

**A STUDY EXPLORING THE NATURE AND EFFECT OF INTERACTIONS IN
PLAY BETWEEN CARERS AND CHILDREN WITH CEREBRAL PALSY,
DOWN SYNDROME AND TYPICAL DEVELOPMENT**

by

Jan Payne

A thesis submitted to the University of Plymouth in partial fulfilment for the degree

of

DOCTOR OF CLINICAL PSYCHOLOGY

Department of Psychology

Faculty of Human Sciences

April 1997

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ABSTRACT

A STUDY EXPLORING THE NATURE AND EFFECT OF INTERACTIONS IN PLAY BETWEEN CARERS AND CHILDREN WITH CEREBRAL PALSY, DOWN SYNDROME AND TYPICAL DEVELOPMENT

Jan Payne

An observational study with an emergent design of two parts, consisting of quantitative and qualitative analysis, looked at communicative interactions between carers and children. The children were drawn from three groups: Cerebral Palsy, Down syndrome and typically developing.

The first part of the study utilised a secondary data set of observations of play sessions of carers with children who have Cerebral Palsy and carers of children with typical development. A continuous observational data-logging method of four verbal and six non-verbal behaviours was piloted and used with this data, and also used with observations of a further research group of carers with children who have Down syndrome. Measurement and comparison of frequencies of verbal and non-verbal behaviours was carried out. The behaviours were: verbal - questions and replies, descriptive commenting and directives; non-verbal - attention-directing, demonstrating, physically orienting, attending and exploring.

Between the groups, similarities and differences were found in the frequencies of particular behaviours. Although the greatest frequency of questions and replies were by carers and children in the typically developing group, frequencies of descriptive commenting were similar across the groups.

The second part of the study consisted of a qualitative analysis of two carer-child pairs from each of the three groups.

Differences in individual style were found between and within the groups. Characteristics and strategies of carer's communicative interactions, and their functional relation to the attentional and responding capacities of the children, were identified and described. A clinically interesting finding was made, that the questions asked by carers of the children with Cerebral Palsy and Down syndrome, were, in the absence of replies by the children, transformed into descriptive comments.

The findings of the study are discussed. The methodology, and issues of interpretation, clinical significance and future research are critically evaluated.

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Finally, my gratitude is extended to members of my family who have given me much support during the preparation of this thesis.

AUTHOR'S DECLARATION

At no time during the registration for the degree of Doctor of Clinical Psychology has the Author been registered for any other University award. The contents of this bound volume are identical to the volume submitted for examination in temporary binding except for the amendments requested at examination.

This study was conducted while the Author was a Trainee Clinical Psychologist in the South West region based in Plymouth. The research was conducted in collaboration with Plymouth Hospitals Trust.

Signed Jan Payne

Date 14.7.97

CHAPTER 1

INTRODUCTION - LITERATURE REVIEW

1.1 Play, cognition and language

Play is the most important developmental ability in the growth of communication skills in young children, being an activity that is self-generating and intrinsically motivated and provides the social basis of language (Fewell and Kaminski, 1988).

Assessment in play of children with adults provides a rich source of spontaneously occurring action and interaction in a relatively natural environment. Linder (1990) points out that formal assessments, within unnatural environments, provide a possible bias against particular disabilities in the lack of flexibility in conditions and may result in a dearth of functional information about the child's abilities. Play based assessment gives a more holistic view of the child, and examines cognitive, social and language development within a context that can focus on the child, the carer and the quality of their interactions.

Piaget's model of cognitive development for normal children describes the emergence of symbolic play in the sensori-motor period (the first two years) as necessary to the development of further mental representational ability, which develops as the child interacts with the environment (Piaget, 1962).

The relationship between cognition and language development is complex, with studies showing correlations but not proving a cause and effect relationship (Bates et al, 1979).

Social interaction, occurring in play between young children and their carers, may be viewed as facilitating language as communication. Effective components of child-

directed speech have been shown to be frequency of verbal stimulation when related, in joint engagement of the carer and child, to the child's own activities and speech. Also the use of warmth and responsiveness in engagement rather than controlling behaviours (Ochs and Schiefflin, 1995).

One of the most studied topics in play research with children with learning difficulties has been the relationship between the developmental level of children and the complexity of their play.

When investigating the possible link between symbolic play and language acquisition, Casby and Ruder (1983) found a strong relationship between symbolic play scores and measures of expressive language in natural observations, for both normal and learning disabled children. However, McConkey (1987) pointed out that other studies have suggested an even stronger relationship between symbolic play and verbal comprehension than with expressive language. Thus, despite the correlational nature of evidence, it can be strongly argued that language structure is built on cognitive capabilities, and that play provides both the cognitive and social basis for language development.

Recent studies, involving play assessment in carer-child interactions, show there may be individual differences in routes into language and cognition, with different patterns of causation. Hampson and Nelson (1993) found differences in mothers' language to slower and faster developing children, showing that mothers were differentiating by the child's language ability even whilst the children were very young (1 year to 1 year 8 months).

1.2 Carer-Child Interactions - nature, effect and strategies

There have been numerous studies over the last two decades investigating the nature and effect of carer-child interaction, resulting in the conclusion that these interactions have a major role in enabling and developing social and cognitive skills (Rogoff, 1990).

Research shows a relationship between the extent and responsivity of adult-child interaction and children's language development (Snow, 1984) e.g. mother's frequency of and responsivity in interaction are related to infants' and toddlers' greater communicative competence (Olson, Bates and Bayles, 1984).

Interactions facilitate the learning and socialising process, in focusing children's attention on important features in a task and helping to organise conception of the environment (Bruner, 1975). Henderson (1984) found the active and supportive involvement of an adult in children's exploration of novel objects led to increased exploration, compared to the effect of the simple presence of adults.

Thus, dyadic experiences stimulate imaginative play and are central to the development of self-directed exploration. Tamis-LeMonda and Bornstein (1991) make the point that the extent to which particular experiences support or promote learning may be limited by cognitive factors, in that children will assimilate only what they can comprehend or newly learn. Optimal learning contexts will involve matching in play level, over time, and mutual sensitivity to change in partner activity.

In their study they found some evidence of matching, but also changes in the mothers' play that were independent of the children's own play, indicating that the mothers' play changes may be partly determined by a priori notions about the child's changing play capabilities, which may be developmentally appropriate. Also, that mothers might be

sensitive, not only to the child's play per se, but other child characteristics e.g.: developing language ability. This finding is similar to that of Hampson and Nelson's (1993) study.

Strategies specifically designed to increase the development of communicative abilities have been described in the literature.

Harrison (1987) describes scaffolding for cognitive schemes and communication, in which the adult demonstrates slightly more advanced object manipulation to encourage the child to engage more complex play. By the adult's imitation of the child's vocalisations or gestures, followed by modelling of slightly advanced skills, the child is encouraged to elaborate on existing skills, and interaction time is also increased.

Wood (1978) found mother - child pairs differed in the quality of scaffolding, and that in the pairs where there was more child-contingent sequencing of demands there was more effective learning..

Research evidence generally supports the effectiveness of scaffolding strategies, but the methodology focus has tended towards counting behaviour occurrences without looking at antecedents and consequences.

1.3 Differences in normal developmental pathways and pathological or delayed development

Normal development is defined in terms of a series of interlocking social, emotional and cognitive competencies, with early adaptation promoting later adaptation and integration (Sroufe and Rutter, 1984). Pathological development may be described as a lack of integration of these competencies (Chicchetti and Schneider-Rosen, 1986).

Systematic relationships have been found to occur between play and language for normally developing infants (McCune-Nicholovich and Carol, 1981), but findings have differed in relation to play assessment of children with Down Syndrome and children with a range of developmental delays.

Down Syndrome is the most frequent of all autosomal abnormalities (occurring 1 in every 600 births). Children with Down Syndrome almost invariably have learning disabilities. They may also have congenital eye, ear and heart defects.

Down Syndrome children are etiologically homogeneous and are usually identified at birth, allowing early tracking of their developmental process. Development is delayed, but variable, in that the population is heterogeneous, ranging from severely learning disabled to approximately normal intellectual functioning.

Children with Down syndrome generally have a number of physiological features, including hearing and visual defects, speech problems, motor delay, memory deficits, dampened affect and passivity. These features may affect quality of social interaction by interfering with the establishment of turn-taking and reciprocity in social interaction, and indicate important qualitative differences in development and organisation in cognition and language.

The importance of both social experience and cognitive development for communicative competence has particular relevance for this population, as children with Down syndrome typically show more advanced cognitive than linguistic development (Fowler,1990).

Beeghly et al (1989) found that, while children with Down syndrome showed delays in learning to play, overall developmental trends in cognitive functioning and play maturity

were similar to normally developing infants. Kennedy et al (1991) in a longitudinal study of six children with a range of developmental delays, found irregularities in patterns of development, compared to typically developing children, but a correspondence between language development and symbolic play.

Optimum developmental progress appears to be achieved when carers are persistent in attempts to stimulate whilst providing emotional support (Mundy et al. 1988). In the past, the generally poor standard of child care in institutions gave rise to low estimates of the intelligence of children with Down syndrome. More recently, work has taken place with parents and children in early intervention programmes (Cunningham 1979). IQ scores in recent tests are higher but it is not known how this is related to the effects of specific training in early intervention, improved parental morale and information, and the general increase in IQ of children entering school. In a review of the data on the cognitive development of Down syndrome children, Gibson (1978) concluded that it occurs in a series of steps interspersed with plateaux, rather than as linear development.

1.4 Studies of interactive strategies

Research findings that communicative and linguistic problems of children with learning disabilities may be related to difficulties in play and understanding of objects, has led to increasing number of studies exploring the nature and effect of different interactive strategies.

Tannock and Girolametto (1992) used an interactive model of language intervention to instruct parents of children with developmental delays to use techniques to promote reciprocal interactions and facilitate the development of communication and language

abilities. They found that mothers became more responsive, less directive and provided clearer linguistic models. However, they warned against a wholesale adoption of their approach as there is some evidence that training parents of children with developmental delays to reduce rather than raise their level of responding may result in an increase in children's spontaneous social initiations.

A study by Harris et al (1996) exploring joint attention and topic initiation in carers' interactions with children with Down syndrome found that following the child's lead by allowing the child to control the focus of joint attention appeared to be a more critical factor in facilitating language development than amount of time spent in joint attention.

Developmentally delayed children, including children with Down Syndrome or language disabilities, tend to be less active and effective in their spontaneous communication, and also to receive child-directed speech that is more directive and less contingent on their own behaviour (Conti-Ramsden, 1994). If child-directed speech is impoverished in nature, it may produce an environment less conducive to good progress in language development, with implications for intervention strategies.

There have been a number of conflicting findings about the nature and effect of verbal directive behaviour, with two competing theories which seek to account for the reported high levels of this behaviour in mothers of children with learning disabilities.

The two theories are the child-driven theory (Hanzlik and Stevenson, 1986), and the instructional intent theory (Davis, Stroud and Green, 1988).

The child-driven theory proposes that maternal directive behaviour is determined by the relative level of children's participation in interaction. Maurer and Sherrod (1987),

compared carers' interactions with children with Down syndrome and typically developing children. They found directives were used to encourage appropriate object-related play and compliance in children with Down syndrome, and with typically developing children were equally likely to be used, but in order to gain attention and encourage further exploration. Their findings supported the 'child driven' concept of maternal directive behaviour as a natural adaptive strategy for enhancing children's interactive engagement.

The 'instructional intent' theory proposes maternal behaviour as being determined primarily by the intentions that mothers have in engaging in interaction with their children. When high levels of directiveness in mothers of children with delayed or pathological development are found, this theory explains their behaviour as resulting from their particular intentions to change or enhance their children's performance.

Evidence reported in support of this theory includes the findings of Mahoney, et al (1990) who found mothers of children with Down syndrome were more directive, and also tended to direct children to engage in behaviours unrelated to their current activity.

This finding was similar to that of Landry and Chapieski's (1989) study, of infants with Down syndrome and mental and motor-age matched premature infants, in their finding that the success of mothers' specific verbal and non-verbal techniques depended on the mothers maintaining their infants' attention to toys with which they were already engaged.

Many studies of carer-child interaction have looked at group differences. In an attempt to provide data with which to interpret and understand individual variations, Crawley and Spiker (1983) examined relationships between different aspects of child and carer

behaviour, in observing two year old children with Down syndrome in play at home. They found significant relationships between the mother's sensitivity, the elaborateness of her play, how much stimulation she provided, and how much positive affect she showed to the child. They did not find a correlation between her sensitivity and how much she directed events.

For the child, social initiative, play maturity and social responsibility were all positively correlated, and correlated with the child's developmental level. No relationship was found between how much the mother directed events and any of the measures of the child's competence. However, nearly half of the mothers scored highly on an intrusiveness subscale, and only half of the mothers were rated as being appropriate on all the subcomponents of sensitivity and directiveness.

If the mother was directive in her behaviour, then the child was less likely to be interested and would seldom initiate play. The more competent children were more likely to play in harmony with their mothers, with these mothers combining sensitivity and directiveness in ways that provided appropriate stimulation. This study allowed the demonstration of the individuality of both the children with Down syndrome and the adults, but the focus on the use of correlational techniques, and the lack of a comparison group of mothers with typically developing children complicates straightforward interpretation of their findings. However, in common with other studies, it did appear to indicate that the most useful maternal style for this group of children's development may combine high sensitivity, elaborateness and directiveness.

Landry and Chapeiski's (1989) study, cited earlier, produced similar findings regarding maternal attention-directing strategies. Fewer specific maternal techniques for directing attention elicited higher level play from the infants with Down syndrome, compared to

the preterm group, but the amount of structure of the techniques used e.g. demonstrating rather than showing, was found to be important. .

There have been a number of studies of carers with Down syndrome children, but comparatively fewer of carers of children with Cerebral Palsy. The term Cerebral Palsy describes a group of conditions characterised by motor dysfunction due to non-progressive brain damage, caused in the pre-natal, perinatal or post-natal period. Muscle and joint problems arise from the disorganisation of the neurological mechanisms of posture, balance and movement. As well as motor disability there is also a high risk of sensory impairment, with between 6 and 16% of the population having hearing impairment and 50% having visual impairment (Capute and Accardo, 1991).

In a study comparing the nature and effect of carers' interactions with children with Cerebral Palsy and normally developing children, Saxby et al (1995) found that carers of children with Cerebral Palsy used less verbal contact, although more physical contact, than the carers of typically developing children. This finding seems surprising in that for children who have sensory deprivations, multi-sensory input, including that of verbal contact, would be indicated for optimum learning and development.

A possible explanation for their finding is that, for the carers of children with Cerebral Palsy, their interaction may be functionally related to their children's disabilities and levels of concentration. As with other groups of children with disabilities, facial expression, eye contact, motor pattern and articulation are implicated in problems of achieving successful communication. As Saxby pointed out, the children's behaviour may act as an antecedent to verbal behaviour by the carers. There may be less

reinforcement for verbal behaviour on the part of the carer if the child has difficulty in articulation or in physically playing with a toy. Also, a question arose as to the pattern of vocal behaviours of the children and carers. Saxby concluded that if the carers' behaviours were not primarily facilitative of speech, but tended to be more reactive, in that the carers would only vocalise in response to the childrens' vocalisations, this would provide scope for intervention and evaluation procedures.

CHAPTER 2

INTRODUCTION - PRESENT STUDY

2.1 Rationale for study

The findings of the Saxby et al study and others cited, of carer-child interactions with developmentally delayed children, and the corresponding methodological issues, are directly related to the design of the present study. This design utilised the video-taped observations of the Saxby study which compared carers' interactions with children with Cerebral Palsy and normally developing children, and extended the research population to include a group of carers with children with Down syndrome.

As cited in the literature review, Saxby et al's study, comparing carers' interactions in play with children with Cerebral Palsy and typically developing children, found that, contrary to expectation, the former group received less verbal contact than the latter.

Saxby implemented a ten second momentary time-sampling procedure, and global measures of behaviour.

2.1.2 Methodological issues

As with most studies involving analysis of behaviour, experimental data is most often obtained through direct observation of behaviour. The question of whether the resulting data accurately reflect observed behavioural events has been experimentally evaluated.

A comparison of four common time-sampling methods, which consisted of a whole-interval method, two partial-interval methods and a time-sampling procedure was made by McPherson et al (1980). They found that the whole-interval method grossly underestimated and the partial-interval method grossly overestimated the true percentage

of the behaviours, except when the duration of individual responses was much longer than the observation interval. The momentary time-sampling procedure was not an errorless method, but consistently superior to other methods.

Mansell (1985) evaluated the accuracy of momentary time-sampling, finding errors according to behaviour duration.

The present study utilised the data produced by the Saxby study. A different methodology was implemented, that of frequency within interval, in which the behaviours occurring within each interval were counted. Each interval was of two seconds duration. This was essentially real time, continuous observation, as the video-recording of the observations allowed constant play-back and re-play in order to explore, both quantitatively and qualitatively, the nature of the communicative interactions.

The present study also extended the research population to include the condition of Down syndrome in order to explore whether similar or different communicative interactions are used by carers of children with Down Syndrome.

Children with Down syndrome are a distinct population from children with Cerebral Palsy, in the nature and degree of intellectual and physical disabilities.

The study also made comparison of the communicative interactions of carers and children of the Cerebral Palsy and Down syndrome groups with those of the carers and children of the typically developing group.

This study is an observational study with an emergent design of two parts, consisting of quantitative and qualitative data analysis, looking at three distinct groups for communicative interactions and yielding descriptive data.

For the purpose of this study, interactions were defined as verbal and non-verbal behaviours produced by the carers and children that occurred as communication between the carers and the children.

2.2 Aims.

1. To investigate and compare the nature of interactions in play situations of carers with children who have:
 - typical development
 - Cerebral Palsy
 - Down syndrome.

2. To conduct a continuous observational data-logging method to achieve an in-depth analysis of interaction techniques used by carers in relation to the different groups of children.

3. To explore qualitative and quantitative differences and the use of strategies in interactions used by carers in functional relation to the attentional and responding capacities of the children.

2.3 Hypotheses

Based on the findings of previous research outlined in the literature review and in this chapter, it was hypothesised that :

1. With regard to the verbal technique of ‘turn-taking’ (question and reply) there will be a higher frequency of questions by carers and replies by children in the typically developing group of children than in the Cerebral Palsy group or the Down syndrome group.

2a. That the highest frequency of the carers’ use of non-verbal attention-directing techniques would occur in the Cerebral Palsy and Down syndrome groups.

2b. That the effectiveness of attention-directing techniques in engaging children’s attention, measured as a correlation between the frequency of attention-directing techniques in the carer and the frequency of engagement exhibited by the child, will be shown to be greater in the typically developing group than the Cerebral Palsy and Down syndrome group.

2c. That the carers of both the Cerebral Palsy children and Down syndrome children will use more verbal ‘directives’ than the carers of the typically developing group.

3. That there will be a higher frequency of verbal descriptive commenting by carers in the typically developing group than in Cerebral Palsy or Down syndrome groups.

4a. That the frequency of physical contact by carers in the Down syndrome group would lie between that of the typically developing group (lowest frequency) and the Cerebral Palsy group (highest frequency).

4b. That there would be a higher correlation between the frequency of physical contact with children and the frequency of verbal descriptive commenting behaviour by carers, in the Cerebral Palsy and Down syndrome groups than in the typically developing group.

CHAPTER 3

METHOD

3.1 Setting and context

The observations, for all the groups, were made at the children's usual daytime placement, with their usual carers. This was either the child's home, with a parent, or in a creche or assessment unit, with a professional carer.

For the present study, in order to control the potential confounding variables of tiredness and proximity to mealtimes, it was pre-arranged with the carers to observe and record the interactions at the time of each child's optimum attention level. In a situation where the child was relatively new to an assessment unit, the observation session was delayed until the child and carer had become familiar with each other and a routine of activities was established.

3.2 Participants

3.2.1 Cerebral Palsy group

The original sample consisted of nine carer-child pairs of children with Cerebral Palsy. However, it was not possible to track one archive video-recording of one Cerebral Palsy child and carer.

The children attended pre-school groups in two specialist centres in the south-west of England. The mean age of the children was 3 years and 8 months (range 1 year 11 months-4 years 3 months). There were 4 males and 4 females.

Three of the carers of children with Cerebral Palsy were Nursery nurses at a Child Development Centre. The remaining five were observed with their mothers.

3. 2. 2. Down syndrome group

This group consisted of nine carer-child pairs of children with Down syndrome. The children identified represented all the children with Down syndrome aged between approximately two and four years in a city in the south-west of England, therefore it was not possible to match precisely for age and sex with the Cerebral Palsy and typically developing children. Their mean age was 3 years 3 months (range 2 years 6 months -4 years 3 months). There were six boys and three girls. Their carers were contacted through their Health Visitors and invited to participate in this study. All carers agreed to take part.

Five of the children were observed with teachers and nursery nurses as carers at pre-school assessment centres and a Child Development Centre. Four were observed at home with their mothers

3. 2. 3. Typically developing group

The children with Cerebral Palsy were matched by sex and age (within three months) with nine children without Cerebral Palsy who were not experiencing any developmental difficulties and attended mainstream child care facilities. There were four boys and five girls. Their mean age was 3 years and 2 months (range 1 year 11 months-4 years 5 months). Three of the children were observed with their mothers at home and the remaining six with Nursery Nurses at a creche.

3.3 Design

The study was an observational study in two parts consisting of quantitative and qualitative data analysis, looking at three distinct groups for communicative interactions and yielding descriptive data.

3.3.1 Part 1

The first part of the study was theory driven, based on the findings of previous research, and obtained quantitative data of the communicative interactions of the three groups.

3.3.2 Part 2

The second part of the study was a deeper qualitative exploration and discussion of the data yielded by the first part of the study.

3.3.3 Hypotheses 1,2a, 2c, 3 & 4a.

The design used to investigate these hypotheses involved between groups comparisons, allowing comparison between the three groups of the frequency of:

questions by carers and replies by children

verbal and non-verbal attention-directing techniques by carers.

verbal 'directives' by carers.

verbal 'commenting' by carers.

physical contact by carers.

3.3.4 Hypotheses 2b & 4b.

A correlational design was used to investigate these hypotheses, to allow the level of association to be assessed between :

- the use of attention-directing techniques by carers and engaged behaviour by the children.
- physical contact with the children and verbal behaviour by the carers.

3.4 Measures

The interactions observed between carers and children during data collection were coded as described below. A detailed description of the coding system can be found in Appendix B.

The nature of the interactions observed between carers and children were recorded using a coding system based on that developed by Landry and Chapieski (1989). The carers' and children's behaviour was separated in two different categories of verbal and non-verbal behaviour. Within these categories, there were four behavioural measures of carers' verbal behaviours, and three measures of carers' non-verbal behaviours. For the children, there were three measures of verbal behaviours, and three measures of non-verbal behaviours.

This detailed system of coding appeared to be particularly relevant to study aims of exploration of qualitative and quantitative differences in verbal and non-verbal interactions, as opposed to using the more general measures of carer behaviours adapted from Felce et al (1986) for the Saxby study..

For the purposes of developing the coding system and to check reliability before data collection of the participant group of Down syndrome, the archive video-tape recordings of interactions of the Cerebral Palsy and typically developing group were viewed and the coding system piloted. The final operationalised coding system is presented in Appendix B.

The researcher coded the videos, with another trained observer performing a reliability check on three videos randomly selected for this purpose. Inter - and intra - observer reliability was over 80% on all behavioural codings.

3.4.1 Materials

Five different toys were used in this study. These were the same toys that were used in the Saxby study, and are described in Appendix C.

3.5 Procedure

The study was presented to and approved by the local Ethics Committee prior to organisation of the further participant group.

3.5.1 Observation

The observations were made at the child's normal daytime placement, either at a creche, pre-school nursery, assessment unit or their home, in a quiet room. The usual daytime carer, either nursery nurse or parent, interacted with the child and an observer with a video camera recorded the interactions for later analysis.

This study differed from the Saxby et al study in some aspects of procedure. The Saxby study followed an ABA design, in which each child was initially presented with a toy for three minutes (condition 1) then the child and carer were observed together with the toy for three minutes (condition 2) and the child was then left to play with the toy alone for three minutes (condition 3).

In the present study only the interaction between the child and the carer was recorded.

This was for reasons of issues related to practical and potential ethical problems (see section 3.5.2), and control of extraneous variables.

Practical issues included constraints of availability of time and human resources e.g. in assessment centres, particularly, carers could only be spared from caring for a group of children for a limited period of time. These factors also occurred in the home settings, where the demands of siblings had to be met.

3.5.2 Ethical issues

The potentiality of ethical issues become apparent when studying a potential effect in the procedure of the Saxby study. The condition in which the child was playing alone with the toy, albeit with the carer present in the room, appeared for some children to have the possibility of creating or maintaining a condition of some distress, in that the child may have experienced frustration in his or her efforts to play with the toy without adult help, or would be likely to request help or attention from the carer who would normally respond. The carer's attention was being withheld in order to fulfil the criteria for the three experimental conditions, of child alone with the toy, child with toy and carer, and child alone with toy.

This procedure, in addition to the ethical concern of potential distress for the child, also appeared to involve the possibility of affecting the nature and process of the carer's interactions with the child. The carer behaviours could be more liable to be either increasingly directive or supportive (or both) in attempting to involve the child in joint attention and play with the carer and toy. The potential for this situation, although observed infrequently, could thus be considered as introducing possibly confounding variables.

Therefore, in this study, the procedure involved only the child and carer being presented with each of the five toys at random. Their interactions with each toy were recorded for three minutes, making a total of fifteen minutes of recorded observations.

In addition, when it was found that removing a toy from the child after the three minute observation period was liable to cause distress, recording was unobtrusively ended and the next toy was presented when the child indicated that he or she was ready. As with the Saxby study, filming was discontinued if the child was unwell or showed obvious distress, and continued on another occasion.

3 5.3 Observer Effect

It is well known that the presence of an observer can have an effect on the behaviour of the observed person (Wilkinson, 1995), therefore the actual amount of time spent in implementing the observational procedure in the assessment units or family homes was, of course, much longer, in order to habituate the carer and child to observation by the observer and with the video-camera. The carer, who had already received information about the research project, was given the opportunity to ask further questions.

3.5.4 Coding of Interactions

The coding of the interactions was facilitated by the design of a recording sheet (see Appendix B). The coding procedure in this study also differed from the Saxby study, in which a ten second momentary time sampling observation schedule was used.

In order to achieve an in depth and accurate analysis of the nature of the interactions, a frequency within interval methodology was implemented, in which the behaviours occurring within each interval were counted. Each interval was of two seconds duration. In effect this was real or continuous data-logging, as in order to discover, for example, whether a carer's verbal behaviour was a comment or a question, it was necessary to continually stop the videotape and replay the previous two-second time interval.

It was also the case that the carers and children produced several verbal and non-verbal behaviours simultaneously, which were differentiated in coding.

The coding of the verbal and non-verbal interactions of the carers and children was a detailed and lengthy process. On average, it involved five hours of video observation to code each carer-child pair's overall fifteen minute session of interactions during play (approximately an hour for each three minute observation of the carer and child). There were twenty-six carer and child pairs....!

CHAPTER 4

RESULTS

4.1 Data Analysis

The quantitative data gathered during the first part of the study was analysed using the statistical packages Excel and SPSS, and by the use of ANOVA tests.

The raw data was produced by coding the verbal and non-verbal interactions for each carer and child. The first analysis of the raw data was to count the occurrences of verbal and non-verbal interactions. In order to make meaningful comparisons the behaviours observed were expressed as percentages of the number of intervals of observation. The filming time aimed at was three minutes for each toy, and in the analysis this was broken down into 90 two-second intervals during which frequency (not duration) of behaviours was counted. Out of a total of 130 play sessions, in 16 sessions children or carers were not observed for a full three minutes, due to cessation of interaction. Percentages were thus calculated as follows:

Example:

TOY TRAIN SESSION

Carer 'A' - Total number of questions ('Q') = 9

Total number of intervals = 90

therefore, percentage of intervals during which questions were asked = 10%.

Carer 'B' - Total number of questions ('Q') = 9

Total number of intervals = 80

therefore, percentage of intervals during which questions were asked = 11.25%.

The data was entered on the Excel statistical package to produce descriptive statistics i.e.: means and standard deviations. In order to gain a comparison between the three

groups (typically developing, Cerebral Palsy and Down syndrome) means were calculated, giving a between-group comparison that controlled for the differing number of subjects within groups.

The data was also entered on the SPSS statistical package to produce correlations of the means of each verbal and non-verbal behaviour by each carer and child. This procedure was implemented in order to give an estimate of association between the carer's verbal and non-verbal behaviours and the childrens' verbal and non-verbal behaviours, to investigate hypotheses 2b and 4b.

The One-Way ANOVA (unrelated) Test was performed on the data to test for significance of differences in frequency of particular verbal and non-verbal behaviours between the groups. This was in relation to hypotheses 1, 2a, 2c, 3 and 4a. (See Appendix D).

4.2 Results

Graphs (and corresponding tables) of all verbal and non-verbal behaviours by carers and children in the three groups are presented below and in the following pages.

Specific extracts of data description in graphs relevant to individual hypotheses will be presented following each hypothesis in section 4.3.

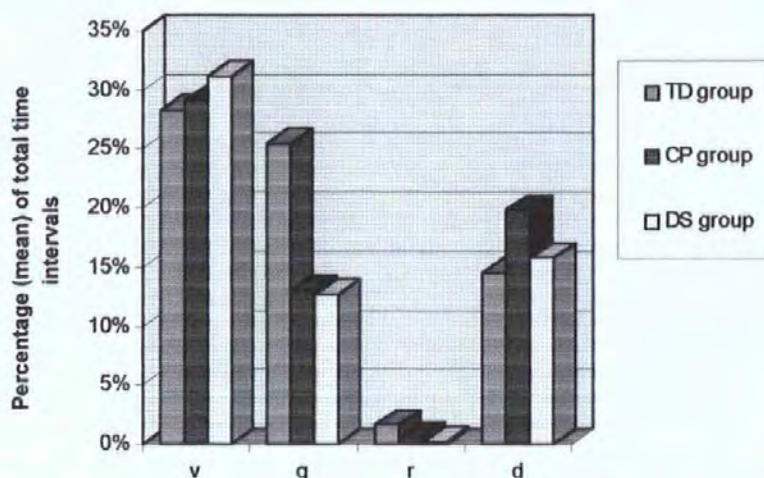


Figure 1. Graph depicting percentage (mean) of verbal behaviours by carers in the three groups.

	v	q	r	d
TD group	28.3%	25.3%	1.6%	14.4%
(SD-)	11.4%	11.3%	2.4%	1.0%
CP group	29.0%	13.0%	0.5%	19.8%
(SD-)	12.7%	9.0%	1.0%	12.9%
DS group	31.2%	12.6%	0.3%	15.7%
(SD-)	13.2%	8.4%	0.8%	13.5%

KEY
TD = Typically Developing
CP = Cerebral Palsy
DS = Down syndrome
v = descriptive commenting
q = question
r = reply
d = directive

Table 1. Table of percentage (mean) and standard deviation of verbal behaviours by carers in the three groups.

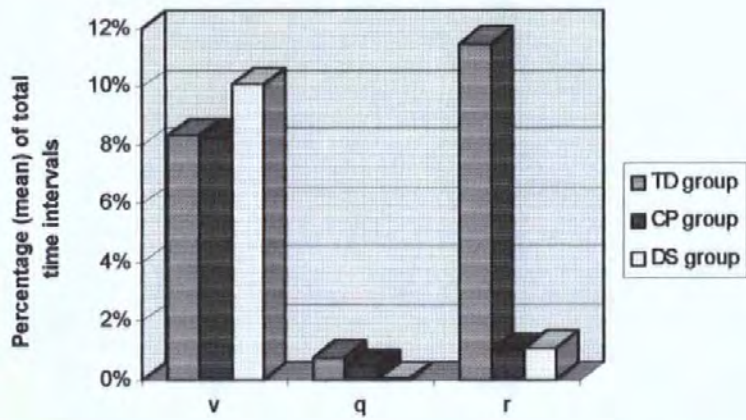


Figure 2. Graph depicting percentage (mean) of verbal behaviours by children in the three groups.

	v	q	r
TD group	8.3%	0.7%	11.4%
(SD-)	11.1%	1.7%	8.5%
CP group	8.3%	0.4%	1.0%
(SD-)	14.4%	1.2%	2.0%
DS group	10.1%	0.0%	1.1%
(SD-)	8.8%	0.2%	1.7%

KEY

TD = Typically Developing
 CP = Cerebral Palsy
 DS = Down syndrome

v = descriptive commenting
 q = question
 r = reply

Table 2. Table of percentage (mean) and standard deviation of verbal behaviours by children in the three groups.

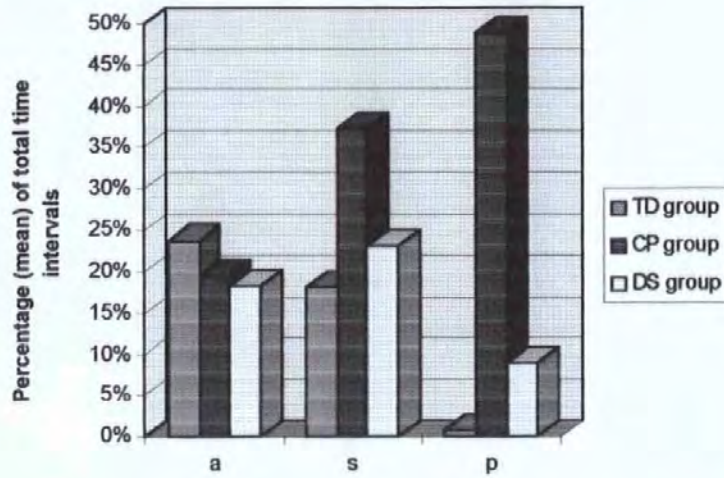


Figure 3. Graph depicting percentage (mean) of non-verbal behaviours by carers in the three groups.

	a	s	p
TD group	23.7%	18.0%	0.9%
(SD-)	16.8%	18.9%	1.7%
CP group	19.4%	37.1%	48.7%
(SD-)	18.0%	20.3%	32.4%
DS group	18.2%	23.0%	9.0%
(SD-)	12.6%	16.8%	18.4%

KEY

TD = Typically Developing
 CP = Cerebral Palsy
 DS = Down syndrome

a = attention-directing gestures
 s = demonstrate
 p = physically orientate

Table 3. Table of percentage (mean) and standard deviation of non-verbal behaviours by carers in the three groups.

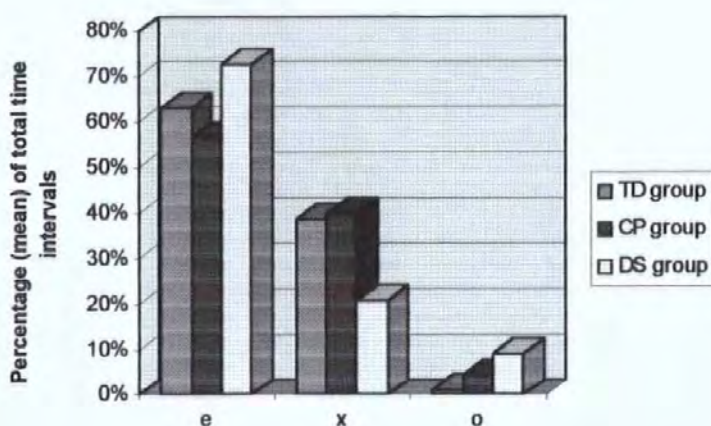


Figure 4. Graph depicting percentage (mean) of non-verbal behaviours by children in the three groups.

	e	x	o
TD group	63.3%	38.8%	0.9%
(SD-)	19.6%	21.4%	2.4%
CP group	56.6%	40.0%	4.0%
(SD-)	28.6%	27.3%	7.1%
DS group	72.9%	20.8%	9.0%
(SD-)	21.3%	15.8%	12.0%

KEY
TD = Typically Developing
CP = Cerebral Palsy
DS = Down syndrome
e = exploration
x = attending
o = non-attending

Table 4. Table of percentage (mean) and standard deviation of non-verbal behaviours by children in the three groups.

4.3 Hypothesis 1

As predicted in hypothesis 1, there was a higher frequency of questions by carers and replies by children in the typically developing group than in the Cerebral Palsy group and Down syndrome group. The differences in frequencies of these behaviours between the typically developing group and the other groups were shown to be statistically significant i.e. questions by carers: Down syndrome vs typically developing group: $F(1,88) 34.2 p=.000$. Cerebral Palsy vs typically developing group $F(1,83) 28.8 p=.000$. Replies by children: typically developing group vs Cerebral Palsy $F(1,83) 58.0 p=.000$. Down syndrome vs typically developing group $F(1,88) 64.5 p=.000$ (see ANOVA table in Appendix D).

The differences are demonstrated by the table of mean percentages of total time intervals by carers, by children and by group. These are visually depicted in the graph below.

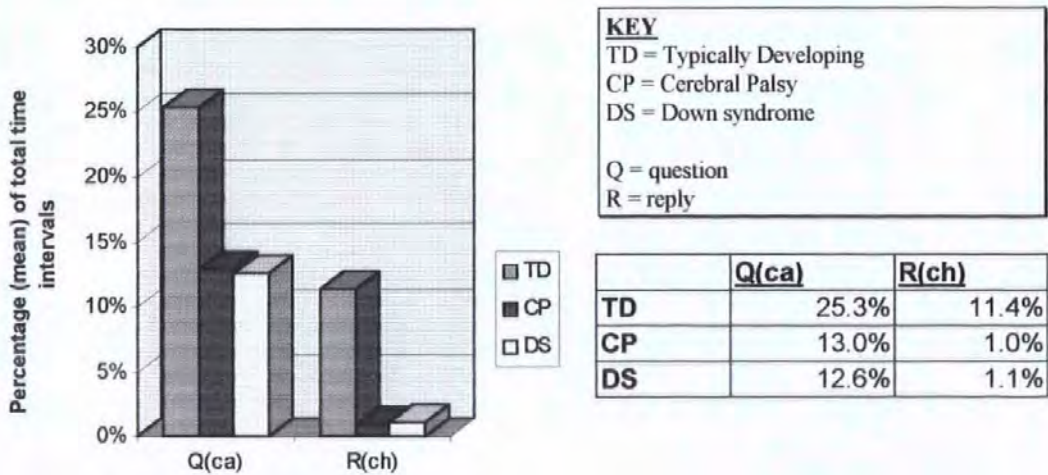


Figure 5 Graph (and corresponding figures) depicting percentage (mean) of questions by carers and replies by children in the three groups.

Hypothesis 2a

This hypothesis predicted that the highest frequency of the carers' use of non-verbal attention-directing techniques would occur in the Cerebral Palsy and Down syndrome groups.

The non-verbal attention-directing techniques (A, S & P) were:

A: - attention-directing gestures towards toy or activity e.g. pointing, tapping, touching.

S: - demonstrate e.g. illustrating the use of a toy or part of toy.

P: - physically orientate e.g. physically directing the child's attention by repositioning the child's body or manipulating the child's hand.

The graph below shows a comparison of average use of non-verbal behaviour by carers across the three groups.

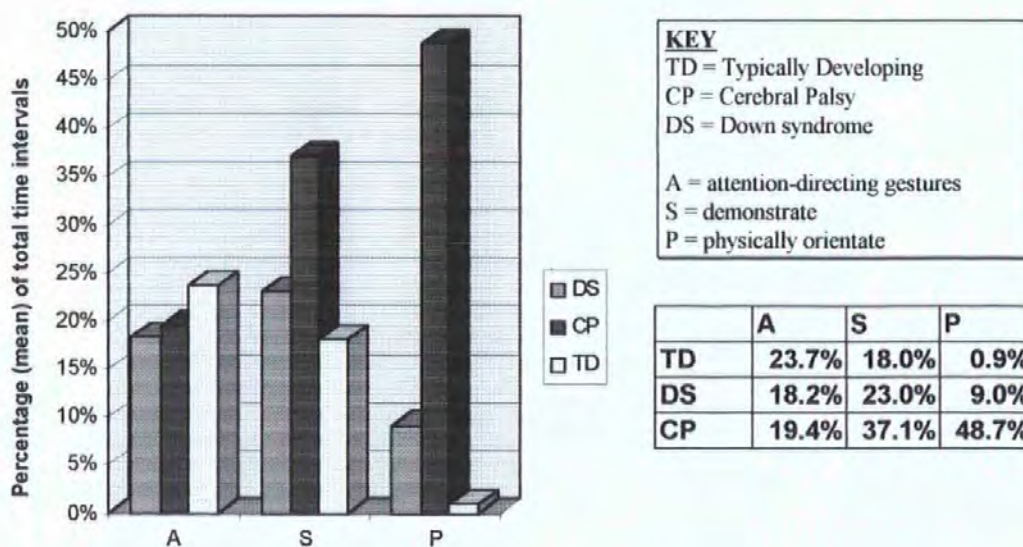


Figure 6. Graph (and corresponding figures) depicting percentages (means) of non-verbal behaviours by carers in the three groups.

The hypothesis was not completely supported by the results. Carers in the typically developing group made more frequent use of the non-verbal attention-directing

technique. There were no significant differences in the use of attention directing gestures (A) between the groups. However, there was a significant difference in the use of showing (S) i.e. $F(1,83) = 20.16$ $p = .000$ and physically orientating (P) i.e. $F(1,83) = 97.7$ $p = .000$ between the Typically Developing group and the Cerebral Palsy group, and between the Down syndrome and Cerebral Palsy groups i.e. $F(1,83) = 49.5$ $p = .000$. There was a significant difference in the frequency of use of physically orienting between the Down syndrome group and the typically developing group i.e. $F(1,88) = 8.78$ $p = .004$. (see Appendix D).

The carers in the Cerebral Palsy group made more frequent use of the non-verbal techniques of S and P.

The hypothesis (4a) that predicted that there would be a greater frequency of physical contact by carers in the Cerebral Palsy group and the Down syndrome group was supported by the results. Significant differences between the groups were found in the use of physical contact by carers (see Appendix D).

Hypothesis 2b

This hypothesis predicted that the effectiveness of verbal and non-verbal attention-directing techniques, measured as a correlation between the frequency of attention-directing techniques by the carer and the frequency of engagement exhibited by the child, would be shown to be a higher correlation in the typically developing group than the Cerebral Palsy and Down syndrome groups.

Engagement in the child was described as detailed visual and manual exploration of toy or appropriate play with toy.

This hypothesis was not supported by the results, as is shown by Table 5 (see over).

In fact, examination of the data using scattergrams (see Appendix E) showed there was no simple linear relationship between carers' use of attention-directing techniques and frequency of engagement, with the exception of physically orienting behaviour by the carer.

This was confirmed by statistical analysis as all other correlation co-efficients obtained were non-significant, as Table 5 demonstrates:

	E vs D		E vs P		E vs A		E vs S	
	r =	p =	r =	p =	r =	p =	r =	p =
TD	0.033	0.830	-0.446	0.002	-0.173	0.256	0.023	0.879
CP	0.087	0.593	-0.438	0.005	0.242	0.132	0.029	0.858
DS	-0.058	0.708	-0.378	0.010	-0.021	0.890	-0.123	0.420

KEY

TD = Typically Developing

CP = Cerebral Palsy

DS = Down syndrome

E = exploration (by child)

D = directives

P = physically orientate

A = attention-directing gestures

S = demonstrate

Table 5. Correlations between exploration (E) by child and four behaviours (verbal and non-verbal) by carers across the three groups.

As shown in the table above, the only correlations to reach significance level were those found between exploration (E) by child and physical orientation of the child (P) by carer, for all three groups. The results show a negative correlation between the variables, suggesting that whilst the carer was physically orientating the child he/she was not exploring (i.e. playing with) the toy.

Hypothesis 2c

This hypothesis predicted that the carers of the Down syndrome group would use more verbal 'directives' than the carers of the Cerebral Palsy and typically developing groups. This prediction was not supported by the results. In fact, more directives were given by the carers in the Cerebral Palsy group, as the graph (see over) demonstrates.

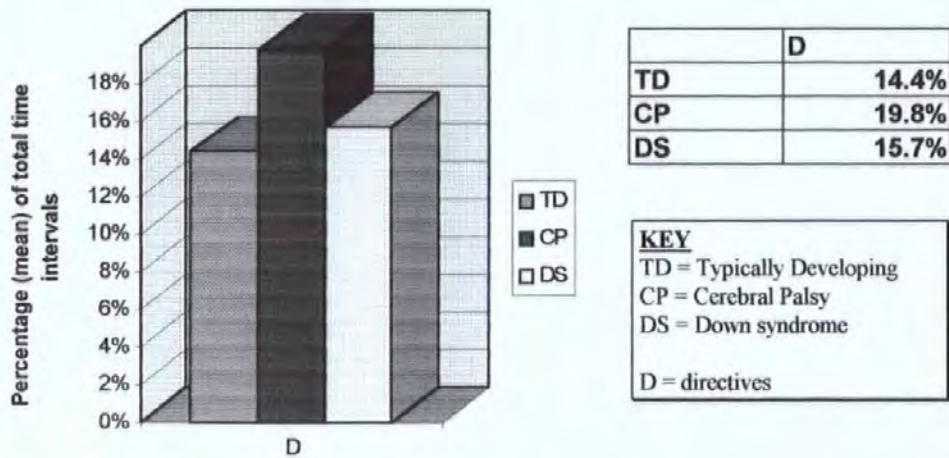


Figure 7. Graph (and corresponding figures) depicting percentage (mean) of verbal directives by carers in the three groups.

There was a significant difference between the Typically Developing group and Cerebral Palsy group in the use of directives (D) i.e. $F(1,83) 4.40 p=.039$ (see Appendix D).

Hypothesis 3

This hypothesis predicted that the highest frequency of verbal descriptive commenting behaviour would occur in the typically developing group. This was not supported by the results, which indicated that the highest frequency of verbal descriptive commenting occurred in the Down syndrome group. (see graph below).

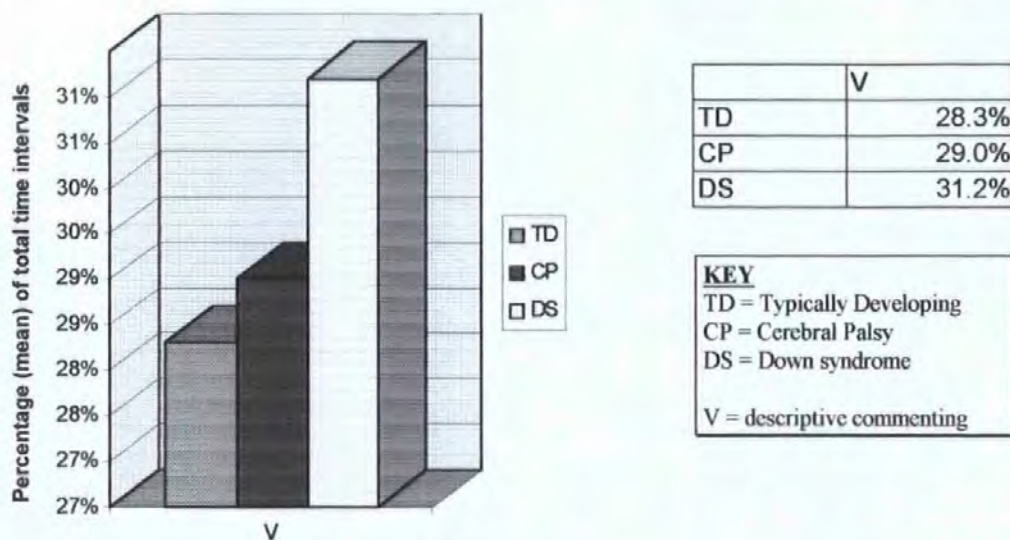


Figure 8. Graph (and corresponding figures) depicting percentage (mean) of verbal descriptive commenting (V) by carers in the three groups.

Hypothesis 4b

This hypothesis predicted that there would be a higher correlation between the frequency of physical contact with children and the frequency of verbal descriptive commenting behaviour by carers, in the Cerebral Palsy and Down syndrome groups than in the typically developing group

This hypothesis was supported by the results. The correlation co-efficients were:

	P vs V	
	r =	p=
TD	0.009	0.956
CP	0.040	0.806
DS	0.403	0.006

Table 6. Correlations between physically orientating (P) by carer and verbal descriptive commenting (V) by carer across the three groups.

These results show that the highest correlation of these carer behaviours occurred in the Down syndrome group, and was the only correlation to reach significance level. The correlation of these behaviours in the Cerebral Palsy group was higher than in the typically developing group.

CHAPTER 5

METHOD 2 (Revisited)

5.1 Methodological considerations of results

It was realised on examination of the data produced in recording the interactions that a solely quantitative approach to analysis would not be practical or sufficient in order to capture the functional nature and communicative processes of the interactions.

This was demonstrated by the difficulty of simply recording a stimulus and response sequence of events, with the carer or child performing a particular verbal or non-verbal behaviour giving rise to an identifiable consequence which could reliably be related to the preceding event.

For example, a carer's verbal behaviour may have been coded as 'directive', in that the carer appeared to be issuing an instruction, but the actual tone of voice may have been a questioning one, and the child would respond with a verbal reply and/or a non-verbal behaviour, both of which would have been appropriate given the ambivalent nature of the stimulus.

It was also observed that the carers would frequently issue a number of verbal directives, questions and descriptive or commenting behaviours, alternating and duplicating these in a very small time frame, so that it was not possible to be clear to which of these behaviours the child may have been responding.

Similarly, when the carer was observed to make verbal descriptive comments of the child's activity the child may or may not have responded verbally in reply to this stimulus, but without clearly giving an answer in response to a clear question.

These problems of analysis applied equally to non-verbal behaviours, in that it was difficult to causally relate the children's exploring behaviour particularly to the carers' attention-directing behaviours. For example, when carers gave children verbal directives or demonstrated an activity, the children were often observed to continue playing, which was recorded as 'exploring', and may or may not have been continuing to play in response to the carers. Thus the carers' behaviour may have been facilitative of the child's continuing engagement in play activity, whilst appearing to be reactive.

5.2 Part two - Qualitative analysis

In order to examine the functional aspects of carers' behaviours in relation to the state of development of the children it was decided that a qualitative exploration and discussion of the observations made of the carer-child interactions was appropriate given the above-stated constraints.

Qualitative methods are inductive and theory generating rather than theory driven. They are used to explore and discover patterns and relationships in the data, and assume that human systems are always evolving and are dynamic and developmental (Glaser and Strauss, 1967).

5.2.1 Materials

For the purpose of comparison and contrast, it was decided to focus on the play sessions with the train toy (sections 5.3.1 - 5.3.3) and the alphabet toy (sections 5.3.4 - 5.3.6). These toys appeared to differentiate most in terms of ease and difficulty in cognitive skills required. The train toy could be simply pushed around, but play with the alphabet toy required pressing buttons that produced verbal questions and instructions emitted by

the toy, and prompted the carer to repeat these instructions to the child. The toys are described in Appendix. C.

5.2.2 Participants

In order to ensure as comprehensive and comparative a qualitative discussion as was possible given the in depth nature of the analysis, it was decided to focus on two different carer-child pairs from each of the three groups.

It was attempted to match the children to be included in this sample for age, in that their ages were closest to the middle of the age-range (about three years).

5.3 Functional analysis

The early part of each session is presented as a functional analysis example of the carer's and child's verbal and non-verbal interactions and behaviours. The use of functional analysis in presentation of qualitative data is described by Miles and Huberman (1994) and allows explanation as well as description of behaviours in terms of antecedents, behaviours and consequences.

The functional analysis presentation was a true sequential presentation of events.

This is followed by a summarised qualitative description of the observations of the strategies used by the carer and the play and interaction behaviour of the child.

The functional analysis presentation of the carers' and children's verbal and non-verbal interactions was repeated for the other carers and children in this sample. These are presented in Appendix F. The summarised descriptions follow in the main text.

The names have been changed for the purpose of confidentiality.

Functional Analysis of Behaviours

5.3.1. train toy session - Down syndrome group –Simon and carer

<u>Antecedents</u>	<u>Carer behaviour</u>	<u>Child behaviour</u>	<u>Consequences</u>
S. playing with toy	Descriptive and praise	Playing	Continue playing
S. playing	Elaborates description	Playing	Continue playing
S. changes play activity	Descriptive	Playing	Continue playing
S. pauses in play	Imitates previous play asks him to do it	Playing	Continue playing
S. playing	Praise-verbal and sign	Playing	Continue playing
Carer imitates first play activity	Directs S. to repeat this	Playing	Continue playing
S. drops toy	Descriptive	S. looks at another toy part	Carer asks 'what's that'
S. flicks at toy	Descriptive	S. taps on floor	Carer copies tapping

<u>Antecedents</u>	<u>Carer behaviour</u>	<u>Child behaviour</u>	<u>Consequences</u>
S. picks toy up	Questions	S. laughs, looking at carer	Praise
S. drops toy	Descriptive	Playing	Continue -playing

This child had slight visual and hearing impairment. Verbal speech was not developed, but he initiated and imitated some sign language. His fine motor skills, demonstrated in grasp of toy, were relatively well established.

This carer demonstrated a relatively high frequency of verbal behaviour and fewer non-verbal behaviours. The child's verbal behaviours were few and consisted only of commenting. There were no questions or replies made by the child. The child's non-verbal behaviour of exploring in play was high.

In the early part of the session the carer was mainly focused on engaging with the child in his play, making few directives but giving verbal and signed comments of interest and approval. As the session continued she began to demonstrate the toy use, and made more attention-directing gestures and more verbal directives, but using a questioning tone e.g. 'you put those together?' She praised him, and commented on the difficulty of the action. When the child made pointing gestures, or his eye-gaze shifted to another part of the toy, the carer made descriptive comments on this behaviour e.g. 'you're more interested in that one'.

The carer made the sound of the train, and asked the child to repeat these noises.

5.3.2. train toy session - Cerebral Palsy group –Martin and carer

(As stated previously, the functional analyses of this carer-child pair and others in this sample are presented in Appendix F).

This child had slight hearing and visual impairment. Speech ability was not developed. His motor skills were more severely impaired. He was not able to hold himself upright without support, and was seated in a high chair. He was able to make volitional and touching movements towards the toy.

Of this carer's relatively few verbal behaviours, the frequency of descriptive commenting was highest, followed by the issuing of directives. Of the non-verbal behaviours, those of demonstrating and positioning were most often observed.

The child's verbal behaviour consisted only of verbal commenting. The measure of verbal descriptive commenting by the child included making sounds, which this child did for most of the session. No questions or replies were recorded. Non-verbal behaviours observed were mainly attending and non-attending, with a relatively small amount of exploring behaviour.

This carer spoke in a whisper, and did not often appear to be claiming the child's attention when she spoke. The carer tried to engage the child's interest by moving the toy parts, which produced sounds which focused the child's attention. The carer also used the another part of the toy to produce a squeaking noise. When the child began to respond by focusing his attention on the toy the carer gave the child a strong but briefly

phrased directive - 'come on, come on'. The child did not respond with play at first, but when the carer repeated this for another activity that she was demonstrating, this behaviour was more successful in engaging the child in play.

At one point this child was observed to make a tapping motion with his hand on the tray, and the carer responded by positioning his hand back on the toy. This can be contrasted with the behaviour described in the preceding summary of the carer with Simon, the child with Down syndrome, who imitated the child's tapping behaviour rather than redirecting the child's activity.

5.3.3. train toy session - Typically developing group – Bill and carer

Of this carer's verbal behaviours, commenting was most often recorded. Non-verbal behaviour consisted mainly of showing an activity to the child. No observations of positioning or attempting to manipulate the child's hands were made.

Verbal behaviours by the child included commenting, questions and replies. Observations of non-verbal behaviours showed a high percentage of exploring in play activity.

It was noticeable in this session with a typically developing child that attempts were made to teach the child and particular strategies were utilised for this purpose.

There was a period of quiet mutual concentration when the carer and child were engaged separately but on similar tasks. This carer extended the child's play by describing the carpet on which they were sitting as an island, and encouraging him to run the train around the island. She described different parts of the toy e.g.: 'a wibbly-wobbly bit',

thus using descriptive, child-oriented language in explaining the process of its working mechanisms.

5.3.4. alphabet toy session - Down syndrome group – Elaine and carer

This child had slight hearing impairment. Her fine motor skills were relatively impaired, shown by her difficulty in performing and co-ordinating precise touching motions. Verbal speech skills were low, but she responded with sign language to the carer's signing. Her attentional abilities were low.

Of this carer's verbal behaviours, questions were most frequent.

Very few verbal behaviours by the child were recorded, and all of these were replies.

Non-verbal behaviours by the carer consisted mainly of attention-directing (pointing).

The larger part of observations of the child's non-verbal behaviours were of non-attending. The child appeared to find this particular toy less interesting, and as she was physically mobile, kept trying to return to other toys.

The carer often repeated the animal sound that the toy was producing, and related these personally to the child e.g. 'Elaine likes dogs'.

The carer also used signing behaviour which produced signing response from the child, and the level of communication and turn-taking was higher than that shown by the observations of verbal and non-verbal behaviours, as signing was not included as an observational measure.

5.3.5. alphabet toy session - Cerebral Palsy group – Jane and carer

This child had slight visual and auditory impairment. Her verbal speech and fine motor were developed.

This carer's verbal behaviours consisted mainly of commenting, as did the child's. Non-verbal behaviours by the carer were mainly attention-directing, and the child was observed to be attending or actively exploring for the majority of the observations.

A common use of the alphabet toy made by all carers to a greater or lesser extent was that of repeating the sounds that the toy produced when certain buttons were pressed.

This carer also used questions that creatively expanded the activity e.g. 'what did the elephant say?.'

The carer praised the child when she pressed the appropriate button, and directed her to listen. The carer and child often appeared to engaged in separate activities in that the carer would repeat particular sounds whilst the child was exploring the board.

The carer engaged the child in mutual activity by chanting the alphabet sounds being produced by the toy, in which the child joined her, and directed her to press the letter on the board that they had chanted.

The carer, when changing the activity, did so by asking the child which button she wanted to press.

At one point, when the carer was aware that the child was attending but could not find a particular button the carer encouraged searching behaviour by the child by saying whilst pointing : 'I think it's on this line somewhere.'

5.3.6. alphabet toy session - Typically developing group – Helen and carer.

A high level of observations of verbal behaviours were made of this carer, of which commenting was the most frequent. This verbal behaviour was also recorded most frequently of the child.

The carer's non-verbal behaviours consisted mainly of attention-directing. Observations of the child's non-verbal behaviours found mainly attending behaviours and fewer exploring behaviours.

In common with the carer of the typically developing child described for the toy train session, this carer used techniques that enabled teaching the child e.g. asking the child a question - 'where's the top?' and after the child's reply, extending the question - 'what letter does top begin with?' - child replies - carer asks: 'can you find the letter?'

The carer also makes suggestions to the child. During one such observation it was interesting to note that the carer cuts in on the child's reply, repeating the toy's instruction - 'press the button' - and points to the board. The child responds by asking the carer 'which one?' and the carer told the child to make a choice. The carer then comments on the child's choice, and suggests and describes other options. This sequence is repeated, and the carer asks open-ended questions which extend the child's play activities, and waits for the child to respond.

The carer also points (attention-directing) whilst simultaneously giving directives.

The frequent use of verbal commenting by this carer appears to result in reciprocal use by the child. The carer does not need to use strategies to engage the child's attention and

play, but, as with the other carer of the typically developing child, there is mutual attention and interplay of verbal and non-verbal behaviours by the carer and child, which appear to facilitate the use of strategies that enable teaching of the child.

CHAPTER SIX

DISCUSSION

6.1 Discussion of verbal and non-verbal behaviours by carers and children

The aims of this study were to investigate and compare the communicative nature of the behaviours in the three groups, and examine their use in functional relation to the attentional and responding capacities of the children. The data-logging methodology allowed the findings of frequencies of the verbal and non-verbal behaviours, as shown in the results (see chapter 4), and their relation to the predictions of the hypotheses.

6.1.1 Verbal behaviours

The four measures of verbal behaviour by carers were descriptive commenting, questions, replies and directives.

There were three measures of children' verbal behaviour: descriptive commenting (including making sounds), questions and replies.

For the carers, the overall difference in frequency of occurrence of descriptive commenting between the three groups was not large. There was slightly less descriptive commenting by the carers of the typically developing children than the carers of the Cerebral Palsy children, and the carers of the Down syndrome children produced most descriptive commenting.

This pattern was similar for descriptive commenting on the part of the children, in that the children with Down syndrome produced more than the other groups, who in this case produced the same amount. The symmetry of differences between the Down syndrome

carers and children and the other groups was an interesting finding, but was not reflected in any other verbal or non-verbal behaviours.

This finding, that the carers of all three groups produced similar amounts of this verbal behaviour, in view of Saxby's findings of fewer amounts of general verbal behaviour in the Cerebral Palsy group of carers, demonstrates that descriptive commenting was the communicative verbal interaction used most often by the carers of the Cerebral Palsy children.

However, although results supported the hypothesis that there would be a higher correlation between the frequency of physical contact and descriptive commenting in the Cerebral Palsy and Down syndrome groups, the highest correlation of these carer behaviours was found in the Down syndrome group. This was the only correlation of these behaviours to reach significance level. This finding will be further explored in the discussion of strategies in section 6.3.

The carers of the typically developing children asked twice as many questions than the other carers. Overall, there were few questions produced by the children, most being made by the typically developing group and none by the Down syndrome group.

The number of replies showed little difference between the Cerebral Palsy and Down syndrome groups, with slightly more being made by the children with Down syndrome. The typically developing children made most replies, resulting in a very large difference compared to the other groups

The comparatively high frequency of questions and replies made by the carers and children in the typically developing group was suggested by the first hypothesis. This

finding was predictable, but the finding that the frequency of this behaviour in the carers in the Down syndrome and Cerebral Palsy groups was almost equal was interesting. It suggests that although there was a wide range of disabilities within these groups, the carers had very low expectation of receiving replies, therefore asking fewer questions.

In the typically developing group in most instances (apart from the phone session) when the carers asked questions the children replied. This pattern is repeated in the Cerebral Palsy and Down syndrome groups, although the frequencies are fewer, suggesting that all the children were capable of making replies, and that therefore this behaviour could be evoked by questioning by the carer.

The carers in the Cerebral Palsy group were observed to make most directives, and slightly more directives were made by the Down syndrome group of carers than by those of the typically developing group. This finding did not support the hypothesis, which predicted that the highest frequency of directives would be made by carers of the Down syndrome group. This assumption was based on the findings of previous research, but perhaps reflects the fact that relatively few studies of children with Down syndrome and typically developing children have included the condition of Cerebral Palsy.

Again in analysis in relation to the findings of fewer verbal behaviours by carers of children with Cerebral Palsy in the Saxby study, this verbal behaviour was produced by these carers more frequently than questions and replies.

The correlations of exploration by children and verbal directives by the carer were not significant across the groups, but was highest for the Cerebral Palsy group.

The correlation of these behaviours was negative for the Down syndrome group, suggesting that the use of verbal directives by the carers for the children of this group may have lessened the potential of engaging in active exploration.

Further examination of verbal directive behaviour will be made in discussion of strategies in section 6.3.

6.1.2 Non-verbal behaviours by carers

The three measures of non-verbal behaviour by carers were: attention-directing gestures (pointing at or touching toy or part of toy), show (demonstrating the use of the toy) physically orienting (directing the child's attention by repositioning the child's body or hand) and O (not attending to child, activity or toy). The last measure was not recorded in the observations, and was dropped from the analysis.

There was little difference between the three groups in the observed frequency of attention-directing gestures. Carers of the typically developing children group used attention-directing gestures slightly more often than the other carers.

The carers of the Cerebral Palsy group made considerably more use of the techniques of showing and physically orienting. Carers of the typically developing children made slightly less use of show than the Down syndrome group carers, and hardly any physically orienting. The carers of the Down syndrome children used physically orienting to a small degree.

The comparatively large use of show and physically orienting by the Cerebral Palsy group carers was to be expected in view of the problems of motor dysfunction in children

with Cerebral Palsy. Observations of children's play in this group found, in most instances, fine motor skills were impaired. These children were more likely to be seated in high chairs, and to require some support.

The fine motor skills of the Down syndrome children were also impaired, but not to the degree of the Cerebral Palsy children. Most of the Down syndrome children were seated on cushions on the floor beside their carers, and did not require physical support. However, their mobility meant that at times carers had to physically bring them back to the play activity.

6.1.3 Non-verbal behaviours by children

The three measures of behaviours were exploration (detailed visual and manual exploration of toy or appropriate play with toy), attending (not manually exploring) to carer, toy, or activity, and not attending to carer, toy or activity.

The highest frequency of observations of exploration occurred in the group of Down syndrome children. The typically developing children were observed to perform this behaviour slightly less often, and there were slightly fewer than this group in the Cerebral Palsy group.

This finding indicates that there was not a large variation between the groups of the children's abilities to manually explore or play with the toys. A somewhat different finding was made of the attending behaviour. Frequency of observations were similar for the typically developing children and Cerebral Palsy children, with slightly more observations of the latter, but fewest observations of this behaviour were made of the

Down syndrome children. This pattern was reversed for the few observations made of non-attending behaviour.

A possible explanation for the findings of frequency of attending behaviour was the relative passivity of some of the Cerebral Palsy children, who were more severely impaired in their motor development, and comparatively high observations of this behaviour were made for these particular children. This explanation is supported by the finding of a comparatively high frequency of observations made of showing, or demonstrating, behaviour by the carers of the Cerebral Palsy group. While this behaviour was occurring, the children were attending.

There were few observations made of non-attending behaviour, and most were of the Down syndrome children. This may have been due to the problems associated with this condition of attentional ability. Also the increased levels of mobility of these children, in comparison with the Cerebral Palsy group, enabled them to attempt to physically escape the play sessions.

Hypothesis 2b predicted that the effectiveness of attention-directing techniques in engaging children's attention, measured as a correlation between the frequency of attention-directing techniques in the carer and the frequency of engagement exhibited by the child, would be shown to be a higher correlation in the typically developing group than the Cerebral Palsy and Down syndrome group.

This hypothesis was not supported by the findings, with the exception of the correlation of physical orienting by the carer and exploration by the child. This correlation was the

only one to be found as significant, and negative, across all the groups, and was highest as an inverse correlation co-efficient for the typically developing group. This finding was not surprising, as it was observed, of most carer-child pairs, that when the carer was physically orienting the child, the child was either not engaged, or ceased to be engaged, in active exploration of the toy or play activity.

The observed frequency of exploring behaviour was highest for the children with Down syndrome. However, there were smaller negative correlations between exploring behaviour and carer's non-verbal behaviours of attention-directing and showing, and the verbal behaviour of descriptive commenting.

The correlation between exploring by child and attention-directing by carer was highest for the Cerebral Palsy group, but in itself was small and not significant, as were all the correlations for all the groups, so it is difficult, quantitatively, to show with any confidence any particular effect of carers' verbal and non-verbal behaviours on exploring behaviour for any of the groups.

6.2 Characteristics of observed carer-child interactions

6.2.1 Verbal directive behaviour

In the quantitative data produced in the first part of this study, overall comparison of the frequency of verbal directive behaviour found little difference in the group means between the amount of verbal directives being made by the carers in the three groups, but observed frequency of directives was highest for the carers in the Cerebral Palsy group.

As discussed in Chapter One, in reference to the existing literature, there have been a number of conflicting findings about the nature and effect of this behaviour.

Some studies have found directives being used to encourage appropriate object-related play and compliance in children with Down syndrome, and equally likely to be used with typically developing children, but in order to gain attention and encourage further exploration.

This supported the 'child driven' concept of maternal directive behaviour as a natural adaptive strategy for enhancing children's interactive engagement.

Other studies found mothers of children with Down syndrome to be more directive, and tended to direct children to engage in behaviours unrelated to their current activity.

These findings supported the 'instructional intent' concept, of maternal behaviour being determined primarily by the intentions that mothers have in engaging in interaction with their children.

The present study, in examination of how directive styles were used in the context of other behaviours, found elements of behaviours in all three groups which corresponded

with the child-driven and instructional intent theories of maternal behaviour, described in the following qualitative description.

The qualitative description of particular carer-child pairs found differences, in context, in the style and use of verbal directive behaviour.

One of the two carers of the children with Down syndrome used directives later in the session, having previously used descriptive commenting on the child's activities to engage with the child. When this carer used directives, they were made in an encouraging and questioning tone. This carer showed a high level of responsiveness and her behaviours were often child-contingent.

The other carer in this group made more use of attention-directing gestures and questions than directives in encouraging play, and her voice tone also was animated. Both of these carers made use of signing simultaneously with verbal speech, which had the effect of ensuring some mutual eye-contact and enhancing the potential for communication.

The behaviours described could be judged as being in line with the 'child-driven' theory of maternal behaviour.

One of the carers in the group with Cerebral Palsy used directives in a way which was qualitatively different, in that they were imposed on the child by the carer, either in the absence of any activity by the child, or instead of an activity which did not include play with the toy. Of this carer, relatively few observations were of her use of commenting and directives being 'finely-tuned' to the child's behaviour or the carer's own non-verbal behaviour.

However, this child had more severe physical and speech impairment than the other children in this part of the study. It is interesting that there were marked differences in this carer's style of interaction in that she appeared to be less responsive in her directiveness to the child.

This carer's behaviours appeared to correspond with the 'instructional intent' theory of maternal behaviour, but it could be argued that they did not occur within the context of the optimum use of scaffolding procedures, referred in the introduction of this study. These procedures included imitating the child's vocalisations and modelling slightly advanced skills. Evidence of more effective learning has been found when the sequencing of maternal demands are contingent on children's behaviour.

Marfo (1990) has warned against wholesale acceptance of the idea that directive styles may be inappropriate and unhelpful for children with disabilities, but concurs with Crawley and Spiker in suggesting that directiveness in combination with low sensitivity to the communication of children may have adverse effects.

It was demonstrated by the quantitative analysis that the main difference in verbal behaviours by carers and children between the groups was in the behaviour of questions by carer and replies by children, in that carers of typically developing children asked more questions, and these children gave more replies.

The continuous data-logging method, and the qualitative analysis allowed identification of a characteristic of interactional style in asking questions by carers of the children with Down syndrome and Cerebral Palsy which was qualitatively different from this behaviour by the carers of the typically developing children.

Questions asked by the carers of the children with Down syndrome and Cerebral Palsy were often rhetorical in nature, in that carers frequently appeared to ask questions with no clear expectation of receiving replies. In so doing, the carers frequently supplied the answers themselves, a behaviour which, when sequentially analysed, became that of descriptive commenting.

This interactional style may be explained by the 'instructional intent' theory of maternal behaviour, and may account for the slightly higher frequency of descriptive commenting behaviour made by the carers of the children with Cerebral Palsy and Down syndrome than the carers of the typically developing children.

Instructional intent was also shown by the carers of the typically developing group of children who often appeared to use behaviours that involved teaching the children, in engaging the developing cognitive and linguistic skills of the children e.g. by explaining the working parts of toys, and prompting the children to look for and identify particular letters and sounds.

6.3 Strategies of communicative interactions

Strategies of communicative interactions were observed in the qualitative exploration of the six play sessions, which consisted of two different carer-child pairs from each of the three groups.

6.3.1 Down syndrome group

One of the main strategies used by the carer of Simon, in the train toy session consisted of a sequence of behaviours which were finely tuned to the child's behaviours: paying very close attention to his activities, verbally describing the activity, giving praise and elaborating her descriptions. When there was a pause in the child's play, she imitated his previous play activity and asked him to repeat this activity.

Descriptive commenting was used early in the session, and twice as often as directives. Verbal speech was often combined with signs, and directives were made in a questioning and encouraging tone. The carer's voice tone generally was animated and interested, and exclamations were often made in response to the child's activities.

The strategies described appeared to be successful not only in encouraging the child's active exploration of the toy, but also elicited from the child a response of laughter whilst making eye contact.

The carer of Elaine, in the alphabet toy session, was persistent in asking questions, combined with attention-directing gestures and signs, whilst ensuring there was mutual eye-contact and pausing for the child to respond. In repeating the toy noises, she related these personally to the child, and was in close physical proximity to the child.

6.3.2 Cerebral Palsy group

The carer of Martin, in the toy train session, used descriptive commenting and directives in ways that were qualitatively different from the use of these behaviours by the carers of the children with Down syndrome. For example, relatively few observations were made her use of commenting and directives being attuned to the child's actual play activity, but these occurred during pauses in activity. Similarly, although the carer often positioned the child and manipulated his hands on the toy, this was rarely accompanied by descriptive commenting.

Another difference was that this carer, rather than imitating an activity by the child which did not directly involve play with the toy, physically redirected the child to the toy.

The carer's voice tone was generally very quiet. However, when she used the toy parts to make sounds, and repeated a brief directive in a more vigorous manner, the child's attention was gained.

Jane, the other child with Cerebral Palsy described in this part of the study had more developed speech and motor skills than those of Martin. The carer, in the alphabet toy

session, used strategies that were similar to those used by the carer of Elaine, the child with Down syndrome, in their alphabet session, in using questions and attention-directing techniques that creatively expanded the child's play.

This carer also used a play strategy in common with all the carers in this toy session, that of repeating and, in this case, chanting, the sounds produced by the toy. The carer encouraged the child to join her in this activity by initially directing her to create the sounds by pressing particular buttons.

6.3.3 Typically developing group

The carer of Bill, in the toy train session, and the carer of Helen, in the alphabet session, made use of strategies that enabled teaching of the children as well as encouraging play exploration.

In the toy train session with Bill and his carer there was a high degree of reciprocal turn-taking, in question and reply. There was a clear expectation of response from the child, in that the carer waited for the child to respond before repeating a question or demonstrating an activity, and the child would comment on her activity.

This carer extended the child's play by using descriptive, child-oriented language in elaborating on the play situation and in explaining the process of the working mechanism of the toy.

The carer with Helen in the alphabet toy session asked open-ended questions , and made simultaneous use of non-verbal and verbal behaviours e.g. attention-directing and directives.

6.4 Critique of method and interpretation

The design and methodology of this study has presented a number of issues which have implications for the interpretation of the findings. These are discussed in detail below:

6.4.1 Sample size and participants

As this study was a part replication of the Saxby et al study, with a secondary data set from that study being utilised in further exploration, the sample size of the further research population of the Down syndrome group was constrained by the numbers of participants in the Saxby study. In the event, in order to age - match the Down syndrome children with the other groups, it was necessary to contact every parent of children with Down syndrome between the ages of two and four years in the geographical area. The constraint of availability of participants meant that precise age and sex - matching of the Down syndrome children with the other groups was not possible. The small sample size for the groups renders the issue of external validity problematic, but this and other problems described were due to limitation in resources.

The use of a secondary data set involved the problem of historical time-lag between data collections, in that the observations of the Down syndrome group took place about eighteen months after those of the Cerebral Palsy and typically developing group, and therefore the issue of philosophical changes over time in the culture of care has to be acknowledged. However, the Down syndrome group were drawn from the same geographical area as the other groups which enabled some cultural matching.

The issue of internal population validity was compromised by lack of homogeneity of characteristics of carers and children. In all three groups, the observations were of both professional carers and mothers. This was an unavoidable factor due to the replication issues of the study, and the aim of observing the children in usual daytime setting with their usual carer. However, there were obviously large differences between the professional carers and mothers in terms of previous experience, training and motivational effects. It would have been preferable to have observed, as carers, either all mothers of the children, or all professional carers.

In order to have allowed generalisation of findings the research population should represent the total defined population.

The considerable heterogeneity of children's characteristics, both between and within groups, included mental and chronological age, and large variability in range of abilities. The lack of norm referenced assessment of the children's intellectual abilities, due to problems with test accuracy in pre-school children with physical abilities, and therefore difficult to establish, was an important methodological issue with clear implications for interpretation of findings. In addition, the ability range amongst the children with Cerebral Palsy presents particular difficulties for valid and meaningful comparisons of carers' interactions, in that there was considerable differences in levels of severity of sensory deprivation in the children.

The small sample size presents difficulties for the acceptance of the (albeit weak) associations found in the correlational analysis, for hypotheses 2b and 4b, as accurate or real levels of association between the particular variables. This method of analysis also complicates interpretation of findings in that it does not show the direction of causality with regard to the variables of behaviour by carers and behaviours by children.

6.4.2 Design

The two-part design of this study was operationalised when, after consideration of methodological issues relating to the complex nature of early data produced by the quantitative analysis, it became clear that the aims of the study would be more achievable with the utilisation of qualitative methods of analysis.

The use of both quantitative and qualitative methods resulted in triangulation of methodology. Triangulation is described as the combination of methodologies in the study of the same phenomena (Denzin, 1978). In the present study, this was used in order to capture a more complete, holistic and contextual examination and description of the interactions of the carers and children.

The utilisation of a design which included further triangulation of data would have strengthened the validity of this study and interpretation of findings. This could have been achieved by, for example, viewing the video-recordings of the observations with the carers and eliciting their views as to the nature and effect of their interactions in relation to the developmental status of their children.

6.4.3 Behavioural interaction measures

The adoption and implementation of the measures of behaviours also have relevance to the reliability and validity of the findings. The behavioural measures, as described in the Method section, were adapted from the coding system developed by Landry and Chapieski (1989). The resulting coding system of behaviours chosen to be measured was more detailed than the measures used in the Saxby study, in order to allow more behaviours to be explored in more detail. The coding system was piloted on the archive data produced by Saxby et al, before use with the further research population group of carers with children with Down syndrome.

The use of video-recording of the interactions allowed extensive testing and retesting of the coding system of measures. This was necessary due to the number of behaviours by the carers and children which were observed to be produced within a very small time-frame. For example, a carer could produce an attention-directing gesture (pointing) whilst simultaneously questioning the child, and, within a split-second interval, commenting on the child's activity or the toy.

The video recording of the behaviours also enabled inter- and intra- rater reliability.

An example of face validity of the measures was shown by consistency in the findings i.e. when a carer was physically positioning the child, or demonstrating the use of a toy, the child was more likely to be attending rather than actively exploring. This behaviour was consistently observed and coded as such across the three groups.

6.4.4 Materials

The procedure of using five different toys, with three minutes observation of the carer and child in interaction with each toy, was implemented in order to replicate this procedure of the Saxby study, which used the same toys, and to enable comparison of the interactions between the three groups.

The toys varied in design and ease of manipulation, with varying demands on the ability to use fine motor skills. This factor had relevance to the differing physical abilities of the children, in that the children whose fine motor skills were more impaired required more physical contact and demonstration from the carers to engage in active exploration of the toys.

The differences in the toys were useful in prompting and portraying the use of different strategies and differing levels of engagement by the carers and children. Some of the toys were not effective in engaging some children for three minutes, and the use of five toys, in a fifteen minute overall observation period, had the potential of creating a stimulus of novelty. Thus floor and ceiling effects on behaviour may have been created, in that the relatively quick change-over of toys may have resulted in some of the children, and particularly those less or unimpaired, being engaged in play regardless of the behaviour of the carers. As such this procedure may not have had the optimum effect in allowing relational play. For the purposes of this study, in examining the nature and effect of communicative interactions, it may have been more useful to have used fewer toys, in order to allow any novelty effect on the children's behaviour to have dissipated over time. It may also have been useful to have repeated the play sessions with particular toys,

those that differentiated most in terms of cognitive demand, a week or so later, thus enabling test-retest reliability and validity.

6.4.5 Clinical significance

The issues of method and interpretation cited obviously bear important relation to the clinical significance of the findings of this study. There were problems of internal and external validity arising from the heterogeneity of carer characteristics, in developmental status of the children both within and between the groups, and in behaviours.

These issues, and that of difficulties relating to study design with regard to replication, imply the necessity for caution in regarding the findings. The methodology was flawed, therefore it would be difficult to extrapolate the findings, particularly for instructional purposes.

6.4.6 The research process

A reflexive account of the research process is an important component in qualitative research (Stevenson and Cooper, 1997), allowing acknowledgement of the relevance of the understanding and experiences of the researcher in relation to the field of enquiry.

These issues are particularly relevant to the present study. The study initially involved detailed examination of archive video data of the observations of interactions in the Cerebral Palsy and typically developing groups of children and their carers.

The author was personally responsible for contact and observation with video recording and data collection with the Down syndrome group of children and their carers. It must be acknowledged that these differences in method and experience may have given rise to observer bias. There was a potential of subjective differences in the quality of impressions received of the nature and effect of the carers' interactions with the children, as contact with the latter group involved personal interaction and, inevitably, more information about the individual carers and their children

The identification of measures of behaviours to be examined, and of particular strategies in the interactions were in part theory based, but were also based on the professional and personal experiences of the author, and are therefore subject to bias and open to further and different interpretations.

The greater focus and availability of research on social interaction and development with children with Down syndrome in comparison with children with Cerebral Palsy, which was reflected in the literature review, also had implications for the issue of research bias.

6.5 Conclusions

The aims of this study were to investigate and compare the nature of communicative interactions in play situations of carers and with children in the three distinct groups of Cerebral Palsy, Down syndrome and typical development. This was achieved by the continuous data-logging method employed in the quantitative data collection. Analysis of this data allowed depiction and comparison of verbal and non-verbal behaviours of the carers and children in three distinct groups.

The in-depth exploration of the qualitative method enabled description of sequences of behaviours which made it possible to identify strategies used by carers that were functionally related to the children's abilities. Of these, one of the main findings, which was clinically interesting and potentially useful, involved that of the verbal behaviour of descriptive commenting by carers.

The carers of children with Cerebral Palsy used this behaviour more often than any of the other verbal behaviours recorded of them. It was also found to be used in functional relation to the level of the children's disabilities. This observation was made in examining the behaviour of asking questions by carers, in that, for the Cerebral Palsy and Down syndrome groups, the questions were often answered by the carers themselves, and so became the behaviour of descriptive commenting.

The clinical interest of this finding is in reference to the characteristic and effect of this behaviour, which was identified in the description of strategies as a child-centred activity, involving joint attention on the toy or play activity. This allowed the carer to be 'alongside' the child in play, rather than splitting the child's attention and thereby increasing the cognitive demands for the child.

Descriptive commenting appeared to be most effective when primarily used before giving verbal directives, and also in conjunction with other verbal and non-verbal behaviours. This was found in the qualitative description of a carer of a child with Down syndrome, and a higher correlation of this behaviour in conjunction with physical contact was also found for this group. The quantitative analysis of results showed, of the three groups, a higher frequency of actively exploring behaviour by the children with Down syndrome.

The frequency of the behaviour of asking questions by carers was found to be almost equal in the Cerebral Palsy and Down syndrome groups. This was an interesting finding, suggesting that although there was a very wide range of disabilities both between and within these groups, the carers, in general, had low expectation of receiving replies, therefore fewer questions were asked of the children in either group.

However, results showed that all the children made replies, though less frequently in the Cerebral Palsy and Down syndrome groups. It would appear that in view of the lower probability of receiving replies from these children, there was correspondingly less positive reinforcement of the carer's behaviour of asking questions.

Saxby (1995) suggested, in relation to the findings of fewer verbal behaviours of carers with the Cerebral Palsy group, that the vocal behaviours of the carers may have been reactive, in that the carers would only verbally relate to the children if they were likely to receive a verbal response. If this was the case, then there may be scope for intervention procedures for the purposes of enabling carers to become more facilitative of children's speech.

The use of a design which allowed measures of duration of behaviours would have made it possible to have discovered whether carers were allowing children enough time to respond verbally. The behaviour described of questions by carers becoming descriptive commenting in the absence of replies by children, may have had mixed effects. Children with particular impairments may have benefited from the use of descriptive commenting, but it may also have been helpful to them to have received greater encouragement to make a verbal response, at whatever level of appropriateness.

This is an area of clinical interest which could be investigated further by viewing the video-recorded observations with the carers in order to elucidate their behavioural intentions.

The qualitative exploration of the sub-sample of carers and children from the three groups yielded information about the nature and effect of the communicative interactions. This could not have been provided by the method of measuring frequency of behaviours within an interval, which is a limitation of quantitative methodology in respect to ecological validity. For example, some carers appeared to create an atmosphere of interest and excitement by the use of animated and vigorous voice tone. When this was combined with the use of signing, which commanded mutual eye-contact, as occurred with the carers of children with Down syndrome, the interactions between the carers and children, and the children's play, appeared to be enhanced and mutually satisfying

Differences were found between the groups in the use and style of verbal directive behaviour, which, as with other behaviours, included elements that corresponded to the theories of child-driven and instructional intent theories of maternal directive behaviour. The findings suggested that verbal directive behaviour, when used in conjunction with other behaviours and was related to the children's behaviour, was a useful component of the strategies, in enabling enhanced interactive engagement between the carers and children and increased exploratory play.

As discussed in the literature review, relationships have been found between extent and responsivity of carer's interactions with children and children's increased exploration and communicative competence. These have been described in relation to the use of scaffolding procedures, which include the adult's imitation of the child's vocalisations or gestures, followed by modelling of slightly advanced skills. This behaviour was observed to be used to varying degrees by carers in this study, and was described in the qualitative description of the carer with Simon, the child with Down syndrome.

Effectiveness of scaffolding strategies has been shown by previous studies, but methodology has focused on counting occurrences of behaviour rather than examining antecedents and consequences of behaviours.

6.6 Indications for future research

The present study has attempted to make a more comprehensive examination of the communicative nature and effects of carer-child interactions by utilising quantitative and qualitative methodologies. Given time and opportunity, there would be value for substantive and theoretical knowledge of child-carer interactions in further extenuation

of these methodologies to the observations. This would also allow greater validity and fuller descriptions and effects of strategies employed in interactions.

The clinical significance of the findings of this study is constrained by the methodological and interpretational issues. Those issues relating to the differences in status, previous experience, training and motivation of carers and the functional abilities of the children, as discussed in section 6.4, are of particular relevance.

The use of a methodology that allowed measures of duration of behaviours would yield further valuable information about the effectiveness of characteristics of behaviour that were identified in this study. This is of particular relevance with regard to the finding, in relation to the carers of the children with learning and sensory impairments, that questions by carers were quickly transformed into descriptive comments.

Much of the research into carer-child interactions has focused on the verbal behaviours of questions and directives by carers. Further research which included looking at the behaviour of descriptive commenting would allow evaluation of the role of this behaviour, particularly in functional relation to attentional and responding capacities of children.

To enable carers to evaluate the usefulness of the various strategies described, a method based on Bandura's (1977) modelling theory, and utilised by parent-training groups, would be of optimum value. This method consists of viewing video-taped interaction scenarios with carers, followed by discussion of interactions and issues that emerge.

Research has shown that therapist - led group discussion based on videotape modelling is superior to therapist - led group discussion without videotapes, as well as to videotape alone (Webster-Stratton and Herbert, 1994). The videos are used collaboratively, enabling carers to be actively involved in sharing ideas and impressions of interactions portrayed on videotape. This method, primarily used in parent - training groups for carers with conduct - disordered children, can be utilised in work with carers of children with learning and sensory impairments. The opportunity for carers themselves to debate the usefulness and applicability of strategies contained within scaffolding procedures, as described in this study, is of clinical value and significance.

The author's professional and personal experiences, which include involvement in parent-skills groups and own child care, allowed some confidence in the identification and description of the characteristics and use of strategies in carers' behaviours, whilst recognising the possibility of subjective bias, as discussed in section 6.4.6.

The micro-analysis of a wide and simultaneously occurring array of communicative interactions was both fascinating and daunting in the complexity and exhaustive detail of the task.

It was a salutary and rewarding experience to witness the energy, patience and imagination of the carers, particularly with those of the children whose levels of sensory impairment created the necessity for great sensitivity and creativity on the part of the carers. This experience highlights the need for a reciprocal sensitivity on the part of the researcher in conducting research in this field and also in interpretation and presentation of findings, particularly if conducted with the aim of instruction.

APPENDIX A

SAMPLE INFORMATION LETTER

Dear....

This information is given to describe the study in which you are invited to participate.

The study is designed to give detailed information about how young children with Down's Syndrome play, and about social behaviour during play with their parent/carer.

The study involves recording each child for a three minute period playing with a toy, with their parent or carer.

This procedure is repeated with four other different toys (supplied by the researcher), involving a recording time of a minimum of fifteen minutes.

The recording by video-camera is necessary for detailed observation, and all material will be used only for the purpose of this study, and treated in confidence. It will be conducted in the familiarity of the child's normal daytime surroundings.

Similar studies have been conducted with children with other learning disabilities. These studies allow us to understand and help children's development through play.

Every effort will be made to ensure that the procedure is unobtrusive and pleasurable for the parent/carer and child.

You are assured that you may decline to participate without giving reasons or incurring displeasure or penalty, and likewise are free to withdraw from the study at any time.

As Annie will have indicated to you, I will be in contact with you to give you further information and invite your participation. Thank you for taking the time to read this.

yours sincerely,

Jan Payne

Trainee Clinical Psychologist,

Clinical Teaching Unit,

Rowe St,

Plymouth University

SAMPLE CONSENT FORM

Study Title: A study comparing carer's interactions during play with children with children with Down's Syndrome, children with Cerebral Palsy and children without learning disability.

Please cross out as necessary:

Have you had an opportunity to ask questions and discuss this study? Yes / No

Have you received satisfactory answers to all your questions? Yes / No

Have you received enough information about the study? Yes / No

Who have you spoken to?

Do you understand that you are free to withdraw from the study:

* At any time

* Without having to give a reason for withdrawing

* And without affecting your future medical care

Yes / No

Do you agree to take part in this study? Yes / No

Signed _____ Date _____

(Name in block letters) _____

Signed (Researcher) _____ Date _____

APPENDIX B

CODED CARER AND CHILD BEHAVIOURS

Carer (M)

Verbal behaviours

V -- descriptive comment on activity / toy - includes repeating words, saying 'Oh' etc.

Q -- inquiry as to whether child wants to do some activity; or question about what the child is doing; or question about the toy.

D -- directive to do some activity (e.g.: come, show, give, put).

R -- reply to query/comment from child.

Non-verbal behaviours

A -- attention-directing gestures (e.g.: pointing, tapping, touching).

S -- demonstrate (e.g.: illustrating the use of a toy or part of a toy).

P -- physically orientate (e.g.: physically directing the child's attention by repositioning the child's body or manipulating the child's hand)

Child (C)

Verbal Behaviours

Q -- question about toy or request for help.

V -- descriptive comment about activity/ toy (includes making sounds).

R -- reply to query/comment from mother.

Non-verbal Behaviours

X --attending (not manually exploring) to toy, activity or mother.

O -- not attending to toy, activity or mother

E -- exploration.(e.g.: detailed visual and manual active exploration of toy or appropriate play with toy).

SAMPLE DATA RECORDING SHEET

SESSION

	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
M															
C															

	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
M															
C															

	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
M															
C															

	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
M															
C															

	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
M															
C															

	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
M															
C															

APPENDIX C

MATERIALS (TOYS)

1. Locomotion Loco (Tomy 1993). A toy train which can be pulled along. One carriage has a turning carousel, one a revolving mirror and one a removable teddy. The funnel has a button that can be pressed to cause a squeak.
2. Alphabet Desk (V-Tech 1993). An electronic talking toy with letters, shapes, numbers, notes and pictures. It asks the child questions. As the child presses the letters, shapes and numbers the toy gives auditory responses e.g. 'this is the letter a', or plays music.
3. Animal Farm Puzzle (Tomy 1993). A puzzle, with colours, shapes and animal pieces. Animal sounds are produced when the buttons are pressed.
4. Mix n' Match Ark (Tomy 1993). A mechanical pop-up toy, which uses words and pictures. It has buttons which cause pictures and words to rotate. If two pictures are the same a button can be pressed which causes another picture to pop up.
5. Small Talk (V-Tech 1993). an electronic talking telephone with a receiver, numbers, pictures, shapes and a keyboard. Pressing buttons gives auditory responses such as music, animal sounds and speech.

APPENDIX D

Analysis of Variance for frequencies of verbal and non-verbal behaviours between the groups.

Child replies (RE) TD vs CP

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
RE	0.231	0.330	0.231	0.004	58.1	0.000

Child replies (RE) DS vs TD

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
RE	0.240	0.328	0.240	0.004	64.5	0.000

Carers questions (Q) DS vs TD

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
Q	0.363	0.932	0.363	0.011	34.3	0.000

Carers questions (Q) CP vs TD

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
Q	0.324	0.931	0.324	0.011	28.9	0.000

Carers attention-directing (A) and showing (S) DS vs TD

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
A	0.066	1.94	0.066	0.022	3.01	0.086 n.s.
S	0.056	2.81	0.056	0.032	1.74	0.190 n.s.

Carers attention-directing (A) and showing (S) TD vs CP

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
A	0.039	2.51	0.039	0.030	1.28	0.261 n.s.
S	0.773	3.18	0.773	0.038	20.2	0.000

Carers attention-directing (A) and showing (S) DS vs CP

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
A	0.003	1.96	0.003	0.024	0.120	0.730 n.s.
S	0.422	2.85	0.422	0.034	12.3	0.001

Carers directives (D) TD vs CP

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
D	0.060	1.14	0.060	0.014	4.40	0.039

Carers directives (D) DS vs TD

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F
D	0.004	1.30	0.004	0.15	0.257	0.614 n.s.

Carers physically-orientating (P) DS vs TD

Source of Variation	SS	DF	MS	F	Sig. of F
Within + Residual	1.50	88	0.02		
Group	0.15	1	0.15	8.78	0.004
(Model)	0.15	1	0.15	8.78	0.004
(Total)	1.65	89	0.02		

Carers physically-orientating (P) CP vs TD

Source of Variation	SS	DF	MS	F	Sig. of F
Within + Residual	4.12	83	0.05		
Group	4.85	1	4.85	97.72	0.000
(Model)	4.85	1	4.85	97.72	0.000
(Total)	8.97	84	0.11		

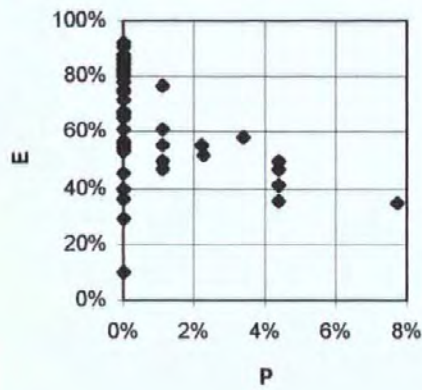
Carers physically-orientating (P) DS vs CP

Source of Variation	SS	DF	MS	F	Sig. of F
Within + Residual	5.60	83	0.07		
Group	3.34	1	3.34	49.49	0.000
(Model)	3.34	1	3.34	49.49	0.000
(Total)	8.93	84	0.11		

APPENDIX E

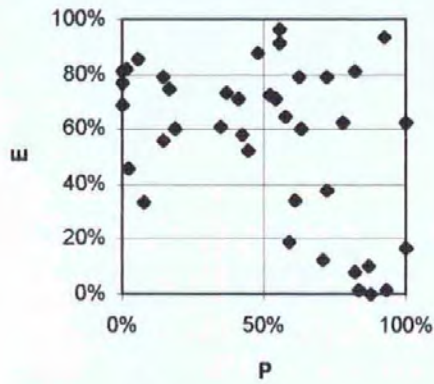
SCATTERGRAMS

P vs E for TD group



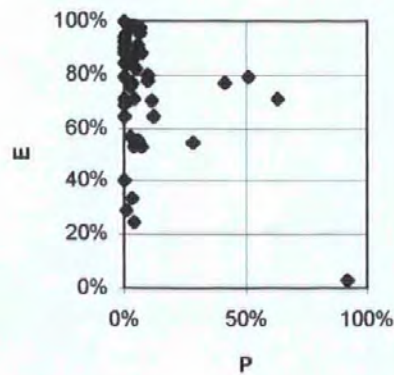
(1) Scattergram of the relationship between positioning by carers and exploratory behaviour by typically developing children

P vs E for CP



(2) Scattergram of the relationship between positioning by carers and exploratory behaviour by children with Cerebral Palsy

P vs E for DS



(3) Scattergram of the relationship between positioning by carers and exploratory behaviour by children with Down syndrome

APPENDIX F

FUNCTIONAL ANALYSES OF BEHAVIOURS

5.3.2. train toy session - Cerebral Palsy group –Martin and carer

<u>Antecedents</u>	<u>Carer behaviour</u>	<u>Child behaviour</u>	<u>Consequences</u>
M.making complaining sounds, clutching toy	removes toy from his grasp, 'excuse me' & 'I know you don't like it'	continues to make complaining noise	M. attending to C.moving toy
M. complaining, attending	assembles toy in front of M, presses squeak.	quiet, attending	M. attending to toy
M. attending, waving hands	moving toy, asks 'what is it' & 'you do it'	attending to toy	attending to toy
M. attending to toy, waving hands	manipulates M's hands on toy, moves toy	playing briefly	brief play and attending
M. reaching to toy, waving hands	watches in silence	begins to complain	brief play, complaining
M. touching toy	verbal praise, touches toy	attending	brief play, attending
M. tapping hand near toy	removes hand, repositions on toy	complaining	complaining

5.3.3. train toy session - typically developing group --Bill and carer

<u>Antecedents</u>	<u>Carer behaviour</u>	<u>Child behaviour</u>	<u>Consequences</u>
C. points to toy	asks q.	B. touches toy	B. attending and playing
B. playing	says 'that's it', demonstrates play	attending to play activity	B. moves toy, plays
B. playing	asks q. about further activity	replies	B. playing
B. playing	comments, in questioning tone	replies	B. playing
B. playing	directs B. to further activity	playing	B. playing
B. playing	observes and demonstrates	playing	B. playing
B. playing	describes action 'twist and pull'	engages in this activity	B. & carer playing
B. playing	observes in silence	asks carer for help	gives toy to carer

5.3.4. alphabet toy session - Down syndrome group –Elaine and carer

<u>Antecedents</u>	<u>Carer behaviour</u>	<u>Child behaviour</u>	<u>Consequences</u>
E attending	describes toy	playing	E. playing
E playing	presses button & directs E to do same	attending	E. attending
E attending	repositions E & directs her	attending	E attending
E. attending	directs E 'tell me', pointing	replies	E. attending
E attending	repeats sound of toy & E's reply	picks toy up, walks away with it	C. asks her to bring it back
C gets toy	asks q. 'what's Mum got?'	returns, attends briefly	E. runs off
C. brings E. back, sits her on lap	points, asks q 'what's that?'	attends	E. attends
C. directs E. & repeats toy sound	asks q. about toy	briefly runs away	C asks q.s about toy
E. returns & attends	asks qs, repeats toy sounds	attends	E. and C. repeat sounds

5.3.5. alphabet toy session -Cerebral Palsy –Jane and carer

<u>Antecedents</u>	<u>Carer behaviour</u>	<u>Child behaviour</u>	<u>Consequences</u>
J. playing	verbal praise	playing	J. playing
J. playing	repeats toy sounds	playing	J. playing
J. playing	presses button, directs J to listen	playing & attending	J. playing
J. playing	repeats toy sound	playing	J. playing
J. playing	points, asks q.	playing	J. playing
J. playing	moves J's hand, repeats q.	attending	J. attending
J. attending	points at button 'this one'	playing	J. playing
J. playing	repeats toy sounds	playing	J. playing
J. playing	repeats toy sounds, points	follows C's direction in play	J. playing

5.3.6. alphabet toy session -typically developing group - Helen and carer

<u>Antecedents</u>	<u>Carer behaviour</u>	<u>Child behaviour</u>	<u>Consequences</u>
H. playing	asks q. about toy	replies	H. playing
H. playing	asks q. 'what letter top begins with?'	replies	H. playing
H. playing	repeats H's reply	playing	H. playing
H. playing	asks q & points & gives directive	follows C's directive in play	H. playing
H playing	repeats toy sounds, asks q. (x2)	attending	H. attending
H. playing	verbal praise & directive & points	follows C's directive in play	H. playing
H. playing	repeats toy sounds	playing	H. playing
H. playing	suggests further activity	replies	H. attends
H attending	suggests activity, asks q.	begins to reply	C . interrupts

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