examine in greater detail the performance of the remaining children, it was necessary to administer a different range of test items in order to tap a greater number of correct responses (Groups D and E) or to induce a greater a number of failures (Group A). The details of this are described in Experiment 5.

4.3. Experiment 5

4.3.1. Method

4.3.1.1. Subjects

Six of the children in Group A (see Table 4.4.) were followed up with problems that were more difficult than those with which they had originally been tested. One of the original group of 8 children had moved to a school outside of London and was no longer available for follow-up: one other was not re-tested because he was much younger than the remaining 6 who were re-tested, and, therefore, well within the age range for which the Coloured Progressive Matrices are considered appropriate. The 6 children who comprised Groups D and E were re-tested with some easier problems.

4.3.1.2. Materials

For the more difficult problems to be given to Group A, the Book Form of the Standard Progressive Matrices (Raven, 1956b) was used.

For the easier problems, two new series, each of 12 matrix-type items were designed. The first of these series was comprised of items where the problems involved the completion of a simple continuous pattern and where the child had to discriminate the correct tile from others which were quite irrelevant to the pattern. There were no items where the solution required the perception of progressive changes, symmetry or orientation. Essentially, these 12 pattern completion problems were of the same type as the first 4 items of sub-scale A of the RCPM, and they were constructed from the same materials as the originally presented Board Form of the RCPM. Appendix B shows in black and white, the patterns used in this version of the test. In actual fact, the patterns were coloured with combinations of either red, purple, green, black, orange, blue or white, although colour was not relevant to the solution of the problems.

The second of the easier series of problems also required the child to select the correct tile from an array of six, but a plain colour was used instead of a pattern. This task could be presented in one of two forms; either as a colour matching task where the correct tile was arranged with five plain white tiles, or as a colour discrimination task where the correct tile was presented along with five differently coloured tiles. It was assumed that these series of problems could be arranged in ascending order of difficulty as follows:

1. Colour matching.
2. Colour discrimination.
3. Pattern completion.

Each series consisted of twelve problems and within the colour matching colour discrimination series, the problems were assumed to be of equal difficulty, the only variable being colour. Although the items within the pattern completion series were more variable, it was assumed that any inter-item differences with respect to difficulty were minimal: this assumption rests upon the constraints imposed upon the design of the items (see page 118), and inspection of the resulting problems suggests that this assumption has at least face validity.

4.3.1.3. Procedure

The six children in Group A who were re-tested were given the 60 items of the Standard Progressive Matrices in the manner recommended in the Guide to the SPM (Raven, 1956b). The picture indicated as being correct was noted.

The six children who were given the easier scales were presented with the test materials in the following order:

1. Pattern completion.
2. RCPM sub-scale A.
3. RCPM sub-scale A_b.
4. Pattern completion.

At a later date, 2 of these children were again tested using, in order:

1. Colour matching.
2. Pattern completion.
3. RCPM sub-scale A.
4. RCPM sub-scale A_b.
5. Colour discrimination.
6. Pattern completion.

4.3.2. Results

4.3.2.1. Standard Matrices

Of the six children in Group A, tested with the Standard Progressive Matrices, 5 appeared to perform in an appropriate fashion. The scores obtained from these five ranged from 30 to 50 (out of a possible 60), with a mean of 44 successes per child. Raven (1956b) has published for each total score obtainable the expected number of items correct out of 12 for each of the five sub-scales. Thus, a total score of 45 would most likely be comprised of sub-scale scores of 12, 10, 9, 9 and 5. This allows some estimate, in terms of deviations from these figures, of how "normally" the child is approaching the test. For each child tested here, the average deviation of the scores of the five component sub-scales from what was predicted from each child's total score, was less than 1 ($\bar{x}$ = 0.96).

The sixth child in this group behaved in a fashion which was not only quite different from that of the other five, but which was qualitatively different from his own earlier performance on the RCPM. After getting the first five items of scale A correct, 54 of the following 55 items elicited an incorrect response. The first 24 items are monochrome versions of scales A and B of the RCPM, and by his own performance on the initial testing with the Board Form of the RCPM, these were demonstrably within his ability. It appeared then, that this child was behaving in a manner that would be described by Cowan, Hodinott and Wright (1965) as 'negativistic' (see Chapter 3). To explore this more fully, the SPM was immediately re-administered, yielding only 4 correct responses out of the possible 60. The last 36 items (scales C, D and E) were then presented yet again, but with a slight modification of the procedure; the display from which the correct tile had to be chosen was covered and the child had to <u>describe</u> the piece that should complete the pattern. Using this procedure, scales C, D and E yielded 12, 9 and 6 correct responses respectively (i.e. 27 out of 36). Reverting to the conventional mode of presentation for scales A and B resulted in the maximum of 24 correct responses.

4.3.2.2. 'Easier' testing

The results of the administration of the pattern completion test, scales A and A_b of the RCPM and the pattern completion test for a second time, to the six children in Groups D and E are shown in Table 4.8.

The three children in Group D and one of Group E (E1) negotiated the pattern completion successfully, but started to make errors as sub-scales A and A_b were administered. However, on returning to the easier pattern completion problems, these four children again started to respond correctly.

The two remaining children (E2 and E3) responded again in a way that could be described as perseverating with

Table 4.8. Results of Re-test of Groups D and E: Number of correct responses per sub-scale.

		Task			
		Pattern completion	A	A_b	Pattern completion
Child	D1	12	7(9)*	9(5)	12
	D2	12	6(7)	11(4)	12
	D3	12	6(9)	3(1)	12
	E1	12	9(9)	4(2)	10
	E2	1	2(5)	2(2)	2
	E3	2	2(6)	2(2)	2

*Figures in parentheses indicate scores obtained on initial presentation of RCPM.

a particular response position. Characteristically, their responses were impulsive and straight to, say, the middle tile in the top row: often they would not look at the problem before responding. It was these two children, who, as described in the procedure, were re-tested with the following tests:

1. Colour matching;
2. Pattern completion;
3. RCPM sub-scale A;
4. RCPM sub-scale A_b;
5. Colour discrimination;
6. Pattern completion.

The results of this sequence of tests are shown in Table 4.9.

Table 4.9. Number of Correct Responses per sub-scale in 3rd testing of Subjects E2 and E3.

	Task					
Child	Colour Matching	Pattern Completion	A	A_b	Colour Discrimination	Pattern Completion
E2	12	12	6	2	12	12
E3	12	9	8	3	12	10

These results indicate that success is achieved with the very easiest items, but as the problems increase in difficulty, the probability of failure increases. On a subsequent return to the easier scales, the child starts to respond correctly once again.

4.4. Discussion

Throughout the administration of the variety of tests described in this chapter, the common objective has been to examine the effect on the autistic child's performance of varying the difficulty of the problems that made up the tests. It was intended that this examination would result in a clarification of the issue of whether the child's performance reflected his 'ability' or his 'motivational state'.

4.4.1. Initial Testing: The Coloured Progressive Matrices.

An index of reasoning ability can be shown to have meaning if it can be demonstrated that whilst obtaining that index, the probability of success in a particular item is related to the difficulty of that item. This, for example would not be the case if the child stopped responding correctly at some point during the test administration and continued to respond incorrectly when easier items, the same or equivalent to those already successfully negotiated, were readministered. In Experiment 4, the results of the Raven's Coloured Progressive Matrices, when given to the whole group of children, indicated that, over the wide range of total scores achieved, there was a relationship between item difficulty and the probability of success, and also that there was a smaller relationship between success and presentation order, (i.e. there was more chance of failure occuring on items presented later on in the test). When corrections were made for the unavoidable partial confounding of item difficulty with presentation order, the former correlation was only marginally reduced whereas the latter was reduced by almost half (see Figures 4.2. and 4.3. and Table 4.2.).

It would not be unreasonable to assume that in any population there will be some deterioration of performance over time and that, therefore, the remaining partial correlation due to presentation order, identified in this sample of children, is only to be expected. However, the manner of the derivation of the rank order of difficulty would preclude this explanation, as any 'fatigue' factor would have operated in the original standardisation sample, and would, therefore, have been in the difficulty index. On the other hand, the conclusion that, as well as there being a 'difficulty factor', there was also a residual 'fatigue factor' also had to be examined more closely because of the heterogeneous nature of the response styles and the low total scores achieved by some of the children (see Table 4.4.). The children who made incorrect responses based on the position of the tile were also those who made fewer correct responses overall. As one would suspect that some of these correct responses can be put down to 'chance', then it becomes unclear which items one would expect to be within the child's capability, and which ones would be outside. Restricting the correlational analysis to those children who scored sufficiently highly for it to be confidently assumed that at least the earlier items on each sub-scale were within their capability level (and also ignoring those children who made hardly any errors), the presentation order coefficient reduces to an insignificant level (see Table 4.7.). It would appear that for these children, behaviour is appropriate for the difficulty of the item, i.e. the greater the difficulty the greater the probability of failure.

This also means that items later on in the series have much the same probability of success associated with them as items of equivalent difficulty presented earlier on. Also, when incorrect responses were made by these children, the errors tended to be of a kind that indicated that the child was using a problem related strategy, albeit incorrect: this probably constituted an 'attempt' at the problem over and above the mere production of a response, and would support the hypothesis that the child's performance is related to the characteristics of the reasoning required to reach a solution. For the children, then, whose performance in terms of total score suggested that the test was pitched at an appropriate level, there was no evidence that lack of motivation was contributing to their responses to the test.

4.4.2. Further testing.

4.4.2.1. The High Scorers.

The children in Group A who were tested further with a range of problems which included considerably more difficult items are, for the issues under scrutiny in this research, generally of less interest: any motivation deficit that is conducive to a child still succeeding on items that are at, or above, his age level, cannot really be described as a primary handicap. However, the one child who reacted to the Standard Progressive Matrices by initially giving an incorrect response on nearly every trial provided an interesting instance of what might be called classi lly negativistic behaviour. The items that he was failing were at least as easy, and easier, in terms of reasoning required to achieve the correct answer, as items that he had had no trouble with on the initial testing with the Board Form of the Coloured Progressive Matrices. The studies described in Chapter 3 were concerned with the meaning of this sort of behaviour which Cowan et al (1965) had reliably observed in a sample of low functioning children with little or no language, and the results failed to demonstrate the presence of such behaviour. Interestingly, the child who was now behaving in this contrary fashion (he was not one of the sample of children who were included in the studies described in Chapter 3) was highly verbal, and his IQ had been assessed some time prior to the experiments reported here as being in the dull-normal range. Interpretation of this child's behaviour can at best be speculative, but to describe it as a function of poor motivation would deny it of its complexity; indeed, to negotiate some of the more difficult items in this fashion would need the expenditure of considerable ingenuity, indicating a highly charged 'motivational state'. It is also interesting that by changing the mode of the response to a verbal description of the missing piece (in itself an index of how far removed this child was from the typically 'no language' negativistic child!) a total reversal of the behaviour was produced which carried over to the more conventional method of presenting the problems.

To pursue the description of this one child's behaviour, he seemed to display signs of being very tense and anxious whilst producing the string of incorrect responses. The provision of the alternative response mode brought about not only a shift to mostly correct answers but seemed to discharge the anxiety, allowing him to complete the test in a much more relaxed manner. It was as if he were 'caught' in the perseverative response style of answering incorrectly from which he could be 'released' by changing the nature of the required response. Child care staff and teachers who were responsible for the management of this child were unanimous in the opinion that he was possibly the most stubborn and "devious" child they had to deal with. It was suggested to them that a possible strategy in overcoming his episodes of stubbornness might be to re-phrase the request that was being made of him in such a way as to attempt to achieve cooperation through another 'response route'. Obviously, this is not easy, as the practical everyday tasks do not have the response flexibility of tasks designed to allow inferences to be made concerning the child's ability. However, on an anecdotal level, there may have been instances where this approach was both appropriate and successful. It was not possible to pursue formally this child's reaction to such an experimental form of management.

4.4.2.2. The Low Scorers.

The children whose performance was most ambiguous with respect to responses to items of varying difficulty, were those who made an initially low score on the RCPM and who also happened to be those whose incorrect responses were based on the position of the tile in the array rather than on any information conveyed by the pattern (Table 4.4.). Where a child begins to respond incorrectly early on in the first of the three sub-scales, it is not possible to assume with any confidence that the later presentation of the first items on the second and third sub-scales is, in fact, within the capability of that child; the reason being that it is at the extremes of the entire test that the rank ordering of item difficulty becomes least reliable (see Figure 4.1.). A wider range of successfully negotiated items is necessary before one can be confident that problems of a particular type are of the same or of less difficulty than ones already passed. The object of the 12-item pattern completion task was, therefore, to provide the children in Groups D and E with a greater number of problems at the very easiest end of the matrices scale in an attempt to establish consistent, correct responding. It should of course be borne in mind that these extra tests do not necessarily invoke the same reasoning processes as do the majority of the RCPM items, and, therefore, possibly add to the heterogeneity of the test items as a whole. However they do maintain the same topographical features of all the other items, and as such, it was considered reasonable to assume that they could all be grouped, according to difficulty, along with the very first items of sub-scale A of the RCPM. Inspection of these items, Appendix B, allows critical examination of the face validity of this assumption.

From the results of the administration of these extra tests it would appear that for four of these six children, the objective of establishing consistent correct responding on easier items was successfully achieved; correct responses on the pattern completion were followed by a mixture of success and failure on the more difficult items of scales A and A_b, and then by a return to consistent successful responding on the re-administration of the pattern completion.

Although this does appear to support the hypothesis that these four children are performing in a fashion consistent with those in Groups A, B and C in that their response can be manipulated between success and failure by altering the difficulty of the task, there is an indication that the scores on sub-scales A and A_b suggest an increase compared with the initial testing.

The further testing of the remaining two children in Groups D and E with the colour matching and colour discrimination is illustrative with respect to this improvement. Here the reduction of the difficulty level to below that of the pattern completion was sufficient to produce not only correct responding on the colour matching but, interestingly, to change the response on the subsequent pattern completion to nearly total success. Failure again increased as the testing proceeded through sub-scales A and A_b, but on administration of the colour discrimination task, and re-administration of the pattern completion performance reverted to near perfect responding. Thus, when the appropriate range of items is chosen, correct responding can be predicted by the difficulty of the task. However, there is a marked difference in the scores of these two children on the pattern completion task between the two occasions it was presented; i.e. when it was presented first (Table 4.8.) and when it was preceded by an easier scale (Table 4.9.). If this can be considered equivalent to the apparent increase in scores on the sub-scales A and A_b when these were preceded by the easier pattern completion task with the other four children of Groups D and E, then some qualification of the predictive power of item difficulty is necessary. It would appear that the experience of success, or the establishment of correct responses to qualitatively easier problems, facilitates the production of correct responses to subsequent, more difficult items.

This is consistent with the findings of Churchill (1971) who noted that in both autistic and schizophrenic children, certain deviant behaviours (e.g. self stimulation and "avoidance") increased as the number of failures increased relative to the number of successes.

Several other studies have hinted at a similar finding. Dehn (1970), in a detailed study of the reinforcement contingencies that influenced "uncooperative" behaviour in four autistic children noted that the rate of correct responses increased with reinforcement only if the number of non-reinforced responses was kept low. Koegel and Egel (1979) found that when autistic children worked at tasks on which they were typically incorrect, their motivation (defined as "attempts at responding and enthusiasm") decreased to extremely low levels. The latter authors formulate an explanation of these results in terms of the notion of "learned helplessness" (Seligman, 1972; Seligman, Klein and Miller, 1976) and cite the research carried out in the area of depression (cf. the entire first issue of the Journal of Abnormal Psychology, 1978) which has pointed to similar effects (e.g. reduced activity) taking place as a function of low rates of positive reinforcement. However, such a link can at best be described as tenuous as one would expect that all "learning disabled" children (who presumably also experience low rates of positive reinforcement) would react in this fashion.

4.4.3. Implications

From the studies described in this Chapter it would appear that in order to maximise performance, it is not only necessary to establish the topographical features of the desired response (in this case the placing of one tile into the pattern) but also to establish a pattern of correct responding. This becomes more pertinent to the children who are operating initially at a low level of functioning (i.e. who are more likely to encounter failure early on) but would not appear to be an explanation of their initial low level. The implication for the assessment, and indeed for the education of autistic children would seem to be that procedures should be designed to avoid the early introduction of material on which the child might fail.

CHAPTER 5

The Intellectual Assessment of Psychotic Children

Ever since Kanner first described autistic children as having good cognitive potential the question of how intelligent they are has been widely debated. In this chapter the issue will be considered in some detail.

The principles underlying some of the difficulties in making statements about an autistic child's intellectual ability may be traced to fundamental difficulties with the concept of intelligence itself and with the relationship between what is understood by intelligence and procedures that are designed to provide measures of intelligence. The chapter, therefore, starts with a brief description of some of the more pertinent 'milestones' in the history of intelligence and intelligence testing.

It is recognised that there are many factors which influence an individual's performance in an IQ test and the chapter goes on to describe some of these. These 'non-intellectual' factors are often grouped together under the heading 'motivational' factors. However, there are weaknesses implicit in explaining performance, or performance deficits, solely in terms of motivation, and the next section outlines basic misunderstandings that may arise when motivational explanations are invoked.

Nevertheless a child who behaves in an observably uncooperative fashion during testing is potentially introducing gross distortions to the final assessment of his intellectual ability. It is in the assessment of psychotic children that this has been described as a particular difficulty. The chapter goes on to examine the properties of IQ scores derived from autistic children in a number of ways. Firstly, follow up studies which include psychometric testing are presented in detail in order to ascertain the reliability, stability and predictive validity of the IQ. Secondly, studies that have examined the child's behaviour during testing are presented to see the extent to which 'test resistance' or lack of cooperation is related to performance.

After reviewing the available evidence, the conclusion is offered that IQ assessments of autistic children provide useful and meaningful statements about their intellectual ability. The notion that they are invalidated because of distortions introduced by non intellectual factors is on the whole unsupported.

5.1. Intelligence and its measurement

It is probably the case that no aspect of human behaviour has attracted as much attention from psychologists as has 'intelligence'. Like many other concepts, it is one that appeals to the commonsense notions of differences in the way people behave and has long been established in the vocabulary of everyday language. However, along with many of those commonsense concepts, close scrutiny, and especially attempts at mensuration, soon revealed the problems in too hasty an application of the term.

The relationship between the development of the study of intelligence and attempts to measure it is an interesting one as the latter seems to have evolved in advance of there being a satisfactory definition of what it was that was being measured. The first published attempt at measuring intelligence can be attributed to Galton in 1869, who as part of his studies based upon eminent Victorian families, devised a battery of tests based mainly on sensory and motor functions. At the turn of the century, Binet pioneered the move towards batteries of tests based upon psychological processes such as memory, mental imagery, imagination, attentiveness, mechanical and verbal comprehension, suggestibility, aesthetic appreciation, moral sensibility and visual judgement of distance. Originally, Binet correlated these measures made on children with judgements made by teachers as to how bright the children were in order to estimate their validity, but soon moved towards comparing the performance of each child with norms derived from age peers. This was a significant step in the development of measures of intellectual ability as the methodology no longer required a definition of what intelligence was.

The technological advances were then rapid with the emphasis being on continually modifying the existing test items in order to improve the internal consistency of the test as a whole. Increasingly stable estimates of a child's 'mental age' enabled Stern in 1912 to advocate, instead of attention being paid to any discrepancy between mental and chronological ages, the use of the ratio between these two values; i.e., the intelligence quotient. In a sense, the intelligence quotient, or IQ, can be seen to have evolved without direct reference to the nature of intelligence.

Attempts at understanding what intelligence was, and at providing a theoretical substrate upon which measurement could be based, proceeded along two paths. The first was to go back to basic principles and to try to articulate what it was that lay behind, say, Binet's original validation estimates. To this end, Thorndike, then editor of the Journal of Educational Psychology, devoted a large part of the 1921 volume of this journal to the replies of thirteen psychologists and educationalists to the question "What is intelligence and in what direction should future research go?". It is unlikely that it had been hoped that such a survey would in fact resolve the issues that had prompted the invitation to provide the essays, but the outcome of 13 different points of view served to highlight the problems in approaching such definitions in this manner (see Miles, 1957).

The second approach to understanding the nature of intelligence took the increasingly used and useful 'tests of intelligence' and applied to them the powerful statistical tools available to the psychometrician in order to see if there were any properties of the 'behaviour' of the tests themselves which would provide the desired theory. The development of this approach has been complex and prolific as one might expect from the complexity and proliferation of correlational techniques upon which they are mainly based. However, its history is punctuated by a number of significant points such as Spearman's general factor of intelligence, e.g., (Spearman, 1904; 1927), Thurstone's hierarchy of Primary Mental Abilities (Thurstone, 1938), Guilford's three-dimensional 'structure-of intellect' (Guilford, 1959; 1967) and Cattell's crystallised (g_c) and fluid (g_f) general factors (Cattell, 1971). It would not be appropriate to describe in detail these models and others, as apart from the original source material, current reviews and critiques are available in abundance (e.g., Butcher, 1968; Stott and Ball, 1965; Herrnstein, 1971; Vernon, 1979; Block and Dworkin, 1977; Anastasi, 1961; Eysenck, 1979).

However, it is important to note that the impression that each model displaces its predecessors (an impression that might be implied by such a chronologically arranged list) is misleading. In clinical settings it is extremely common to hear an individual's intellectual ability described as a single score, thus implying the Galton/Spearman general factor. Several current intelligence tests closely resemble the Thurstone Primary Mental Abilities model where an overall score can usefully be subdivided into say, verbal and logical abilities, and then further subdivided into further clusters of abilities (e.g., the Wechsler Intelligence Scales). Cattell's assertion that g_f is relatively culture free whereas g_c reflects the individual's experience and ability to use experience encapsulates much of the current controversy regarding the immutability and heritability of intelligence.

History may well eventually support the conclusion that the relationship between the commonsense meanings of intelligence and what intelligence tests measure is illusory (Daniels, 1976; Tyler, 1976). As Block and Dworkin (1977) put it:

> "It is likely that, only when we understand cognitive processes better than we do now shall we be able to see what sort of differences there are in cognitive processes, how they arise and how they give rise to what we prescientifically describe as differences in intelligence .... When cognitive processes are well understood we may decide not to retain the term "intelligence" at all, for it may turn out that intelligence phenomena do not constitute a "natural kind", that no single theory of a class of cognitive phenomena can explain most of the phenomena we would want a theory of intelligence to explain". (p. 428)

Such a statement need not be viewed as defeatist, nor need it steer one towards the conclusion that intelligence is what intelligences tests measure. This sort of operationalism, originally attributed to Boring (cited by

Jensen, 1972), is inadmissible if one then uses it to argue that therefore intelligence tests measure what we have always 'understood' by intelligence, or that our understanding of the nature of intelligence can never be improved upon beyond what we know of intelligence tests. However, there is an enormous amount of knowledge regarding the properties of intelligence tests, and a more pragmatic, and less contentious, reformulation of the operational definition given above might be that 'whatever it is that intelligence tests measure, we are interested in it'.

Certainly this is pertinent to current clinical usage of information derived from intelligence tests, and it is with aspects of this usage that the findings of the research reported so far in this thesis have some bearing.

5.2. Factors influencing IQ

> "...... intelligent behaviour may at times call upon ability to reason, to learn, to solve problems etc., but at other times, and as often, behaviour involves capabilities of quite another sort - capabilities more of the nature of conative, affective, or personality traits. They include such traits as drive, persistence, and goal awareness, traits not akin to the kind of aptitudes comprehended under the usual notation of intellective ability"
>
> (Wechsler, 1975, p. 136)

That a child's performance under conditions that might be regarded as 'testing' does not necessarily reflect his limit of ability has long been recognised. In fact, the hope that significant gains can be made in the performance of individuals who are deemed to be intellectually retarded rests upon this belief. Experimental work has repeatedly demonstrated that limited 'free-field' performance can often be improved upon when presentation of the task and the task requirements are made under more contrived circumstances (see review by Bortner and Birch, 1970). Indeed, it is becoming increasingly recognised that what have previously been accepted as limiting abilities at various stages of normal development do not necessarily reflect an absence of the cognitive functions necessary for the performance of those operations, but rather the use of alternative and incorrect cognitive functions or incorrect sets of cues (Mehler and Bever, 1967; Birch and Bortner, 1966; Bryant, 1974).

Zigler (1978) on the basis of many years of research into the issue has implied that the factors which influence performance in intellectually demanding circumstances such as an IQ test can be grouped into three categories. Firstly, and most obviously, there is the quality of the formal cognitive processes such as abstracting ability, reasoning and speed of visual information processing. These, of course, correspond to the processes implied in the studies on the nature of intelligence mentioned earlier. Secondly, the experience and knowledge that the child has at his command and which he can muster to help solve the problem with which he is confronted, is pertinent to the probability of success. In this sense, an IQ test can be seen as partly a test of achievement. The third facet of performance can be seen as being composed of a "variety of motivational and/or personality variables that have little to do with either formal cognition or achievement variables" (Zigler & Tricket,1978 pp. 792-793). The word "motivational" is used because these variables are largely seen to be related to the appropriateness of, and the child's responsiveness to, reinforcement. Thus it has been demonstrated that the effectiveness of reinforcement, especially social approval, is affected by, amongst other things, the sex of the examiner (Stevenson, 1961), the child's social class (Terrell, Durkin and Wiesley, 1959; Zigler, Abelson and Seitz, 1973), the place in which the test actually takes place (Seitz, Abelson, Levine and Zigler, 1975), and the relationship of the examiner and the child (McCoy and Zigler, 1965).

5.3. Objections to 'motivational' explanations of performance

All of the above studies establish that changes in the circumstances of 'testing' can influence the child's performance and that the mechanism whereby this is achieved is by making the reward for success more relevant to the child. Hence, the child could be described as being more motivated to do well.

However, there is weakness implicit in the use of the rubric 'motivational factors' when describing these studies. Certain concepts are ranked as motives in our culture because of the explanatory status we attribute to them (Peters, 1958; 1970) but it must be stressed that it is the concepts that are explanatory rather than the 'rubric' itself. This becomes more apparent when the last sentence of the preceding paragraph is rephrased: to what extent can a child who is not performing well on an IQ test be described as poorly motivated? Strictly speaking, the way to approach this question would be to increase in some way the child's level of motivation and observe the effects this has on performance. An improvement in test score would provide support for the assertion that the child was originally poorly motivated, but the problem that needs to be confronted is how one manipulates motivation without relying upon inferences drawn from the dependent behaviour under scrutiny. Under normal circumstances one would manipulate what are referred to as the incentive conditions, i.e., the reward for successful completion of the task, in the assumption that it is these which have a direct influence on the child's motivational state (his desire to do well). Although this is enlightening with regard to telling us something about those circumstances under which the child is likely to perform maximally, the assumed congruence between incentive and motivation may be misleading.

Take, for example the study by Mehler and Bever (1967) which was based on the classic number conservation experiments of Piaget (1952). Two rows of clay pellets were layed out such that the row containing the smaller number was stretched out more than the row containing the greater number. In response to the question "Which row has more?", children below a certain age (around 5 years) gave the classic 'pre-operational' answer of indicating the longer (but less numerous) row. When the clay pellets were replaced by button-like sweets, however, the same children, in response to the same question and on being allowed to eat the row of their choice, tended to indicate the shorter and more numerous row. Given children's usual eagerness to eat the sort of sweets used in this study, it might be argued that the difference between the two stages of the experiment is one of incentive and that in the second stage the children were more motivated to do well. Their apparently incorrect answers on the first stage reflected their poor motivation. (In fact, given that they consistently choose the longer and less numerous row in the first stage might be described in purely motivational terms as 'negativism'!).

However, a generally more preferred explanation of this finding is that, to the children, when confronted with two different sorts of stimulus array, the questions they were being asked were qualitatively different. In stage one, 'more' meant greater visual extent whereas in stage two 'more' meant more to eat. The nature of the stimuli determined what attribute 'more' applied to. Thus a change in the incentive properties of a task has been seen to bring about a change (improvement?) in performance, but scrutiny of those changes gives rise to an explanation in terms of salience of cues rather than in terms of a theory of motivation *per se*. As Toulmin (1970) points out, causes and reasons are not necessarily the same.

A second problem with the assumed congruence between incentive and motivation is apparent when one considers the possibility of an increase in the reinforcement value of the incentive not being accompanied by a change in behaviour. As reinforcement can be defined as something which increases the probability of the occurrence of a particular behaviour (Skinner, 1953) and in parallel, an increase in incentive as something which increases the probability that an individual will try harder, one is forced to conclude that what was assumed to increase the level of motivation did not in fact do so. This form of tautology (cf. Chomsky, 1959) means that an explanation of a performance deficit in motivational terms is likely to be non-disprovable making its status as a scientific explanation extremely tenuous (Popper, 1959).

The study by Cowan et al (1965) which was the starting point for the experiments described in Chapter 3 is illustrative with respect to both of these objections to explanations of behavioural deficits couched in motivational terms. Consider the possibility that the application of reward (popcorn) contingent only upon correct responses had not brought about the change from negativistic behaviour to compliance. Would the next step have been to increase the amount of popcorn? Then perhaps a switch to another type of food reward or perhaps to physical stimulation? Conceivably this could continue until a change of behaviour confirmed the incentive value of the reinforcer at the same time as the incentive value of the reward confirmed the role of increased motivation in determining compliance.

Nevertheless, the obvious and first change in incentive conditions did bring about compliance: this is an important finding but the explanation of it needs to be pursued further (as in the Mehler and Bever study). Reward contingent upon success constitutes the standard procedure of operant training and thus, by implication, a non verbal method of communicating the exact requirements of the task. In the case of the children described as having 'no language' this possibility must be considered as reasonable, and it was to this end that the experiments in Chapter 3 were initiated. It was premature to conclude that the children knew what the correct responses were, that they were able to emit them but did not do so, and that their poor performance was due to an unwillingness to comply.

5.4. The effects of non-cooperation

It is important, however, not to neglect the role of non-intellective factors during the course of intellectual assessment. One such factor which could constitute a serious threat to the validity of such assessment and lead to gross underestimates of ability is 'test cooperation'. Although at first this might appear to suffer from the same problems associated above with motivation, it in fact represents an important subset of motivational factors which can be characterised by behaviours independent of those from which ability level is inferred. For example, these behaviours might indicate that the testee is actively resisting being tested or rejecting those interpersonal aspects that are essential in most testing situations. The testee must accept the basic requirements of the test such as sitting at the table with the examiner, manipulating the test materials, being seen to make some sort of appropriate response etc. Failure to satisfy the basic requirements means that not only must the non-intellective factors discussed above be taken into consideration as perhaps contributing to a poor performance, but that non-cooperation has obtruded to such an extent as to render any index of ability quite meaningless.

Surprisingly few studies have applied themselves to the effects of non-cooperative behaviour in testing, perhaps because under normal circumstances it is not considered to represent a problem. Certainly, with normal children it is often difficult to suppress an abundance of enthusiasm for taking part in the 'quizzes' and 'puzzles'. However, with very young children, it is recognised that engaging the child in the task can be difficult and the literature contains several references to what could be described as a developmental phenomenon of test resistance. Rust (1931) estimated that the age of peak test resistance fell between 18 and 30 months and noted that resistance (defined as item refusal on the Merrill-Palmer) decreased with repeated (up to 10 times) presentations of refused items, although obviously it is difficult to know what the effect so many repetitions of any item has on the item's discriminative validity. Phatak (1966) suggested that the non-involvement in testing of children of this age reflects their inner directedness and their concern with things that primarily give themselves pleasure.

Gallagher (1953) observed that during assessment prior to adoption, some children (aged 4 to 24 months), especially those that came from particularly deprived environments, appeared not to be doing their best and that on subsequent testing some months later appeared to be trying harder and scored higher. Unfortunately, although the observation that they were not 'trying' on the initial assessment may well have been based on specific non-cooperative behaviours, these are not described. It is therefore not clear how much of the test score improvement can be attributed to increases in cooperation.

Observable instances of non-cooperative behaviours are more frequent with deviant populations, typically those who are often deemed to be of limited intellectual ability. The threat to the validity of intellectual assessment with these populations needs therefore to be examined in greater detail. The following sections deal with this issue.

5.5. Testing with psychotic children

5.5.1. General Issues

The interpretation of the performance of any 'deviant' population on tasks designed to evaluate individual levels of ability requires special caution for several reasons. Firstly, norms derived from standardisation samples may not include members of that deviant population. As discussed earlier, one of the ways of circumventing a precise definition of what intelligence is, is to describe an individual's performance in terms of how it compares with the parametric properties of the performance of his age related peers. The constitution of the standardisation samples of most IQ tests does not include, for example, autistic or Down's Syndrome children, and thus the qualification of that sample being comprised of 'peers' has to be held in doubt.

Secondly, the scores on the test of ability may not validly discriminate between individuals within that population along the intended dimension. (This, of course, also applies to normal populations if one asks whether IQ tests are in fact measuring intelligence: however, it has been argued earlier that whatever it is that IQ tests measure, we are interested in it). With deviant populations the problem is whether the difference between the scores of two individuals reflects a difference in the same sorts of psychological processes as would a similar difference between two individuals of a 'normal' population. For example, in the usual application of a test of cognitive ability, it has to be assumed that the other factors (the non-intellective factors) which may influence the final scores are held constant, i.e., it is expected that the differences between an individual score and the expected norm, or among individual scores, reflect differences in the ability that the test is intended to measure. When this assumption is unwarranted (e.g., when it is apparent that the child's familiarity with the test materials or with the mode of responding is substantially different from other children) the meaning of the final score becomes less clear.

With psychotic or autistic children this issue is particularly pertinent. Characteristically, autistic children display abnormal social behaviour (DeMyer, Churchill, Pontius and Gilkey, 1971; Kanner, 1943; 1973; Howlin, 1978; Wing, 1978; Churchill and Bryson, 1972; Bartak, Rutter and Cox, 1975; Rutter, 1970; 1971) and their performance in tasks involving interactions with another person has been described as being largely under the control of 'motivational' factors (O'Gorman, 1970; Tinbergen and Tinbergen, 1972; Tinbergen, 1974; Kohn, 1971; Szureck, 1956; 1971). Indeed, the difficulties that the abnormal social behaviour can give rise to in intelligence testing are frequently reported in the literature (e.g., Mittler, 1968; 1970; Gallagher, 1962; Davids, 1958; Miller, 1933; Colbert and Koegler, 1958; Spivack and Levine, 1964) and some of these authors have therefore argued that the lack of cooperation obtrudes to such an extent as to render the assessment of intellectual ability meaningless.

5.5.2. Evidence from follow-up studies

Much of the support for the continuing use of IQ test with autistic children comes from the studies that have claimed to demonstrate the stability and predictive power of information derived from such tests. Lockyer and Rutter, in their 'Five to Fifteen Year Follow-up' (1969), examined in considerable detail the reliability, stability and predictive validity of IQ measures taken from children with infantile psychosis. The results of this study showed that the predictive power of the initial IQ score, in terms of the extent to which it was correlated with the follow-up measures (i.e., with the Vineland SQ, r=+0.74; Full WISC IQ, r=+0.63; WISC Verbal IQ, r=+0.65; WISC Performance IQ, r=+0.52) was not different from that derived from the age, sex and IQ matched controls.

In the light of these correlations there would seem to be a fairly strong case for arguing that the initial assessment of IQ was both reliable in the sense that it predicted to a large extent follow-up assessment of IQ and valid in that it also predicted subsequent social maturity as assessed by the Vineland Scale (Doll, 1953). However, some caution should perhaps be exercised in the latter relationship on the basis of more detailed analysis. Lockyer and Rutter were interested to see if the level of initial IQ affected the strength of the relationship between initial IQ and subsequent SQ. In order to do this the group of psychotic children (N=53) was split into two, according to whether the initial IQ was above or below 60 (N=30 and 23 respectively).

The correlations for each group between initial IQ and subsequent SQ were recalculated with the result that there was no significant difference between the groups in this respect. The conclusion drawn from this was that "Whether initial IQ was above or below 60 did not affect the correlation with follow-up scores " (p. 869). However, what this analysis also reveals is that, although there was no significant difference between the two subgroups, there was a large difference between each of these two correlations and the correlation of the group as a whole.

Table 5.1. Correlations between initial IQ and follow-up SQ for the group as a whole, and for the high and low IQ groups. (after Lockyer and Rutter, 1969)

Psychotic group	
(N= 53) r=+0.74	
Initial IQ >60	Initial IQ <60
(N= 30) r=+0.43	(N= 23) r=+0.39

With anything less than a perfect correlation, dividing the group on the basis of one of the variables involved in the correlation often causes a drop in the size of the relationship. However, a drop of this magnitude may have reflected the fact that the original scores were not smoothly distributed. Examination of the raw data (Lockyer, 1967) revealed this not to be the case.

As well as establishing test-retest correlations that compared favourably with non-psychotic controls (and also with reported estimates derived from normal children over a similar time span (Bradway, 1944; 1945), the Lockyer and Rutter study also established the stability of these measures over the same period of time (see Table 5.2.).

Also included in the report of this study is an analysis of the outcome of that group of children (N=19) who, on assessment at their first attendance, had been

Table 5.2. Difference in IQ between initial and follow-up testing. (after Lockyer and Rutter, 1969)

		Initial IQ		Follow-up IQ		
	N	Mean	S.D.	Mean	S.D.	
WISC Verbal IQ						
Psychotic	17	80.47	13.69	76.65	23.16	N.S.
Controls	17	80.65	15.70	77.24	17.37	N.S.
WISC Perf IQ						
Psychotic	18	80.22	13.33	76.44	25.86	N.S.
Controls	18	80.39	15.27	79.67	25.86	N.S.

deemed as 'untestable' in the sense that the psychologist had been unable to obtain any scorable response. At follow-up "..... only one (of the 19) had a Vineland Social Quotient of 50 or above. None of the other 18 children was testable on the Peabody Picture Vocabulary Scale (the quotients obtained were 20 and 11) and the Vineland SQs at follow-up were all below 50 (the highest was 41)". One child had an SQ of 72 and was testable to some degree at follow up (WAIS Performance Score = 47). The authors state that "In this one case the untestability was due to factors other than low IQ, but it appeared that in the other 18 cases the untestability was due to simply a function of a very low level of intelligence" (p. 874).

Other follow up studies support the long term predictability of IQ measures. Mittler, Gillies and Jukes (1966) in a follow-up of 27 hospitalised psychotic children recorded a test-retest correlation of +0.74 which was indeed higher than that of the control groups ("borderline psychotic" and mentally subnormal). There was, however, a significant proportion of children who, on initial assessment had been classified as untestable but who on follow-up proved to be otherwise. These children (N=4) were excluded from the correlational analysis, as were those who remained untestable. With regard to the children who were testable on both occasions, as well as the correlation being high, there was a tendency for the scores to increase, a finding at variance with the Lockyer and Rutter study. Mittler et al suggest that this might well be due to the fact that the original assessments were based on Stanford-Binet tests and the follow-ups on WISCs. Honzik et al (1948) are quoted as discovering changes in IQ of 15 points or more in 58 percent of normal children when comparing these two tests over a similar period of time; Hindley and Owen (1978) report similar findings. The mean IQ change for the psychotic group in the Mittler et al study was +24 points: the magnitude of the apparent increase in IQ score was not related to the initial level of IQ.

In a relatively large follow-up study with 115 autistic children, DeMyer, Barton, Alpern, Kimberlin, Allen, Yang and Steele (1974) describe how, during the decade following 1961 and during which their data were collected, the attitudes of the research team switched from the belief that interpersonal relationships (which precluded normal skill acquisition) accounted for autistic children's apparent deficits in intellectual functioning, to the belief that the intelligence of the children could be measured reliably and validly. They point out four observations made during the data collection which contribute to this attitude change.

"(1) Nearly all the autistic children, even the most withdrawn, did things that infants would do: for example, they scribbled with crayons or hurled a ball at random.

(2) In these easy activities they seemed almost as cooperative, willing and testable as more normal youngsters. It was only when they started to fail that temper tantrums and refusals to try began.

(3) The children's motor control was not as good as we had expected it would be. In many cases their integration of visual and motor skills was inferior to that of the non-psychotic subnormal children used as controls.

(4) Their performance depended on the nature of the task as well as how easy it was. Autistic children seemed to perform better and more willingly on tasks that

suggested their own solution, such as form boards, puzzles and ring stack sets" (p. 44).

Deriving IQs from a battery of tests including the WISC, Stanford-Binet, Cattell-Binet and Merrill-Palmer, and testing children with an average interval between initial assessment and follow-up of 6.13 years DeMyer et al calculated the test-retest correlation to be +0.70 with estimates of Verbal IQ and Performance IQ correlations as +0.58 and +0.63 respectively. (Throughout the report of this study, DeMyer et al refer to the correlation coefficients as indicating the 'remarkable stability' of the IQ score. This is a different usage of the term stability from that of Lockyer and Rutter (1969) and Mittler et al (1966). They do not explicitly compare initial and follow-up <u>means</u> but they do mention that the children who had initial scores of above 50 <u>and</u> who were treated showed some IQ gains. The nature of the treatment was not specified). As in the Mittler et al study, a higher IQ at time of initial testing predicted better educational attainments and school placement.

All of the above studies suffer from, and acknowledge, the problem of using different tests to assess IQ at initial and follow-up stages. Gittelman and Birch (1967) were able to report estimates of IQ predictability and stability on a group of children diagnosed as 'childhood schizophrenic' but where the same test (Stanford-Binet or WISC) had been used on both occasions. It is true that the time interval between assessments was somewhat less than that for the studies mentioned previously (mean interval = 2 years) but the results are nevertheless remarkable: the test-retest correlations were +0.82 and +0.90 for the Stanford-Binet and WISC respectively with there being an average difference for the group of less than one IQ point between the two occasions. There was no difference in these results according to initial level of IQ (in this case, above or below 70). Signs of neurological dysfunction were associated with low IQ scores.

5.5.3. Closer analysis

The follow-up studies so far presented all concluded, on the basis of the long term robustness of IQ estimates and their usefulness in predicting both other aspects of the psychotic disorder and success of outcome, that the measures they used were far from meaningless and that the apparent low level of functioning of some of the children was in fact very real and not a function of an "emotional disturbance" (Wolf, 1965). However, despite this consensus regarding some of the statistical properties of scores derived from such assessments it should be recognised that their validity as indices of intellectual ability need not necessarily have been demonstrated (Wedell, 1968; Kohn, 1971). Whilst admitting that the tests do measure something, indeed very reliably, it could be that what is being measured is some characteristic of the autistic child other than intellectual ability, which may itself be a persistent feature of the child's disorder.

Thus, predictions of subsequent performance on similar tests, of quality of outcome, and of other aspects of the disorder may reflect the stability and severity of, say, the child's inability, or reluctance, to engage in interpersonal encounters. That low IQ scores tend to remain low IQ scores may mean that little is known of how to improve the child's performance.

When viewed in this light, findings such as those of DeMyer et al (1974) which demonstrate a relationship between IQ score and adequacy of emotional (interpersonal) behaviour can be argued as being circular (see Table 5.3.). Unfortunately, in this case, no information is provided regarding the independence of the IQ assessment and the process whereby each child was given a 'social rating'.

Table 5.3. Relationship of social ratings to general IQ (after DeMyer et al, 1974)

Social Rating	N	Mean IQ
Normal	0	-
Too friendly	15	68
Negative/hostile	8	72
Shy/distant	18	68
In/out of contact	28	57
Withdrawn	62	37
Oblivious	22	29

Using a more detailed analysis of psychotic children's performance in IQ assessment, Alpern (1967) had tried to add further information regarding its validity. It was his contention that many former attempts to assess autistic children with standard intelligence test procedures had been unsuccessful because the tests had been too difficult. (Alpern's position regarding the intellectual ability of many autistic children is thus already clear). Alpern constructed a scale which was a modification of the Cattell Infant Scale (Cattell, 1940) covering the first 12 months (the sample consisted of very young children, N=14; mean age = 5 years), and validated the score against independent "psychiatric ratings" of motor age, personal/ social age and verbal age, and also against the child's score on the Vineland Social Maturity Scale. The results were all consistent with the view that the scores derived from this scale were an index of the child's level of ability. Although there were no direct measures of the child's behaviour and 'attitude' whilst being tested (which might be considered necessary if the objections outlined above are to be met) Alpern argued that the Vineland Scale was adequate in that it provided a measure of the child's overall functioning and, more importantly, it required no cooperation on the part of the child.

5.5.4. Validation Issues

It is pertinent at this point to examine briefly the use of the Vineland Scale of Social Maturity as a criterion variable in the validation of intellectual assessment procedures. It is implicit in such use that intelligence quotients should predict social quotients or that intellectual retardation corresponds with social retardation. Doll (1953), in describing the scale, makes the following observations regarding the rationale behind its construction:

> "We chose deliberately to select items which reflected the tout ensemble of social expression. Consequently we discarded items which seemed to be specific measures of intelligence, skill, attitudes, habits, specific achievement, and the like, preferring instead the more generalised and more utilitarian end results produced by their correlated application".
>
> (p. 41)

> "....... We are concerned not so much with innate ability as with overt ability. Consequently we desire to appraise a person's habitual or customary behaviour as an established mode of conduct rather than as a potential for acquiring such conduct. Hence, we require of the method that it should reveal what the subject typically does in daily life .... rather than what he could do if required."
>
> (p. 46)

Nowhere is there a statement that suggests that there is a theoretical link between social maturity (measured thus) and intelligence, although the first quotation implies that, with all other things being maximal, differences in intelligence should be reflected in different levels of social maturity. It would seem that in this respect the usefulness of the Vineland scale as a validating instrument is demonstrated by the fact that it does correlate with the scale to be validated.

The notion that the Vineland scale is designed to assess a person's habitual social behaviour means that even high correlation between IQ and SQ do not necessarily validate the IQ. The objections raised to the IQ of psychotic children are concerned mainly with the abnormalities of interpersonal behaviour interfering with the testing process. It is arguable that these abnormalities persist into everyday life and that indeed the Vineland scale is measuring the severity of those abnormalities. The fact that it is completed without requiring any cooperation on the part of the child does not, therefore, guarantee that lack of cooperation is not being measured.

Alpern's second set of validating criteria also need to be treated with caution. The conclusion that the modified Cattell scores are related to the psychiatric ratings is based upon a series of significant correlations, yet the absolute size of some of these is quite small (e.g., +0.43, +0.55). The significance level is not the most useful interpretation of a correlation coefficient (Nunnally, 1960); moreover, it is interesting to speculate what Alpern's conclusions would have been had the correlations not been significant at all. Strictly speaking the outcome would have to have been the rejection of the scale on the grounds of it being invalid; an outcome which exposes the confidence which is attached to the strength of the validation criterion (see Meehl,(1967; 1978) for discussions of the role of 'auxiliary theories' when making an observational test of a theoretical conjecture; also Loevinger, 1957).

5.5.5. Studies including measures of cooperative behaviour

What is needed to supplement the type of study carried out by Alpern is an independent measure of the extent to which the child is engaging in the test items.

As described earlier (p.145) , it is important that such a measure of, say, cooperative behaviour must be seen to be applied independently of the behaviour it is attempting to explain.

For example, Shakow (1946, 1950), has asserted that differences between test scores of adult schizophrenics and of normals can be accounted for by lack of cooperation with the examiner, and has described 4 categories of cooperative behaviour. Moran (1953) has expanded this classification to a 6-point scale (see Table 5.4.) and noted that indeed, test score was related to ratings on this scale.

Table 5.4. 6-point scale of cooperative behaviour (after Moran, 1953)

1. Openly negative towards task. Performs reluctantly.
2. Somewhat resistive to task. Performs with little interest.
3. Doesn't mind task. Performs with moderate interest.
4. Some enjoyment of task. Performs with more than moderate interest.
5. Task seen as a challenge. Performs with great interest.
6. Greatly motivated to make highest possible score. Very absorbed in his performance.

However, similar correlations were noted within the control group which suggests that the differences between the two groups in terms of test scores could not be accounted for by the degree of cooperation. Moran describes the use of the scale in the following way:

> "All subjects were tested and then rated for cooperativeness by the same examiner .... Although the examiner made a special effort to rate the patient on attitude toward the examination rather than the level of performance, no objective measure of the examiner's success in this effort may be provided".
>
> (Moran, 1953, p. 4)

Examination of the scale and the method of its use suggest that the relationship between rating and task success is not surprising. Were there to have been a difference in cooperation ratings between the experimental and control groups, it would have been difficult to explain test score differences as being due to this.

Kohn (1971) was aware of the need to derive ratings of cooperative behaviour which were as independent of knowledge of test score as possible. She replicated the Alpern (1967) study and added an 8-point rating scale which was applied after the completion of all the Cattell testing and based upon notes made during the testing. Although this goes someway to making the collection of the two sets of data separate, it is still obviously open to criticism, especially as it was again the same person making the ratings as carried out the original testing. Furthermore, an attempt was made to validate the cooperativeness ratings by comparing them to a resistance score which was derived directly from the Cattell test. Resistance was defined as "not attempting an item within the time it continued to be presented" and a resistance score obtained for each child by summing up the items upon which this happened. Thus, if a child succeeds on any item he cannot be given a resistance score for that item:

perfect score implies zero resistance, suggesting that this validation criterion is quite inadequate.

As in other studies, test cooperation was seen to be related to test score, this time in a sample of autistic children. Again, the doubts about the derivation of the cooperation ratings make this finding unsurprising. Kohn had used a group of mentally retarded Down's Syndrome children as a control group and found that they too showed a similar relationship between test score and degree of cooperation (although the nature of the uncooperative behaviour was not the same; the retarded children tended to express this in a 'mischievious' and 'aggressive' manner, whilst the autistic children were 'withdrawn'). Given, then, that ratings derived in the way described correlate with test score for both the autistic and retarded groups (and for adult schizophrenics and normal adults (Moran, 1953)), it would appear that the assertion that IQ test results of psychotic children merely reflect the child's abnormalities of interpersonal behaviour is not supported.

5.5.6. General Implications

The bulk of the evidence from the follow up studies suggests that information derived from IQ assessment of psychotic children is useful as a predictor of various aspects of outcome. There are high test-retest correlations with many years separating the two tests (often better than the correlations obtained from control populations). Initial IQ also predicts subsequent assessment of social development and educational attainment.

Qualitative differences also exist between autistic children with low IQ and those who are assessed as being near the normal range. There are differences in cognitive deficit in that the former group have difficulties in sequencing and feature extraction whereas the latter have deficits mainly affecting verbal skills (Hermelin and O'Connor, 1970). The low IQ children are also more likely to display signs of overt neurological disorder and develop epileptic seizures (Goldfarb, 1961; Rutter, 1970; Rutter, Bartak and Newman, 1971).

Together with the absence of any convincing evidence that IQ test results are substantially influenced by abnormalities of interpersonal behaviour in the sense that the child is refusing to cooperate with the requirements of the task, a strong case can be argued for the relevance and value of measures of intelligence with autistic children.

Nevertheless there is still no certainty as to precisely what it is that the assessments are indices of. The methodological difficulties involved in drawing a distinction between 'intelligence' and other aspects of behaviour that contribute to successful functioning suggest critical examination of the conceptual issues involved. As pointed out in the opening sections of this chapter this concerns not only psychotic children but also the assessment of more 'normal' populations.

Wechsler (1975) has recently argued for a more realistic conceptualisation of intelligence on the basis that intelligence is (a) not a quality of mind, (b) not a singular and unique trait, and (c) not concerned primarily with how the mind functions or operates logically.

> "Like Einsteinian time and space, it (intelligence) cannot be measured separately and independently .... Unless we are told the reference systems to which a statement about intelligence refers, there is no meaning to the statement that intelligence exists".
>
> (Wechsler, 1975 p137)

These thoughts have been extended to the use, and interpretation, of IQ tests by Zigler (Zigler and Tricket, 1978) and represent the culmination of his research into factors influencing IQ scores (see Section 5.2.). In a critical discussion of IQ as an outcome measure of the effectiveness of intervention programmes, Zigler and Tricket argue that demonstrable improvements in IQ that are attributable to the intervention are due not to changes in intellectual ability but rather "motivational changes that influence the child's test performance".

They argue that IQ tests should be just part of a rather more comprehensive measure of functioning (what they call the Social Competence Alternative); this measure would be more explicit in acknowledgement of the non-intellective contributions to IQ, and also attempts to include measures of the 50 percent unexplained variance in the prediction of school performance from IQ (based on a correlation of 0.70 between IQ and school performance[1]).

An equivalent case can be argued for the intellectual assessment of psychotic children and responsible clinical usage has long used batteries of tests to build up a picture of each child's deficiencies in a variety of areas of functioning (Mittler, 1966; Berger and Yule, 1972; Gould, 1976; 1977). The prognostic value of intellectual assessment with these children is amply demonstrated by the follow up studies; the question of the non-intellective contributions to assessment performance is a moot point but one which may only serve to detract (or distract) from the usefulness of the assessment.

It is sufficient to have confidence that, during the assessment, the probability of a child succeeding on a particular item is related to the intrinsic difficulty of that item. The experiment described in Chapter 4 showed that with autistic children,

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1 Although there are frequent references in the literature to correlations of this magnitude (e.g., Herrnstein, 1971;) the empirical evidence suggests that .7 is the highest one might expect and that quite often the relationship is demonstrably weaker (e.g., Husen, 1969; McCandless, 1970).

and using a non-verbal test of reasoning ability, this is largely the case: this accounts for those 'motivational' factors which operate independently of the cognitive demands of the task at hand, It still, of course, includes those motivational factors which covary with the demands of the task, but this is the case with such assessments on all populations. Care must be taken not to accord to the concept of motivation the status of an <u>explanation</u> of behaviour rather than a rubric under which are subsumed all those factors involved in performance and which also have an effect on the measures concerned. It does not contribute to our understanding of performance to say that there is a gap between the skills possessed by a child and the level at which they are utilised, and then to explain this gap in terms of motivation. If such a gap is suspected then what is needed is systematic study into specific, and testable, suggestions concerning situational factors that impinge upon a child's performance, so that more effective programmes of training can be devised.

CHAPTER 6

6.1. Background

In Chapter 5 it was argued that to describe the poor intellectual performance of an autistic child as being due to poor task motivation was inaccurate, if, by this, it was meant that the child's apparent level of functioning necessarily reflected factors independent of the cognitive requirements of the task. It was also argued that to invoke motivational explanations for performance deficits where the motivational component covaried with the demands of the task was not at all useful in understanding psychological processes that contributed to that poor performance or in planning remedial action. Rather, what was needed was greater knowledge regarding the characteristics of the circumstances in which a poor performance was elicited, and the interactions amongst those characteristics which depressed or elevated the child's level of appropriate functioning.

Such knowledge that exists in this matter is ambiguous. The strategy behind an interpersonal encounter with an autistic child and the manner with which he should be approached by an adult in order to maximise the likelihood of productive social contact (of the sort, for example, required for effective estimation of the child's ability) remains a contentious issue. For example, it has been argued that any attempt at making social contact should be child initiated. Approaches made by the adult may only serve to increase the likelihood that the child would 'flee' from the situation, thus committing the adult to intensify his approach and making the position worse (Tinbergen 1974; Tinbergen and Tinbergen 1972; Richer 1976; 1978; Richer and Coss 1976; Richer and Richards 1975). The Tinbergen thesis, as elaborated by Richer, specifically refers to the functional significance of the autistic child's abnormal behaviour and how this is maintained by the normal, but inappropriate, social responses of the adult. This analysis of the autistic child's social behaviour, based upon observations of normal youngsters, has formed the nucleus of the theory concerned with the aetiology of autism. The Tinbergens suggest that the autistic infant is constitutionally timid and that the normal conflict between fear on the one hand and sociability on the other is never resolved and that consequently the social bonding necessary for further and appropriate development either never develops or does so in a grossly abnormal way (see also Clancy and McBride, 1969). Other aspects of the autistic syndrome such as the stereotyped behaviour patterns and the abnormal language development can be considered as secondary to this breakdown of the initial social bonding process which is exacerbated by excessive attempts on the parents' part to make contact with the child but which only serve to increase the fear-sociability conflict.

Richer (1976; 1978; Richer and Richards, 1975; Richer and Coss, 1976) has set about providing experimental evidence of the Tinbergen thesis and of what he calls the "partial non-communication of culture to autistic children" (1978). Using primarily eye contact as a dependent variable (which was intended to be a measure of social approach) he concludes that "an autistic child is more likely to avoid someone (i.e. look away from) who stares at him than someone who does not; and he is more likely to avoid if someone smiles, or, more generally "reacts" after eye contact than if there is no smile or "reaction"" (Richer, 1978 pp 50-51). In discussing the evidence regarding the reactions of adults to attempts on the part of the autistic children to avoid social contact he concluded that "Although the autistic children avoided much more frequently and approached less than the non-autistic (disturbed and retarded) children, teachers approached them about as frequently and in fact tried to look into their faces more than with the non-autistic children. The autistic children tended to react to these approaches with further avoidance, whereas the non-autistic children tended to react with approaches" (Richer, 1978 p52).

One might conclude from these findings that to impose 'structure' in the sense of allowing the task at hand or the demands of the adult to dictate the course of the interaction would have a deleterious effect on the child's progress, and indeed it has been considered that to involve a psychotic child in <u>any</u> task (over and above those where social behaviour is the dependent variable), an essentially child-directed approach must be taken if one is to avoid the resistance that might otherwise be encountered (Axline, 1947; D'Ambrosio, 1971; Ekstein, 1954; Clancy and McBride, 1969).

However, an alternative and opposite view is that progress in a variety of aspects of the autistic child's development can be made by application of an operant training regime. This was first developed into a theoretical conceptualisation of autism by Ferster (1961) who suggested that the central feature of the disorder could be described as a failure of the child's environment to achieve secondary reinforcement value, i.e. failed to acquire meaning. As such, operant techniques can be applied and the child trained to behave appropriately by the skillful use of external prompts, reinforcement and punishment (Lovaas, Schaeffer and Simmons, 1965; Lovaas, Schreibman and Koegel, 1976; Currie and Brannigan, 1970). Targets such as the control of self destructive behaviour (Risley, 1968; Tate and Baroff, 1966), positive social contact (Hingtgen, Sanders and DeMyer, 1965; Hingtgen and Trost, 1966; Lovaas, Schaeffer and Simmons, 1965), eye contact (McConnell, 1967), language function (Risley and Wolf, 1967; Sloane, Johnston and Harris, 1968) appropriate play (Koegel, Firestone, Kramme and Dunlap, 1974) and improved attention span (Hemsley, Howlin, Berger, Hersov, Holbrook, Rutter and Yule, 1978), are defined and the child 'steered' towards the achievement of these targets.

Obviously there is a spectrum of approaches representing varying emphases of different aspects of the autistic syndrome. However, any comparative evaluation of therapeutic models such as those described above must go beyond which is believed to be the most effective. The very nature of the autistic child's disorder and the interpretations that are made about the behaviours that make up the syndrome, mean that, at the extremes, each school of thought is, in the eyes of the other, exacerbating the position. For example, advocates of the operant training based treatment would argue that left to his own devices the autistic child would perhaps engage in more self-stimulatory behaviour and cut himself off further from the secondary reinforcing properties of his environment (e.g. Koegel and Covert, 1972; Lovaas, Litrownik and Mann, 1971); alternatively attempts at explicitly directing the child to those qualities of his environment which are conducive to normal development would result in the autistic child increasing his attempts at resisting those advances (e.g. Richer, 1978).

There would seem to be, therefore, much to be gained from examining some of the basic assumptions that are made about the child's immediate reactions to advances made by an adult and to look for differences in those reactions when the adult's behaviour is controlled in a variety of ways.

Previous studies have touched upon this issue and a term often used to describe differences between treatments has been 'structure'. Whilst commenting that it is not realistically possible to make a distinction between those treatments that have structure and those that do not (i.e. all treatments have some amount of some kind of structure), Schopler, Brehm, Kinsbourne and Reichler, (1971) hypothesised on the basis of their own "extensive clinical interaction with psychotic children" that a more favourable response would be obtained when the context in which the children were treated was "relatively structured" rather than "relatively unstructured". The treatment sessions differed in that in the former, an attending adult determined what material was to be worked with, for how long the child was to work with it, and the manner in which he was to work: in the latter, the child was allowed to 'go his own way' in choosing his own materials and deciding how long and in what manner he was to use those materials. Observational measures based on a battery of dependent variables designed to be indices of "favourable response" confirmed differences in the behaviour of the children in the direction predicted by their hypothesis, but it was noticed that these differences tended to get smaller with time in what was described as "regression to the mean trend". (As data were collected over a period of eight weeks there may have been shifts in the attitude of the therapists or a decrease in the original impact of purely a change of routine).

The more permanent effects of variations of 'structure' in a therapeutic setting have been examined by Bartak (Bartak and Rutter, 1973; Rutter and Bartak, 1973; Bartak, 1978) who looked at psychoeducational differences between three existing treatment units employing different regimes and which necessarily varied in both degree and type of structure. Again, lack of structure implied spending much time in free play with minimal attention to the teaching of specific skills whereas the presence of structure involved an "organised and logical rather than permissive" environment (Bartak, 1978 p 427). On the basis of the measures chosen for evaluation of the children's progress, the unit that came out best was the one which was considered to have the most structure in its curriculum. The authors were quite rightly cautious in not ascribing any causal link between unit characteristics and outcome; however, the implication is that the notion of structure needs to be clarified and that the direct effects of structure on behaviour need to be further evaluated.

Although the literature contains other references to comparisons of different treatments where variations in 'structure' are either explicitly or implicitly involved (Fischer and Glanville, 1970; Graziano, 1970; Halpern, 1970; Ney, Palvesky and Markely, 1971), the experiment to be described in this chapter (Experiment 6) is concerned with the short term but immediate effects of various styles of adult-child interaction on some behaviour that might be seen as relevant to long term therapeutic progress, and also to specify the ways in which the styles differed. The strategy to be employed was to be based upon comparisons of direct observations of behaviour between four such styles. The styles were designed to examine differences in the child's behaviour which might result from differences in (a) whether or not the encounter is focussed around an explicit and structured task and (b) the extent to which interpersonal or social demands are made. These are described in detail below.

6.2. Experiment 6

6.2.1. Method

6.2.1.1. Description of styles

As outlined above, it was decided to examine in detail the effects of manipulating two parameters of an interpersonal encounter with an autistic child:

(a) the degree of task structure

and (b) the degree of interpersonal demands.

Four styles resulted from the combinations of high and low levels of these two factors.

'Task structure' was defined by the extent to which the objectives of the interactions were explicitly presented to the child and the extent to which the child was allowed to deviate from the 'route' to these objectives. For example, a high degree of task structure (STR+) included the initial statement of what the child was expected to do during the session and continual reminders throughout the session of this objective. The manner in which the child was to execute the task was decided by the adult (within the constraints of what it was considered the child was capable of doing); attempts on the child's part to resist these instructions were to be countered by a certain firmness and insistence as to the way the task was to be done. Low structure (STR-) was characterised by a more child directed approach to the task materials, the child being allowed to decide what the object of the session was to be and how he was to go about it.

'Interpersonal demands' defined the interactive quality of the session and the extent to which it was seen as an exercise in establishing a joint activity. For example, high 'interpersonal demand' (ID+) included attempts by the adult to get the child to acknowledge his presence and to impose himself upon the activity of the child. This would involve physical and verbal contact in attempts to get the child to respond, both physically and verbally. Low 'interpersonal demand' (ID-) was typically non-intrusive on the part of the adult and social contact was only made or continued if it was initiated by the child.

The four resulting styles, therefore, were intended to reflect the four combinations of high and low 'task structure' and high and low 'interpersonal demands'; namely STR+ ID+; STR+ ID-; STR- ID+; and STR- ID-.

It was a deliberate decision to avoid defining these parameters in terms of an inflexible set of criteria, as this allowed for a certain amount of accommodation, within each style, to each child's level of functioning and idiosyncracies, which were anticipated to be variable. To have done otherwise would have resulted in the evaluation of styles of management which, because of their inappropriateness to the needs of individual children, would have represented an unrealistic test of their effects on the child's behaviour. However, it was considered necessary to provide a check on the discriminability of the styles with respect to the behaviour of the adult; for this purpose a checklist of behaviours that were considered to be relevant to the differences between styles was drawn up so that a more operational description of the styles might subsequently be made. This is described in a later section.

6.2.1.2. Subjects

Ten children, drawn from two schools for autistic children in London were used in this experiment. All were boys, with ages ranging from 15 years 1 month to 8 years 2 months (mean age = 11 years 8 months). Estimated mental ages derived from selected items of the Merrill-Palmer of Mental Abilities (Stutsman, 1948) and the WISC (Wechsler, 1949) ranged from 12 years 2 months to 4 years 1 month (mean mental age = 8 years 1 month). As in Experiments 1 and 4 (Chapters 3 and 4 respectively), the medical and psychiatric records of these 10 children were examined to see how closely they fitted the diagnostic criteria of (i) abnormal development of interpersonal relationships (ii) language impairment and (iii) the presence of compulsive or ritualistic phenomena (Rutter, 1978). On the basis of this review, 6 children certainly satisfied all three criteria and were classified for the purpose of the experiment as 'typically autistic'; the remaining four, although all had in the past been referred to their special schools on the basis of having been diagnosed as autistic, were thought to be in some way 'atypical'. This atypicality in all 4 cases was based on the suspected absence of the 'aloof' quality (cf Wing, 1971) in their interpersonal behaviour although their social behaviour was quite markedly deviant. Table 6.1. shows some characteristics of the groups designated as 'typically' and 'atypically' autistic.

6.2.1.3. Procedure

Each child was seen individually on four separate occasions in a quiet room familiar to the child. Each occasion lasted approximately one half hour and was

Table 6.1. Sample characteristics for Experiment 6

	N	CA	Estimated Perf. IQ	Estimated MA
		x (sd)	x (sd)	x (sd)
'Typical'	6	12.3(1.6)	77(10.7)	9.6(1.9)
'Atypical'	4	10.2(1.8)	53(10.1)	5.8(1.7)
	't'	= 1.9 NS	3.6 $p < .01$	3.3 $p < .02$

spent doing a task which reflected one of the four styles described above. Each child was exposed to each of the four styles. There were at least four days between each session for any one child and usually the intervals were much longer. The order in which the sessions were presented to each child was randomised.

Each session, regardless of style, was centred upon a model building activity with a large LEGO construction set. It was assumed that all of the children were familiar with the use of this sort of toy which could be found in, all classrooms from which the children were drawn. Also available in each session was a large picture of a house which was used, when appropriate to the particular style being executed, as a demonstration of the sort of thing that the child was expected to build. The child was brought into the room in which there was a table and two chairs, one on each of two adjoining sides of the table. The LEGO pieces and the picture of the house would already be on the table and the child asked to sit on one of the chairs. The adult (myself) would then sit on the other chair and the next 30 minutes were spent in some activity involving these materials but operating within the constraints of whichever management style was being employed.

Each session was 'video recorded' using a SONY portable video recorder. The camera position was fixed, the field of view encompassing the table, the building materials and the two people involved in the session. The camera was mounted on a tripod at a height of approximately 1.7 metres and at a distance of approximately 2.75 metres so that the camera subtended an angle just below the horizontal. A 'zoom' lens was fitted to the camera so the focal length could be adjusted to include in the field of view just those elements described above.

6.2.1.4. Practice sessions

It was necessary to establish, prior to the experiment proper, whether or not the different styles could be effected, in a realistic manner, by me. To this end, children at a third school for autistic children (at Kelveden, Essex) were selected, and 'practice sessions' were recorded in the manner described above. Video recordings of all the styles were viewed by an experienced clinician (Professor Michael Rutter) and me, and according to the outcome of these viewings, further sessions recorded until it was considered that all four styles could be produced in a way that reflected variations in the parameters of interest (i.e. STR and ID) and in a natural and relaxed manner. Tapes of these sessions were retained for the purpose of training the people who would subsequently rate the experimental tapes.

6.2.1.5. Observational measures

Detailed and separate observation measures were devised for the evaluation of both the adult's behaviour and that of the child.

(a) adult behaviour : A list of 27 codifiable aspects of the adult's behaviour, all considered as possibly relevant to the issues under scrutiny, was drawn up and formed the basis of the observation schedule. A full list of these is given in Appendix C. Some of these categories were rarely checked during the rating of the tapes, suggesting that the coding system was too 'finely' constructed: consequently, it was necessary to collapse the original categories into a 'coarser' form for the purposes of the analysis. Table 6.2. presents this summary of the coding schedule and, where necessary, definitions and examples.

(b) child behaviour : Thirty six codifiable behaviours were used in the full child observation schedule; the complete list can be seen in Appendix C.

Table 6.2. Categories of behaviour used in the assessment of adult behaviour

1.	**Instructions**	
	(a) Positive	e.g. "Put a window here"
	(b) Negative	e.g. "Don't put a yellow brick there"
	(c) Inhibitory	these are instructions that are couched in a positive mode but designed to stop the child doing something else e.g. "Come over here and sit down".
2.	**Questions**	
	(a) Central to task	e.g. "How many windows does the house have?"
	(b) Peripheral to task	e.g. "What kind of house do you live in?"
3.	**Prompts**	
	(a) Verbal suggestion	"Why not use some of the red bricks?"
	(b) Verbal explanation	"That brick is too big for the space"
	(c) Non verbal prompts	Demonstration to child of what is required
	(d) Physical prompts	Physically directing child's action or attention.
4.	**Gives Answer**	
		Either in response to question asked by child or by the adult himself (in the sense of supplying the answer for the child).
5.	**Gives Praise**	
		(a) Verbal
		(b) Physical
6.	**Rhetorical Statement**	
		Adult verbal behaviour which other than providing a spoken background to the activity makes no direct demands upon the child.
7.	**Physical Restraint**	
		Physical suppression of negative behaviour.
8.	**Completion**	
		Physical assistance given by the adult e.g. in making a firm connection between pieces.

For the same reason that applied to the categories of adult behaviour, this list was, prior to analysis, condensed. The resulting summary categories are shown in Table 6.3.

'Observations' (i.e. codings of the behaviour) were made from the video recordings. The adult and child behaviours were coded independently on separate occasions by separate raters. Both raters were students engaged specifically for this purpose. The raters were 'blind' to the purpose of the experiment. Observations were made on a time sampling basis with ten seconds of observation followed by ten seconds for the recording of the occurring behaviours. Those behaviours that did occur during the ten seconds were checked only once regardless of their frequency within that ten second interval.

The observers were trained using the final practice tapes described earlier and estimates of interobserver agreement calculated (ie. between the observer concerned and the author). Training was continued until it was considered that the degree of agreement had achieved an acceptably high standard.

Table 6.3. Categories of behaviour used in the assessment of the child behaviour

1.	On or off task	judgment as to whether or not the child's activity over the time sample unit was oriented toward the task at hand.
2.	Relevant use of material	i.e. constructive use of LEGO pieces.
3.	Irrelevant use of material	included mouthing, spinning or any inappropriate use of LEGO pieces.
4.	Adult related behaviour	this included behaviour, both verbal and non verbal, that suggested the child was acknowledging the presence of the adult.
5.	Resisting behaviours	these included leaving the table, apparently deliberate looking away, etc.
6.	Types of speech, either spontaneous or responsive	(a) relevant to the situation either to himself or to the adult (b) apparent echolalia (c) irrelevant speech or 'jargon' (d) meaningless vocalisations
7.	Stereotypies	(a) body rocking (b) head weaving (c) finger flicking (d) gross hand movements (e) facial grimaces
8.	Ignores instructions	complete absence of a response where one would normally be called for.

6.2.2. Results

6.2.2.1. Reliability

The calculation of indices of reliability is problematic when one is dealing with indices based upon relative agreement of categoric data; especially so when the number of possible categories is greater than one or two and the probability of endorsing any particular category at any one time is small. The chosen index in this study is based upon the method described by Rutter, Graham and Yule (1970) and uses the following formula for each dependent variable.

$$\frac{2 \times \text{No. of observations in agreement}}{\text{Total No. of observations made by both raters}} \times \frac{100}{1}$$

This formula disregards that majority of occasions when both raters agree on the absence of an event (see Hartman, 1977).

Overall, for the observations of the adult behaviour (all categories combined) the index of agreement was 88.5 and for the observations of the child behaviour it was 92.2. Individual values for all variables used in the main analysis (both child and adult behaviour ranged from 82.3 (Adult: Inhibitory instructions) to 100.0 (Adult: Gives Praise).

6.2.2.2. Analysis of Adult Behaviour

For the analysis of the main body of the data, the first 80 periods of 20 second observe/record cycles for each session were used. The number of observation intervals during which each codifiable behaviour occurred in each session were treated as 'scores' and the statistical analyses carried out on these 'scores'.

Table 6.4. shows the means of these totals per style for the adult behaviour. Two way analyses of variance were carried out on these means with the independent

factors being 'task structure' (STR) and 'interpersonal demands' (ID), each at two levels, high (+) and 'low'(-). Figure 6.1. present graphically those data in Table 6.4. together with summaries of the significant effects resulting from the analyses of variance. Table 6.5. gives numerical details of these analyses.

Table 6.4. Mean frequency of occurrence for all sessions on those adult variables which subsequently showed a statistically significant effect.

		STR+		STR-	
	Adult Behaviour	ID+	ID-	ID+	ID-
1.	Positive, task related instructions	35.2	58.1	8.0	1.2
2.	Positive, adult related instructions	6.9	0.7	3.8	0
3.	Negative, task related instructions	5.5	6.3	0.6	0
4.	Inhibitory instructions	8.6	8.8	1.0	1.7
5.	All questions	38.3	7.6	50.5	4.2
6.	Verbal suggestion	11.1	5.9	12.4	1.5
7.	Verbal explanation	9.4	5.3	6.1	0.6
8.	Non verbal prompt (demo. of piece)	30.2	22.4	14.0	3.1
9.	Non verbal prompt (demo. of action)	6.1	15.2	2.3	0.2
10.	Physical prompt	5.6	1.6	3.1	0.1
11.	Answers adults question	7.6	1.1	5.1	0.2
12.	Rhetorical statements	8.2	3.3	11.7	1.7
13.	Rhetorical action	1.2	1.8	2.8	12.4
14.	Completion	6.8	7.4	5.9	1.3
15.	Verbal praise	30.1	33.7	16.4	4.6

As can be seen from Table 6.4. and Figure 6.1. the significant differences between conditions in the adult behaviour are very much in the directions that might be predicted from the descriptions of the styles made at the outset. The important thing is that these conditions were

Fig. 6.1. Mean frequencies of occurrence of adult behaviours.

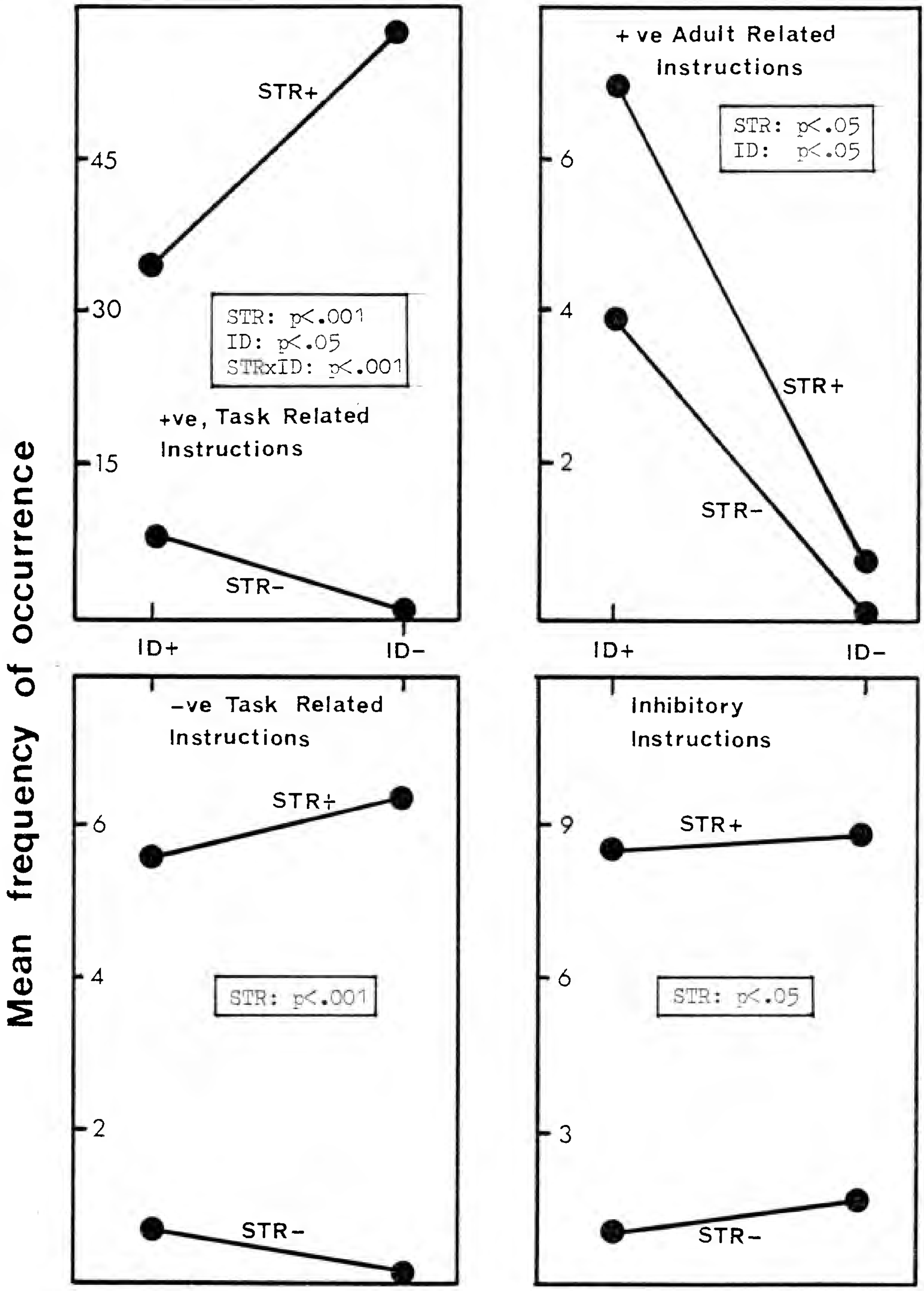


Figure 6.1. (continued) Mean frequencies of occurrence of adult behaviours.

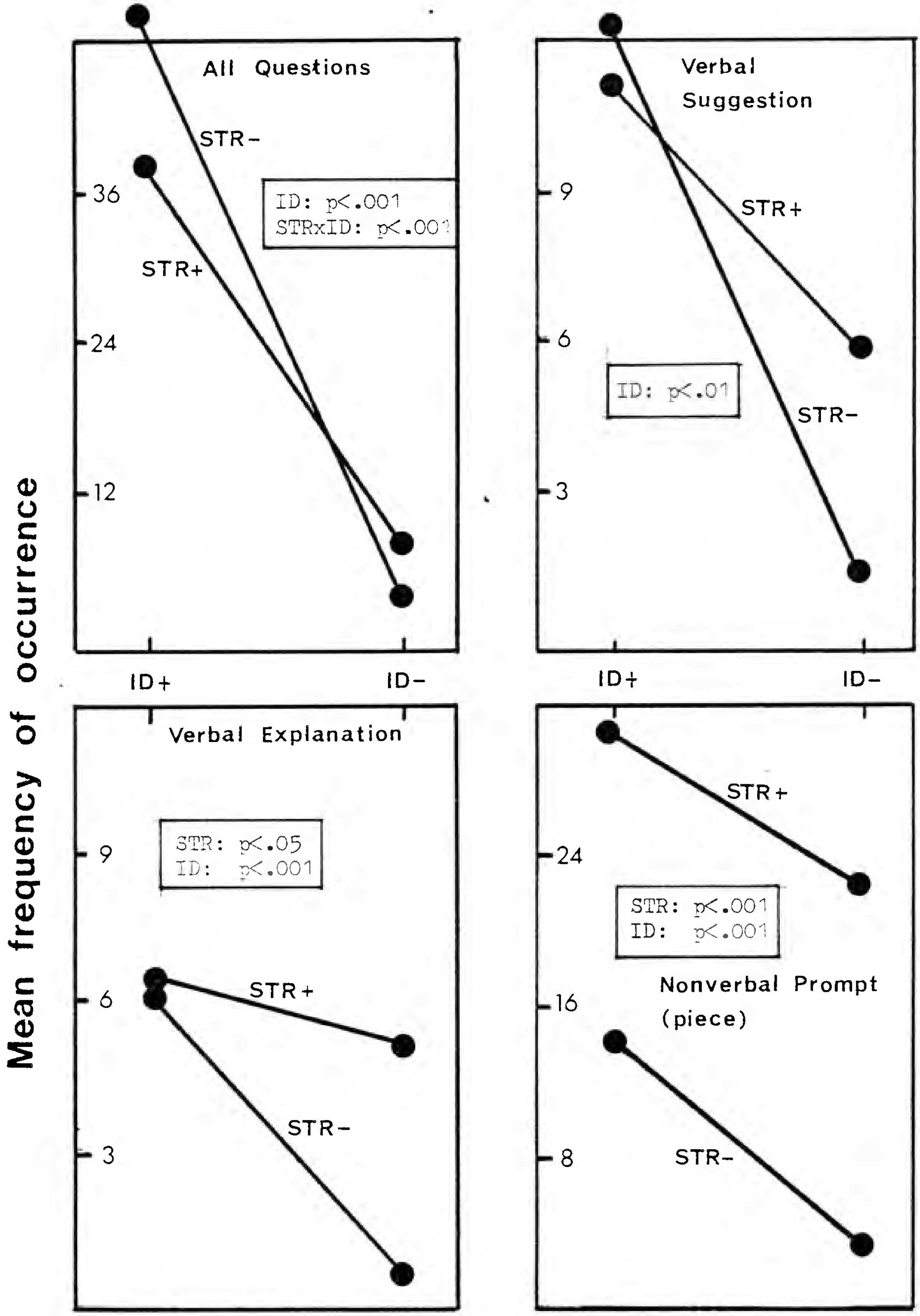


Figure 6.1. (continued). Mean frequencies of occurrence of adult behaviours.

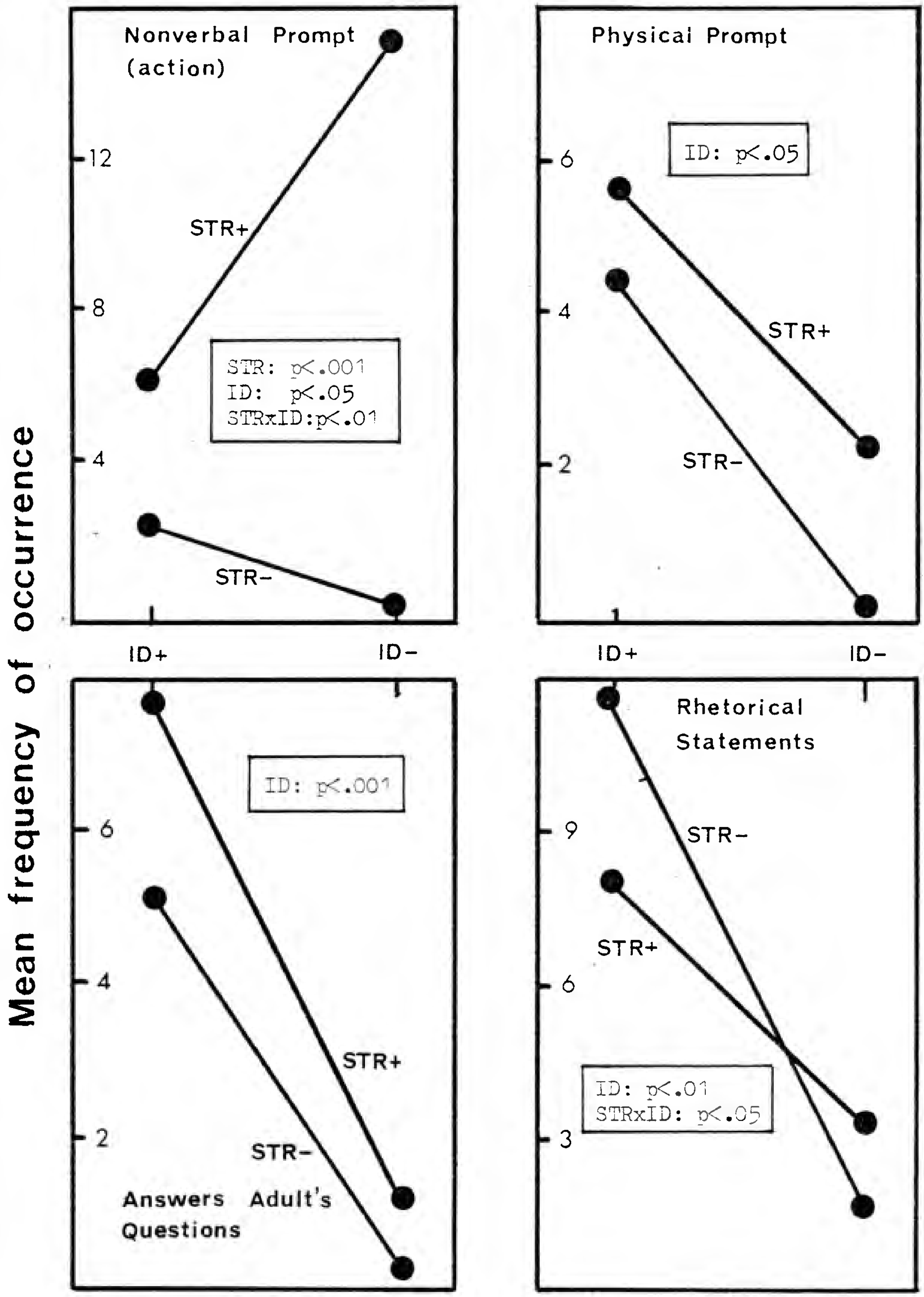


Figure 6.1. (continued) Mean frequencies of occurrence of adult behaviours.

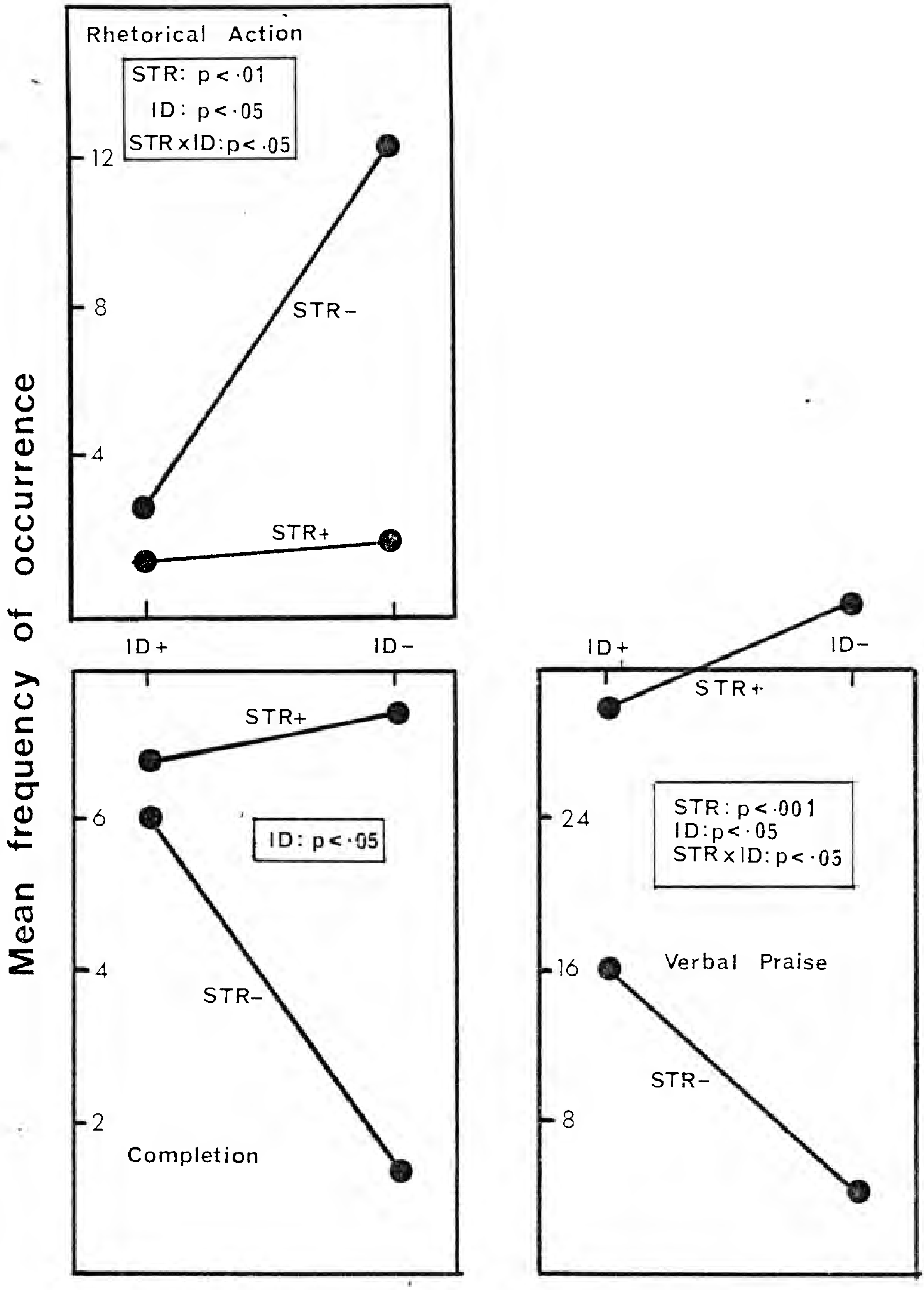


Table 6.5. Details of ANOVA of adult data

Variable[1]	Effect	Hypothesis Mean Square	Error Mean Square	F	Significance of F
1.	STR	16426.6	65.5	250.52	p <.001
	ID	616.6	56.0	10.99	p= . 01
	STR x ID	1834.6	74.3	24.67	p <.001
2.	STR	46.6	8.5	5.48	p <. 05
	ID	230.0	25.5	8.98	p <. 05
	STR x ID	23.3	16.0	1.45	NS
3.	STR	27.7	12.5	22.17	p= .001
	ID	0.4	5.0	.08	NS
	STR x ID	5.4	9.2	.59	NS
4.	STR	484.0	49.1	9.85	p< .05
	ID	1.0	2.8	.34	NS
	STR x ID	1.0	30.3	.03	NS
5.	STR	177.8	39.5	4.50	NS
	ID	13380.8	83.2	160.66	p <.001
	STR x ID	592.1	32.8	18.04	p <.001
6.	STR	36.0	24.0	1.5	NS
	ID	625.0	40.5	15.4	p <. 01
	STR xID	58.7	15.6	8.75	NS
7.	STR	136.1	18.9	7.19	p <. 05
	ID	177.8	3.5	49.51	p <.001
	STR x ID	9.0	8.2	1.08	NS
8.	STR	2791.3	76.6	36.41	p <.001
	ID	774.6	16.5	46.9	p <.001
	STR x ID	23.3	76.8	.30	NS
9.	STR	821.8	27.8	29.58	p <.001
	ID	106.8	15.9	6.71	p <. 05
	STR x ID	266.8	16.7	15.97	p <. 01
10.	STR	34.0	13.4	2.52	NS
	ID	132.2	12.5	10.52	p <. 05
	STR x ID	2.2	18.7	.16	NS
11.	STR	30.2	10.1	2.97	NS
	ID	283.3	8.1	45.89	p <.001
	STR x ID	8.0	9.2	.86	NS
12.	STR	11.1	17.9	.61	NS
	ID	513.7	20.6	24.87	p <. 01
	STR x ID	81.0	17.5	4.62	p <. 05

contd...

Table 6.5. contd.

Variable[1]	Effect	Hypothesis Mean Square	Error Mean Square	F	Significance of F
13.	STR	367.3	30.6	11.97	$p < .01$
	ID	240.2	41.4	5.79	$p < .05$
	STR x ID	164.6	40.2	4.09	$p = .05$
14.	STR	103.3	22.6	4.57	NS (p=.06)
	ID	56.2	9.8	5.69	$p < .05$
	STR x ID	61.3	22.2	2.75	NS
15.	STR	4225.0	83.8	50.4	$p < .001$
	ID	186.7	32.2	5.79	$p < .05$
	STR x ID	576.0	75.7	7.60	$p < .05$

[1] see Table 6.4. for variable names.

different in a variety of ways. Thus, high structure can be seen to be confirmed as including a relatively high frequency of task related instructions and instructions intended to inhibit counterproductive behaviours. This difference is also reflected in the higher rate of non-verbal prompts and in the rate at which verbal praise is given. This last aspect, however, is difficult to interpret as to a large extent it is under the control of what the child is doing to deserve praise.

High interpersonal demands seem to be characterised by an increase in all types of questions, suggestions (as opposed to instructions) and also an increase in all types of those aspects which give a conversational tone to the encounter, i.e. answering his own questions when the child does not do so and in making more 'rhetorical statements'.

It must be stressed that one of the reasons for analysing these data in this fashion was to provide an empirically based check of the treatment manipulation. However, the presence of a number of STR x ID interactions necessitates caution when subsequently discussing the effects of the styles (on the child's behaviour) in terms of the original design parameters, STR and ID. For example, the significant effect of ID on the positive, task related instructions (and to a certain extent the STR effect) is almost certainly an artefact of the strong STR x ID interaction. Thus it should be noted that this type of instruction is much more frequent in the STR+ID- condition than when the high levels of both factors are combined. Similarly, the rate of 'questions' is much higher in the absence of task structure. This might reflect the fact that there is a limit to the amount of verbal activity in which the adult can engage during a session, and that an increase in one type (e.g. questions) occurs at the expense of another (e.g. instructions). The important consequence of this (along with the presence of other significant STR x ID interactions) is that the two parameters cannot be considered as varying independently. This has implications for the analysis of the child data, as described below.

6.2.2.3. Analysis of Child Behaviour

As for the adult behaviour, the number of intervals which included each codifiable behaviour was totalled for each session. Not surprisingly, the overall range of behaviour reflected by these scores was considerably less than was the case with the adult data. It was necessary, therefore, to collapse some of the coding categories before the analysis could proceed (e.g. the frequencies of occurrence of different types of stereotyped behaviours were combined under the single heading 'stereotypies'). This resulted in 8 composite variables shown in Table 6.6.

As mentioned above, the analysis of the adult data had indicated that the two variables used in the design of the styles, i.e. STR and ID, could not be viewed as orthogonal. Thus, in the evaluation of the outcome of any one style, the contribution of, say, the level of STR can only be evaluated by taking into account at the same time the level of ID. For this reason, the child data were analysed with the four 'styles' representing four categories of one variable. This was incorporated into a 2-way ANOVA, the second independent variable being the classification of the children as 'typically' and 'atypically' autistic (N= 6 and 4 respectively). Table 6.6. shows the mean frequencies of occurrence of each dependent variable according to this design of analysis. Effects that proved to be statistically significant are demonstrated graphically in Figure 6.2. Where the 'conditions' effect was significant, comparisons between means were made using the Newman-Keuls method (Winer, 1962). Table 6.7. gives the numerical details of the analyses of variance.

It is clear from these data that the differences between the four styles had substantial effects on the

Child Behaviour	Typical STR+ ID+	Typical STR+ ID-	Typical STR- ID+	Typical STR- ID-	Atypical STR+ ID+	Atypical STR+ ID-	Atypical STR- ID+	Atypical STR- ID-	Styles	Grps	SxG
1. On task behaviour	36.3	40.0	27.0	14.3	27.2	41.0	19.0	13.5	**		
2. Relevant use of material	35.3	47.6	30.6	18.0	25.5	35.5	11.25	11.25	**		
3. Irrelevant use of material	12.0	16.2	21.3	41.5	16.8	13.0	20.8	38.3	**		
4. Adult related behaviour	39.7	28.8	29.8	7.33	36.5	31.0	21.5	18.5	**		
5. Resisting behaviour	1.67	2.8	2.0	3.16	5.75	1.8	15.5	27.5		**	*
6. Meaningless vocalisations	19.8	17.6	10.7	24.5	49.8	45.0	35.8	41.3		*	
7. Relevant speech	13.5	3.5	13.8	1.0	2.5	0.8	2.3	0	**	.08	
8. Stereotypies	12.5	9.3	9.2	4.7	2.8	7.8	10.8	2.5			

Table 6.6.

Mean frequencies of occurrence of the composite child variables and analysis of variance summary (*=p < .05, **=p < .01, ***=p < .001).

Figure 6.2.(a) Mean frequencies of occurrence of child behaviours. Levels connected by arrows are not significantly different (p=.05).

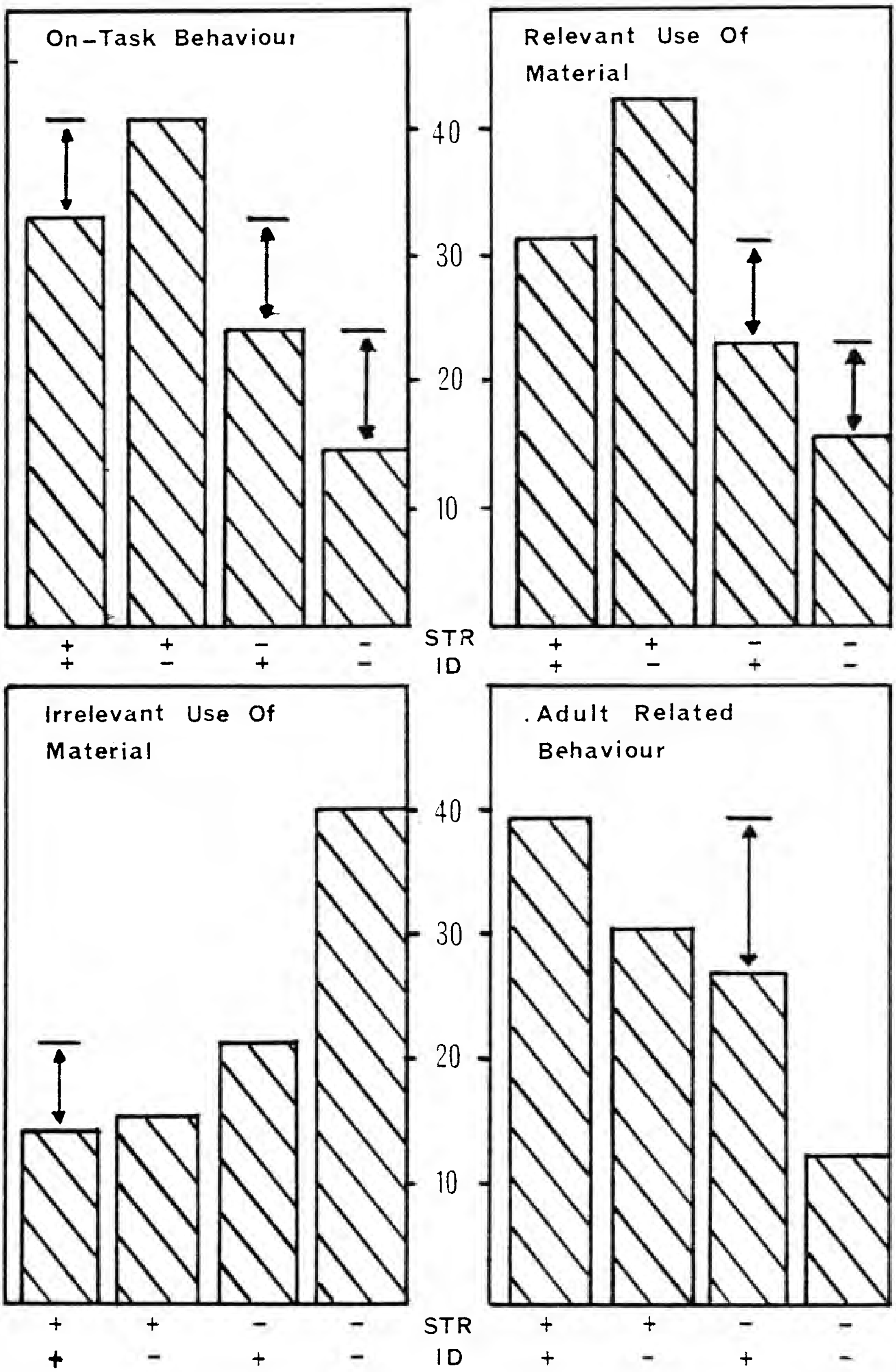


Figure 6.2.(b) Mean frequencies of occurrence of child behaviour (= 'typical'; = 'atypical').

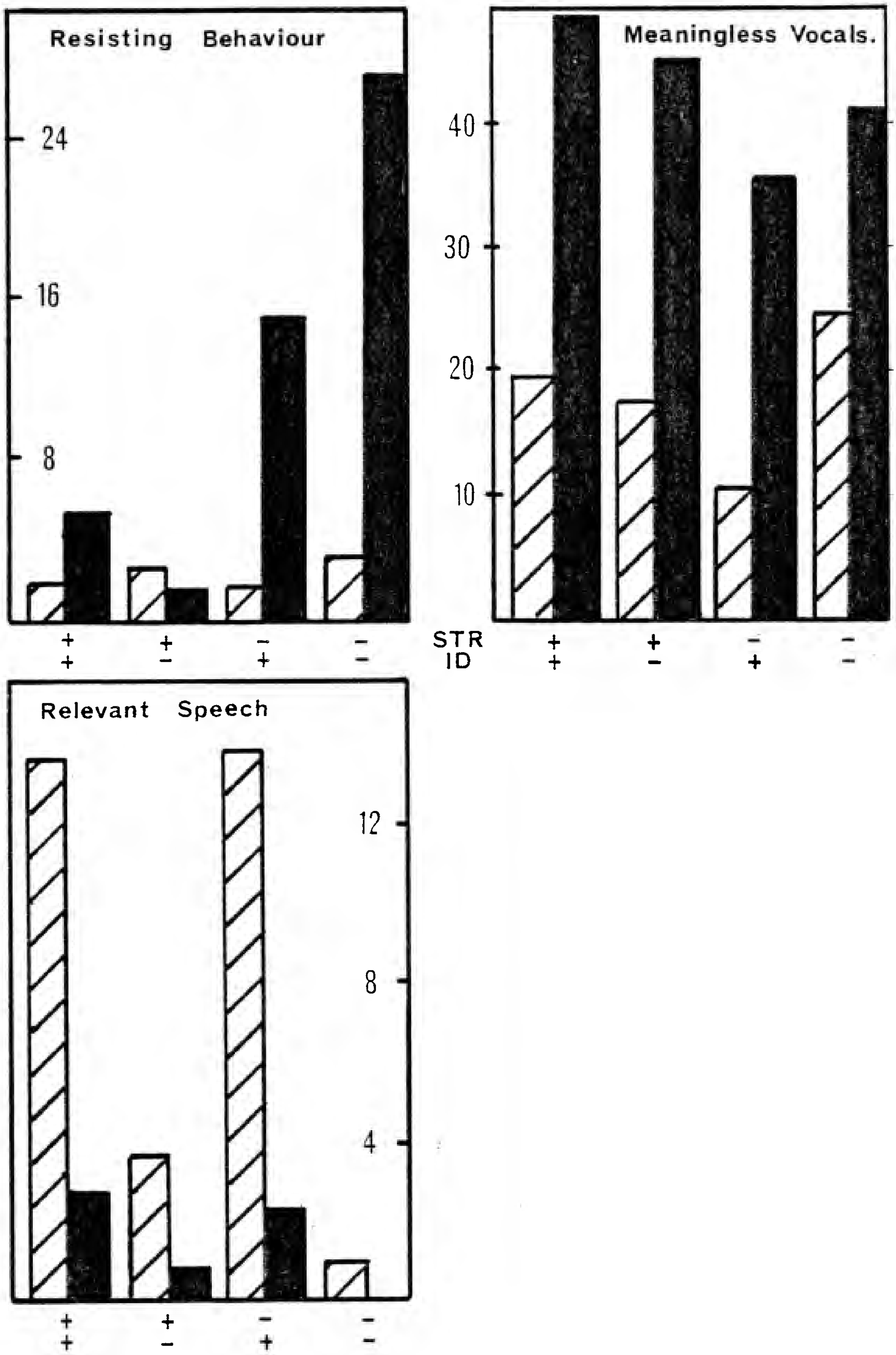


Table 6.7. Details of ANOVA of child behaviour

Variable[1]	Effect	Hypothesis Mean Square	Error Mean Square	F	significance of F
1	Style	1412.0	133.1	10.6	$p < .01$
	Grps	1435.7	1090.2	1.31	NS
	SxG	76.0	133.1	0.57	NS
2	Style	1399.6	115.1	12.15	$p < .01$
	Grps	1421.0	785.1	1.41	NS
	SxG	68.2	115.1	0.59	NS
3	Style	1399.5	272.9	5.12	$p < .01$
	Grps	268.1	1204.3	.22	NS
	SxG	124.1	272.9	.45	NS
4	Style	1226.3	105.6	11.61	$p < .01$
	Grps	2.0	870.6	.002	NS
	SxG	166.4	.05.6	1.56	NS
5.	Style	229.4	102.7	2.23	NS
	Grps	1000.4	142.4	7.02	$p < .01$
	SxG	300.2	102.7	2.92	$p = .05$
6	Style	261.0	247.4	1.05	NS
	Grps	5890.5	1259.3	4.67	$p < .05$
	SxG	77.9	247.4	.31	NS
7	Style	200.4	33.8	5.91	$p < .01$
	Grps	416.1	150.2	2.77	$p = .08$
	SxG	72.3	33.8	2.13	NS
8	Style	71.4	81.5	.87	NS
	Grps	85.2	138.3	.61	NS
	SxG	55.4	81.5	.62	NS

[1] see Table 6.6. for variable names.

child's behaviour. With respect to the amount of time spent 'on task' the two conditions involving high task structure showed an increase when compared to the low task structure and low interpersonal demand condition ($p < .01$ in both comparisons). In addition STR+ID- was superior to STR-ID+ ($p < .05$). The same pattern emerges with regard to relevant use of material, but here STR+ID- is superior to all other conditions (vs. STR+ID+, $p < .05$; vs. STR-ID+ and STR-ID-, $p < .01$). Irrelevant use of the material was significantly increased ($p < .01$) in the least intrusive condition when compared to the three other conditions. The opposite was true of the extent to which the child engaged in adult related behaviour: the three conditions which involved at least some intrusion were statistically indistinguishable in this respect, but all higher than STR-ID- ($P < .01$). The distinction between the 'typical' and 'atypical' children needs to be taken into account on the three remaining variables of Figure 6.2. There was a significant 'styles' x 'groups' interaction ($p < .05$) on the 'resisting behaviours' which is explained by the sharp increase in this behaviour for the 'atypically' autistic group when exposed to the low task structure conditions. The 'atypical' group also showed a marked increased in the production of 'meaningless vocalisations' across all conditions when compared to the 'typical' group, ($p < .05$). The type of condition did not seem to have any effect on the production of meaningless vocalisations or on the difference in this respect between the two groups of children. There was a significant difference between the styles in terms of the amount of relevant speech; both of the high interpersonal conditions eliciting more speech than the low interpersonal conditions ($p < .05$). The data for both groups of children are presented in Figure 6.2. on this last variable despite the fact that the 'autism' variable and the 'groups' x 'styles' interaction narrowly failed to achieve significance at the 5 percent level. It was felt that the clinical and theoretical significance of such a finding, should it transpire to reflect a real difference, warranted some consideration and discussion.

6.2.3. Part Replication

Some 6 months after the data collection had been completed, the opportunity arose to test the same group of children under two of the experimental conditions. It was considered that such extra data would allow some examination of the stability of the effects noted in the analysis of the main study. Conditions STR+ID- and STR-ID- were repeated for all 10 children, using the same procedure as described previously. The video-tape recordings of these sessions were assessed with regard to the child's behaviour only, the rating being carried out by the same person who did this rating in the main part of the study.

In order to have confidence in the comparability of the ratings between the main study and this part replication, the rater was given a 'refresher course' in the use of the coding schedule and then given four tapes (one representing each style) taken from the main study to re-rate. The rater was not told that she had already viewed these tapes and on subsequent questioning there was no indication that she remembered having seen these particular tapes before or that she had already rated them. The product moment correlation between the first and second ratings for the eight composite child variables can be viewed as indices of test-retest reliability (see Table 6.8.).

Table 6.8. Correlation coefficients between first and second ratings of the child data.

	Variable	'r'
1.	On task behaviour	.91
2.	Relevant use of material	.89
3.	Irrelevant use of material	.81
4.	Adult related behaviour	.69
5.	Resisting behaviour	.85
6.	Relevant speech	.68
7.	Meaningless vocalisations	.71
8.	Stereotypies	.46

In addition to these correlations the mean frequencies of occurrence for each of these variables between first and second ratings were not significantly different, with the exceptions of 'on-task behaviour' and relevant use of material (see Table 6.9.).

Overall all it would appear that there is good evidence for comparability between the ratings of the part replication and the main study with the possible exception of the rating of 'stereotypies' and the apparent consistent decrease in sensitivity towards the recording of 'on-task

Table 6.9. Mean frequency of occurrence (per 50 secs. observation time) for the variables that showed significant test-retest differences

	Variable	1st rating $\bar{X}$	1st rating SD	2nd rating $\bar{X}$	2nd rating SD	r	p
1.	On task behaviour	2.70	2.08	2.38	1.99	.91	$<.005$
2.	relevant use of material	2.57	2.01	2.08	1.67	.89	$<.001$

behaviour and 'relevant use of material'. This latter caveat however is not serious given that the absolute shift in mean frequencies is small in each case and that the correlations are very high.

The results of the analysis of the part-replication data indicate that on all variables, the significant differences between the two conditions retested (STR+ID- and STR-ID-), when present initially, are confirmed by the supplementary data.

Table 6.10. Comparison of mean frequencies of occurrence of child behaviours between original testing and the part replication. Means are given for the total group except for 'Resisting behaviour' and 'meaningless vocalisations' where the total is broken down into means for the 'typically autistic' and 'atypically autistic' subgroups (the latter being in parentheses).

		Original testing		Part-replication	
		STR+ ID-	STR- ID-	STR+ ID-	STR- ID-
1.	On task behaviour	40.4	14.0	45.8	15.8
2.	Relevant use of material	42.8	15.4	52.1	18.4
3.	Irrelevant use of material	14.9	40.2	11.1	25.4
4.	Adult related behaviour	29.7	11.8	32.5	9.5
5.	Resisting behaviour	2.8(1.8)	3.2(27.5)	0.0(2.8)	3.2(22.0)
6.	Meaningless vocalisations	17.6(45.0)	24.5(41.3)	15.6(30.5)	16.6(42.8)
7.	Relevant speech	2.4	0.6	3.3	3.4
8.	Stereotypies	8.7	3.8	3.5	5.9

6.2.4. DISCUSSION

6.2.4.1. Adult behaviour

The object of this study was to examine the immediate effects on various positive and negative aspects of the autistic child's behaviour when the child is exposed to various 'styles' of adult-child encounter. It was intended that these styles should differ according to the amount of 'structure' that they imposed upon the situation and according to the extent to which interpersonal or social demands were made of the child. The styles were not prescribed to the extent that a particular number of specified events would have to be included, as adherence to such *a priori* rules may well have interrupted the natural flow of the encounter and resulted in the evaluation of rather artificial situations. Therefore, the study had to include detailed analysis of the behaviour of the adult in each of the styles so that their essence could be readily communicated, and to establish that, according to statistical criteria, they were discriminable in a variety of respects that were relevant to the rationale of the study. Examination of Tables 6.4., 6.5. and Figure 6.1. confirm that, over and above the variability that was brought to the sessions by the individual children, the styles *were* significantly different in a number of ways and that, also, these differences were more complex than the original two dimensional model might have suggested.

For example, the analysis demonstrates that the conditions which were described as 'high task structure' included a greater number of explicit instructions concerning the activity at hand reflecting the manner in which the requirements of the task were to influence the style. However, the strong interaction effect on this variable between 'task structure' and 'interpersonal demands' requires a qualification to be added to this influence. The source of this interaction lies in the considerable increase in the number of positive and task related instructions (e.g. "put a blue brick on next") in the condition involving high structure but in the absence of interpersonal demands. Thus the added constraint of having to introduce the 'interpersonal' contact can be seen as diluting the instructional tone of the session. Negative instructions, i.e. telling the child not to do something, more clearly distinguishes the two levels of task structure although it should be noted that the absolute levels of the frequency of this type of instruction are low when compared to the positive type.

Similarly, the conditions that were designed to include high interpersonal demands contained significantly more questions being asked by the adult, reflecting an increase in those aspects of the situation where the appropriate child response would have to take the adult into consideration. Again, this effect is complicated by the presence of a significant interaction between the two independent variables: the number of questions asked is greater in the condition where the high interpersonal demands are in the absence of task structure. One explanation of these interaction effects, which concern both the 'task structure' and 'interpersonal demands' variables mutually, is that there is necessarily a maximum amount of verbal activity appropriate to any of the sessions and that an excess of one aspect of this activity occurs at the expense of another. This is supported by looking at the combined average scores for the 'positive task related instructions' and 'all questions' variables (see Table 6.4.). For the first three columns, the new scores all converge, indicating that any differences between these conditions in the analysis of the child data are not due to different levels of adult verbal activity.

Other differences were apparent between the styles; 'verbal suggestion' and 'verbal explanations' are more frequent in the ID+ conditions. Both of these categories involve attempts on the adult's part to draw the child's attention to the speaker. This is more obvious in the 'positive adult related instructions' (e.g. "look at me") which also showed a significant ID effect. Regarding the non-verbal aspects of the sessions, prompts were associated both with STR+ and ID+, although where such prompts took the form of demonstrating an action, a significant interaction shows that this occurred most frequently in the STR+ ID- condition. This probably reflects the fact that had these prompts been made verbally then they would have been classified as 'verbal suggestion' or 'explanations' which are characteristics of the ID+ conditions. Physical prompts, which involve physical contact with the child, and thus represent explicit examples of the child being made aware of the adult presence, were significantly associated with high interpersonal demands.

Obviously, the styles were discriminable in ways other than those described above. However, it is important that they were discriminable and in ways that were relevant to the intentions of the styles. In addition, it is important that the dimensions defining the styles were not independent in that, for the analysis of the child data, the sessions were to be treated as four separate conditions rather than all combinations of two levels of two factors.

6.2.4.2. Child behaviour

There were several important differences in the outcome of the styles, both in the positive and negative aspects of the behaviour of the children. 'On task behaviour', 'Relevant use of material', and 'Adult related behaviour', all positive aspects of the child's responsiveness, were least frequent in STR-ID-. Thus, both task and person related behaviours were influenced by the amount of effort that the adult put into eliciting them. The latter is especially important: the finding that the child's social responsiveness increased with the interpersonal demands of the encounter is contrary to the belief that the child's deviance can be explained in terms of an active avoidance of social contact. The difference between STR-ID- and the other conditions is further demonstrated by the amount of 'Irrelevant use of material'; here the positive aspects of performance were replaced by the mouthing, twiddling, spinning and other inappropriate uses of the LEGO pieces.

It would appear that when left to his own devices, and with materials that are familiar in appearance and usage, the autistic child is most likely to behave in a compulsive or ritualistic manner. However, this functional inertness can be intruded upon and more desirable behaviour super-imposed, both in relation to the task at hand and to the presence of another person.

The observed increases in positive behaviours were not associated with parallel increases in resisting behaviours, i.e. there was no suggestion that making demands of the autistic child produced an increase in those behaviours (gaze aversion, leaving the table, pushing away the adult, etc.,) which would indicate a rise in the child's anxiety or in his efforts to escape the pressure. Those children who, at the outset, had been confirmed as typically autistic showed very little resistance in any of the conditions, reinforcing the impression of passive compliance. On the other hand, those children who were considered to be in some way atypical, responded to the absence of control in a much more active fashion. This, of course, is not what would be expected if the resistance were a product of the pressures that were put upon the child. As control was exercised in the form of high task structure, then the resistance dropped to a manageable level.

Differences between the children designated as 'atypical' and 'typical' were also present in the frequencies of both 'meaningless' and 'relevant' vocal behaviours, (although the latter was only demonstrably significant at the 10 percent level). The atypical group produced many more meaningless vocalisations, but the rate of the activity, for either group, was not affected by the style of the session. However, with respect to relevant speech, there was a tendency for the 'typical' children who had at least some speech, to produce it when requested (i.e. in the ID+ condition). The use of relevant speech, albeit at best at an infrequent level, is a crucial aspect of social behaviour as it implies both an ability to comprehend what it is that is being required and an acknowledgement of the presence of the other person to whom the speech is addressed. As such, the suggestion that relevant speech is most likely to be forthcoming if the child is urged to use it, is in accord with the findings already discussed.

The possible difference between the 'typical' and 'atypical' children in their usage of functional speech may be related to the weight that is attached to abnormal language development in making a diagnosis of autism. This 'weight' may be justified by the relationship between diagnosis and treatment, but the finding does reinforce the necessity for consideration of the typicality of all features of the syndrome in the communication of research findings concerning autistic children (see Schopler and Rutter, 1978).

Stereotyped behaviour proved to be highly variable, not only between children and between conditions but also between the main study and the part replication (r=.17 and .19 for STR+ID- and STR-ID- respectively). It would seem that the factors which contribute to changes in rates of stereotyped behaviour in autistic children were varying independently of those under examination in this study.

Certainly, it would be wrong to argue that the sessions which made most demands upon the child, served to increase the child's level of arousal and thereby affected the rates of stereotyped behaviour (Hutt and Hutt, 1968; Berkson and Mason, 1964).

The results of the present study were concerned with the immediate effects of exposing autistic children to a variety of styles of interaction with an adult where the styles differed according to the manner in which the task at hand was presented and to the extent of the interpersonal demands made of the child. The belief that the children would react to increases in the levels of one, or both, of these parameters as if threatened, and that they would therefore, be more motivated to avoid (Richer, 1978) was in all aspects unsupported. In fact the very opposite appeared to be the case. The children, when exposed to the least intrusive of the conditions were most likely to be preoccupied with obsessive manipulation of the available materials. As the demands of the situation were stepped up, the children would respond accordingly and, moreover, did not appear to respond differentially to either the 'interpersonal' aspects of the encounter or to those aspects that were more related to 'task structure'. That is to say, as social demands were increased, so was the likelihood that the child would make some sort of social response; as the task related features increased, so did the rates of productive behaviour. The implications for the day to day handling of autistic children would seem to be that in the short term, organising the child's activities in a structured way, and exposing him to situations of an interpersonal nature do not result in an increase in his autistic features. In order to increase the child's behavioural repertoire and therefore to facilitate more successful adaption to his environment, it is necessary to elicit constructive behaviour that can be used as a foundation. The most profitable strategy would seem to be to exploit those characteristics of the situation described in this study.

CHAPTER 7

SUMMARY OF FINDINGS

Detailed discussion of research findings occur at the ends of relevant chapters. However before the concluding discussion (Chapter 8) it is perhaps necessary to summarise briefly some of these findings.

Chapter 3 Studies of negativism.

1. On the 'degree of wrongness' tasks and in the shape and colour discriminations, only one child made a greater number of errors than would be expected by chance and then only on the 'white' discrimination. It was concluded that none of the children were behaving 'negativistically'.

2. Performance on the discrimination tasks was related to language ability. Children with no language tended to perform within the limits of chance.

3. With the chance performers there was no relationship between response and request. Response and request did not covary.

4. Failure to replicate the Cowan, Hodinott and Wright (1968) findings could not be explained by procedural differences.

5. Failure to replicate was not due to the task being inappropriately easy.

6. Based on the available evidence, the failure to replicate was not due to diagnostic differences.

7. Children performing at chance level were more likely to be 'typically autistic' than 'atypically autistic'.

8. The relationship between language ability and performance held for the 'typically autistic' group only.

9. Negativism appears not to be a basic feature of the autistic syndrome. The findings of Cowan et al may be a consequence of an interaction between living in an institutional environment and autism. The reason why the children were in long stay hospital may also be related to behaviour problems related to negativism.

Chapter 4 Task difficulty and performance

1. Performance in the Raven's Coloured Progressive Matrices is related to the difficulty of the items and, to a lesser degree, to the position of the item in the test. This latter relationship drops almost by one half when the correlation between presentation order and item difficulty is taken into account.

2. Analysis of error types suggested five groups of performance. Reanalysing the performance of the children whose errors were of the type shown by normal children, the relationship between performance and presentation order was reduced to an insignificant level.

3. There was no difference in types of response between the 'typical and 'atypical' groups.

4. Administration of more difficult problems to children who had performed maximally on the RCPM indicated no abnormalities in performance despite the expected increase in number of failures. The exception to this was one child who now responded incorrectly on every trial. Altering the response mode brought about 'compliant' responding.

5. Administration of successively easier items to the children who had scored poorly on the original testing and who had also shown abnormal error strategies, revealed that appropriate responding could be elicited if sufficiently simple problems were presented first.

Chapter 5 Intellectual assessment of psychotic children

Based upon a review of the use of IQ tests, factors affecting performance in such tests, the special problems associated with testing psychotic children, and the predictive aspects of measures derived from clinically deviant populations, it was concluded that formal estimates of IQ can provide useful clinical and research information.

Chapter 6 Task structure and interpersonal demands

Children's responsiveness to variations in task structure (STR) and interpersonal demands (ID) were assessed.

1. With regard to the adult's behaviour, there were differences between high and low structure and between high and low interpersonal demands.

2. High task structure (STR+) was characterised by a relatively high frequency of task related instructions and instructions intended to inhibit counterproductive behaviours.

3. High interpersonal demands (ID+) were characterised by an increase in all types of questions, suggestions (as opposed to instructions) and in those aspects which gave a conversational tone to the encounter and which emphasised the task as a joint activity.

4. The analysis of the adult behaviour served as a manipulation check that the definition of the parameters of the styles were effectively applied. This check also revealed that in a number of ways these parameters were not independent of each other. For this reason, the 'child behaviour' was analysed as a one-way ANOVA with the four styles being represented as four levels of one factor.

5. With regard to the child behaviour, there were substantial differences between the four styles. There was more 'on task' behaviour in the two conditions including STR+ when compared to STR-ID-. In addition STR+ ID- was superior to STR-ID+. The same was the case with 'relevant use of material' but with STR+ID- being superior to all other conditions. Irrelevant use of material was significantly increased in STR-ID-; and in

the same condition, adult related behaviour was significantly reduced.

6. Differences between the 'typical' and 'atypical' children emerged on 'resisting behaviour': there was a significant increase here for the latter group in the STR- conditions. The atypical children also produced more 'meaningless vocalisation' in all conditions and a tendency to produce less 'relevant speech' when this was required of them (i.e., in the ID+ conditions).

7. 'Stereotyped behaviour' was unrelated to the differences between styles.

8. The results of the part replication indicated that on all child variables, the significant differences between the two conditions retested (STR+ID- and STR-ID-) were confirmed by the supplementary data.

CHAPTER 8

DISCUSSION

8.1. Methodological Considerations

8.1.1. Replication

It is often stated that one of the basic requirements of scientific research and ensuing reports is that they should be carried out and presented in a way that allows subsequent replication. This issue occurs in the research described in this thesis and therefore warrants some discussion.

At the outset it was stated that the research theme of this thesis was an examination of the relationship between the impaired interpersonal relationships characteristic of autistic children's functioning and their level of ability in other aspects of their behaviour. Chapter 3 was concerned with a particularly molecular aspect of their responsiveness to demands made upon them by other people, namely their reported tendency to react to apparently simple requests by the consistent production of incorrect answers. It was hypothesised that this apparently deliberate avoidance of correct answers might be interpreted in ways other than implying a knowledge of what the correct answer was and an 'unwillingness' to supply it. One study (Cowan, Hoddinott and Wright, 1965) had demonstrated empirically this phenomenon of 'negativism' in some autistic children (namely those with 'no language') and it was the strategy of the current studies to reproduce the phenomenon using much the same paradigm, and then to explore it more fully.

Thus, the first step constituted a 'replication'.

As this 'replication' was not carried out primarily to examine the repeatability of the Cowan et al findings, it was considered unnecessary to copy in every detail the method originally described. Rather, it was felt that some modifications to the experimental method, which should have proved irrelevant to the main outcome (i.e., the elicitation of negativism) would in fact add extra information that would have contributed to its interpretation.

Thus, the Cowan et al study involved a multiple choice discrimination task (three shapes, each of four colours) and each child was asked for 25 consecutive trials to "put a square one in the box". Twenty five further trials were then given with the request being "put a red one in the box". Experiment 1 (Chapter 3) modified this procedure in four ways.

(1) The number of tiles was reduced to nine (three tiles each of three colours).

(2) The request was varied so that all of the colours and all of the shapes were asked for in a quasi-random order.

(3) The number of trials was increased to a maximum of 96 (48 for shapes and 48 for colours).

(4) A preliminary 'degree of wrongness' task was introduced.

Modification (2) was introduced to establish that the negativism, should it occur, was not specific to a particular stimulus, and that the incorrect responses covaried with the requests made by the examiner. Modifications (1) and (3) were made so that this design change could be made in a manageable way and so that there would be enough trials to examine possible differences per request. Modification (4) was introduced to allow the children's choice of wrong responses to vary in terms of how wrong their options were.

The interpretation of negativism put forward by Cowan et al implies that these modifications to the procedure should have no bearing on the demonstration of the phenomenon given that the essential feature of a multiple choice discrimination paradigm had been maintained, allowing children to perform 'significantly worse than chance'. Thus it is argued that as long as an experiment takes into account certain aspects of interpretation of a previous study, it can be classed as a replication despite procedural modifications.

Yet the outcome of Experiment 1 was markedly at variance with the findings of Cowan et al. Not one of the children performed negativistically (although several performed at chance level), compared with the ten out of twelve in the Cowan study. Disregarding entirely the possibility that the Cowan et al study was inaccurately reported and disregarding also for the moment that the original findings (or, indeed, the current ones) were an extraordinary set of chance occurrences, one is forced to conclude that what was considered a replication was not in fact so.

There are two possible reasons for this to be the case. Firstly, the procedural modifications made in the current research, which were assumed to be irrelevant to negativism, were in fact relevant. Given that these changes were made with the Cowan et al interpretation in mind, this would imply that the interpretation was already demonstrated to be wrong. Although this possibility was not considered likely, it need not be impossible. For example, given autistic children's sensitivity to routine and 'sameness', the repeated request for the same colour or the same shape may conceivably have had some bearing on their style of response. This possibility was examined in Experiment 2 by repeating, as far as was possible, the exact method described by Cowan et al with the outcome that again none of the children was negativistic. Although it is inevitable that some differences in procedure still persisted (e.g., skeins of wool were used in the original for pretraining as opposed to WISC Block Design cubes; pop-corn was used as a reward as opposed to praise) the line has to be drawn somewhere and it was assumed that these would have no bearing on the outcome.

The second possibility that was considered to be relevant to the failure to replicate was that the samples of children were not equivalent (over and above their failure to be negativistic). Experiment 3 considered the possibility that the current sample was too intelligent by giving those who had previously been compliant (i.e., performed significantly above chance) a demonstrably more difficult discrimination task to do. Of course, it is not necessarily the case that even if the failure to replicate was due to the children being more intelligent, raising the difficulty level would tend to being about negativism. Moreover, some of the children in the Cowan et al study had performance IQs above 100 (i.e., were comparable in terms of IQ to some of the children in the current study). As it happened, no negativism ensued.

In general, the sample used by Cowan et al, and as described in their paper, could be found represented in the larger sample used in the current study. The two groups overlapped in terms of IQ, language ability and diagnosis of autism. Yet it was felt that the only possible source of the failure to replicate must lie in differences between the two groups.

The most explicit difference lay in the known histories of the children. The Cowan sample consisted of an hospitalised group of children whereas the current group were all attending, on a daily or weekly boarding basis, schools specially for autistic children. As discussed in Chapter 3, it is known that such differences in child management for non-autistic children may have some bearing on aspects of their social responsiveness, and it is possible that this contributed to the difference in findings.

It is also possible that the reason why the children in the Canadian sample were hospitalised in the first place may be correlated with 'anti-social' behaviour problems, making it more likely the negativism would be found in this group. Without further knowledge regarding the facilities available, referral policies or special education goals that exist in the area from which the Cowan children were drawn (and also at the time the study took place) it is only possible to speculate on this possible cause. It is true that at the time the current studies were carried out, it was implicit policy that any child who was deemed to have behaviour problems so great that their management seriously disrupted the running of the school, was more likely to be transferred to a hospital. However, there is evidence that such behaviour is correlated with IQ (Wing, 1978; Rees and Taylor, 1975) and in this respect the groups were comparable.

The question of the concurrence of the diagnosis of autism needs also to be considered. Certainly, the criteria described by Cowan et al would agree with criteria employed in the current studies (Rutter, 1971; 1978) but such criteria should be treated with caution. It is possible for children to have a history of abnormal development of interpersonal relationships, of abnormal language development, exhibit compulsive and ritualistic phenomena, with an age of onset of less than 30 months, and yet still not be, in the Kanner sense, autistic (Bartak, Rutter and Cox, 1975; Pronovost, Wakstein and Wakstein, 1966; Cohen, Caparulo and Shaywitz, 1976). For example, an experienced clinician will bear in mind when making such a diagnosis that it is a particular type of abnormal interpersonal behaviour that characterises autism. Unfortunately, it is not easy to articulate what it is that constitutes this 'particular type' although it has been referred to as 'aloneness' or 'aloofness' (e.g., Kanner, 1973; Prior, Boulton, Gajzago and Perry, 1975). It may well be that lack of cooperation, or negativism, as a manifestation of abnormal interpersonal behaviour, is not necessarily exclusive to autism, but rather a phenomenon associated with some children who fall within the more heterogeneous group defined by the general criteria listed above. In this case, the precise diagnosis need not be crucial. However, it does highlight the problem of interpreting the research carried out on autistic children and in carrying out adequate replications of previously published material when definition of the subject population cannot be made with confidence.

8.1.2. Diagnostic problems

Throughout the studies described in this thesis, an attempt has been made to be as precise as is possible about the diagnosis of the children used as subjects. Other workers have commented on the difficulty of evaluating research findings to do with the autistic syndrome when one lacks confidence in the descriptions of the subjects (Kiernan, 1981; Prior, 1979), and this almost certainly reflects difficulties in defining the syndrome. Rutter (1978) has pointed out that there is little point in starting with the word 'autism' and then defining it; rather, one needs to believe that there are certain abnormal behaviours which are found together in a particular group of children and which differentiate these children from other psychiatric groups, and then apply to these children the term 'autism'. As it was Kanner who first coined the term autism, it is sensible to reserve it for the sort of disease entity that he was postulating in his original case descriptions. Rutter (1978) has also argued that of the original symptoms described by Kanner (see Chapter 2), not all were 'universal and specific' (Rutter, 1966; Rutter and Lockyer, 1967). Those that were, are those that have been used as the diagnostic criteria in the studies contained in this thesis.

In the same essay, Rutter goes on to say that in the light of more certain knowledge concerning the primary and secondary nature of these symptoms, or with a greater understanding of the causal mechanisms involved, it may be necessary to restate the defining criteria.

This point of view cannot be stressed enough. Earlier in this Chapter, it was pointed out that the specificity of the diagnostic criteria is far from watertight: although all of the children included in the studies described in this thesis had been referred to their special schools as being autistic and on the face of it satisfied the criteria, particular attention has been paid to the quality of these symptoms when interpreting the results.

Thus, although all the children were deviant with respect to language skills, consideration was made of the type of deviance. Presence of, or a history of, pronominal reversal, echolalia, and non-communicative speech were looked for in those children who had some language. Similarly, the abnormalities of interpersonal behaviour had to be interpreted as not being due to the child's developmental level and to be characterised by, for example, absence of play with other children and an apparent failure to take into account the presence and response of other people.

The medical and psychological records of all the children included in the studies were examined by Professor Michael Rutter and myself. In addition, many of the children had been known to

Professor Rutter for several years. On the basis of this review of the case histories the children were designated as being either:

(a) typically autistic - i.e., they conformed in all respects to what is currently understood to be the autistic syndrome, or

(b) atypically autistic - i.e, there was some doubt concerning the typicality (but not the presence) of one of the necessary criteria.

In all cases that were designated as being 'atypical', the doubt reflected some hesitation concerning the typicality of the abnormal social behaviour. Those children whose reactions to the presence of another person suggested a degree of awareness or empathy not usually associated with autism were included in this category.

The purpose of making such a distinction was to try to convey how closely the children fitted the definition of the classically autistic child. However it is necessary that caution be exercised before it is argued that the distinction is a 'real one'. Thus, the <u>absence</u> of any differences between the two groups with respect to the dependent variables cannot be claimed to have any significance; this may well reflect the fact that the distinction is not valid. Where differences <u>do</u> occur, then further examination may prove worthwhile.

In examining any differences that occur between the 'typical' and 'atypical' groups it must first be asked whether such observed differences merely reflect the criteria that were implicitly or explicitly applied when allocating the children to the groups. If this does not appear to be the case then the difference may be seen as support for the validity of the distinction, and interpretation made accordingly.

In the experiments described in Chapter 3, one of the reasons put forward as a possible explanation of the failure to replicate the Cowan et al findings concerned diagnostic differences between the samples used in the two studies. This possibility was examined in the light of the comparability of the descriptions of the two samples, which seemed satisfactory, and also in terms of the heterogeneity of the sample in the current study: hence the categorisation described above. In summary, the relevant results were:

(a) performance in the discrimination tasks was related to the level of spoken language (Figs. 3.1., 3.2., and Table 3.2.)

(b) language ability was <u>not</u> related to typicality (Table 3.5.)

(c) the 'chance performers' were more likely to come from the typically autistic group (Table 3.6.) and moreover were most likely to be the typically autistic children with 'no language' (Table 3.7)

As with the Cowan study, performance within the strictly defined group was related to language ability, although not in the sense that the children were negativistic. Further, although the atypical group had a slightly higher mean performance IQ ($\overline{IQ}$= 91.9) than the typical group ($\overline{IQ}$= 83.9), this difference is not significant ('t = 1.46; d.f. = 26). The difference in performance between the two groups would appear, therefore, to reflect an inability, for whatever reason, of the typical children to carry out the task successfully and that this difference would appear not to be related to performance IQ. This independence of IQ is further reflected within the typically autistic group in that whereas language ability and performance are related, language ability and IQ are not ($\overline{IQ}_L$= 88.5, $\overline{IQ}_{NL}$ = 80.3; 't' = 0.81; d.f. = 15; $p > .05$). It is suggested that these findings provide some support for the validity of the distinction between the 'typical' and 'atypical' groups.

In the studies described in Chapter 4, which were concerned with the effects on performance of manipulating the intrinsic difficulty of the task, the children were again designated as either 'typical' or 'atypical'. Here, however, this designation had no detectable meaning on the results. This suggests that for the sort of non-verbal task used, item difficulty predicted performance equally well across most of the group. However, in Experiment 6, differences between the 'typical' and 'atypical' children re-emerged. In general, the children's responses to the different styles of adult approach created a picture of passive inertness rather than active avoidance of structure and interpersonal demands. However, the 'atypically autistic' children, when exposed to the less structured conditions, reacted by showing more uncontrolled 'resisting behaviour' than did the 'typical' group. The latter also engaged less in meaningless vocalisation across all four conditions and there was a suggestion that, when required, they were more likely to produce relevant speech. Although the resisting behaviour may merely reflect the criteria used in allocating the children to one of the two groups, the differences in language use is of interest.

For several years the case had been argued for the primary disorder in the autistic syndrome being abnormal language development. Comparisons between autistic and other types of language disordered children (Bartak, Rutter and Cox, 1975; Cantwell, Baker and Rutter, 1978b) have largely shown that this is too simple a view and that probably more fundamental systems which subserve a variety of functions (including language) are implicated. However, the effect of this focus upon language abnormalities may well have been the attachment of too much weight to this aspect of the syndrome when making the diagnosis of autism.

Diagnosis may variously be based upon specific knowledge concerning the aetiology of the presenting symptoms (obviously not yet possible in the case of autism) or, more pragmatically, as a guide towards the most efficacious form of treatment (see Kendell,1975). Given that children diagnosed as autistic appear to benefit most from therapeutic regimes involving structured, language based curricula (Bartak, 1978), then the weight attached to language disorder may be seen to be justified. However, if research concerned with the aetiology of and the natures of the impaired psychological processes involved in autism is to be communicated, then attention must be paid to the explicit diagnosis and description of subject populations.

One final point needs to be made about the subject classification in this thesis and this concerns the choice of 'typical' and 'atypical' as labels. It must be stressed that all of the children had been diagnosed as autistic and would most likely have been included as subjects in many research projects concerned with autism. Yet it was felt that some statement acknowledging the heterogeneity of such a group needed to be made and attempts made to allow for this. Thus, the terms 'typical' and 'atypical' were chosen as best conveying the notion of degree of conformity to the picture of the classically autistic child.

Unfortunately, the terms 'atypical development' and 'atypical children' can be found in the literature pertaining to childhood psychosis (Rank, 1949; 1955; Brown, 1978) and seem to imply children with autistic-like symptoms. This inclusive use of the word 'atypical' is not the same as its intended use in this report.

8.1.3. Strategies of autism research

A purely experimental approach to autism research, where a group of autistic children and a group of variously matched controls are compared in terms of, for example, measures of central tendency, may well be an inefficient strategy. The heterogeneity of the target population (as described above) means that the likelihood of establishing features common to the group may well be very small, or, if successful, reflect only superficial characteristics. The approach taken in this thesis, although primarily experimental, has tried to take this into account in two ways.

The first has already been described and concerns precision in sample description and diagnosis, and the examination of the sample accordingly.

The second also applies to looking within the sample, but on the basis of performance on the dependent variables under scrutiny. The studies described in Chapters 3 and 4 demonstrate this. Thus,

children and who interpret poor performance as "he can but he will not" are likely to view the child as stubborn or 'cussed'. Their reaction will therefore be different if their interpretation is based upon recognising the possibility that what needs to be established is the entire cognitive chain from the statement of the request, through the operation of the perceptual process, to the production of the response. The vignette presented in Section 4.3.2.1. is illustrative here: the child who completed the Standard Progressive Matrices in a classically negativistic fashion, switched to compliant behaviour when the nature of the response was changed (possibly to an even more difficult response).

The studies described in Chapter 4 represented a shift of emphasis. Basically, the question that was being asked was "if one establishes that the child understands fully the nature of the task that is being required of him, do 'motivational factors' interfere with performance, and, more specifically, to what extent is his performance related to the demands put upon the child's 'reasoning ability'?" In most estimates of a child's ability level it is implicitly assumed that the probability of success or failure in an item is a function of the intrinsic difficulty of that item, and that the point at which success turns to failure can be used as an index of the ability level. If one cannot establish that item difficulty and performance are related then it is not possible to draw inferences about the child's level of ability in the processes that the items are designed to 'exercise'. Further, if his performance can be shown to be related to factors such as how long he has been working on the task, or if his errors indicate that responses are being made on information irrelevant to the solution of the problem, then one has to conclude that the apparent level of functioning is due to non-intellective factors.

The introductory sections to Chapter 4 explain the rationale behind the procedure for looking at these issues, but in essence the task comprised a series of problems where the instructions and type of response were identical for each problem, where the problems varied only in terms of their difficulty and where information was available enabling the problems to be ranked in terms of difficulty. The results of Experiment 4, and of the follow-up procedures (Experiment 5) suggested strongly that for most of these children, item difficulty was indeed the major contributor to the probability of item success. It would seem, for these children, that having established understanding of instructions and the nature of the response required, then their performance showed no real qualitative abnormalities. The exceptions to this pattern of responding seemed to be those who experienced failure early on in the task and who responded to subsequent items by perseverating on one position. Thus it may be necessary to establish not only understanding of instructions and the type of response but also to establish a sequence of correct responding.

Although the central experimental task in Chapter 4 used a form of a standard test of intellectual ability, the object of the procedure was not specifically to validate the use of such a test in determining, say, the mental age of an autistic child. Rather, as described above, it was used as a tool to elucidate some of the factors that might affect the child's performance. However, the findings do impinge upon questions that are involved in the formal estimation of an autistic child's level of intellectual ability and the debate surrounding how meaningful his performance is, during ~~as~~ an assessment, as an index of intelligence.

Consequently, Chapter 5 discusses these issues at some length. Bearing in mind that the concept of intelligence, and its measurement, is one which still generates a variety of opinions with regard to normal children, the evidence derived from the stability and predictive properties of IQ, and from the internal consistency of test scores, suggests that it is a valid and useful procedure in the assessment of autistic children.

However, that is not to say that assessment procedures with autistic children are easy. By its very nature, autism presents great difficulties for anyone who has to interact with an autistic child, especially as the disorder implies a severe disturbance of normal interpersonal relationships. One needs, therefore, to adopt strategies of approach that will maximise the likelihood that the child will be receptive to the instructions that explain the nature of the task he is expected to do. Obviously these difficulties transcend mere questions of assessment procedures; in fact such strategies may be seen to be necessary in all attempts at establishing contact with the child and are central in some formulations of the aetiology of the disorder.

As well as attending to some of the particular difficulties in administering psychological tests to autistic children, interpreting them requires experience and skill. (This does, of course, apply to the assessment of all children). Although the case had been put for the clinical usefulness of intelligence testing with autistic children, it is quite clear that an autistic child with a measured IQ of 75 is quite different from a Down's Syndrome child with the same 'score' and from a normally intelligent child with the same calculated mental age. Thus, although a summary or average score may in general be used as an index of the amounts of progress a child is likely to make, a more detailed picture of the child's specific areas of difficulty or proficiency may be construed from the pattern of scores that make up the overall score. It was a failure to do this that led Kanner to believe, on the basis of the existence of a one or two special skills, that the children had all-round good cognitive potential (Kanner, 1943). A good clinical assessment, therefore, will consist of the administration of a variety of tests of ability designed to explore different areas of functioning, and the interpretation of not only summary indices but also intra-test performance. Gould (1976) discusses the usefulness and limitations of a range of tests for use with autistic children: Berger and Yule (1972) do the same with a slightly broader objective, i.e., the assessment of children with language delay.

The introductory section to Chapter 6 outlined the case put by those who argue for one of the primary causes of the development of autistic behaviour being a pathological 'timidity' and an inability to resolve constantly occurring approach-avoidance conflicts (e.g., Tinbergen, 1974; Richer, 1976; 1978). This theory would predict that imposing structure on an autistic child, in the sense of directing him towards externally defined objectives, and making interpersonal or social demands upon him, would serve, in the short term, to increase the avoidance component of the conflict and to increase his attempts at resisting further contact. Experiment 6 set out to test specifically certain aspects of these predictions and found no support at all for them.

In fact, the opposite appeared to be the case. In a variety of aspects of the children's behaviour they were more likely to be productive with regard to the task they were expected to do, and to produce elements of interpersonal behaviour, when specific demands were made of them in these respects. When the children were exposed to the least intrusive of the conditions, their behaviour was typically centred around their own rituals and preoccupations.

On their own, these findings provide a minimal test of the 'Tinbergen thesis'. It is, therefore, worthwhile considering the evidence, put forward by its originators, in support of the notion that autism develops as a result of a failure to establish social bonding which is in turn a function of the motivational conflict already described. Firstly, Tinbergen argues that all autistic non-verbal behaviour can be found, in certain circumstances, to be present in the behavioural repertoire of normal children. Moreover, it is in situations that involve a conflict between fear and social exploration that one tends to see autistic-like behaviours emerge in the normal child. Secondly, Tinbergen cites "the (growing) body of evidence that points to environmental causes" (1974, p.22). Studies which demonstrate that the incidence of autism is not random, e.g., "many autistics are firstborn children (Wing, 1971)" are used to illustrate this point. Thirdly, the procedures which one employs to overcome the natural timidity in young children (so-called "taming procedures") can be successfully employed with severely autistic children. Fourthly, it is stated that the point at which affiliation and subsequent socialisation processes were disrupted "can be traced back to something in the early environment - on occasions a frightening accident, but most often something in the behaviour of the parents, in particular the mother" (1974, p.22). Fifthly, existing therapies which run along lines that the theory would predict as being efficacious (e.g., Clancy and McBride, 1969) demonstrate results that are "little short of spectacular" (p.23).

The notion that disturbance of the normal social bonding process can have an effect on later development is not new (see review by Rutter, 1972; 1980; Wolkind, 1974), but the point is made by Wing and Ricks (1976) that the sorts of subsequent developmental abnormalities bear no relation to autistic behaviours. They further point out that the sort of retardation in language and social skills that is reported as being a consequence of privation in early life appears to be more a function of the lack of appropriate stimulation rather than the problems of social bonding. It is perhaps an oversimplification to argue that the effects of early privation can be accounted for solely in terms of lack of stimulation as there is evidence indicating a relationship between the quality of infant attachments and subsequent psychosocial development (e.g., Easterbrooks and Lamb, 1979; Waters, Wippman and Sroufe, 1979). Nevertheless, it remains the case that these relationships in no way point to the subsequent development of autistic features.

Over and above the fact that the process linking impaired affiliation and autism needs to be clarified and distinguished from what we already know about the consequences of early privation, the other assumptions made by the Tinbergens lack supportive evidence. Thus, the analysis of normal children exhibiting autistic-like behaviours in conflict situations, the success of the "taming procedures" and the efficacy of therapies based on the notion of motivational conflict need to be demonstrated on more than an anecdotal level. The last of these is especially crucial in the light of evidence already discussed concerning comparisons of different therapeutic milieu and in the absence of <u>any</u> evidence suggesting that a complete cure is possible (Wing and Ricks, 1976).

The non-randomness of the occurrence of autism as support for environmental causes of the disorder is, on its own, insufficient evidence. Certainly it is the case that autism cannot be entirely attributed to, say, genetic abnormalities, but the citing of instances of monozygotic twins where only one member of the pair is autistic cannot be viewed as demonstrating entirely environmental causes.

Folstein and Rutter (1977) have examined in detail 21 pairs of twins where at least one member was autistic and on the basis of a large MZ-DZ difference in ratio of concordance for autism calculate a heritability coefficient of approximately 90% (Rutter, 1981). Moreover, what discordance there was seemed to be related to biological factors in the environment.

Similarly, the assumption that there are identifiable histories of traumatic bonding experiences and abnormal parenting patterns is counter to the evidence. Taking into account the effects of having any sort of handicapped child, little evidence of peculiarities in parents' personalities or child rearing methods has been found other than there being a tendency for the parents to be intelligent, middle class and have professional occupations (Cox, Rutter, Newman and Bartak, 1975; DeMyer, Pontius, Norton, Barton, Allen and Steele, 1972; Pitfield and Oppenheim, 1964). A recent study by Wing (1980) has suggested that this tendency is likely to be due to selection factors.

The assumptions upon which an explanation of autism couched in terms of some form of anxiety neurosis would seem, therefore, to be either unsupported by any evidence stronger than anecdotal or to be contradicted by what evidence there is. As such, the findings that autistic children do not react to what might be seen as situations likely to increase the child's stress by increasing their autistic behaviours (Experiment 6) would seem to add to the list of studies that run counter to Tinbergen's predictions.

In their reply to Wing and Rick's (1976) criticism of their position, Tinbergen and Tinbergen (1976) did not comment on the discrepancies between what is known about autism and what they assume to be its cause. Rather, they focussed upon what the ethologist has to offer to the study of autism. Ethology *per se* does not offer a theory (although one seems to have arisen) but rather it offers a set of techniques derived originally from animal studies but which may prove useful in studying human social behaviour. The value of ethology may well lie in future studies of the functional aspects of autistic children's social abnormalities, but as yet its worth is untested.

Cognition: The implications of the research reported in this thesis extend further than a test of one of the predictions of the Tinbergen hypothesis. An autistic child is a handicapped child, and the current studies lend no support to the notion that his primary handicap is to do with an aversion to social interactions. In the main, no evidence is presented for an explanation of aspects of deficient cognitive performance in terms of motivation or non-cooperation.

This raises the question of whether or not there are cognitive deficits specific to autism: given that poor motivation is an inadequate explanation of inferior performance, how much of the observed deficits can be accounted for in developmental terms and which areas of cognitive dysfunction might be implicated in the development of the autistic process? Inevitably, the amount of research that has been devoted to this issue is enormous, if only because the term 'cognition' is itself very broadly defined. It covers all those processes whereby an organism obtains knowledge of, or becomes aware of, his environment e.g., perception, discovery, recognition, imagining, judging, memorising, learning, thinking and speech (Wagenknecht, 1972). Reviewing the experimental work in many of these areas, Prior (1979) concluded that most of the demonstrated differences between autistic and normal children can be accounted for by developmental factors. Much of the research is carried out on mixed groups of retarded and normally intelligent autistic children, producing findings that are influenced by mental age and IQ much more than they are influenced by the clinical condition. This obviously points to the need for appropriate control groups (Yule, 1978) in studies designed to elucidate cognitive dysfunction specific to autism. Where these measures have been adequately taken, few leads appear to warrant pursuit (Prior, 1979).

One such area where the cognitive dysfunction appears to transcend explanation in purely developmental terms is that of certain types of information processing, especially those which implicate left cerebral hemisphere dysfunction. For example, information which requires sequential and analytic processing is traditionally considered the domain of the left hemisphere, whereas visuospatial skills, and 'recognition without analysis' are mediated primarily by the right hemisphere (Nebes, 1974). It is in the former that the autistic child appears to be particularly handicapped (Hermelin, 1976). Prior and Clark (1981) have reviewed the evidence that pertains to left cerebral hemisphere dysfunction and information processing in autistic children and conclude that there is qualified support for the hypothesis from neurophysiological studies (e.g., Damasio and Maurer, 1978), from psychometric data (e.g., DeMyer, 1976) and from experimental neuropsychological studies (e.g., Blackstock, 1978; Prior and Bradshaw, 1979).

It remains to be seen what the further implications of this line of research are and several basic questions need to be answered. For example, is autistic behaviour the result of neurological damage to the left hemisphere or is it the case that because of difficulties with language and 'language-like' processing, autistic children develop right hemisphere strategies in order to deal with incoming information? What is the relationship between the hypothesised dysfunction and the other behavioural manifestations of the disorder such as abnormal interpersonal responsiveness? Although neurophysiological concepts are centrally involved it is likely that the answers to questions such as these will come from a higher level of analysis, i.e., experimental investigation of the information processing deficits. The manner in which incoming information is analysed, ordered and matched to existing schemata is fundamental to the way in which we make sense of the world. Successful adaptation to the social and non-social environment requires not only a system of meaning being attributed to external events, but also that that system be shared by other individuals. Dysfunction of the processes whereby the shared rules that govern the comprehension of the world are developed would result in an extremely isolated individual.

<u>Treatment</u>: Research into the 'causes' of autistic behaviour can take place on many levels. Mention has been made of neurophysiological correlates and of information processing deficits, and indeed, long term benefits in terms of treatment and management will emerge from following positive leads in these areas. A greater understanding of the fundamental aspects of the disorder will doubtless allow the formulation of treatment strategies to be made

with confidence. However, in the absence of sufficient knowledge on these levels, decisions regarding the best methods of treating autistic children have to be made on a more pragmatic basis. This often means that analysis of more overt phenomena is relied upon, both in setting therapeutic goals and in assessing the efficacy of methods of achieving these goals.

Given that it is generally considered that autistic children are best provided for within a special education framework (certainly, all the children involved in the current studies attended 'schools for autistic children') the issue of treatment strategies is closely related to educational principles. Treatment goals can be specified in both clinical and educational terms, but strategies for achieving these should be represented in an integrated curriculum.

The first step in the specification of these goals involves an analysis of the areas of the child's relative strengths and weaknesses. It would be wrong to focus on one aspect of the clinical condition on the assumption that the child will improve in other areas <u>as a consequence</u> of these efforts (although, of course, it may be necessary to attempt to eliminate specific behaviour problems which occur to the exclusion of other behaviours). The child's handicap is manifest, amongst other things, in difficulties with language, a failure to deal adequately with the demands of normal social interactions, non-productive stereotyped behaviours and rituals, and specific or generalised difficulties with school-type learning. On the level at which they appear, difficulties such as these cannot be explained as being due to other aspects of the condition: in particular, deficits in psycho-educational matters cannot be seen as a function of the child's reluctance to engage in these sorts of activities. Thus, if a child is assessed as having learning difficulties, or has an IQ sufficiently low as to suggest that problems in schooling are likely to be encountered, then the curriculum must draw upon resources that are designed for use in remedial education.

Having established the scope of the treatment programme, there are questions as to the best ways of applying it. One needs to maximise the likelihood of positive behaviours occurring: it is these that are to be encouraged and shaped towards the programme goals. If it were the case that adult initiated approaches, intended to elicit these positive elements, had the opposite effect (i.e., by virtue of the structure imposed upon the situation or due to the interpersonal content) then a less intrusive approach might be indicated. The evidence, however, does not support this notion. In the current studies it was demonstrated that, at least in the short term, appropriate task related and interpersonal responses were most likely to be forthcoming when demands were made of them in these respects. It was in the least intrusive condition that the negative aspects of the children's behaviour was most apparent. With regard to the longer term effects, it would seem likely that the immediate benefits can be capitalised upon and enlarged into more robust psycho-educational gains (Bartak, 1978).

8.3. Next steps

The studies in this thesis have been concerned with factors that impinge upon an autistic child's performance when the task he is expected to do involves interaction with another person. As such they can be seen as dealing with the extent to which abnormalities of interpersonal or social behaviour interfere with what he appears to be able to do. A progression can be traced from the examination of a specific aspect of abnormal responsiveness (negativism) through the wider effects on success and failure of manipulating task difficulty to an analysis of those aspects of the other persons behaviour which might increase or decrease responsiveness. The studies have moved from the 'micro' to the 'macro'. What then might be the next steps if this progression were to be continued?

It has been pointed out earlier that whilst there is consensus regarding the existence of abnormal social behaviour, an accurate description of the qualities of its deviance is incomplete and certainly the functional significance of this behaviour has yet to be established.

For example, one much used index of impaired social responsiveness is poor eye contact or gaze aversion, yet there is disagreement regarding the conditions under which this is shown. Hutt and Ounsted (1970) found that, compared with normal controls, autistic children spent less time gazing at pictures of human faces than they did at pictures of monkeys or non-social objects, and Richer and Coss (1976) showed that gaze aversion increased as did the number of eyes (i.e., none, one or two) that the nearby adult had uncovered. On the other hand, Hermelin and O'Connor (1970) failed to support these findings when they showed that while autistic children tended to look less at human faces than did non autistic controls, they also tended to look less at everything i.e., their responses to people were not different to their responses to objects. Churchill and Bryson (1972) failed to show any difference between autistic and non autistic children in terms of looking and approach behaviour and moreover showed that there was an increase in the measures of both these variables when the adult present was attentive rather than preoccupied (a finding in accord with those of Experiment 6 reported here).

Of course, there are methodological differences between these studies which could explain the variety of findings, but therein lie several weaknesses shared by all these studies as explanations of social behaviour. Firstly, in restricting the studies to one or two overt manifestations of social behaviour, i.e., eye contact and/or physical approach, the complexity of social responsiveness is ignored. Personal interactions have some unity and the isolation of individual elements may misrepresent the process. Secondly, usually scant regard is paid to either the social context of the activity or to the activity or responsiveness of the other element of the dyad (adult or another autistic child). Not only is the 'other's' behaviour rarely recorded as a naturally covarying response to the autistic child's own eliciting behaviour, but often the child's behaviour is interpreted without the caution necessary when the adult is behaving bizarrely (e.g., Richer and Coss, 1976, where the adult was sitting passively with one or both eyes covered by his hands). Thirdly, the design of an experimental study often leads to a concern with quantities of behaviour rather than qualities. Any attempt to provide a functional interpretation of deviant behaviour must do so with reference to a context, and that context should include the behaviours (of child and 'other) that occur before and after the one immediately observed. For example, Hutt and Ounsted (1966) observed that although autistic children were recorded as having initiated few social encounters, nevertheless when contact had been made they tolerated closer physical contact than did other children. Thus the surrounding events may well be outside the parameters defined by the limited variable lists used in most studies.

To overcome these shortcomings and to develop an adequate description and analysis of autistic children's social behaviour, one must avoid taking 'snapshots' of interactions. The first step, therefore, would seem to be the description and classification of the behaviour (Hinde, 1976) in terms of sequences of behaviours including all participants of social interactions. This approach, however, raises several problems.

Firstly, adequate methods of describing interactions involving normal children are not abundant which suggests that the issues are indeed complex (Hinde, 1976). It also suggests that without a framework derived fron normal behaviour, the interpretation of abnormal behaviour is fraught with hazards (Medawar, 1967). Secondly, given that the data, based on direct observation, should consist of sequences of behaviour, problems of data handling and analysis arise that have yet to be satisfactorily solved. Certainly, this problem has been confronted in naturalistic observations of behaviour sequences involving infra-human species, and techniques for handling the data have been evolved (e.g., Ray, Upson and Henderson, 1977). These may be applied to human behaviour (Ray and Ray, 1976) but they become extremely cumbersome when the number of behaviour categories exceeds as few as six. Similarly, the use of Markov and semi-Markov chains would seem appropriate for the statistical analysis of behaviour sequences (e.g., Kemeny and Snell, 1960; Hedge, Everitt and Frith, 1978) but again these are only suitable if the number of behaviours is very small (Cane, 1978). Thirdly, instances of spontaneous social behaviour involving autistic children are very rare, making naturalistic observation and subsequent analysis a very inefficient process.

This last difficulty would suggest that as valuable as descriptions of naturally occurring behaviours are, in the case of autistic children experimental methods must be used to precipitate different situations in which one would normally expect social behaviour. Thus, within the framework of experimental method, adequate analysis of the abnormalities of autistic children's interpersonal behaviour should take into account the issues summarised above. The long term objectives of the research should be couched, not in terms of establishing the primacy, or otherwise, of criterial symptoms, but in terms of more fundamental processes (cognitive) which have implications for all aspects of the autistic child's handicap. The methodological and conceptual problems are not insurmountable, but the difficulties should serve as reminders of the fact that it is part of a complex process.

A P P E N D I X   A

Derivation of sampling distribution for estimating significance levels for Kendall Partial Rank Correlation Coefficients

In order to get an idea of the significance of Kendall partial rank correlation coefficients of the magnitude reported in Experiment 4 (see Tables 4.2. and 4.7) and in the absence of any published information in this matter (Kendall, 1948; Siegel, 1956) it was decided to generate empirically a sampling distribution for the statistic.

A program, in BASIC, was written for a Commodore 2001 Series desk top computer, to generate random sets of ranked data (N=36) and to calculate the partial rank correlations with groups of 3 sets of such data. Table A.1. presents the program used and Figure A.1. the resulting distribution based upon the calculation of 1530 partial correlations.

On the basis of this distribution, estimated significance levels for the statistics in Tables 4.2. and 4.7. are calculated and shown in Table A.2.

This program does not take into account the occurence of ties which occur on variable y only. Siegel (1956) points out that "the effect of correcting for ties is relatively small" (p.219).

Briefly, the program first creates a data set consisting of the numbers 1 to 36. It then randomly picks one of these numbers and allocates it the rank of 'one'. Another number is randomly picked and ranked 'two', and so on until all the numbers 1 to 36 have been arranged and ranked in a random order. This whole process is repeated twice more so that the outcome is three parallel sets of the number 1 to 36 in random order. These three sets of ranks are used as data and 'tau' calculated between the three possible pairs of variables. Partial 'tau' is then calculated using the formula.

$$tau_{xy.z} = \frac{tau_{xy} - tau_{zy} . tau_{zx}}{\sqrt{(1-tau_{zy}^2)(1-tau_{zx}^2)}}$$

The entire process is then repeated to generate many 'tau's'. The program prints out the frequency of occurrence of each 'tau' between .00 and .80. For practical reasons values larger than .80 were not included but the outcome of the exercise revealed that none fell in the range .80 to 1.00.

Table A.1. BASIC Program for generating sampling distribution of Kendall Partial Rank Correlation Coefficients.

```
        DIMX$(36),Y$(36),Z$(36),Q(100)
        DIMB$(36),C$(36),D$(36)
8       X=36

        REM CREATE A DATASET
        A$="0102030405060708O9 10"
        A$=A$+"11121314151617181920"
        A$=A$+"21222324252627282930"
        A$=A$+"313233343536"

        REM GENERATE RANDOM ODD NUMBER  2X
90      Y=INT(X*RND (1)+1)*2-1
        IFY=1GOTO90

        REM PICK A NUMBER
        B$(X)=MID$(A$,Y,2)

        REM SHRINK DATA SET
        IFY=1THENT$=LEFT$(A$,Y-1):GOTO145
        T$=""
145     A$=T$+MID$(A$,Y+2)
        X=X-1:IFX  1GOTO90
        B$(1)=A$
        REMB$(X)=RANDOM ARRANGEMENT OF 1 TO 36

        IFC$(10)<>""GOTO230
        FORI=1TO36
        C$(I)=B$(I):NEXT
        GOTO8
230     IFD$(10)<>""GOTO280
        FORI=1TO36
        D$(I)=B$(I):NEXT
        GOTO8
        REM NOW HAVE 3 PARALLEL SETS OF RANKS

280     FORI=1TO36
        X$(I)=B$(I):Y$(I)=C$(I)
        NEXT
        GOSUB1000
        R(1)=R
        FORI=1TO36
        X$(I)=B$(I):Y$(I)=D$(I)
        NEXT
        GOSUB1000
        R(2)=R
        FORI=1TO36
        X$(I)=C$(I):Y$(I)=D$(I)
        NEXT
        GOSUB1000
        R(3)=R
        REM 3TAUS NOW COMPUTED
```

```
        T(1)=(R(1)-R(2)*R(3))/(((1-R(2) 2)*(1-R(3) 2))↑.5)
        T(2)=(R(2)-R(1)*R(3))/(((1-R(1) 2)*(1-R(3) 2))↑.5)
        T(3)=(R(3)-R(1)*R(2))/(((1-R(1) 2)*(1-R(2) 2))↑.5)
        REM PARTIAL TAUS COMPUTED

        FORI=1TO3
        M=INT(ABS(T(I))*100):Q(M)=Q(M)+1
        NEXT
        C$(10)="":D$(10)=""
        PRINT"♥"
        FORI=0TO19
        PRINTI;"=";Q(I),I+20;"=";Q(I+20),I+40;"=";Q(I+40),I+60;"=";Q(I+60)
        NEXT
        O=O+1: PRINT"NUMBER OF CYCLES=";O
        GOTO8
        END
1000    FORI=1TO35
1010    IFX$(I)=X$(I+1)GOTO1050
        Z$=X$(I+1):X$(I+1)=X$(I):X$(I)=Z$
        Z$=Y$(I+1):Y$(I+1)=Y$(I):Y$(I)=Z$
        GOTO1010
1050    NEXT
        FORK=1TO35
        FORI=1TO(36-K)
        IFY$(K)<Y$(K+1)THENP=P+1
        IFY$(K)>Y$(K+1)THENQ=Q+1
        NEXT:NEXT
        r=(P-Q)/(36*35/2):P=0:Q=0
        RETURN
```

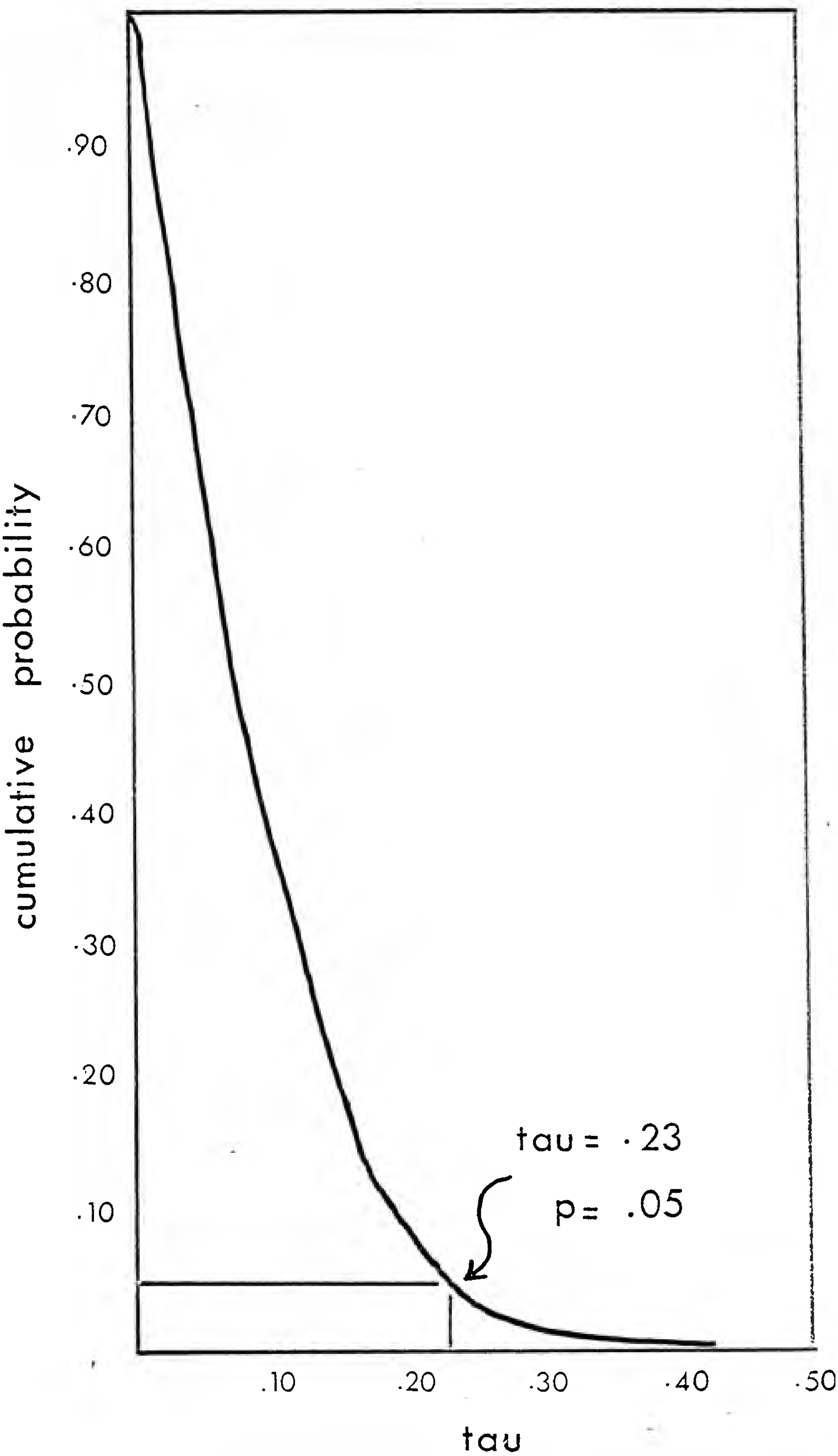
Table A.2. Estimated levels of significance for the Partial Rank Correlation Coefficients shown in Table 4.2

tau_{xy},	$p < .001$	$tau_{xy.z}$,	$p = .01$
tau_{yz},	$p < .001$	$tau_{yz.x}$,	$p < .001$
tau_{xz},	$p < .001$	$tau_{yz.x}$,	

and in Table 4.7.

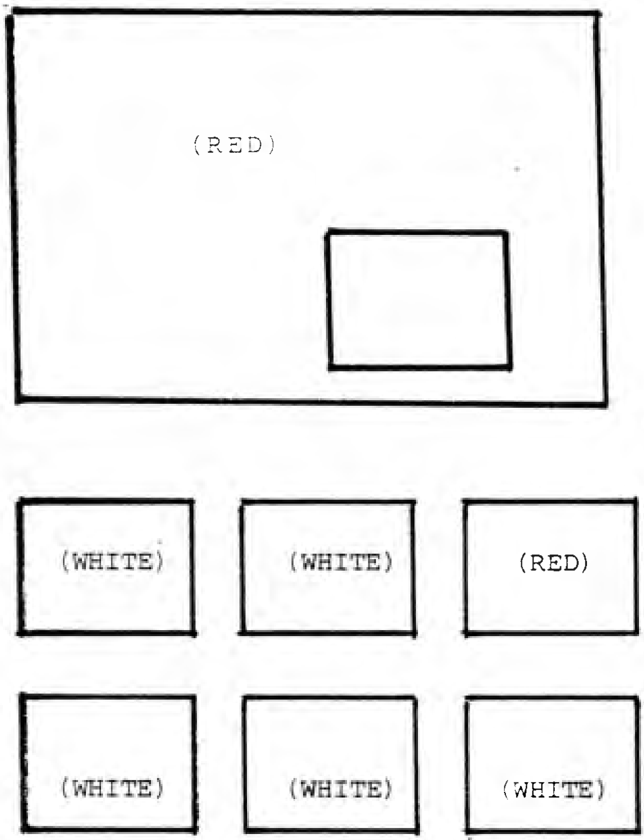
tau_{xy},	$p < .001$	$tau_{xy.z}$,	$p = .14$
tau_{yz},	$p < .001$	$tau_{yz.x}$,	$p < .001$
tau_{xz},	$p < .001$		

Figure A.1. Two-tailed cumulative probability curve for Kendall Partial Rank Correlation Coefficient (N= 36)

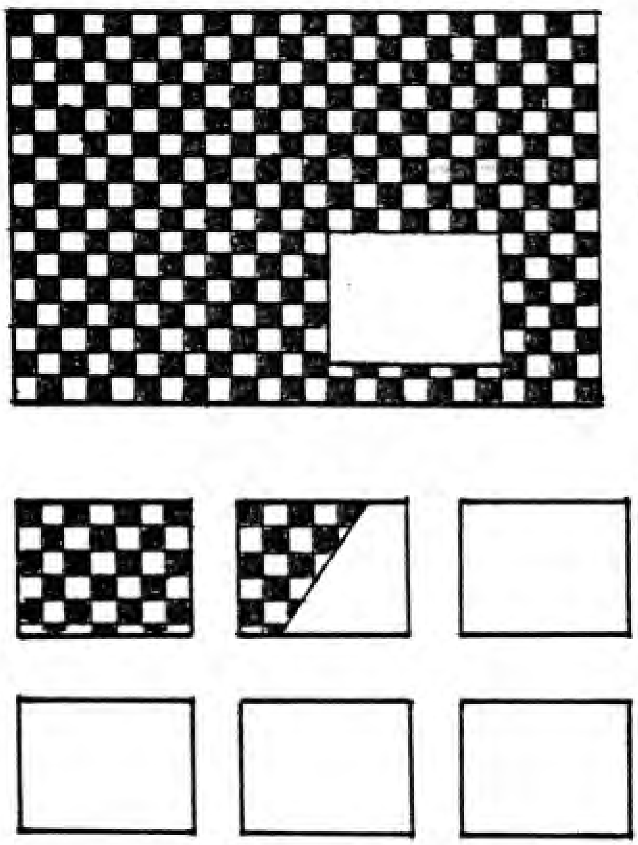


A P P E N D I X   B

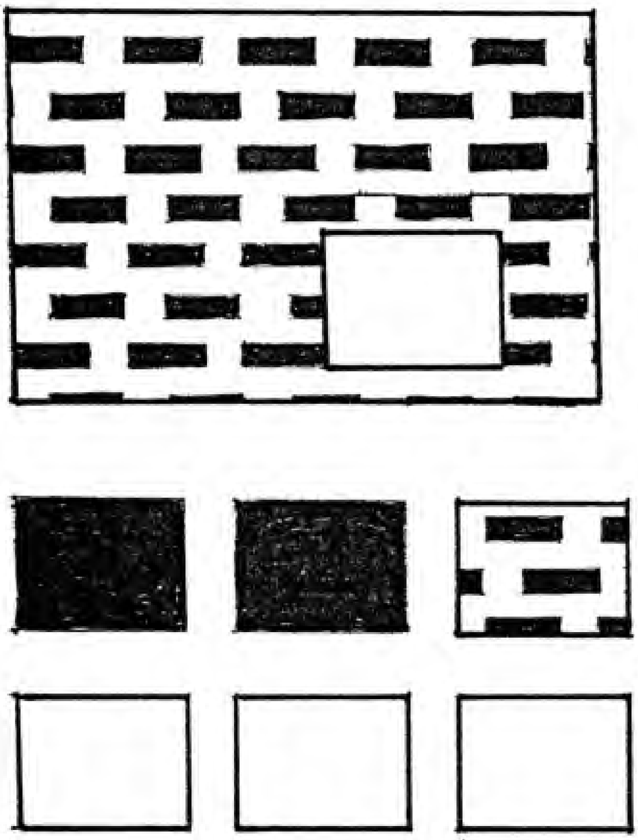
The twelve items used in the 'pattern completion' problems used in Experiment 5.



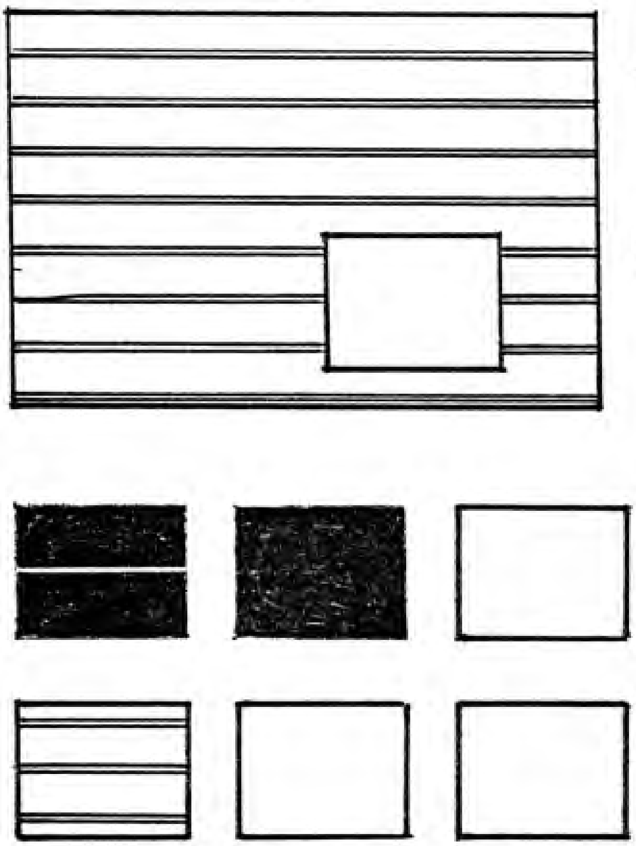
①



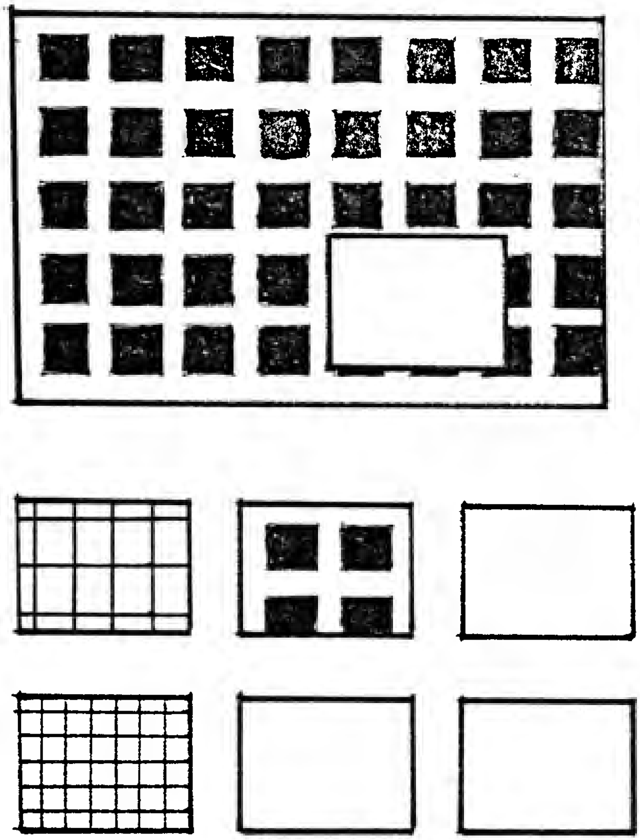
②



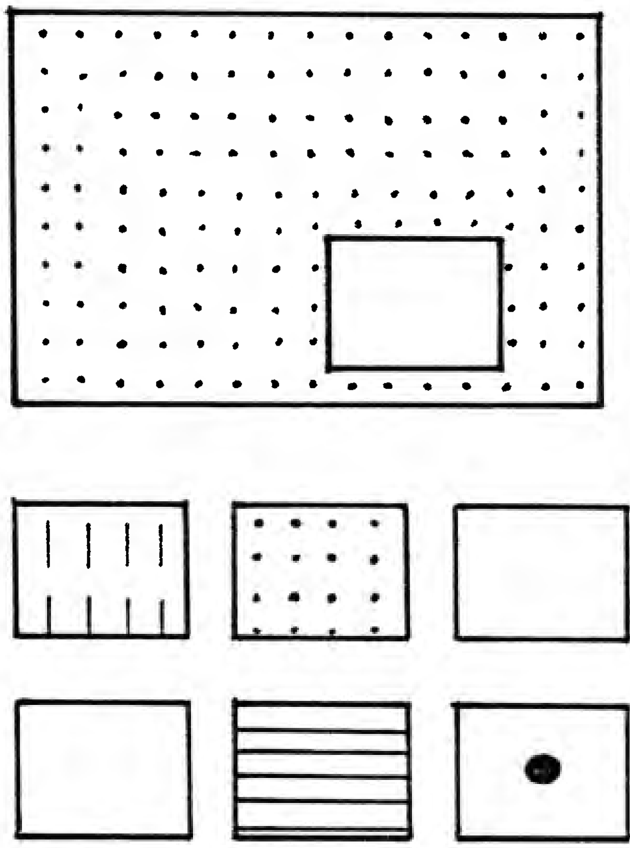
3



4



5



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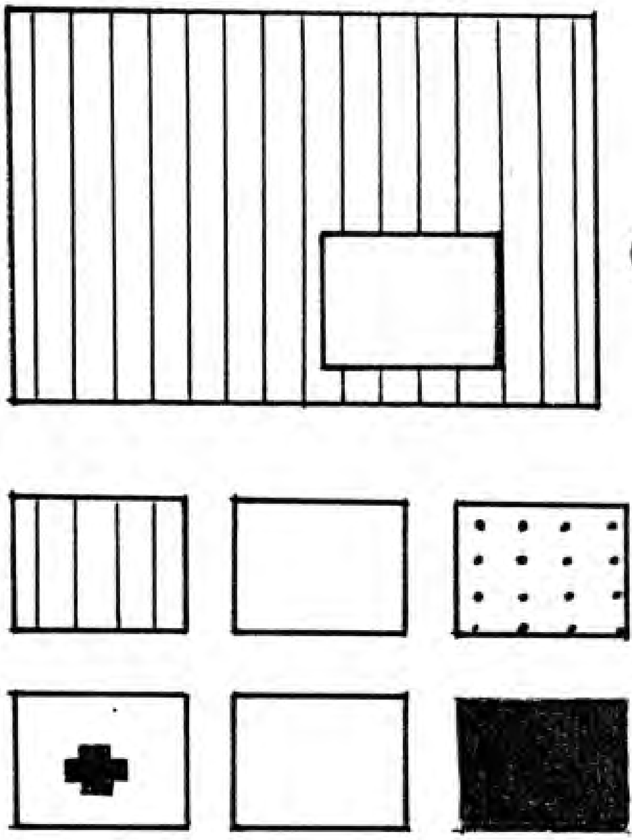

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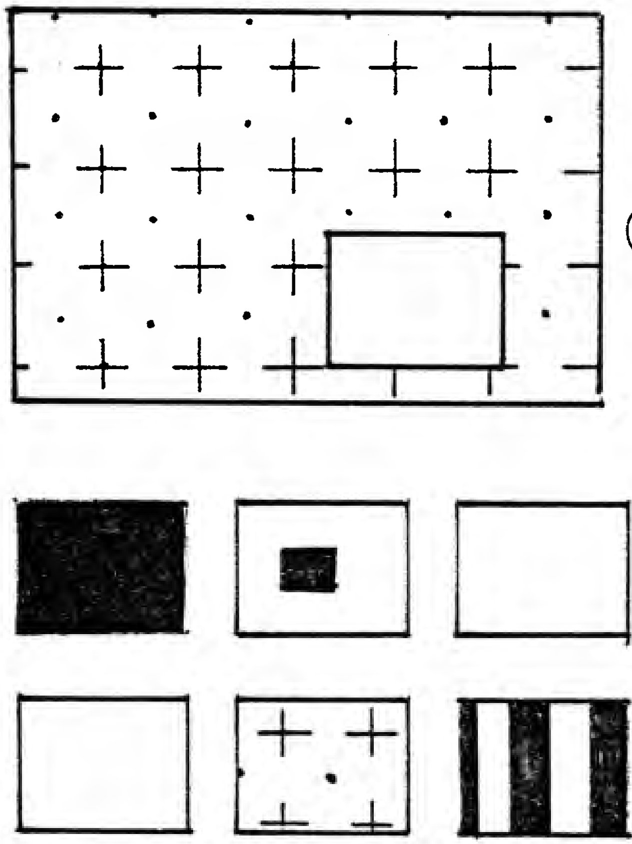

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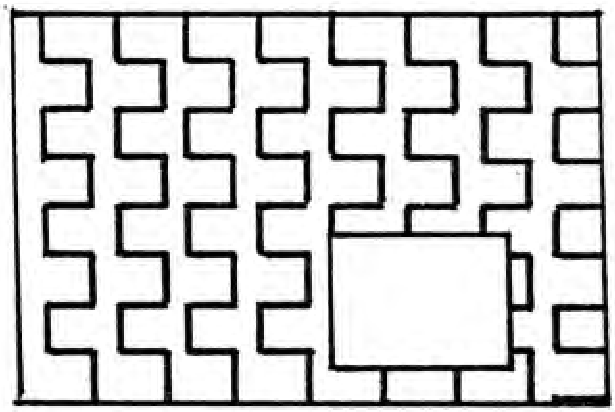

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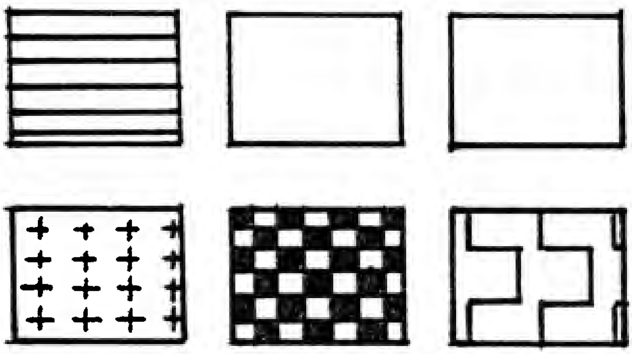

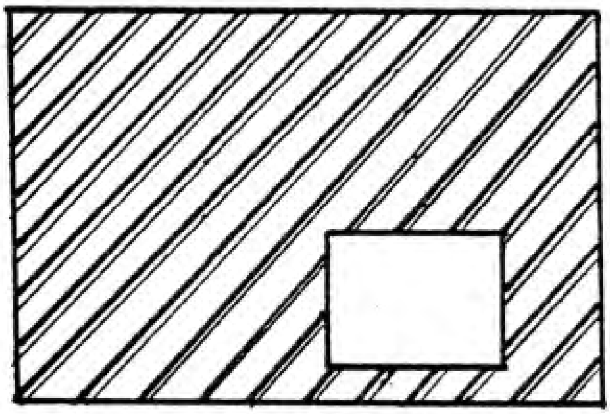

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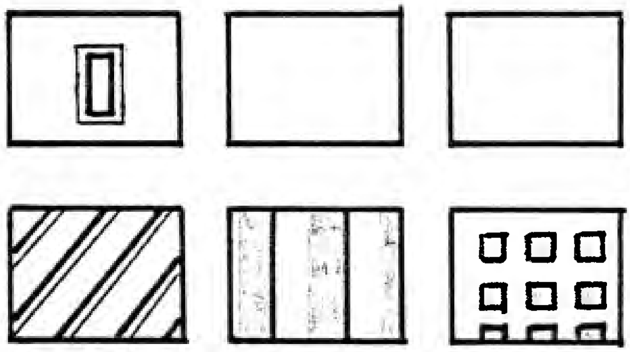

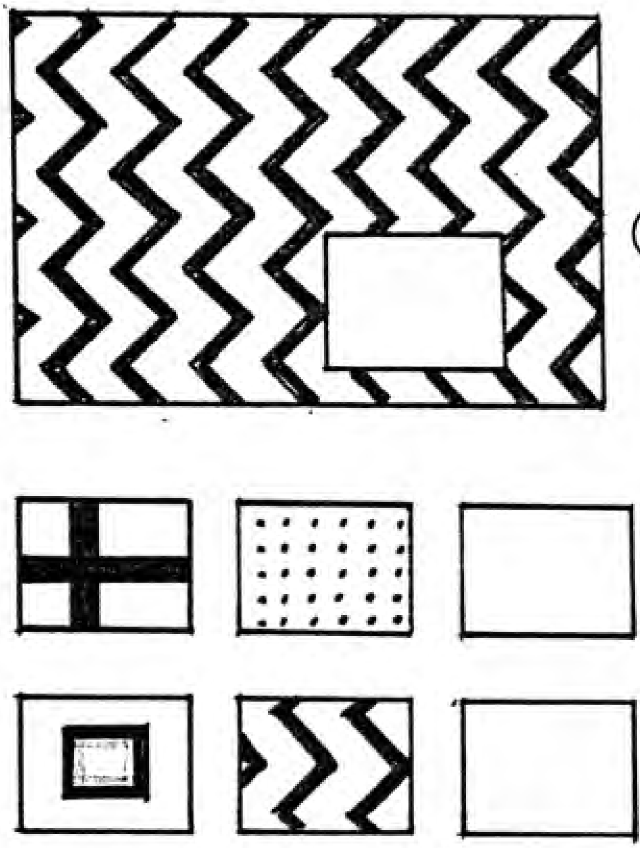

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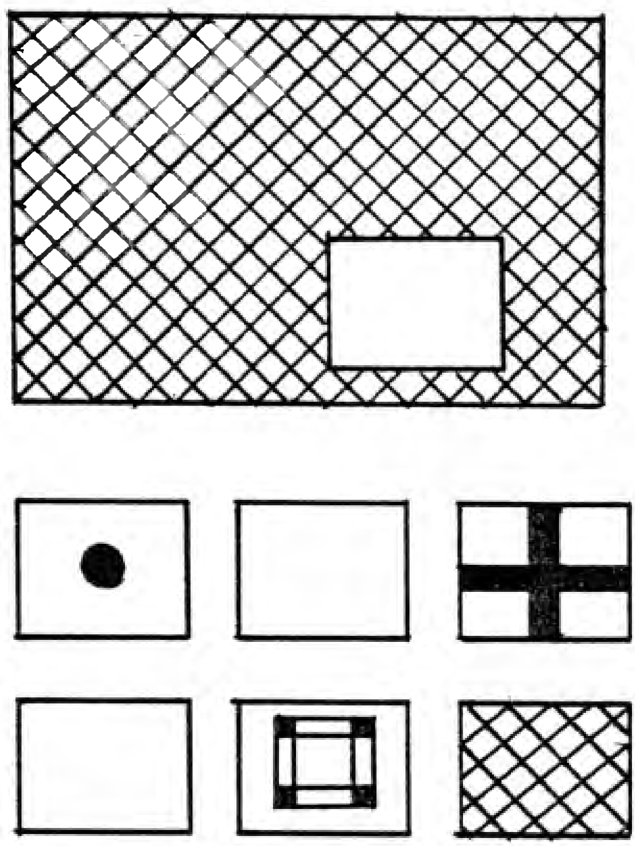

(12)

Appendix C

Coding schedules used in Experiment 6

Table C.1. Coding schedule for adult behaviour

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
INSTRUCTIONS[1]	positive																				
	negative																				
	inhibitory																				
QUESTIONS[2]	central																				
	peripheral																				
PRAISE	verbal																				
	physical																				
PROMPTS	v. sugg.																				
	v. expl.																				
	nonverbal[3]																				
	physical[4]																				
ANSWERS	adult																				
	child																				
RHETORICAL	statements[5]																				
	action																				
PHYSICAL RESTRAINT																					
COMPLETION																					

1. Code 'T' or 'A' for task or adult related instructions: 'J' = joint
2. Code 'I' 'Y' 'W' or 'X' for 'I', 'You', 'We' or 'It' type questions
3. Code 'P' or 'A' for demonstration of 'piece' or 'action'
4. Code 'D' or 'J' for 'directing' or 'joint' action
5. Code 'I', 'Y', 'W' or 'X' for 'I', 'You', 'We' or 'It' type statements

Description of Adult Behaviour coding schedule

1. Instructions

These are coded according to whether or not they are task-related(T)or adult-related (A) or refer to a joint action (J).

(i) positive - instruction couched in a positive form e.g., "put a window here" (T); "Now we'll put a window here" (J);"Look at me" (A).

(ii) negative - instructions couched in a negative form e.g., "Don't put a yellow brick there"(T)

(iii) inhibitory - instructions couched in a positive form but where the intention is to stop the child doing something else e.g., "Come over here and sit down by me" (A).

2. Questions

These are coded according to the subject of the answer that would be expected i.e., questions which implied answers containing the subjects "I", "You", "We" or "It" are coded 'I', 'Y', 'W' or 'X' respectively.

(i) central - questions which are directly related to the task e.g., "How many windows does the house have?" (X); "What colour brick shall we use now?" (W).

(ii) peripheral - questions not directly related to the activity e.g., "What kind of house do you live in?" (I); "Do you know what kind of car I have?" (Y).

3. <u>Prompts</u>

These can be verbal or nonverbal and are all intended to steer the child towards an intended goal but without being as direct as 'Instructions'. Verbal prompts are of two sorts:

(i) suggestion, e.g., "Why not use some of the red bricks?"

(ii) explanation, e.g., "That brick is too big for the space".

Nonverbal prompts are also of two sorts:

(iii) demonstration to the child of what is required, coded according to whether it is a piece which is proffered (P) or an action, such as how two pieces might be connected (A) which is demonstrated.

(iv) physical prompt, where the child's action or attention is physically directed by holding his arm or turning his head.

4. <u>Gives answer</u>

This is where the adult is responding to a question asked:

(i) by the child

or (ii) by the adult (in the sense of supplying the answer himself when it is not forthcoming from the child).

5. <u>Gives Praise</u>

Instances of positive encouragement or reinforcement. Recorded as either verbal or physical praise.

6. Rhetorical statements

Adult verbal behaviour which, other than providing a spoken background to the activity makes no direct demands upon the child. Included are 'asides' or 'thinking out loud' which may be intended for the child's ears but which do not imply a response. As for 'questions' these are also coded 'I', 'Y', 'W' or 'X' but according to the form of the statement, e.g., "I think it must be nearly lunch time" (I); "You've got paint in your hair" (Y).

7. 'Rhetorical actions'

Whilst realising that 'rhetorical' only applies to aspects of language, this category was defined as nonverbal activity that made no direct demands on the child or did not require a response from the child. In general they were activities intended to increase the 'busyness' of the session. For example, brushing dust off the child's shirt or rummaging through the LEGO box.

8. Physical restraint

Physically stopping the child from doing something e.g., holding his hands to stop him throwing the LEGO pieces.

9. Completion

Action which finishes off something the child has attempted but not quite succeeded in e.g., pushing two LEGO pieces together which are not quite fixed.

Table C. 2. Coding schedule for child behaviour

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ON/OFF TASK		+ –																				
USE OF MATERIAL	relevant irrelevant	S,R (S,M (T O																				
ADULT RELATED BEHAVIOUR		S R + –																				
RESISTING BEHAVIOUR	leaves table gaze avert other																					
SPEECH	relevant - self relevant - adult echo irrelevant	S R S R S R S R																				
MEANINGLESS VOCALS		S R																				
	body head fingers hand face	S R S R S R S R S R																				
IGNORED INSTRUCTIONS																						

Description of Child Behaviour Coding Schedule

1. On/Off task

   Judgement by rater for each observation interval whether, on the whole, the interval had been spent with the child engaged in positive task related activity (+) or in non productive activity (-).

2. Relevant use of material

   Use of the LEGO pieces for their intended purpose. Coded according to whether the use appeared to be spontaneous (S) or in response to prompting or instruction from the adult (R).

3. Irrelevant use of material

   Coded according to whether the LEGO pieces were spun (S), mouthed (M), 'twiddled' in the fingers (T) or used in some other inappropriate way (O)

4. Resisting behaviour

   Behaviour which suggests the child is actively resisting the demands of the situation. Coded as:

   (i) leaves table

   (ii) averts gaze or appears to avoid eye contact

   (iii) other (e.g., pushes adult's hand away).

5. Speech

   Verbal activity was recorded as either relevant or apparently irrelevant.

(i) relevant speech directed to himself

(ii) relevant speech directed to the adult

(iii) irrelevant speech was recorded as either (a) on obvious non-communicative echo or (b) other irrelevant language.

6. <u>Meaningless vocalisation</u>

Vocalisation which appears to have no verbal content.

7. <u>Stereotyped behaviour</u>

Separately coded are

(i) body rocking

(ii) head movements e.g., 'weaving'

(iii) finger mannerisms e.g., moving fingers at the periphery of the visual field

(iv) hand movements; includes hand and arm flapping

(v) facial mannerisms e.g., grimacing or bearing teeth.

All of the speech categories, Meaningless Vocalisations and Stereotyped Behaviour were coded according to whether they appeared to be spontaneous (S) or in response to the adult's activity (R).

8. <u>Ignores instructions</u>

Instances where specific demands are made of the child and he appears to make no response at all.

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